Government of Kerala

Evaluation Study on Soil Conservation in Kerala 2014-15

DEPARTMENT OF ECONOMICS & STATISTICS
THIRUVANANTHAPURAM
2017

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 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 soil conservation schemes has been done by the Directorate of Economics and Statistics for all districts except Wayanad. This report relates to the survey results of 39Schemes completed by the Soil Conservation Department and various other agencies. The field survey was conducted during the agricultural year 2014-15 by the Statistical Investigators under the supervision of the Research Officer and Deputy Director in the District Offices. 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, Agricultural Geologists and others interested in the subject. The efforts taken by the staffs of this section is appreciated.

I acknowledge my thanks to the staff of Soil Conservation Department and other local bodies for their valuable suggestion and whole hearted co-operation for the successful conduct of the survey in the state.

Sd/-

V. RAMACHANDRAN
DIRECTOR GENERAL

Thiruvananthapuram
24/08/2017

OFFICERS OF EVALUATION DIVISION

Director (SDP)	Smt. E. BABY
Additional Director	Smt.SHEELA.P.SANKAR
Deputy Director	Smt. SOBHANA PILLAI.L
Research Assistant	Sri.ANILKUMAR.R
Statistical Assistants Grade I	Smt. S. MINIMOL
Statistical Assistants Grade I	Smt. K.K. GRACY
Statistical Assistants Grade I	Smt.SAMEERA.V.R

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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.

1.2 Objectives and Methodology

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 executed five years prior to the survey i.e. during 2009-10 in the State by the Soil ConservationDepartmentLocal Self Government Department and other Government agencies were selected. The study covered all the districts of the State except Wayanad. The list of beneficiaries under each scheme is collected from the Soil Conservation Department, Local Self Government Department and other Government agencies. The beneficiaries are selected by stratified random sampling method on the basis of the area of the holding. The holdings are stratified into four stratums.

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 from the list of beneficiaries collected from Soil Conservation Department, local bodies and other Government agencies.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. 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. Name of all selected schemes from all districts except Wayanaddistrict are given in 1.3.

1.3 - District Wise Name of Selected schemes

Sl No.	DISTRICT NAME	SCHEME NUMBER	Name of Selected Schemes
1	THIRUVANANTHAPUAM	1	KeezhammagamPadasekharam
		2	MalayilkadaPangottuvilaScheme
		3	Parachel Scheme
		4	VettormunikunuColony
		5	Naduvathala Bund Check Dam
2	KOLLAM	1	Kurakkode Watershed
3	PATHANAMTHITTA	1	AruvikuzhiWatershed
		2	VettorWatershed
4	ALAPPUZHA	1	NanekkadBundNirmanaPadhathi
		2	AllumParambuThoduNirthadaVikhasanam
		3	AnjuttamPadamNirchalVikhasanam
		4	NaluppadamBundSamrakshanam
5	KOTTAYAM	1	VallakkadavuWatershed

6	IDUKKI	1	MeleChinarWatershedScheme (RIDF)
		2	PayithottiWatershedScheme (RIDF)
		3	ChattikuzhiWatershedScheme (RIDF)
7	ERNAKULAM	1	KadavoormuriWatershed
		2	KuzhumberiThoduWatershed
		3	PanankaraThoduWatershed
		4	ManiyanthramNirampuzhaWatershed
		5	KozhipilliValiyachiraSamrakshnaPadhathi
8	THRISSUR	1	Chemeenchal
9	PALAKKAD	1	MachanthoduWatershed (RIDF)
		2	PulliyamThodu Watershed (RIDF)
		3	MaruthancheriWatershed (WGDP)
		4	KalliyadWatershed (WGDP)
		5	OomanadiNirthadaPadhathi (WGDP)
10	MALAPPURAM	1	KodithuthimalaWatershed
11	KOZHIKODE	1	MoonamannilWatershed
12	KANNUR	1	KalankiWatershed
		2	EzharakunduThoduWatershed
		3	MuringodiWatershed
		4	KorambakunduThodu
		5	Eyyabharani
13	KASARGOD	1	KundaramWatershed (RIDF)
		2	NeelipuzhachalWatershed (RIDF)
		3	Maranad Watershed (RIDF)
		4	Plathadam Watershed (RIDF)
		5	Kariyottuchal Watershed (RIDF)
	Total	**39**	

The District wise selection details of beneficiary plots and control plots are given in the table 1and 1(a).

Table - 1

Statement Showing Stratum Wise Distribution of Selected Beneficiaries

(Area in Acres)

Sl No	Districts	No of Schemes selected	Stratum -1		Stratum-11		Stratum-111		Stratum 1V		Total	
			No	Area in Acres	No	Area in Acres	No	Area in Acres	No	Area in Acres	No	Area in Acres
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
1	Thiruvananthapuram	5	121	20.82	4	7.67	0	0	0	0	125	28.49
2	Kollam	1	100	37.62	25	35.82	0	0	0	0	125	73.44
3	Pathanamthitta	2	116	39.17	9	11.36	0	0	0	0	125	50.53
4	Alappuzha	4	63	32.45	37	65.17	23	87.34	2	12.68	125	197.64
5	Kottayam	1	31	18.36	69	124.74	22	89.38	3	15.39	125	247.87
6	Idukki	3	30	22.12	95	160.90	0	0	0	0	125	183.02
7	Ernakulam	5	41	25.13	81	130.41	3	10.00	0	0	125	165.54
8	Thrissur	1	106	33.35	18	27.17	1	3.26	0	0	125	63.78
9	Palakkad	5	58	34.87	63	105.51	3	10.05	1	5.00	125	155.43
10	Malappuram	1	27	12.89	54	103.49	1	3.61	0	0	82	119.99
11	Kozhikkode	1	117	35.67	7	8.15	1	4.42	0	0	125	48.24
12	Kannur	5	36	20.76	89	125.58	0	0	0	0	125	146.34
13	Kasargode	5	48	24.64	57	86.18	12	45.48	7	173.50	124	329.8
Total		39	894	357.85	608	992.15	66	253.54	13	206.57	1581	1810.11

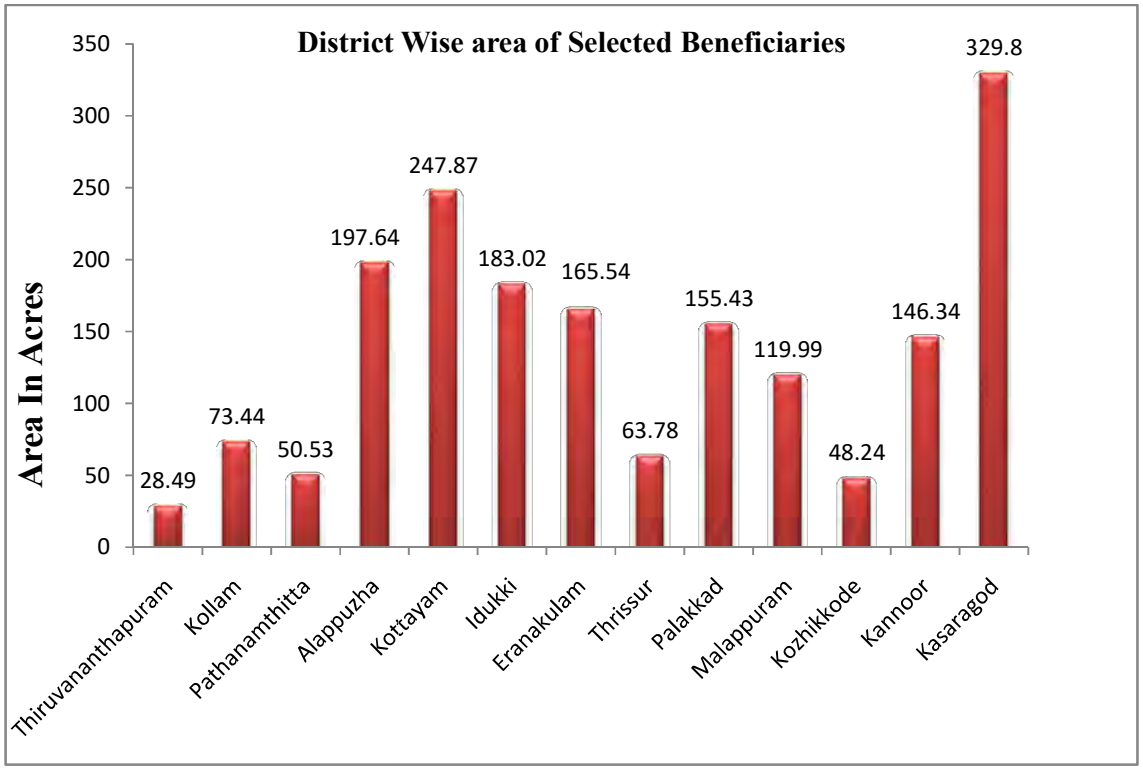
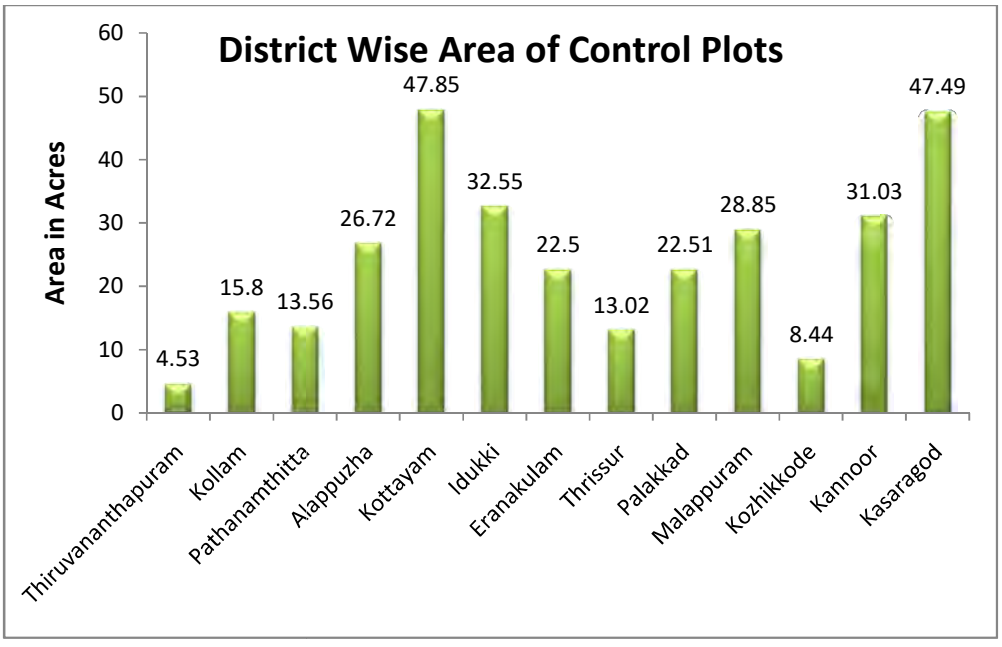


TABLE 1(a)

Statement Showing Stratum Wise Distribution of Control Plots (Area in Acres)

Sl No	Districts	No of Schemes selected	Stratum -1		Stratum-11		Stratum-111		Stratum 1V		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	4.53	0	0	0	0	0	0	25	4.53
2	Kollam	1	20	10.28	5	5.52	0	0	0	0	25	15.8
3	Pathanamthitta	2	22	10.19	3	3.37	0	0	0	0	25	13.56
4	Alappuzha	4	15	7.41	9	15.93	1	3.38	0	0	25	26.72
5	Kottayam	1	6	4.09	18	31.31	0	0	1	12.45	25	47.85
6	Idukki	3	8	5.35	17	27.20	0	0	0	0	25	32.55
7	Ernakulam	5	10	4.50	15	18.00	0	0	0	0	25	22.5
8	Thrissur	1	21	5.77	3	4.15	1	3.10	0	0	25	13.02
9	Palakkad	5	15	8.11	10	14.40	0	0	0	0	25	22.51
10	Malappuram	1	5	3.32	14	22.28	1	3.25	0	0	20	28.85
11	Kozhikkode	1	22	5.27	3	3.17	0	0	0	0	25	8.44
12	Kannur	5	5	2.72	20	28.31	0	0	0	0	25	31.03
13	Kasaragod	5	10	4.36	12	17.13	1	4.00	2	22.00	25	47.49
Total		39	184	75.9	129	190.77	4	13.73	3	34.45	320	314.85



The total number of beneficiaries selected are1581. About 56.55% of the beneficiaries are having holding less than one acre, 38.46% are having holdings one acre or more but less than 3 acres,4.17% are having holding 3 acre or more but less

than 5 acres and only 0.82% 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 57.5%, 40.31%, 1.25% and 0.94% 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

1.4.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 lead to many indirect damages, such as increasing extent of wasteland, soil erosion, land sliding, etc. all these cumulatively or independently affected agricultural area or reduce 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 5cm to 10 cm of the top soil (ranging from 0.05m to 0.1 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 gifts 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 Km 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 is more prone to erosion. The different forms of soil erosion cause huge damage to Kerala's economy every year and reported casualties every year due to landslides in monsoon season.

1.5 Methods of Soil Conservation Programme

Soil Conservation practices are mainly grouped into two categories viz. Agronomical and Engineering measures. Agronomic measures are comparatively less costly such as contour ploughing / optimal fertilizing, organic farming, etc. Engineering measures include contour bunding, land levelling, 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.

1.6 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 leaves 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, soil conservation programme was executed by Department of Agriculture/Soil and Water conservation. Due to soil and water conservation works there was an increased employment among rural people which improved income of people and reduced migration of labour. Soil and water conservation structures in arable and non arable lands reduces soil erosion, soil loss, run-off water, etc. and increased rainwater infiltration, surface storage, cropping intensity, productivity of crops, etc. As long as works were carried out based on funding by Government and subsides provided for supporting income generating enterprises, there was positive impact.

After 1994, 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;

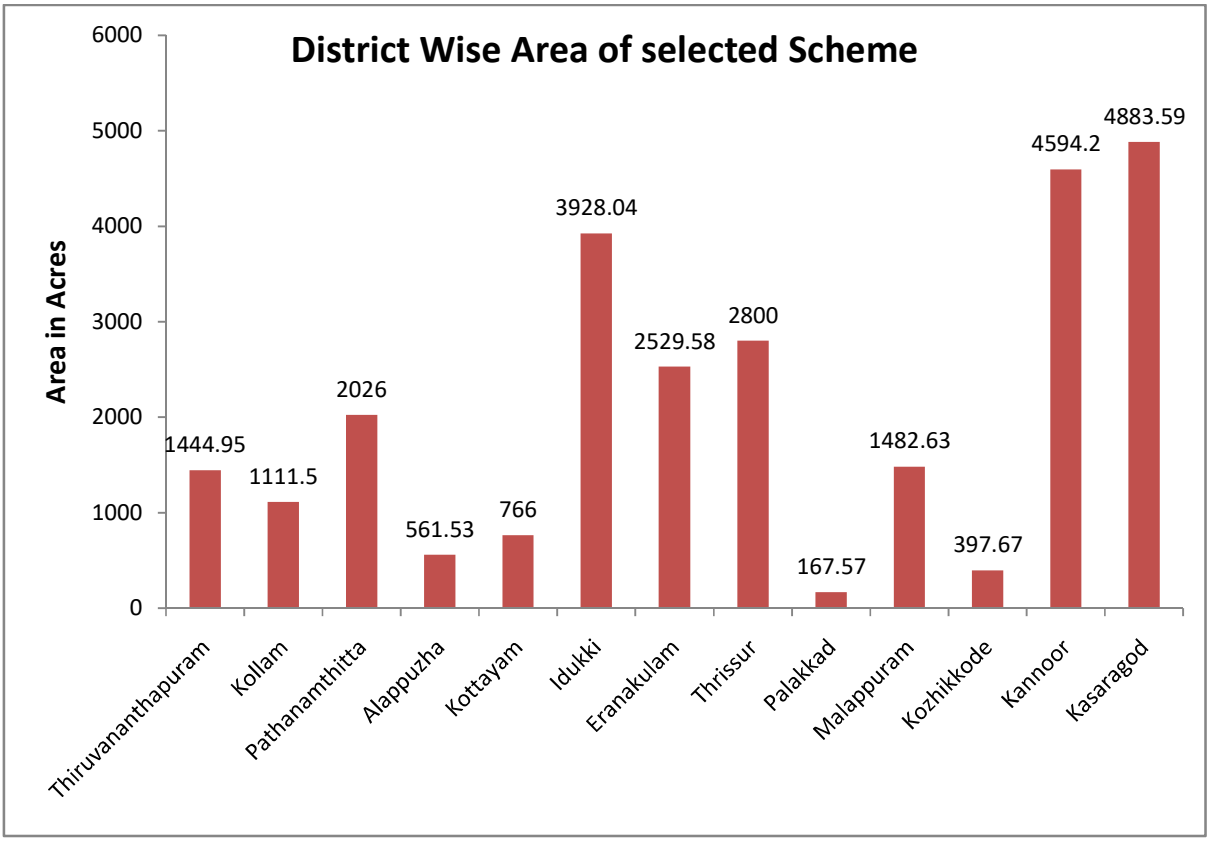
Soil can be well maintained through bunding (mechanical and mechanical-cum-vegetative barriers), deep ploughing, levelling, smoothening, etc. Bunding was accepted by farmers to strengthen existing bunds without any obstruction in their plot Moisture conservation on measures increased yield magically.

