



GOVERNMENT OF KERALA

EVALUATION STUDY ON SOIL CONSERVATION IN KERALA 2016-17



DEPARTMENT OF ECONOMICS & STATISTICS
Thiruvananthapuram
2019



Government of Kerala

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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 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 48 schemes completed by the Soil Conservation Department. The field survey was conducted during the agricultural year 2016-2017 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.

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.

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CHAPTER – I

1.1 Introduction

Fertile soil leads to better harvest which helps to meet our most basic needs. Those living in countries with healthy soil are properly nourished. So the conservation of soil is one of the important matter in a country.

Soil conservation includes not only control over erosion but also all those measures like correction of soil defects, proper crop rotations, irrigations etc. which aim at maintaining the productivity of the soil at high level. In this sense, soil conservation is closely allied to improvement of land use in general. 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 implemented 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 selected were those executed five years prior to the survey i.e. during 2011-12 in the State by the Soil Conservation Department, Local Self Government Department and other Government agencies. 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 holding. The holdings are stratified into four strata.

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 of the scheme collected from Soil Conservation Department, local bodies and other Government agencies in which evaluation studies performed. 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. The district wise selection details of beneficiary plots and control plots are given in the table 1 & 1(a).

Statement showing list of selected schemes

<i>Sl No.</i>	<i>District Name</i>	<i>Number</i>	<i>Name of Selected Schemes</i>
1	Thiruvananthapuram	1	Venpakal Micro watershed
		2	Kizhakkumparathode watershed
		3	Ayiroorparawatershed(RIDF X11)
		4	Valiyakulam Bund Punarudharanam
		5	Kundamuzhy watershed(RIDF X11)
2	Kollam	1	Punnala Chambraman watershed (RIDF X11)
3	Pathanamthitta	1	Kuthiramon watershed
		2	Kumblatham watershed
4	Alappuzha	1	Arunooram Paadam
		2	Nanekadpadashekaram
		3	Naalupadam Bund Nirmanam
		4	Koladikad Padashekaram
		5	Ottaveli Padashekaram
5	Kottayam	1	Neeramthanam
		2	Aruvickal thode Neerthadavikasanapadthathy
		3	Karimpanoli Neerthadavikasanapadthathy
		4	Manjukulam Neerthadavikasanapadthathy
6	Idukki	1	RIDF XV
		2	RIDF XII Nellipara-Nalumukku
7	Ernakulam	1	Kuzhumberithodu watershed project
		2	Kadavoor muri watershed project
		3	Panakkara watershed project
		4	Maniyathram Neerampuzha watershed project
		5	Mekadambu watershed project
8	Trissur	1	Wadakkanchery watershed
9	Palakkad	1	Umanaadi watershed
		2	Malappuram watershed project
		3	Meenvallam watershed
		4	Thadukkassery watershed

<i>Sl No.</i>	<i>District Name</i>	<i>Scheme Number</i>	<i>Name of Selected Schemes</i>
10	Kozhikode	1	VatachiraJhanniyaadproject
		2	Mavilpadi watershed
		3	MundomKandom Watershed
		4	Muthukutty-valayam(RIDF)
		5	MaavullaChaalil (RIDF)
11	Malappuram	1	Palliyarathode watershed
		2	Puliyakkode Watershed
		3	Pulluttaruthodewatershed
		4	Kizhikallingalwatershed
		5	Chekkunnu watershed
12	Kannur	1	Vempuzhawatershed
		2	Palliyarathoduwatershed(RIDF XV)
		3	Nellikutty watershed
		4	Santhinagar Watershed
		5	AranguMannamkundu Watershed
13	Kasargod	1	MalamkadavWatershedscheme (WGDP)
		2	ChullikaraWatershedscheme(WGDP)
		3	VarakkadWatershedscheme(WGDP)
		4	KothodWatershedscheme(WGDP)

Table-1
Statement showing stratum wise distribution of selected beneficiaries
(Area in acres)