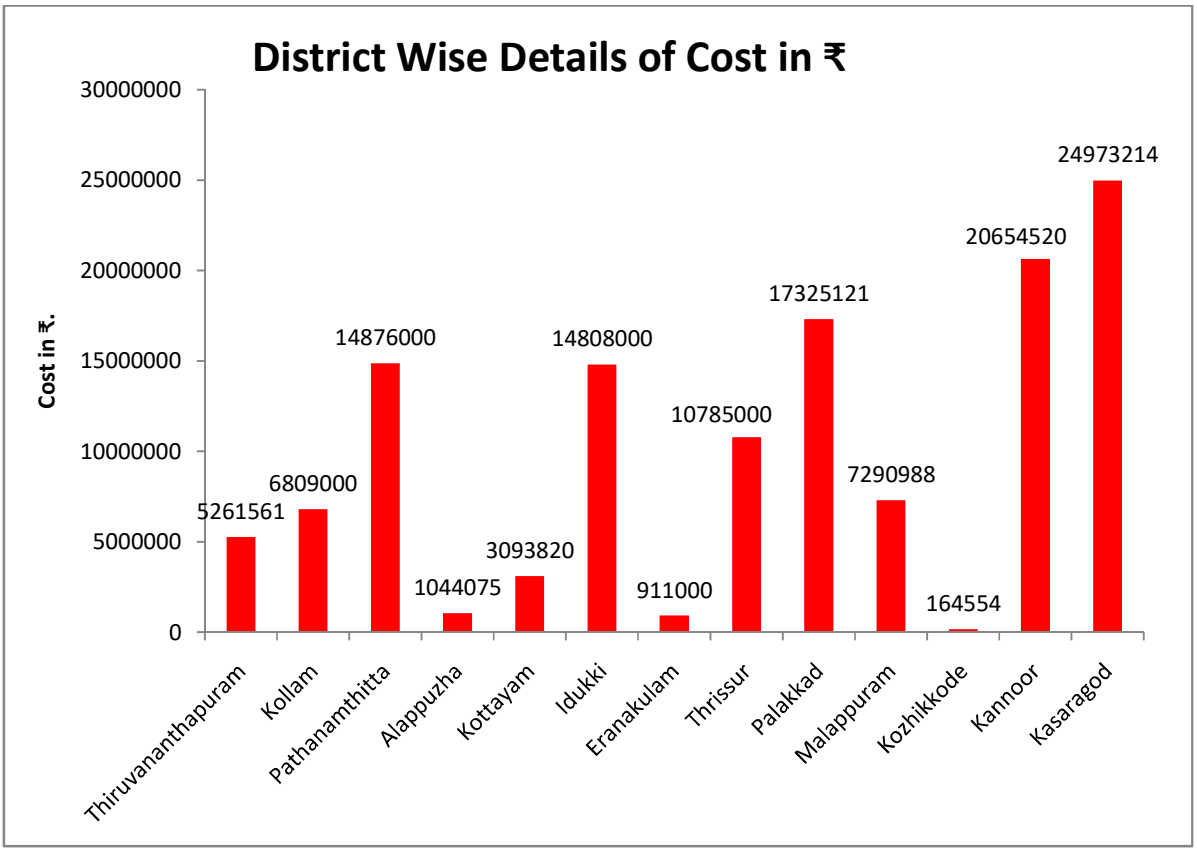
Farmers in different parts reported the fact that the sustainability of agriculture is only possible by soil and water conservation measures. They also reported that soil erosion can be minimized and irrigation potentials can be improved through soil and water conservation measures. In addition, vegetation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

Table 2 gives number of beneficiaries selected in each district and cost of the selected schemes. Also gives total area covered under the schemes in each district. In the year 2014-15, 39 schemes were selected from 13 districts.

Table – 2
District wise Details of Area, Cost and Number of Beneficiaries of all schemes selected

SL No	District	Area (Acres)	Cost (₹)	Number of beneficiaries	
				Total	Selected
1	*2*	*3*	*4*	*5*	*6*
1	Thiruvananthapuram	1444.95	5261561	925	125
2	Kollam	1111.5	6809000	406	125
3	Pathanamthitta	2026	14876000	398	125
4	Alappuzha	561.53	1044075	340	125
5	Kottayam	766	3093820	153	125
6	Idukki	3928.04	14808000	2038	125
7	Ernakulum	2529.58	911000	125	125
8	Thrissur	2800	10785000	125	125
9	Palakkad	167.57	17325121	833	125
10	Malappuram	1482.63	7290988	82	82
11	Kozhikkode	397.67	164554	303	125
12	Kannur	4594.20	20654520	1217	125
13	Kasaragod	4883.59	24973214	1298	124
Total		**26693.26**	**127996853**	**8243**	**1581**





Land Use particulars of Beneficiary plots

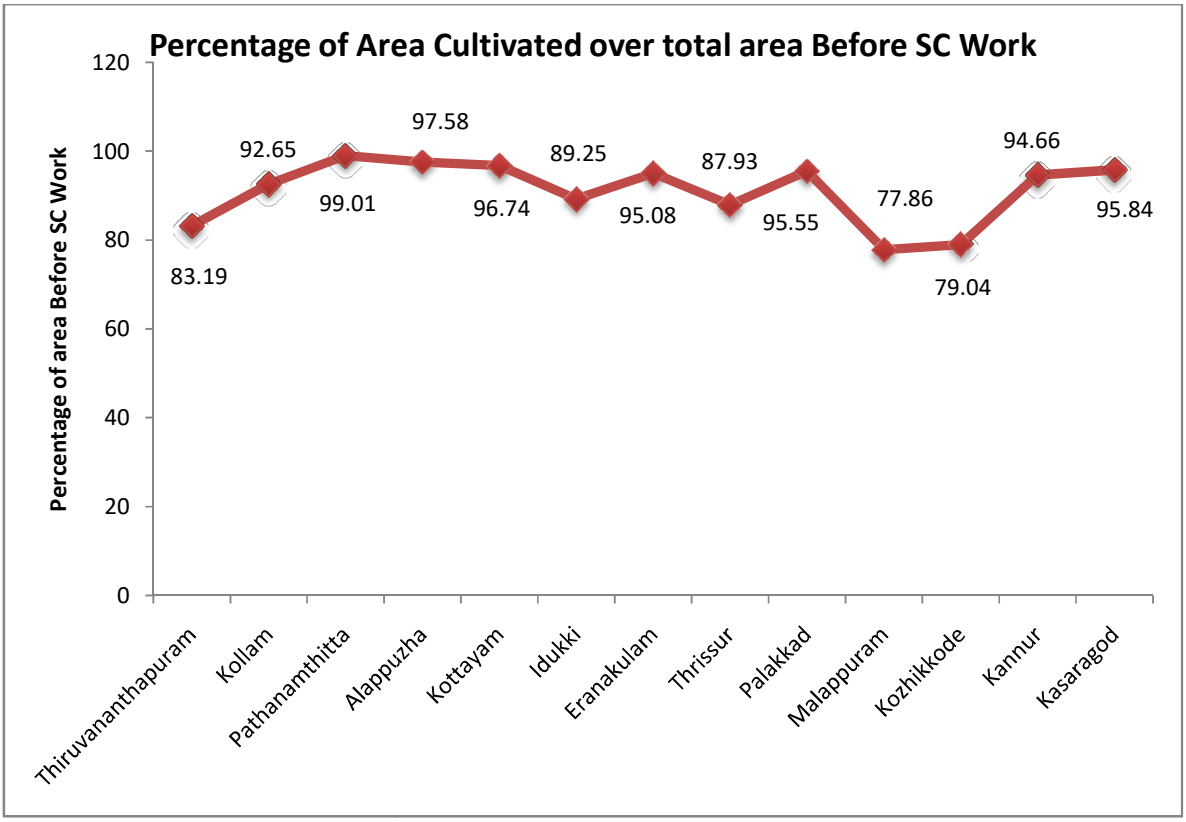
Table Ns. 3 and 3(a) reveals the land use particulars of beneficiary plots and control plots respectively. It gives us certain positive trends while comparing with the area before and after soil conservation programme. Area increased from 1685.91 acres to 1719.07 acres after the implementation of soil conservation programme. An additional area of 33.16 acre of land has brought under cultivation which was not cultivated earlier. Hence it can be stated that 1.97% 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 93.14% to 94.97% by decreasing the current fallow from 3.04% to 1.25%.

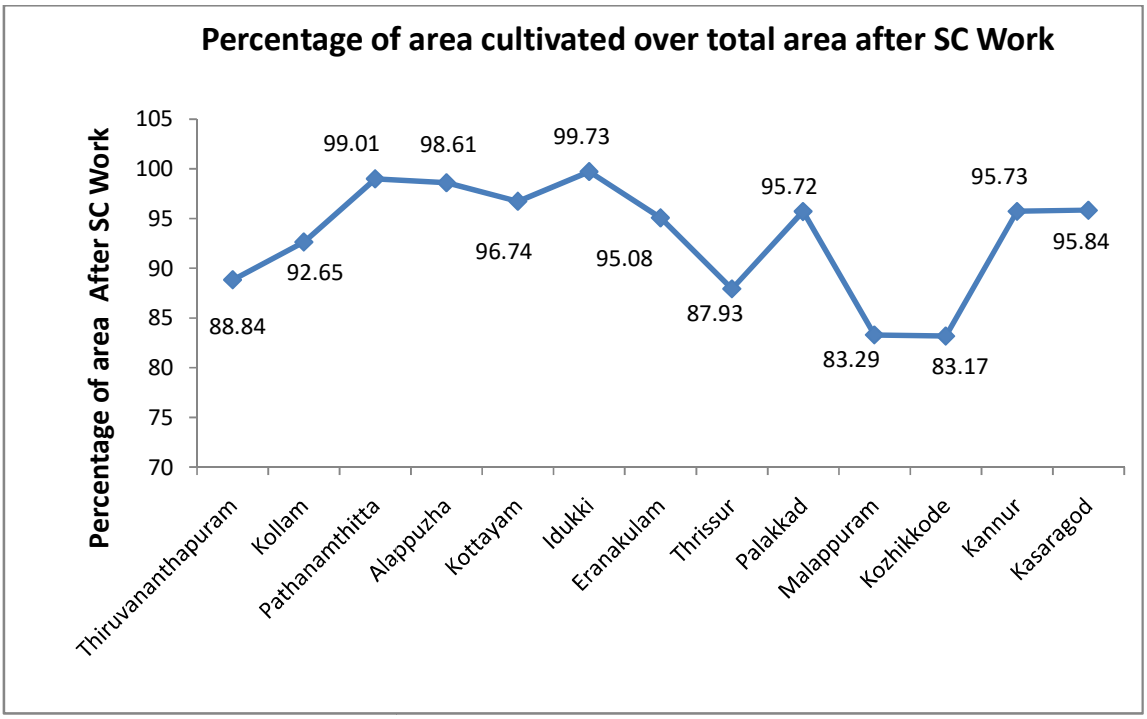
On examining the district wise data, a marginal increase is noted in the area additionally brought under cultivation in Idukki, Malappuram, Alappuzha, Kozhikode, Thiruvananthapuram and Kannur.

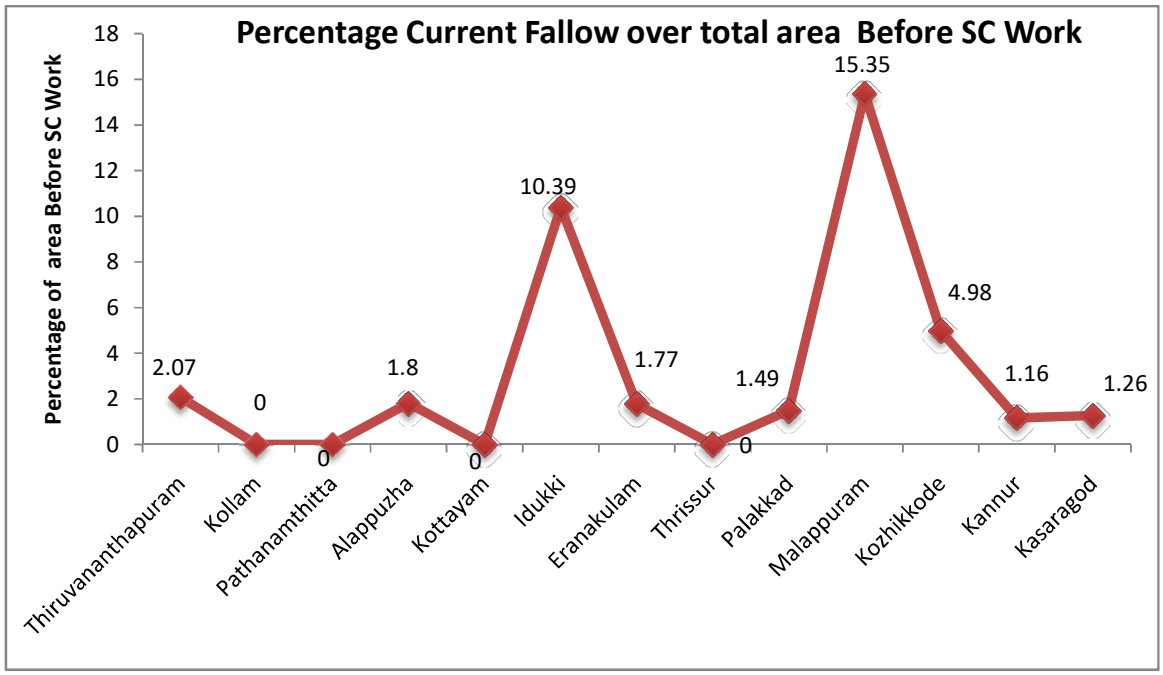
Table 3 - Land Use Particulars of Beneficiary Plots

(Area in Acres)

Sl No	District	Area Cultivated				Current Fallow				Other Use				Area not Cultivated				**Total**	
		Before SC Work		After SC Work		Before SC Work		After SCWork		Before SC Work		After SC Work		Before SCWork		After SC Work		**Before SCWork**	**After SCWork**
		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**	**21**
1	Thiruvananthapuram	23.7	83.19	25.31	88.84	0.59	2.07	0	0	3.17	11.13	3.16	11.09	1.03	3.62	0.02	0.07	28.49	28.49
2	Kollam	68.04	92.65	68.04	92.65	0	0	0	0	4.95	6.74	4.95	6.74	0.45	0.61	0.45	0.61	73.44	73.44
3	Pathanamthitta	50.03	99.01	50.03	99.01	0	0	0	0	0.5	0.99	0.5	0.99	0	0	0	0	50.53	50.53
4	Alappuzha	192.86	97.58	194.9	98.61	3.56	1.8	1.18	0.6	1.22	0.62	1.56	0.79	0	0	0	0	197.64	197.64
5	Kottayam	239.79	96.74	239.79	96.74	0	0	0	0	8.08	3.26	8.08	3.26	0	0	0	0	247.87	247.87
6	Idukki	163.35	89.25	182.52	99.73	19.02	10.4	0.4	0.22	0.3	0.16	0	0	0.35	0.19	0.1	0.05	183.02	183.02
7	Ernakulam	157.39	95.08	157.39	95.08	2.93	1.77	2.93	1.77	4.72	2.85	4.72	2.85	0.5	0.3	0.5	0.3	165.54	165.54
8	Thrissur	56.08	87.93	56.08	87.93	0	0	0	0	7.7	12.07	7.7	12.07	0	0	0	0	63.78	63.78
9	Palakkad	148.51	95.55	148.77	95.72	2.31	1.49	2	1.29	4.51	2.9	4.51	2.9	0.1	0.06	0.15	0.1	155.43	155.43
10	Malappuram	93.42	77.86	99.94	83.29	18.42	15.4	11.85	9.88	3.99	3.33	4.04	3.37	4.16	3.47	4.16	3.47	119.99	119.99
11	Kozhikkode	38.13	79.04	40.12	83.17	2.4	4.98	0	0	7.71	15.98	8.12	16.83	0	0	0	0	48.24	48.24
12	Kannur	138.52	94.66	140.09	95.73	1.7	1.16	0.2	0.14	4	2.73	3.93	2.69	2.12	1.45	2.12	1.45	146.34	146.34
13	Kasaragod	316.09	95.84	316.09	95.84	4.15	1.26	4.15	1.26	7.9	2.4	7.9	2.4	1.66	0.5	1.66	0.5	329.8	329.8
	Total	**1685.91**	**93.14**	**1719.07**	**95**	**55.08**	**3.04**	**22.71**	**1.25**	**58.75**	**3.25**	**59.17**	**3.27**	**10.37**	**0.57**	**9.16**	**0.51**	**1810.1**	**1810.1**


Percentage of Area Cultivated over total area Before SC Work
Percentage of area Before SC Work
120
100
80
60
40
20
0
83.19
92.65
99.01
97.58
96.74
89.25
95.08
87.93
95.55
77.86
79.04
94.66
95.84
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannur
Kasaragod


Percentage of area cultivated over total area after SC Work
Percentage of area After SC Work
105
100
95
90
85
80
75
70
88.84
92.65
99.01
98.61
96.74
99.73
95.08
87.93
95.72
83.29
83.17
95.73
95.84
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannur
Kasaragod


Percentage Current Fallow over total area Before SC Work
Percentage of area Before SC Work
18
16
14
12
10
8
6
4
2
0
2.07
0
0
1.8
0
10.39
1.77
0
1.49
15.35
4.98
1.16
1.26
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannur
Kasaragod

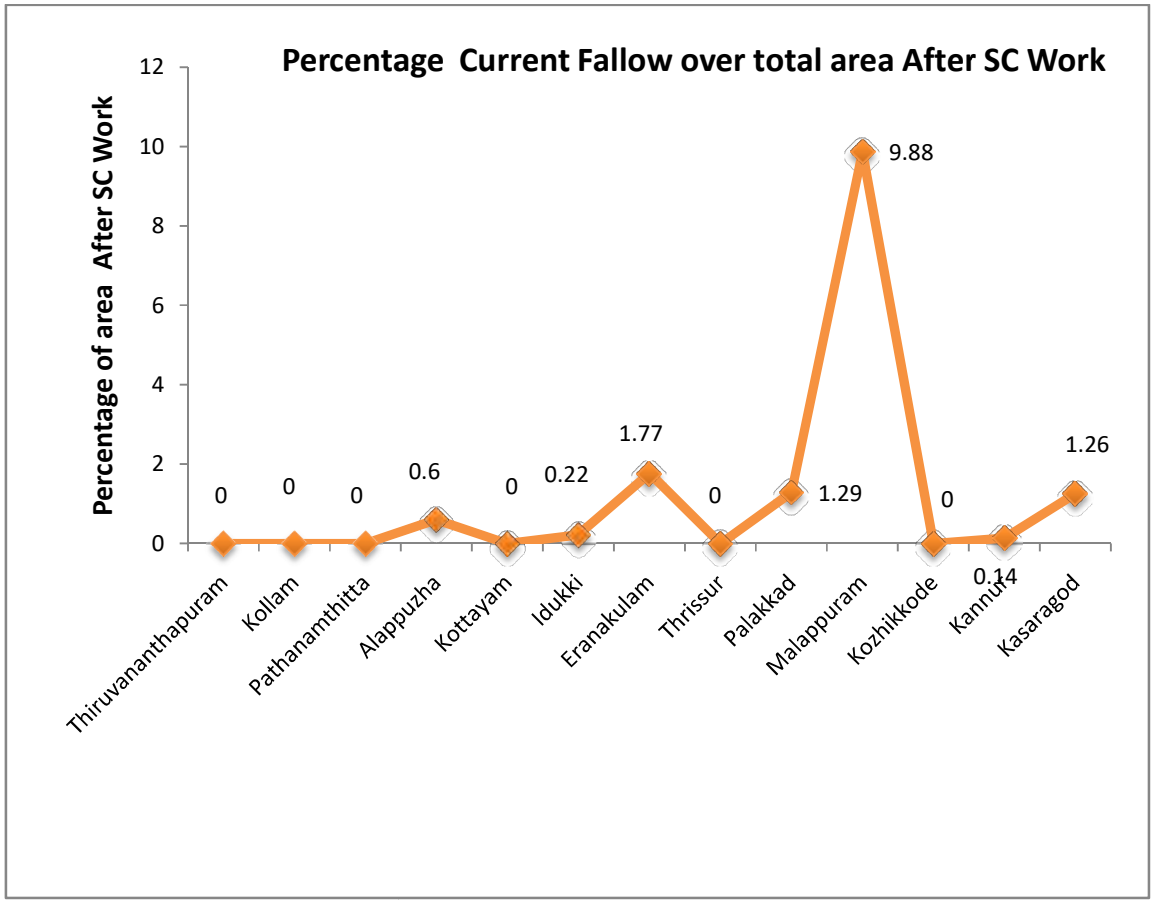
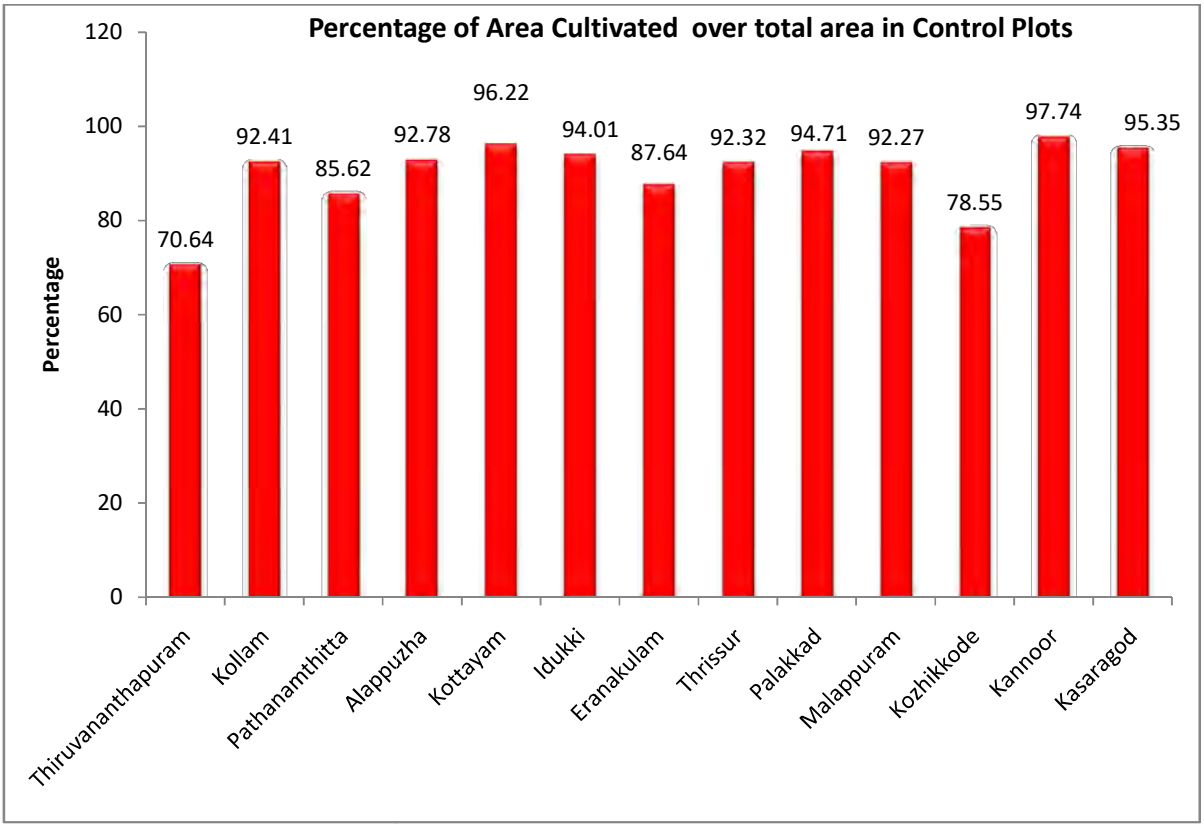
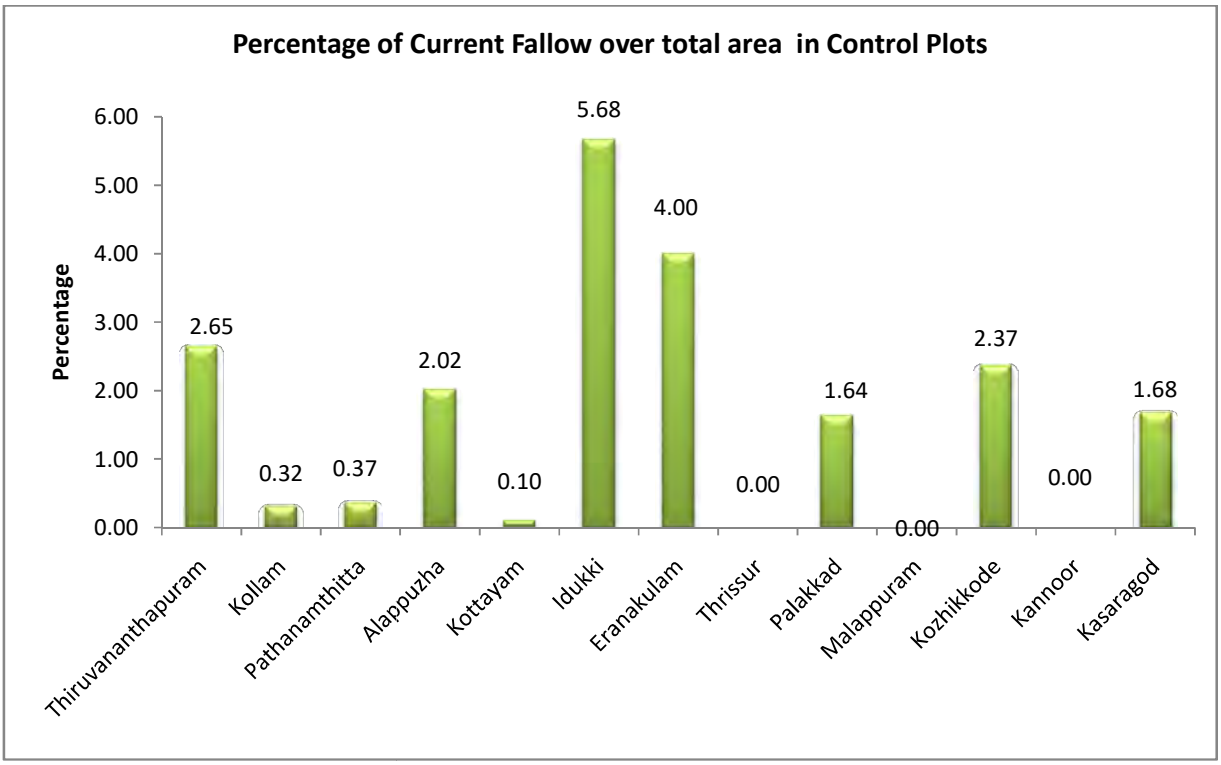

Percentage Current Fallow over total area After SC Work
Percentage of area After SC Work
12
10
8
6
4
2
0
0
0
0
0.6
0
0.22
1.77
0
1.29
9.88
0
0.14
1.26
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannur
Kasaragod

Table 3(A) - Land Use Particulars (Control Plots)

Sl. No.	District Name	Area Cultivated		Current Fallow		Other Use		Area Not Cultivated		Total
		Area	% over total area	Area	%	Area	%	Area	%	Area
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1	Thiruvananthapuram	3.2	70.64	0.12	2.65	0.70	15.45	0.51	11.26	4.53
2	Kollam	14.6	92.41	0.05	0.32	1.15	7.28	0.00	0.00	15.80
3	Pathanamthitta	11.61	85.62	0.05	0.37	1.90	14.01	0.00	0.00	13.56
4	Alappuzha	24.79	92.78	0.54	2.02	1.01	3.78	0.38	1.42	26.72
5	Kottayam	46.04	96.22	0.05	0.10	1.76	3.68	0.00	0.00	47.85
6	Idukki	30.6	94.01	1.85	5.68	0.10	0.31	0.00	0.00	32.55
7	Ernakulam	19.72	87.64	0.90	4.00	1.88	8.36	0.00	0.00	22.50
8	Thrissur	12.02	92.32	0.00	0.00	1.00	7.68	0.00	0.00	13.02
9	Palakkad	21.32	94.71	0.37	1.64	0.82	3.64	0.00	0.00	22.51
10	Malappuram	26.62	92.27	0.00	0.00	0.23	0.80	2.00	6.93	28.85
11	Kozhikkode	6.63	78.55	0.20	2.37	1.53	18.13	0.08	0.95	8.44
12	Kannur	30.33	97.74	0.00	0.00	0.65	2.09	0.05	0.16	31.03
13	Kasaragod	45.28	95.35	0.80	1.68	1.08	2.27	0.33	0.69	47.49
Total		**292.76**	**92.98**	**4.93**	**1.57**	**13.81**	**4.39**	**3.35**	**1.06**	**314.85**


Percentage of Area Cultivated over total area in Control Plots
Percentage
120
100
80
60
40
20
0
70.64
92.41
85.62
92.78
96.22
94.01
87.64
92.32
94.71
92.27
78.55
97.74
95.35
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod


Percentage of Current Fallow over total area in Control Plots
Percentage
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2.65
0.32
0.37
2.02
0.10
5.68
4.00
0.00
1.64
0.00
2.37
0.00
1.68
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod

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; multi-storeyedcropping, 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.