Sl No.	Districts	No of schemes selected	Stratum 1		Stratum 2		Stratum 3		Stratum 4		Total	
			No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	5	114	30.120	11	16.780		0.000		0.000	125	46.900
2	Kollam	1	108	37.140	16	21.490	1	3.840		0.000	125	62.470
3	Pathanamthitta	2	105	30.640	20	27.360		0.000		0.000	125	58.000
4	Alappuzha	5	60	32.140	41	61.100	18	64.400	6	32.310	125	189.950
5	Kottayam	4	50	20.930	64	109.000	7	27.110	4	28.350	125	185.390
6	Idukki	2	16	10.116	109	208.800		0.000		0.000	125	218.916
7	Ernakulam	5	81	45.230	40	61.450	4	12.500		0.000	125	119.180
8	Thrissur	1	64	33.140	56	88.220	4	14.080	1	7.340	125	142.780
9	Palakkad	4	33	16.720	42	71.140	31	90.660	19	108.000	125	286.520
10	Malappuram	5	33	19.920	42	73.380	33	121.400	17	129.130	125	343.830
11	Kozhikode	5	57	30.330	56	81.850	11	39.300	1	5.000	125	156.480
12	Kannur	5	38	23.150	57	94.800	17	59.320	13	80.060	125	257.330
13	Kasargod	4	27	15.795	42	71.420	29	98.650	27	142.120	125	327.985
Total		48	786	345.371	596	986.790	155	531.260	88	532.310	1625	2395.731