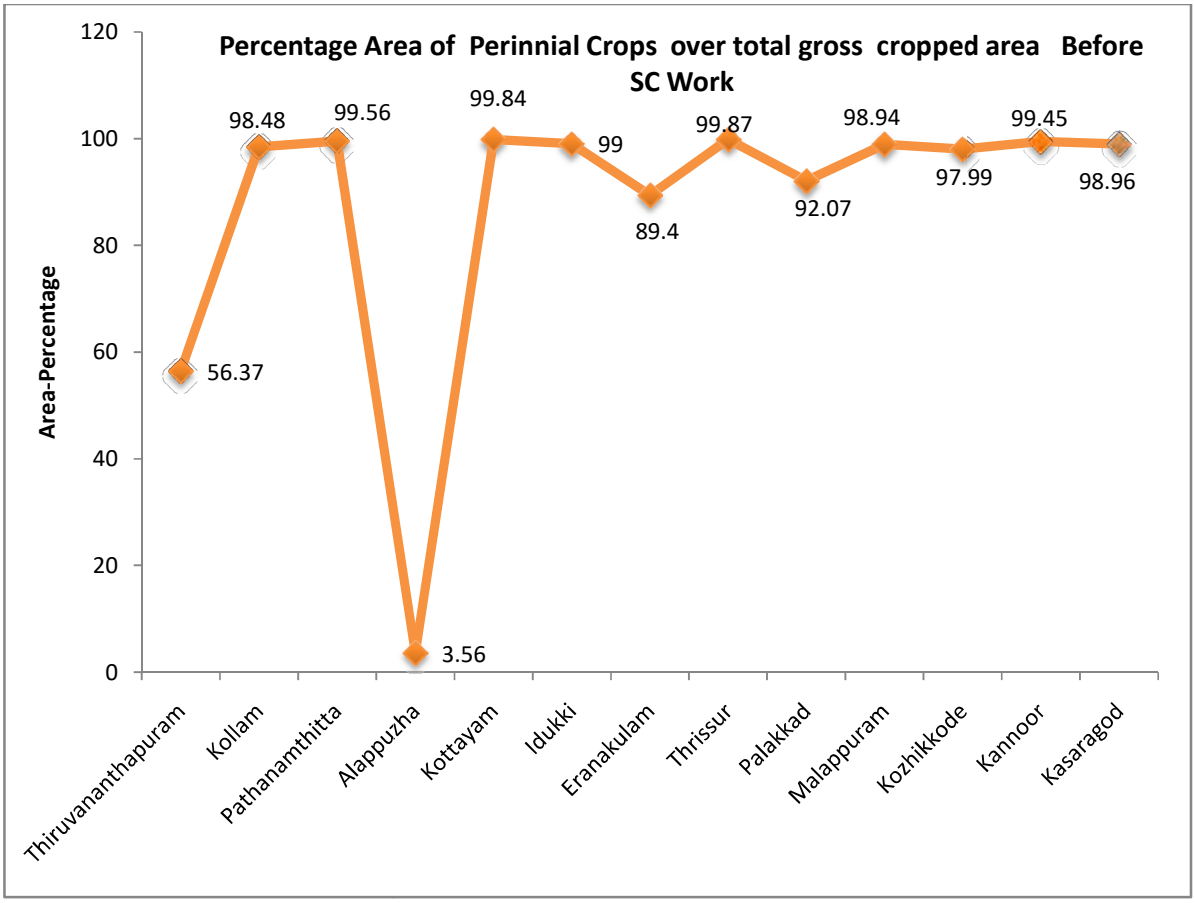
Consequent in the introduction of the soil conservation programmes significant changes in the cropping pattern occurred which favours perennial crops. In Table 4 the area under perennial crops has increased from 1403.7 acres to 1457.38 acres. It showed an increase of 3.82%. At the same time the percentage change occurred in the cultivation of seasonal crops recorded as 13.67 %. 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 Banana, Plantain, Vegetables, Colocasia and Tapiocaexhibited comparative increase. The respective percentage changes recorded as 339.01%, 16.32%, 12.2%, 7.4%,and 2.65% respectively.

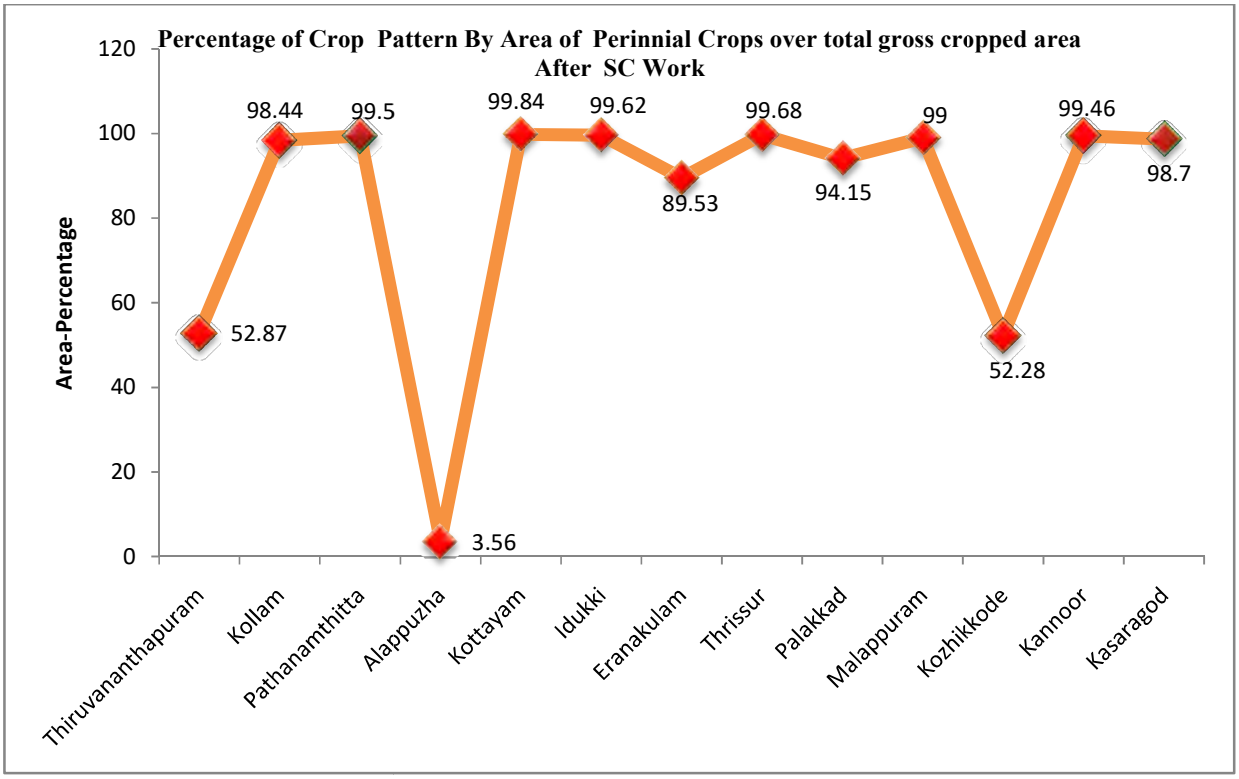
Table No. 5 reveals that after the introduction of soil conservation programmes, Rubber and Coconut have occupied the large area under perennial crops contains 883.85 acre and 304.75 acre respectively. The percentage increase ofCardamom comesan increase of 24.24%. The Area under Arecanut and Cashewhave decreased to 2.94% and 34.59% after the Soil Conservation Programme.

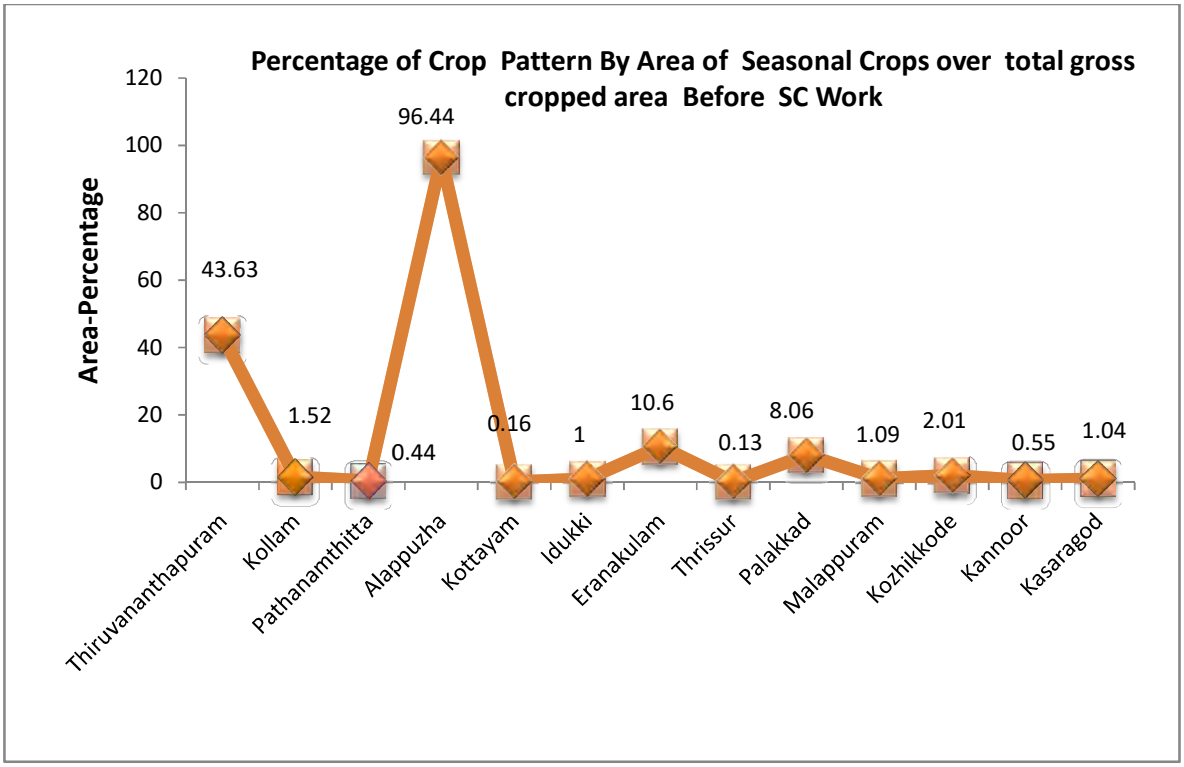
By analyzing the district wise data, it is noted that the cropping area under different crops are interchanged according to the suitability of land.

Table 4 – Crop Pattern (Area Wise)

		Perennial crops				Seasonal Crops				Total Gross area cropped			
Sl.No	District Name	Before SCwork	%	After SCwork	%	Before SCwork	%	After SC work	%	Before SCwork	%	After SCwork	%
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1	Thiruvananthapuram	15.70	56.37	16.10	52.87	12.15	43.63	14.35	47.13	27.85	100	30.45	100
2	Kollam	72.50	98.48	72.36	98.44	1.12	1.52	1.15	1.56	73.62	100	73.51	100
3	Pathanamthitta	53.81	99.56	53.76	99.50	0.24	0.44	0.27	0.50	54.05	100	54.03	100
4	Alappuzha	6.91	3.56	6.99	3.56	187.18	96.44	189.52	96.44	194.09	100	196.51	100
5	Kottayam	221.28	99.84	223.15	99.84	0.35	0.16	0.35	0.16	221.63	100	223.50	100
6	Idukki	200.91	99.00	208.00	99.62	2.02	1.00	0.80	0.38	202.93	100	208.80	100
7	Ernakulam	163.73	89.40	168.14	89.53	19.41	10.60	19.66	10.47	183.14	100	187.80	100
8	Thrissur	52.70	99.87	52.77	99.68	0.07	0.13	0.17	0.32	52.77	100	52.94	100
9	Palakkad	131.92	92.07	132.01	94.15	11.37	8.06	8.07	5.85	141.05	100	137.84	100
10	Malappuram	77.48	98.94	92.21	99.00	0.99	1.09	1.08	1.00	78.47	100	93.29	100
11	Kozhikkode	34.20	97.99	34.93	52.28	0.70	2.01	31.88	47.72	34.90	100	66.81	100
12	Kannur	125.55	99.45	128.10	99.46	0.70	0.55	0.70	0.54	126.25	100	128.80	100
13	Kasaragod	247.01	98.96	268.86	98.70	2.60	1.04	3.55	1.30	249.61	100	272.41	100
Total		**1403.70**	**85.46**	**1457.38**	**84.28**	**238.9**	**14.56**	**271.55**	**15.72**	**1640.12**	**100**	**1726.54**	**100**


Percentage Area of Perinnial Crops over total gross cropped area Before SC Work
Area-Percentage
120
100
80
60
40
20
0
98.48
99.56
99.84
99
89.4
99.87
92.07
98.94
97.99
99.45
98.96
56.37
3.56
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod


Percentage of Crop Pattern By Area of Perinnial Crops over total gross cropped area After SC Work
Area-Percentage
120
100
80
60
40
20
0
98.44
99.5
99.84
99.62
89.53
99.68
94.15
99
52.28
99.46
98.7
52.87
3.56
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod


Percentage of Crop Pattern By Area of Seasonal Crops over total gross cropped area Before SC Work
Area-Percentage
120
100
80
60
40
20
0
43.63
1.52
0.44
96.44
0.16
1
10.6
0.13
8.06
1.09
2.01
0.55
1.04
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod

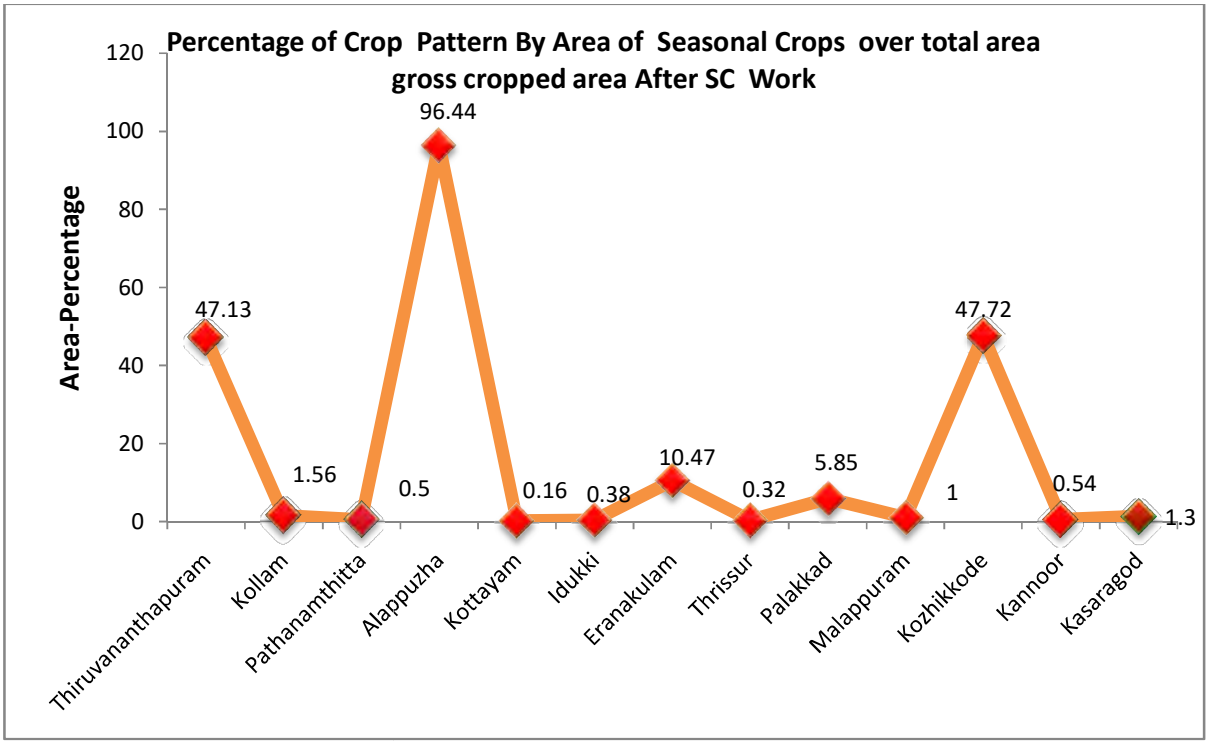

Percentage of Crop Pattern By Area of Seasonal Crops over total area gross cropped area After SC Work
Area-Percentage
120
100
80
60
40
20
0
47.13
1.56
0.5
96.44
0.16
0.38
10.47
0.32
5.85
1
47.72
0.54
1.3
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod

Table 5 – Area Under Selected Perennial Crops

Sl No	District	Arecanut			Coconut			Papaya		
		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	0.12	0.12	0.00	8.62	9.07	5.22			
2	Kollam	0.09	0.09	0.00	5.64	5.71	1.24			
3	Pathanamthitta	0.04	0.04	0.00	1.81	1.81	0.00			
4	Alappuzha	0.01	0.01	0.00	6.86	6.94	1.17	0.02	0.02	0.00
5	Kottayam	3.19	3.48	9.09	16.22	16.59	2.28			
6	Idukki	0.06	0.28	366.67	30.33	27.63	-8.90			
7	Ernakulum	1.91	1.91	0.00	25.44	31.69	24.57	0.1	0.1	0.00
8	Thrissur				50.58	50.6	0.04			
9	Palakkad	1.57	1.54	-1.91	25.67	25.67	0.00			
10	Malappuram	0.82	0.82	0.00	27.81	27.24	-2.05	0	0	
11	Kozhikkode	1.53	1.47	-3.92	30.36	31.12	2.50			
12	Kannur	3.16	2.13	-32.59	19.07	19.04	-0.16			
13	Kasaragod	12.37	12.25	-0.97	50.62	51.64	2.02			
Total		**24.87**	**24.14**	**-2.94**	**299.03**	**304.75**	**1.91**	**0.12**	**0.12**	**0.00**

Table 5 –Contd....

Sl No	District	Cashew			Pepper(Garbled)			Rubber		
		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				0.62	0.62	0.00	6.27	6.22	-0.80
2	Kollam	0.02	0.02	0.00	0.54	0.54	0.00	64.51	64.3	-0.33
3	Pathanamthitta				1.2	1.19	-0.83	50.35	50.32	-0.06
4	Alappuzha									
5	Kottayam	0.37	0.37	0.00	12.67	13.57	7.10	187.01	187.31	0.16
6	Idukki				87.65	86.31	-1.53	10.69	10.82	1.22
7	Ernakulam	0.18	0.18	0.00	5.44	5.36	-1.47	128.36	126.64	-1.34
8	Thrissur									
9	Palakkad				0.09	0.09	0.00	103.69	103.42	-0.26
10	Malappuram	4.88	2.73	-41.67	0.42	0.48	-7.69	40.69	57.11	40.35
11	Kozhikkode	0.02	0.03	50.00	0.81	0.85	4.94	0.01	0.01	0.00
12	Kannur	24.21	15.51	-35.94	2.19	2.26	3.20	75.62	87.45	15.64
13	Kasaragod	2.38	2.13	-10.50	3.69	6.9	86.99	176.79	190.25	7.61
Total		**32.06**	**20.97**	**-34.59**	**115.32**	**118.17**	**2.47**	**843.99**	**883.85**	**4.72**

Table 5 Contd.....

Sl No.	District	Cardamom			Coco			Nutmeg			Cloves		
		Before SC Work	After SC Work	%Increase	Before SC Work	After SC Work	%Increase	Before SC Work	After SC Work	%Increase	Before SC Work	After SC Work	%Increase
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*9*	*10*	*11*
1	Thiruvananthapuram												
2	Kollam				0.01	0.01	0.00						
3	Pathanamthitta												
4	Alapuzha												
5	Kottayam				0.19	0.19	0.00	1.4	1.4	0.00			
6	Idukki	49.51	61.51	24.24	11.45	10.02	-12.49	3.84	4.42	15.10	0	0.21	
7	Ernakulum				0.05	0.05	0.00	0.45	0.45	0.00			
8	Thrissur							2.12	2.17	2.36			
9	Palakkad				0	0		0.07	0.07	0.00			
10	Malappuram												
11	kozhikode												
12	Kannur				0	0.37							
13	Kasargode				0	0.74							
Total		**49.51**	**61.51**	**24.24**	**11.7**	**11.38**	**-2.74**	**7.88**	**8.51**	**7.99**	**0**	**0.21**	

Table 5 – Contd.....

Sl No.	District	Coffee			Jack			Mango			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*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1	Thiruvananthapuram				0.07	0.07	0.00				15.7	16.1	2.55
2	Kollam	0.01	0.01	0.00	1.47	1.47	0.00	0.21	0.21	0.00	72.5	72.36	-0.19
3	Pathanamthitta				1.2	1.19	-0.83				53.81	53.76	-0.09
4	Alappuzha							0.02	0.02	0.00	6.91	6.99	1.16
5	Kottayam	0.23	0.24	4.35							221.28	223.15	0.85
6	Idukki	6.51	6.06	-6.91	0.87	0.74	-14.94				200.91	208	3.53
7	Ernakulum	0.22	0.22	0.00	1.49	1.45	-2.68	0.09	0.09	0.00	163.73	168.14	2.69
8	Thrissur										52.7	52.77	2.36
9	Palakkad				0.04	0.05	25.00	0.79	1.17	48.10	131.92	132.01	0.07
10	Malappuram	0.01	0.01	0.00	1.86	2.41	29.57	0.99	1.41	42.42	77.48	92.21	19.01
11	Kozhikkode				1.47	1.45	-1.36				34.2	34.93	2.13
12	Kannur	0	0.04		1.3	1.3	0.00				125.55	128.1	2.03
13	Kasargode	0.12	0.54	350.00	1.04	4.41	324.04				247.01	268.86	8.85
Total		**7.1**	**7.12**	**0.28**	**10.02**	**13.75**	**37.2**	**2.1**	**2.9**	**38.10**	**1403.7**	**1457.38**	**3.82**

Table 6 - Area Under Selected Seasonal Crops

Sl.No	District	Paddy			Tapioca			Peas(pulses)		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	Thiruvananthapuram				3.88	4.23	9.02			
2	Kollam				0.24	0.25	4.17			
3	Pathanamthitta				0.14	0.14	0.00			
4	Alappuzha	186.62	188.88	1.21	0.05	0.06	20.00			
5	Kottayam				0.35	0.35	0.00			
6	Idukki				0.4	0	-100.00			
7	Ernakulam	4.5	4.5	0.00	5.43	5.53	1.84	0.1	0.1	0.00
8	Thrissur									
9	Palakkad	8.07	8.07	0.00						
10	Malappuram	0.23	0.23	0.00				0.01	0.01	
11	Kozhikkode				0.28	0.51	82.14			
12	Kannur									
13	Kasargode				0.54	0.54	0.00			
Total		**199.42**	**201.68**	**1.13**	**11.31**	**11.61**	**2.65**	**0.11**	**0.11**	**0**

Table 6 –Contd.....

SL.No	District	Ginger			Plantain			Banana		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	Thiruvananthapuram	0.1	0.16	60.00	3.81	4.59	20.47	4.13	5.09	23.24
2	Kollam	0.03	0.03	0.00	0.53	0.55	3.77	0.22	0.22	0.00
3	Pathanamthitta				0.09	0.12	33.33	0.01	0.01	0.00
4	Alappuzha				0.49	0.56	14.29			
5	Kottayam									
6	Idukki	0.6	0	-100.00	0.13			0.89	0.8	-10.11
7	Ernakulam				5.19	5.34	2.89	3.44	3.39	-1.45
8	Thrissur				0.07	0.17	142.86			
9	Palakkad									
10	Malappuram				0.08	0.13	62.50	0.5	0.51	2.00
11	Kozhikkode				0.34	0.49	44.12	0.08	30.88	38500.00
12	Kannur				0.64	0.64	0.00	0.06	0.06	0.00
13	Kasargode				1.93	2.88	49.22			
Total		**0.73**	**0.19**	**-73.97**	**13.3**	**15.47**	**16.32**	**9.33**	**40.96**	**339.01**

Table 6 – Contd.....

SL No	District	Vegetables			Pineapple			Elephant Yam		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1	Thiruvananthapuram				0.12	0.16	33.33			
2	Kollam				0.03	0.03	0.00	0.04	0.04	0.00
3	Pathanamthitta									
4	Alappuzha									
5	Kottayam									
6	Idukki									
7	Ernakulam	0.65	0.7	7.69				0.1	0.1	0.00
8	Thrissur									
9	Palakkad				3.3	0	-100.00			
10	Malappuram	0.17	0.22	50.00						
11	Kozhikkode									
12	kannur									
13	Kasargode				0.13	0.13	0.00			
TOTAL		**0.82**	**0.92**	**12.20**	**3.58**	**0.32**	**-91.1**	**0.14**	**0.14**	**0**

Table 6 – Contd.....

SL NO	District	Colocasia			Others			Total		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1	Thiruvananthapuram	0.11	0.12	9.09				12.15	14.35	18.11
2	Kollam	0.03	0.03	0.00				1.12	1.15	2.68
3	Pathanamthitta							0.24	0.27	12.50
4	Alappuzha				0.02	0.02	0	187.18	189.52	1.25
5	Kottayam							0.35	0.35	0.00
6	Idukki							2.02	0.8	-60.40
7	Ernakulam							19.41	19.66	1.29
8	Thrissur							0.07	0.17	142.86
9	Palakkad							11.37	8.07	-29.02
10	Malappuram							0.99	1.08	9.09
11	Kozhikkode							0.7	31.88	4454.29
12	kannur							0.7	0.7	0.00
13	Kasargode							2.6	3.55	36.54
TOTAL		**0.14**	**0.15**	**7.14**	**0.02**	**0.02**	**0**	**238.9**	**271.55**	**13.67**

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 No7 and 8. Survey result 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.

In Kozhikkode district Gross cropped area is more increased. In this district total cropped area before Soil conservation works was 34.9 acres. Itis increased to 66.81 acres after the implementation of Soil conservation measures. The increase in area is accounted as 31.91 acres. The percentage of increase recorded as91.43%. When we analyzethe yield of perennial crops in this district, it can be seen that production of Coconut, Pepper, Arecanut, are increased. In the case of Seasonal crops, in this district it can be seen that the yield of tapioca, plantain, banana etc. are increased.

In Kasargode, Malappuram, Idukki and Ernakulum districts before soil conservation work, thetotal gross cropped area were 249.01, 78.47, 202.93 and 183.14acres respectively. It is increased to272.41, 93.29, 208.80and187.80 acres respectively after the implementation of soil conservation work. Increase in area accounted are 22.8, 14.82, 5.87and 4.66 respectively.

Production impact is also commendable. Productions of all perennial crops are increased Except Cashew after soil conservation works.

The district wise details ofSeasonal Crops area shows that area of all other seasonal crops except ginger &pineapple are 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		Value at constant price	% Change Over Quantity
			Quantity	Value	Quantity	Value		
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	
Thiruvananthapuram	Coconut	Nos.	25292	133043	27089	299610	279735	7.11
	Areca nut	Nos.	6155	3632	6300	6364	6218	2.36
	Pepper(Garbled)	Quintal	0.45	5625	0.47	22281	21333	4.44
	Rubber	Quintal	84.2	825585	86.9	1359622	1317378	3.21
	Jack	Quintal	6.7	1676	6.95	1638	1579	3.73
	Total			969561		1689515	1626243	
Kollam	Coconut	Nos.	9547	60717	12455	199410	152852	30.46
	Areca nut	Nos.	4480	2509	5400	6588	5466	21.54
	Pepper(Garbled)	Quintal	0.42	5315	0.70	32366	19420	66.67
	Cashew	Quintal	5.6	30336	8.27	62646	42421	47.68
	Rubber	Quintal	721.02	6644213	1054.45	16242939	11106723	46.24
	Jack	Quintal	360.25	43230	499.45	459494	331430	38.64
	Total			6786320		17003443	11658312	
Pathanamthitta	Coconut	Nos.	1059	7192	2477	33984	14529	133.90
	Areca nut	Nos.	350	186	855	992	406	144.29
	Pepper(Garbled)	Quintal	6.26	72477	12.46	632431	317738	99.04
	Rubber	Quintal	169.88	1595343	255.28	3975192	2645353	50.27
	Total			1675198		4642599	2978026	
Alappuzha	Coconut	Nos.	23321	144826	29876	371960	290349	28.11
	Areca nut	Nos.	210	94	242	242	210	15.24
	Mango	Quintal	1.86	1471	2.19	3422	2906	17.74
	Total			146391		375624	293465	
Kottayam	Coconut	Nos.	54990	362934	61282	720676	646682	11.44
	Areca nut	Nos.	313070	194103	353730	396179	350640	12.99
	Pepper(Garbled)	Quintal	46.6	536929	51.52	2625076	2374389	10.56
	Rubber	Quintal	1667.2	15683370	1633.20	25454775	25984693	2.04
	Coffee	Quintal	11.75	66188	13.27	94190	83401	12.94
	Coco	Quintal	13.20	35971	14.55	52905	47996	10.23
	Nutmeg	Quintal	51.20	6247	56.9	17393	15651	11.13
	Total			16885742		29361194	29503452	

Table 7 Contd.....

1	2	3	4	5	6	7	8	9
Idukki	Coconut	Nos.	44458	321876	60550	640620	470366	36.2
	Arecanut	Nos.	5000	2000	1200	852	3550	76
	Pepper(Garbled)	Quintal	134.5	1499282	155.95	7768691	6700154	15.95
	Rubber	Quintal	18.75	183356	37.5	578984	289492	100
	Coffee	Quintal	45.30	332684	46.35	326317	318925	2.32
	Coco	Quintal	32.40	95838	49.65	210805	137565	53.24
	Cardamom	Quintal	80.10	4781970	206.85	12153842	4706419	158.24
	Nutmeg	Quintal	2.6	327	10.10	3051	785	288.46
	Total			7217333		21683162	12627256	
Ernakulam	Coconut	Nos.	95290	565077	102669	1308007	1213991	7.74
	Arecanut	Nos.	277206	138603	301128	225859	207916	8.63
	Pepper(Garbled)	Quintal	18.59	205482	23.23	1149604	919980	24.96
	Cashew	Quintal	0.51	1734	0.58	3329	2927	13.73
	Rubber	Quintal	1193.48	11198430	1243.51	19306526	18529769	4.19
	Jack	Quintal	30.43	12601	34.78	15303	13389	14.30
	Mango	Quintal	0.30	232	0.35	889	762	16.67
	Coffee	Quintal	0.77	956	0.94	6956	5698	22.08
	Nutmeg	Quintal	1.6	30560	1.76	52898	48089	10
	Total			12153675		22069371	20942521	
Thrissur	Coconut	Nos.	262530	1338903	434970	4201810	2536040	65.68
	Nutmeg	Quintal	25.5	326400	57.75	1780664	786267	126.47
	Total			1665303		5982474	3322307	
Palakkad	Coconut	Nos.	119379	558693	131918	1364030	1234377	10.5
	Arecanut	Nos.	181107	63388	207672	164061	143075	14.67
	Rubber	Quintal	728.52	6913658	850.76	12864196	11015826	16.78
	Mango	Quintal	8.40	6334	47.80	102461	18006	469.05
	Total			7542073		14494748	12411284	

Table 7 Contd.....

1	2	3	4	5	6	7	8	9
Malappuram	Coconut	Nos.	120556	530446	135514	1191154	1059675	12.41
	Arecanut	Nos.	44800	17024	63620	50896	35840	42.01
	Pepper(Garbled)	Quintal	0.20	2308	0.28	13711	9794	40
	Cashew	Quintal	23.10	69924	7.75	46314	138046	66.45
	Rubber	Quintal	63.20	584790	80.94	1247116	973780	28.07
	Total			1204492		2549191	2217135	
Kozhikkode	Coconut	Nos.	98422	409439	115540	1101107	937971	17.39
	Arecanut	Nos.	87630	31547	107900	119770	97270	23.13
	Pepper(Garbled)	Quintal	0.98	11160	1	49137	48154	2.04
	Total			452146		1270014	1083395	
Kannur	Coconut	Nos.	74600	294673	97850	811173	618431	31.17
	Arecanut	Nos.	474000	194340	529000	476100	426600	12
	Pepper(Garbled)	Quintal	5.17	59330	8.53	402366	243872	64.99
	Cashew	Quintal	59.24	253073	53.34	351822	390737	9.96
	Rubber	Quintal	451.90	4199510	587.7	9146097	7032706	30.05
	Total			5000926		11187558	8712346	
Kasaragod	Coconut	Nos.	264187	1215260	319321	3228343	2670937	20.87
	Arecanut	Nos.	3064570	1624223	3413840	4403857	3953298	11.4
	Pepper(Garbled)	Quintal	9.98	114544	14.90	803772	538365	49.30
	Cashew	Quintal	30.54	132851	34.79	252491	221646	13.92
	Rubber	Quintal	1856.51	16170205	2446.99	36348009	27576918	31.81
	Total			19257083		45036472	34961164	

Table-7 Contd.....

STATE	Name of Crop	Unit	Before SC Work		After SC Work		Value at constant price	% Change Over Quantity
			Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
KERALA	Coconut	Nos.	1193631	5943079	1531511	15471884	12125935	28.31
	Arecanut	Nos.	4458578	2271649	4990887	5851760	5230489	11.94
	Pepper(Garbled)	Quintal	223.15	2512452	269.04	13499435	11193199	20.56
	Cashew	Quintal	118.99	487918	104.73	716602	795777	11.98
	Rubber	Quintal	6954.66	63998460	8277.23	126523456	106472638	19.02
	Jack	Quintal	397.38	57507	541.18	476435	345398	36.19
	Mango	Quintal	10.56	8037	50.34	106772	21674	376.70
	Coffee	Quintal	57.82	399828	60.56	427463	408024	4.74
	Coco	Quintal	45.6	131809	64.20	263710	185561	40.79
	Cardamom	Quintal	80.10	4781970	206.85	12153842	4706419	158.24
	Nutmeg	Quintal	80.90	363534	126.51	1854006	850792	56.38
	Total			**80956243**		**177345365**	**142335906**	

Table 8 - Crop wise Yield and Value of Seasonal Crops in Scheme Area

District	Name of Crop	Unit	Before SC Work		After SC Work		Value at constant price	% of Change Over Quantity
			Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
Thiruvananthapuram	Paddy	Quintal	6.35	6154	8.40	13751	10395	32.28
	Tapioca	Quintal	735.40	372854	807.30	1235335	1125313	9.78
	Ginger	Quintal	5.65	22538	8.85	44665	28515	56.64
	Plantain	Quintal	303.37	264240	359.03	641200	541796	18.35
	Banana	Quintal	274.65	473223	298.15	1076134	991314	8.56
	Pineapple	Quintal	2.55	2295	3.95	4889	3156	54.9
	Colocasia	Quintal	1.88	2570	2.29	7477	6138	21.81
	Total			1143874		3023451	2706627	
Kollam	Tapioca	Quintal	20.25	11039	27.34	45210	33486	35.01
	Ginger	Quintal	0.48	1920	0.65	6539	4829	35.42
	Plantain	Quintal	16.93	14311	21.31	41645	33085	25.87
	Banana	Quintal	11.43	19179	7.62	29439	44159	-33.33
	Pineapple	Quintal	0.20	167	0.35	849	485	75
	Chenai	Quintal	2.20	1816	2.95	5540	4132	34.09
	Total			48432		129222	120176	
Pathanamthitta	Tapioca	Quintal	1.7	1013	2.56	5212	3461	50.59
	Plantain	Quintal	2.10	1594	5.41	8359	3245	157.62
	Banana	Quintal	0.45	805	0.70	2584	1661	55.56
	Total			3412		16155	8367	
Alappuzha	Paddy	Quintal	6048.03	6580259	8032.71	14458878	10886454	32.82
	Tapioca	Quintal	3.75	2190	4.72	8212	6524	25.87
	Plantain	Quintal	19.83	15668	22.95	36464	31507	15.73
	Total			6598117		14503554	10924485	
Kottayam	Tapioca	Quintal	54.75	35642	57.8	107492	101820	5.57
	Total			35642		107492	101820	

Table - 8 Contd...

1	2	3	4	5	6	7	8	9
Idukki	Tapioca	Quintal	5	3145	0	0	8924	-100
	Ginger	Quintal	3	9009	0	0	19908	-100
	Plantain	Quintal	4	2876	0	0	6050	-100
	Banana	Quintal	57	75582	80	258612	184261	40.35
	Total			90612		258612	219143	
Eranakulam	Paddy	Quintal	68.7	65403	73.7	107880	100561	7.28
	Tapioca	Quintal	576.55	315948	620.55	1109964	1031262	7.63
	Ginger	Quintal	21	46725	24	186850	163494	14.29
	Plantain	Quintal	333.05	229806	360.7	618217	570827	8.30
	Banana	Quintal	372.45	578790	398.45	1418035	1325504	6.98
	Vegetables	Quintal	16.9	11492	22.30	24530	18590	31.95
	Total			1248164		3465476	3210238	
Thrissur	Plantain	Quintal	15.05	9257	40.7	64576	23879	170.43
	Total			9257		64576	23879	
Palakkad	Paddy	Quintal	364.50	343359	376	647945	628128	3.16
	Pineapple	Quintal	534	654150	0	0	1068000	-100
	Total			997509		647945	1696128	
Malappuram	Paddy	Quintal	4.8	4253	5.10	8670	8160	6.25
	Peas	Quintal	0.22	242	0.24	720	660	9.09
	Plantain	Quintal	6.46	5096	10.05	17629	11332	55.57
	Banana	Quintal	26.10	37219	29.5	95691	84662	13.03
	Vegetables	Quintal	3.96	2376	4.48	5601	4951	13.13
	Total			49186		128311	109765	
Kozhikkode	Tapioca	Quintal	10	5911	25.20	45798	18174	152
	Ginger	Quintal	0.70	1251	0.90	5255	4087	28.57
	Plantain	Quintal	10.98	9993	15.5	29181	20671	41.17
	Banana	Quintal	2.8	4386	22.30	77214	9695	696.43
	Total			21541		157448	52627	
Kannur	Plantain	Quintal	28.20	26395	33.95	61252	50878	20.39
	Banana	Quintal	4	6104	4.5	15837	14077	12.50
	Total			32499		77089	64955	
Kasargode	Tapioca	Quintal	1.8	1557	1.90	3557	3370	5.56
	Plantain	Quintal	173.2	137697	269.49	499117	320780	55.59
	Total			139254		502674	324150	

Table - 8 Contd...

District	Name of Crop	Unit	Before SC Work		After SC Work		Value at constant price	% of Change Over Quantity
			Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
STATE	Paddy	Quintal	6493.38	6999428	8495.91	15237124	11633698	30.86
	Tapioca	Quintal	1409.20	749299	1547.37	2560780	2332334	9.8
	Peas	Quintal	0.22	242	0.24	720	660	9.09
	Ginger	Quintal	30.83	81443	34.40	243309	220833	11.58
	Plantain	Quintal	913.17	716933	1139.09	2017640	1614050	24.74
	Banana	Quintal	748.88	1195288	841.22	2973546	2655333	12.33
	Vegetables	Quintal	20.86	13868	26.78	30131	23541	28.38
	Pineapple	Quintal	536.75	656612	4.30	5738	1071641	-99.20
	Elephant Yam	Quintal	2.20	1816	2.95	5540	4132	34.09
	Colocasia	Quintal	1.88	2570	2.29	7477	6138	21.81
	Total			**10417499**		**23082005**	**19562360**	

Table - 9

Quantity and Value of Selected Perennial and Seasonal Crops for the year 2014-2015

	Name of Crops	Units	Before SC Work		After SC Work		Value at	% change over quantity
			Quantity	Values(Rs)	Quantity	Values(Rs)	Constant Price	
1	2	3	4	5	6	7	8	9
A. Perennial	Coconut	Nos.	1193631	5943079	1531511	15471884	12125935	28.31
	Arecanut	Nos.	4458578	2271649	4990887	5851760	5260489	11.94
	Pepper(Garbled)	Quintal	223.15	2512452	269.04	13499435	11193199	20.56
	Cashew	Quintal	118.99	487918	104.73	716602	795777	-11.98
	Rubber	Quintal	6954.66	63998460	8277.23	126523456	106472638	19.02
	Jack	Quintal	397.38	57507	541.18	476435	346398	36.19
	Mango	Quintal	10.56	8037	50.34	106772	21674	376.70
	Cardamom	Quintal	80	4781970	206.85	12153842	4706419	158.56
	Coffee	Quintal	57.82	399828	60.56	427463	408024	4.74
	Coco	Quintal	45.6	131809	64.20	263710	185561	40.79
	Nutmeg	Quintal	80.9	363534	126.51	1854006	850792	56.38
	Total			80956243		177345365	142366906	
B. Seasonal								
	Paddy	Quintal	6493.38	6999428	8496	15237124	11633698	30.86
	Tapioca	Quintal	1409	749299	1547	2560780	2332334	19.8
	Peas	Quintal	0.22	242	0.24	720	660	9.09
	Ginger	Quintal	30.83	81443	34.40	243309	220833	11.58
	Plantain	Quintal	913.17	716933	1139.09	2017640	1614050	24.74
	Banana	Quintal	748.88	1195288	841.22	2973546	2655333	12.33
	Pineapple	Quintal	536.75	656612	4.30	5738	1071641	-99.20
	Elephant Yam	Quintal	2.20	1816	2.95	5540	4132	34.09
	Colocasia	Quintal	1.88	2570	2.29	7477	6138	21.81
	Vegetables	Quintal	20.86	13868	26.78	30131	23541	28.38
	Total			10417499		23082005	19562360	
	All Crops (A+B)			**91373742**		**200427370**	**161929266**	

2.2. Cost Benefit Analysis of the Soil Conservation Programmes

An important objective of a project evaluation is to estimate 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 continues 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 depletes 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 compared further 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 its 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 39 schemes is ₹127996853/-.

The total area under cultivation after soil conservation work was 1719.07acres. The value of crops before the soil conservation programme comes to ₹91373742/- and the value of crops after the implementation of soil conservation programme has also been calculated as ₹200427370/- . It is estimated that the value at constant price as ₹ 161929266/- .

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 33.16 acres 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 Production

Production also increased due to the implementation of soil conservation programme. In the case of coconut, it recorded 28.31%, Pepper 20.56%, Rubber 19.02%, Jack 36.19 %, Mango 376.7%, Cardamom158.56%, Cocoa 40.79% and Nutmeg 56.38%. In the case of seasonal crops, percentage increase in production of Paddy,Tapioca ,Ginger, Plantain, Banana ,Elephant Yam, Colocasia and Vegetables are 30.84%, 9.8%, 11.58%, 24.74%,12.33%,34.09%,21.81%and28.38% respectively.

(iii) Diversification of cropping pattern

Soil Conservation Programmes increased the soil capacity and which facilitates the cultivation of more remunerative crops. This advantagecanbe reaped in full, only if the conservation programmes are followed properly, i.e. the dissemination 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 has shown encouraging performance. The increase in area of perennial crops is higher than the area under same before the conservation programme (3.82 %.) Growing of perennial crops will accelerate conservation of soil more affectively.

Occupational Profile

The occupational profile of the selected beneficiaries reveals that 40.99% included agriculture job, 41.11% are accounted as non-agriculture; 9.74% agricultural labourersand8.16% 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 (₹)

Sl No.	District	Income(₹)		Expenditure(₹)		Net Income (₹)	
		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	2113435	4712966	1025157	1693892	1088278	3019074
2	Kollam	6834752	17132665	1702685	3419050	5132067	13713615
3	Pathanamthitta	1678610	4658754	664140	1586396	1014470	3072358
4	Alappuzha	6744508	14879178	1815068	4246866	4929440	10632312
5	Kottayam	16921994	29470520	8329474	11789930	8592520	17680590
6	Idukki	7307945	21941774	6300300	15490600	1007645	6451174
7	Ernakulum	13401839	25534847	3964680	5930900	9437159	19603947
8	Thrissur	1674560	6047050	884500	1672920	790060	4374130
9	Palakkad	8539582	15142693	2317405	4916124	6222177	10226569
10	Malappuram	1253594	2677302	1463350	2218083	-209756	459219
11	Kozhikkode	473687	1427462	352440	731900	121247	695562
12	Kannur	5033425	11264647	1813130	3505380	3220295	7759267
13	Kasargode	19396337	45539146	2971216	8312517	16425121	37226629
Total		**91374268**	**200429004**	**33603545**	**65514558**	**57770723**	**134914446**

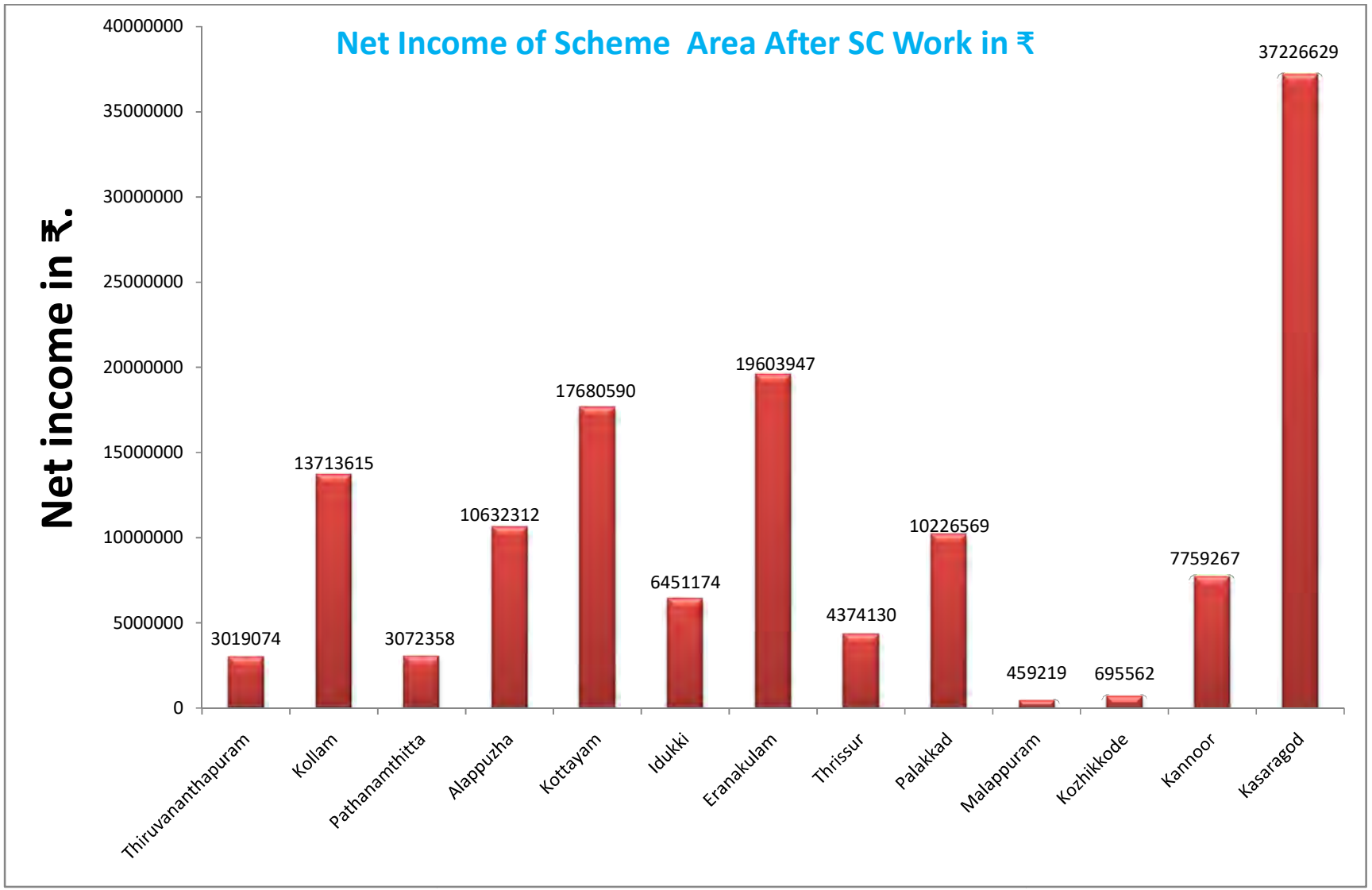

Net Income of Scheme Area After SC Work in ₹
Net income in ₹.
40000000
35000000
30000000
25000000
20000000
15000000
10000000
5000000
0
3019074
13713615
3072358
10632312
17680590
6451174
19603947
4374130
10226569
459219
695562
7759267
37226629
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod

Table 10(A) - Income, Expenditure and Net Income of Control Plot (₹)

Sl.No.	Name of District	Income	Expenditure	Net Income
1	*2*	*3*	*4*	*5*
1	Thiruvananthapuram	481253	247760	233493
2	Kollam	1465582	860950	604632
3	Pathanamthitta	899350	308935	590415
4	Alappuzha	1412778	613295	799483
5	Kottayam	3489249	2396900	1092349
6	Idukki	995870	935500	60370
7	Eranakulam	2850373	853500	1996873
8	Thrissur	444710	192896	251814
9	Palakkad	1296947	436895	860052
10	Malappuram	583476	430900	152576
11	Kozhikkode	233805	120900	112905
12	Kannur	2358052	811600	1546452
13	Kasaragod	10674268	1620670	9053598
Total		**27185713**	**9830701**	**17355012**

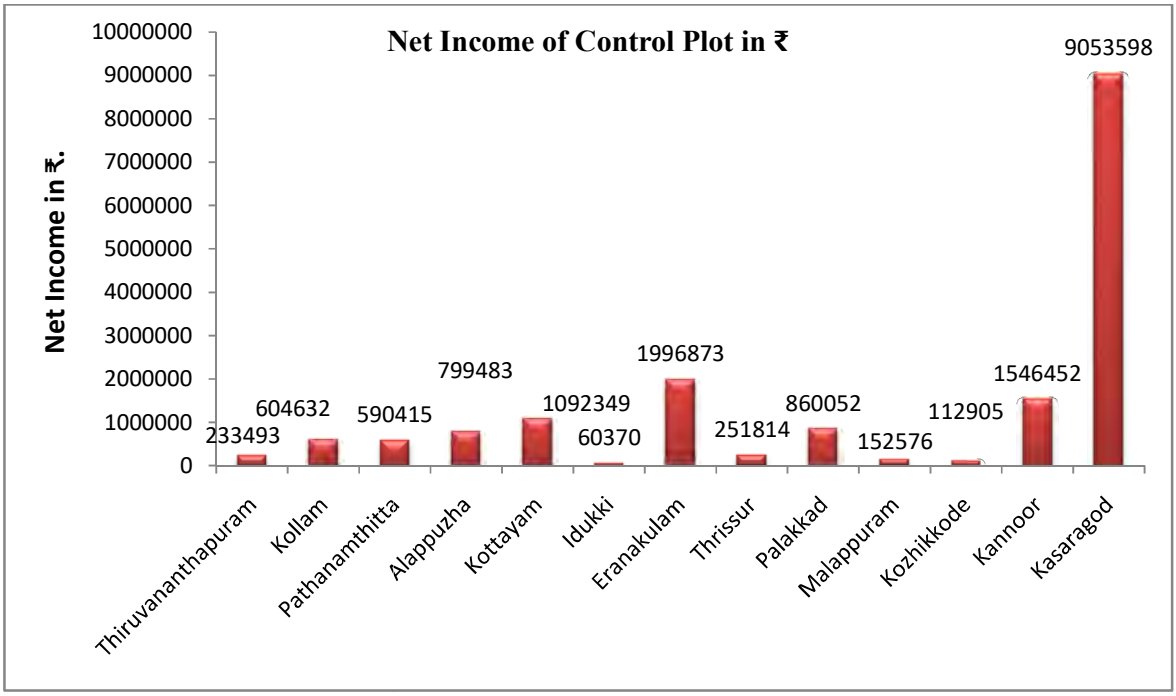
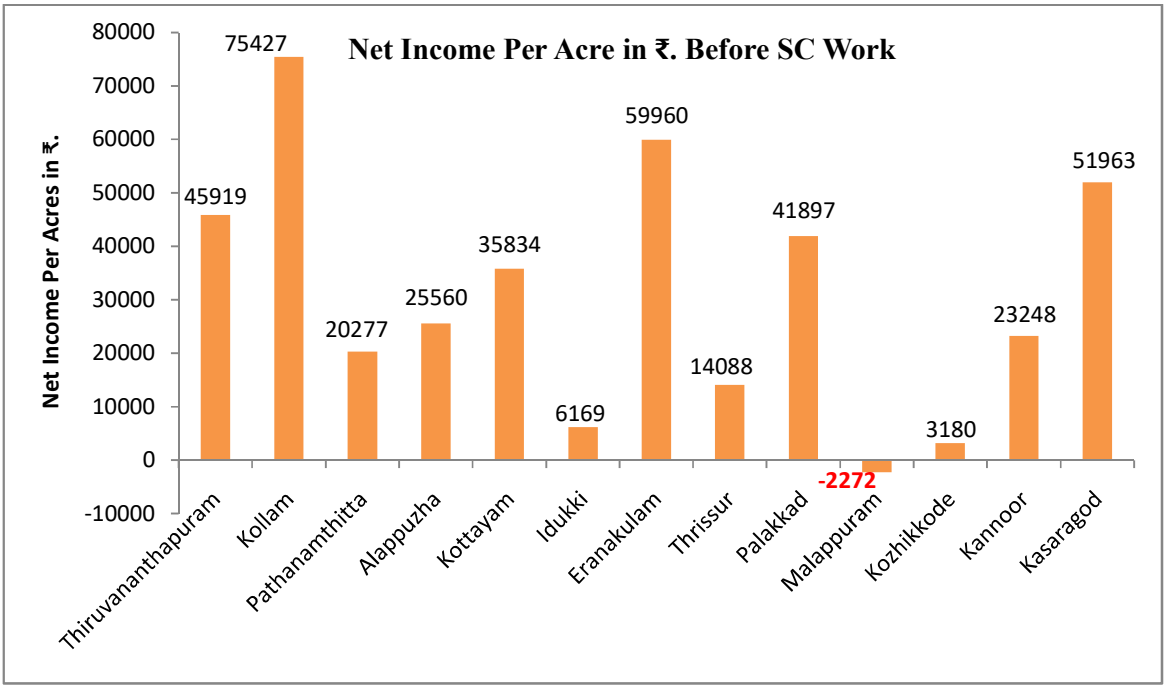


Table 11 - Income Per Acre Before And After Soil Conservation Programme

(Income in ₹.)

Sl. No	District Name	Before SC work			After SC work		
		Area in acre	Net Income (₹)	Net Income per acre(₹)	Area in acre	Net Income(₹)	Net Income per acre
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Thiruvananthapuram	23.70	1088278	45919	25.31	3019074	119284
2	Kollam	68.04	5132067	75427	68.04	13713615	201552
3	Pathanamthitta	50.03	1014470	20277	50.03	3072358	61410
4	Alappuzha	192.86	4929440	25560	194.90	10632312	54553
5	Kottayam	239.79	8592520	35834	239.79	17680590	73734
6	Idukki	163.35	1007645	6169	182.52	6451174	35345
7	Eranakulam	157.39	9437159	59960	157.39	19603947	124556
8	Thrissur	56.08	790060	14088	56.08	4374130	77998
9	Palakkad	148.51	6222177	41897	148.77	10226569	68741
10	Malappuram	93.42	-209756	-2272	99.94	459219	4534
11	Kozhikkode	38.13	121247	3180	40.12	695562	17337
12	Kannur	138.52	3220295	23248	140.09	7759267	55388
13	Kasaragod	316.09	16425121	51963	316.09	37226629	117772
Total		**1685.91**	**57770723**	**34267**	**1719.07**	**134914446**	**78481**



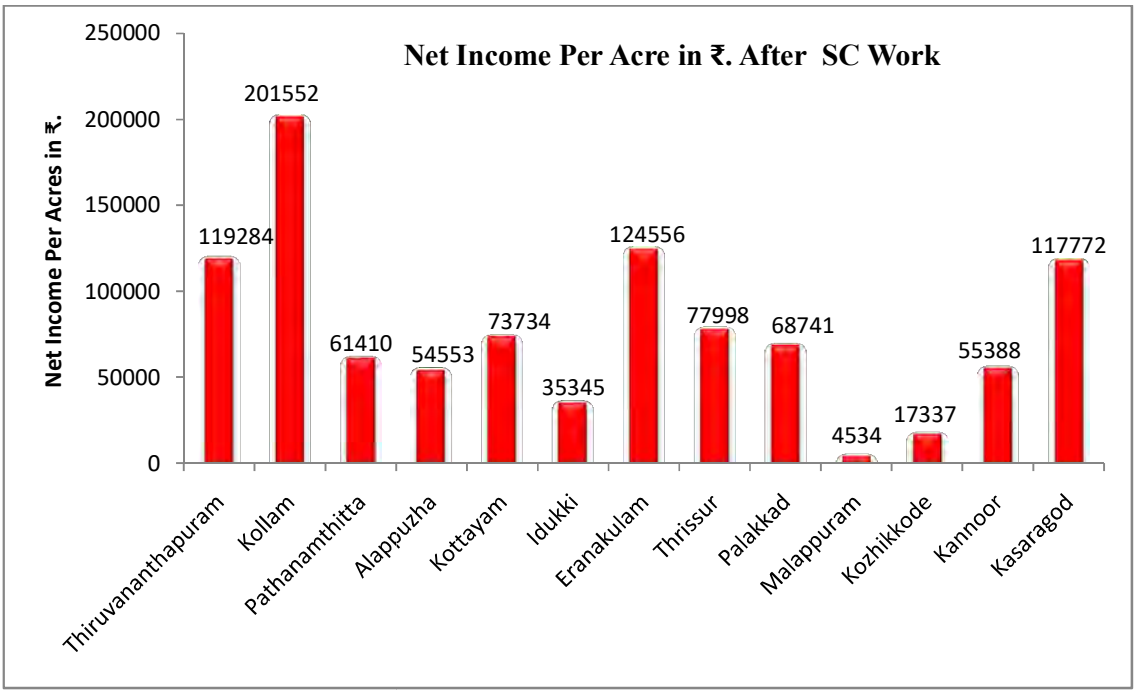
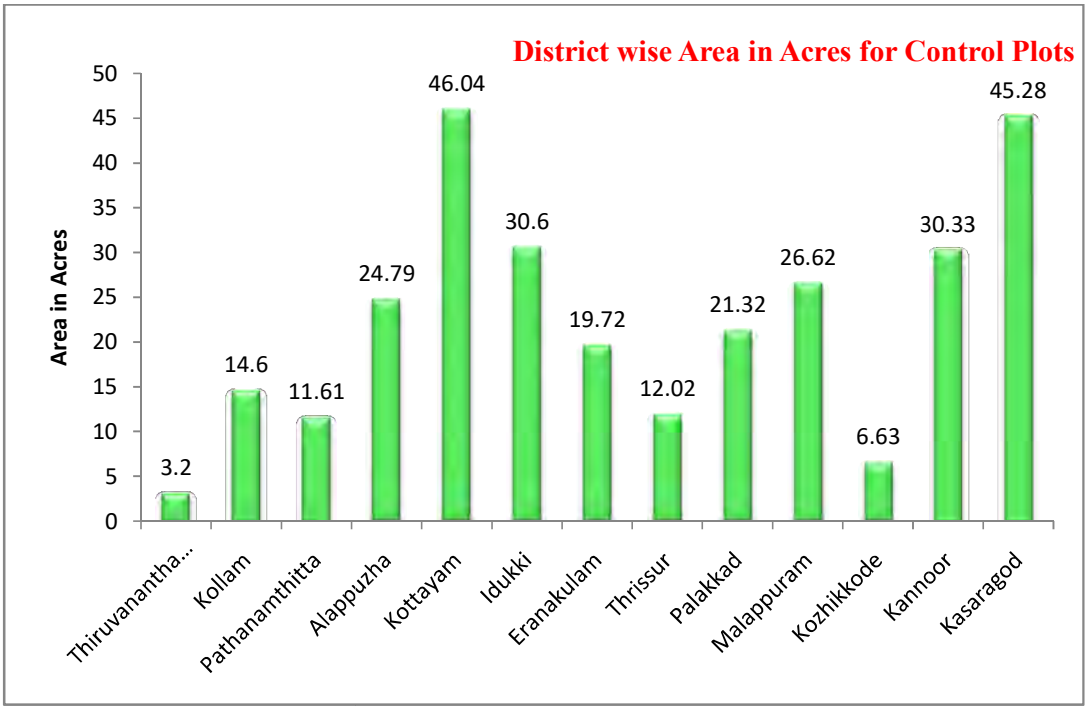
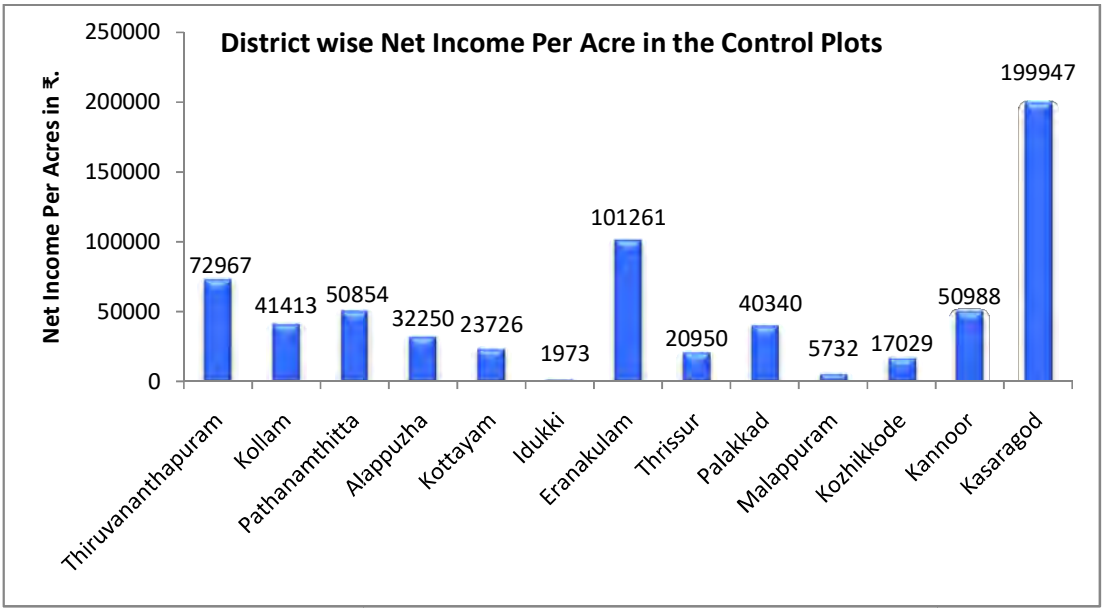


Table 11(A) - Income Per Acre in the Control Plots

Sl. No	District Name	Area in Acre	Net Income (₹)	Net Income per Acre
1	*2*	*3*	*4*	*5*
1	Thiruvananthapuram	3.20	233493	72967
2	Kollam	14.60	604632	41413
3	Pathanamthitta	11.61	590415	50854
4	Alappuzha	24.79	799483	32250
5	Kottayam	46.04	1092349	23726
6	Idukki	30.60	60370	1973
7	Ernkulam	19.72	1996873	101261
8	Thrissur	12.02	251814	20950
9	Palakkad	21.32	860052	40340
10	Malappuram	26.62	152576	5732
11	Kozhikkode	6.63	112905	17029
12	Kannur	30.33	1546452	50988
13	Kasargode	45.28	9053598	199947
Total		**292.76**	**17355012**	**59281**


District wise Area in Acres for Control Plots
Area in Acres
50
45
40
35
30
25
20
15
10
5
0
3.2
14.6
11.61
24.79
46.04
30.6
19.72
12.02
21.32
26.62
6.63
30.33
45.28
Thiruvanantha...
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod


District wise Net Income Per Acre in the Control Plots
Net Income Per Acres in ₹.
250000
200000
150000
100000
50000
0
72967
41413
50854
32250
23726
1973
101261
20950
40340
5732
17029
50988
199947
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod

Chapter III

3.1 General Observations

During the survey period the staffs of this department has visited all the beneficiary plots.

The distribution of holdings of the selected beneficiaries of the soil conservation programmes reveals that 56.55% of the beneficiary holding belongs to less than one acre, 38.46% have holding area between one acre to 3 acres, above 3 acres were 4.17% and up to 5 acres were 0.82% respectively.

The opinions of selected beneficiaries are collected. Out of this, 32.32% of the beneficiaries reported that contour bunds effectively controlled soil erosion while about 67.24% rests in the opinion that it moderately controlled soil erosion.

About the fertility of the soil 11.70% are of the view that the conservation measures have improved the fertility of the soil remarkably while 87.54% reported that the fertility of the soil has improved moderately and 0.76% opinioned that it has no effect on the fertility of the soil.

Similarly regarding the moisture retention 9.74% reported that the scheme has substantially controlled moisture retention while 89.69% reported that the scheme has caused moisture retention moderately and 0.57% reported that 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

		Effectiveness of Contour Bunds			Fertility of Soil			Moisture Retention			
Sl.No	Name of District	Effectively Controlled	Moderately Controlled	No effect	Remarkably Controlled	Moderately Controlled	No effect	Substantially Controlled	Moderately Controlled	No effect	Total
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1	Thiruvananthapuram	32	93	0	2	122	1	2	123	0	125
2	Kollam	4	121	0	1	124	0	1	124	0	125
3	Pathanamthitta	116	9	0	2	123	0	0	125	0	125
4	Alappuzha	10	114	1	6	119	0	5	120	0	125
5	Kottayam	4	121	0	2	123	0	0	125	0	125
6	Idukki	10	114	1	3	121	1	2	123	0	125
7	Ernakulam	108	17	0	107	18	0	108	17	0	125
8	Thrissur	4	120	1	1	124	0	0	125	0	125
9	Palakkad	100	24	1	1	124	0	1	124	0	125
10	Malappuram	10	72	0	4	78	0	4	78	0	82
11	Kozhikkode	28	95	2	0	116	9	0	116	9	125
12	Kannur	4	120	1	0	124	1	0	125	0	125
13	Kasaragod	81	43	0	56	68	0	31	93	0	124
State		**511**	**1063**	**7**	**185**	**1384**	**12**	**154**	**1418**	**9**	**1581**

Table 13
Conditions of Bunds
(Scheme Area)

SLNO	District	Good	Partially damaged	Seriously damaged	Total
1	*2*	*3*	*4*	*5*	*6*
1	Thiruvananthapuram	120	5	0	125
2	Kollam	109	16	0	125
3	Pathanamthitta	125	0	0	125
4	Alappuzha	33	92	0	125
5	Kottayam	116	9	0	125
6	Idukki	81	44	0	125
7	Ernakulum	99	26	0	125
8	Thrissur	14	111	0	125
9	Palakkad	125	0	0	125
10	Malappuram	74	8	0	82
11	Kozhikkode	58	52	15	125
12	Kannur	116	9	0	125
13	Kasaragod	57	67	0	124
State		**1127**	**439**	**15**	**1581**

Table 14
Occupational Profile
(Scheme Area)

Sl. No	Name of District	Occupation				
		Agriculture	Non-Agriculture	Agricultural-Labours	Non-Agri. Labours	Total
1	*2*	*3*	*4*	*5*	*6*	*7*
1	Thiruvananthapuram	9	38	23	55	125
2	Kollam	84	28	9	4	125
3	Pathanamthitta	26	93	6	0	125
4	Alappuzha	43	60	14	8	125
5	Kottayam	74	38	12	1	125
6	Idukki	76	40	6	3	125
7	Ernakulum	85	39	1	0	125
8	Thrissur	14	107	4	0	125
9	Palakkad	88	29	5	3	125
10	Malappuram	5	68	4	5	82
11	Kozhikkode	6	78	11	30	125
12	Kannoor	58	18	33	16	125
13	Kasaragod	80	14	26	4	124
State		**648**	**650**	**154**	**129**	**1581**

Table 14(a)
Occupational Profile (Control Plots)

Sl.No	Name of District	Occupation				
		Agriculture	Non-Agriculture	Agricultural-Labours	Non-Agri. Labours	Total
1	*2*	*3*	*4*	*5*	*6*	*7*
1	Thiruvananthapuram	1	6	6	12	25
2	Kollam	22	3	0	0	25
3	Pathanamthitta	21	3	1	0	25
4	Alappuzha	6	12	5	2	25
5	Kottayam	15	5	4	1	25
6	Idukki	9	13	0	3	25
7	Eranakulam	12	11	2	0	25
8	Thrissur	1	5	2	17	25
9	Palakkad	19	1	5	0	25
10	Malappuram	4	16	0	0	20
11	Kozhikkode	0	20	0	5	25
12	Kannoor	13	0	10	2	25
13	Kasargode	16	3	6	0	25
State		**139**	**98**	**41**	**42**	**320**

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 includes 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 71.28% are in good condition 27.77% reported that bundsare partially damaged and 0.95% reported that bunds are 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 2014-15. The entire districts except Wayanad were covered in this study. 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 in this report district wise name of all selected schemes are also included. Some of the findings of the study are given below:

For the study purpose 39 schemes were selected. The total number of beneficiaries comes to 8243. Out of this 1581 number of beneficiaries were selected for the detailed study. Land use particulars of beneficiary plots give us certain positive trends while comparing with the area before and after the soil conservation programme. The study revealed that 33.16 acres of land has been additionally brought under cultivation by cultivating area which was 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. BesidesSoilConservationDepartment,LocalSelfGovernment implementing various programmes in this direction. 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 133.53%. It is estimated that the percentage increase of net income per acre in beneficiary plots of the scheme area as 129.03%.

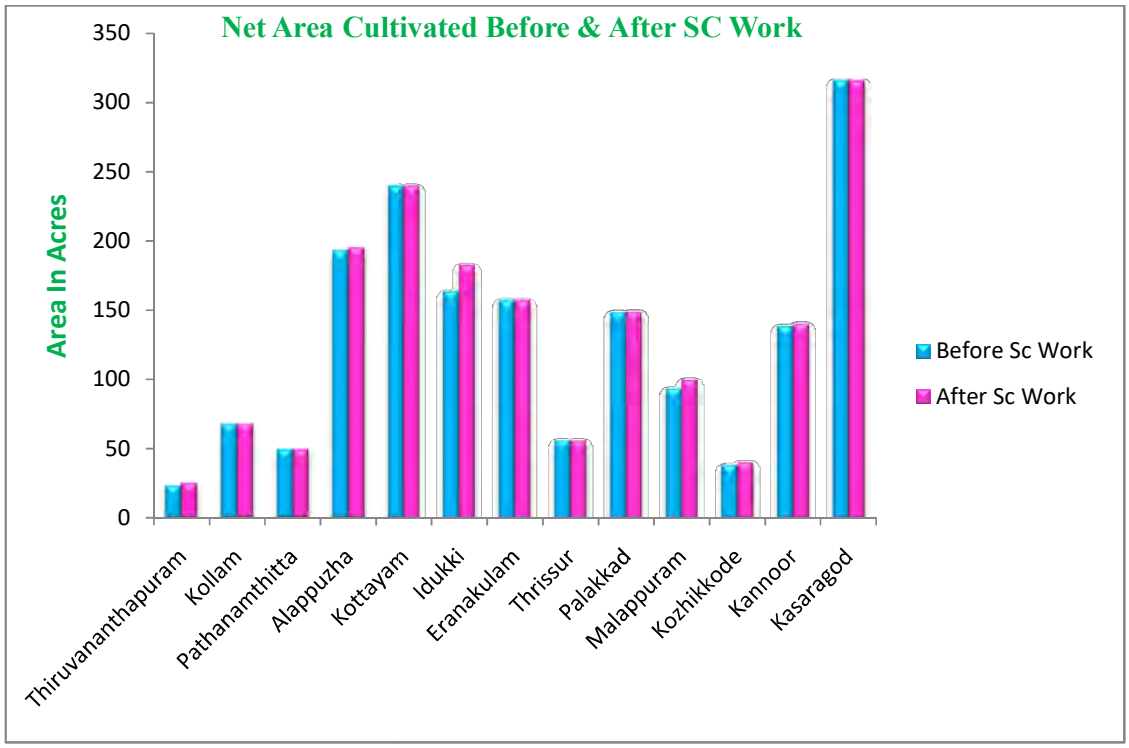
Analysis of data collected from the beneficiary and control plots reveals that the net income per acre, received from the beneficiary plot is ₹.78481/- and from the control plot is ₹.59281/- The district wise details are presented in Table No. 11 and 11 (a). The higher rate of income from the scheme area is due to the positive impact of soil conservation programme.

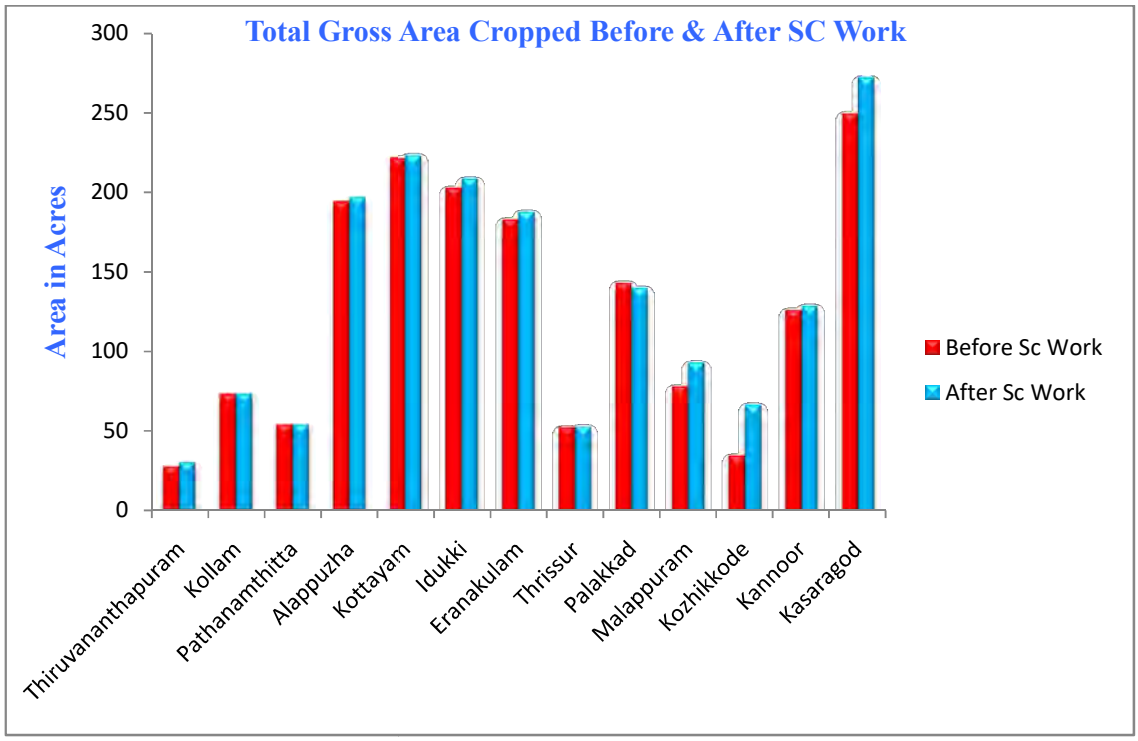
Cost benefit analysis of the collected data reveals that 85% of the cost of soil conservation programme has benefited in the year under study.

Table 15
Cropping Intensity in Scheme Area

(Area in Acres)

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 Sc Work
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
1	Thiruvananthapuram	23.70	25.31	27.85	30.45	117.47	120.23
2	Kollam	68.04	68.04	73.62	73.51	108.20	108.04
3	Pathanamthitta	50.03	50.03	54.05	54.03	108.02	108.02
4	Alappuzha	192.86	194.90	194.09	196.51	100.64	100.82
5	Kottayam	239.79	239.79	221.63	223.50	92.43	93.21
6	Idukki	163.35	182.52	202.93	208.80	124.24	114.40
7	Ernakulam	157.39	157.39	183.14	187.8	116.36	119.33
8	Thrissur	56.08	56.08	52.77	52.94	94.10	94.40
9	Palakkad	148.51	148.77	143.29	140.08	96.48	94.15
10	Malappuram	93.42	99.94	78.47	93.29	84	93.35
11	Kozhikkode	38.13	40.12	34.90	66.81	91.53	166.53
12	Kannur	138.52	140.09	126.25	128.8	91.14	91.95
13	Kasargode	316.09	316.09	249.61	272.41	78.97	86.19
State		**1685.91**	**1719.07**	**1642.6**	**1728.93**	**97.43**	**100.58**


Net Area Cultivated Before & After SC Work
Area In Acres
350
300
250
200
150
100
50
0
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod
Before Sc Work
After Sc Work


Total Gross Area Cropped Before & After SC Work
Area in Acres
300
250
200
150
100
50
0
Thiruvananthapuram
Kollam
Pathanamthitta
Alappuzha
Kottayam
Idukki
Eranakulam
Thrissur
Palakkad
Malappuram
Kozhikkode
Kannoor
Kasaragod
Before Sc Work
After Sc Work

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 is increased from 97.43% to 100.58%. District wise details are presented in table No.15.

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