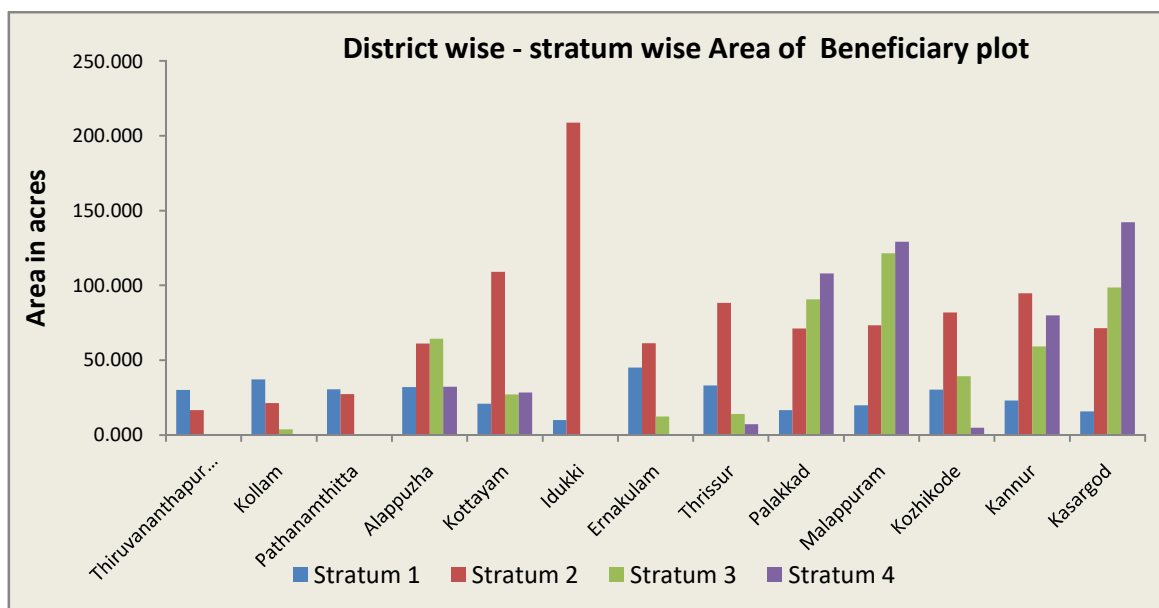
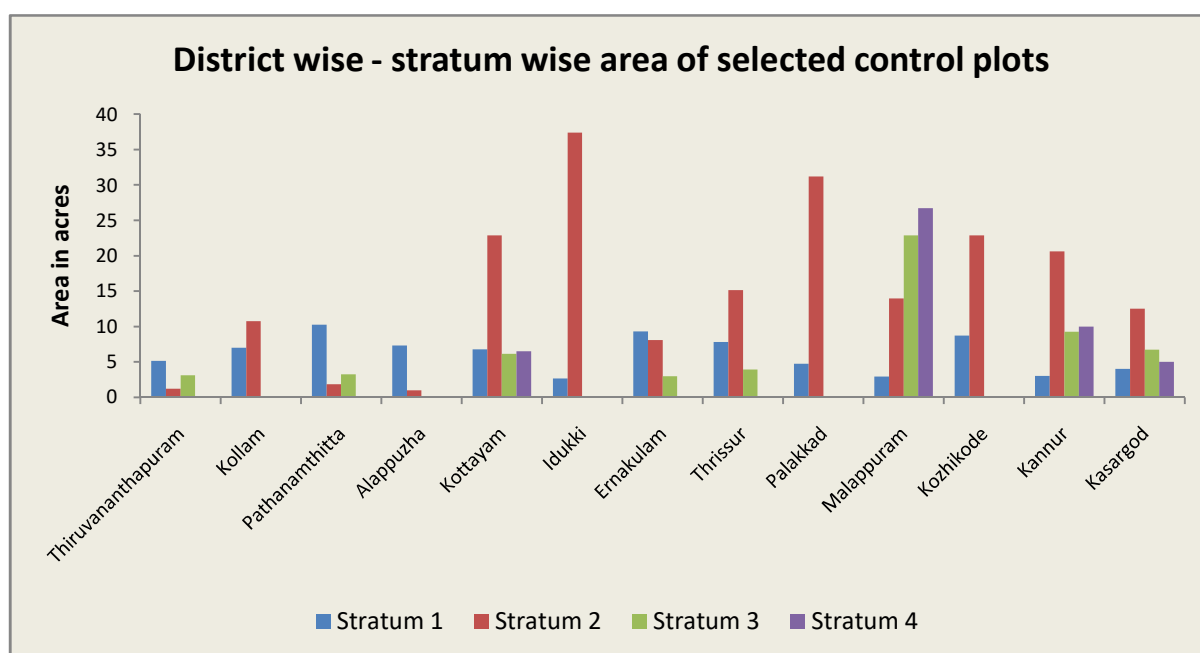


TABLE 1(a)
Statement showing stratum wise distribution of selected Control Plots
(Area in acres)

Sl No.	Districts	No of schemes selected	Stratum 1		Stratum 2		Stratum 3		Stratum 4		Total	
			No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	5	23	5.150	1	1.200	1	3.100		0.000	25	9.450
2	Kollam	1	16	7.020	9	10.740		0.000		0.000	25	17.760
3	Pathanamthitta	2	23	10.260	1	1.870	1	3.250		0.000	25	15.380
4	Alappuzha	5	24	7.300	1	1.000		0.000		0.000	25	8.300
5	Kottayam	4	10	6.790	12	22.870	2	6.130	1	6.500	25	42.290
6	Idukki	2	5	2.650	20	37.400		0.000		0.000	25	40.050
7	Ernakulam	5	17	9.300	7	8.100	1	3.000		0.000	25	20.400
8	Thrissur	1	13	7.800	11	15.150	1	3.920		0.000	25	26.870
9	Palakkad	4	9	4.760	16	31.200		0.000		0.000	25	35.960
10	Malappuram	5	5	2.950	8	13.950	7	22.880	5	26.690	25	66.470
11	Kozhikode	5	14	8.730	11	22.890		0.000		0.000	25	31.620
12	Kannur	5	7	3.050	14	20.630	2	9.260	2	10.000	25	42.940
13	Kasargod	4	10	4.010	7	12.500	2	6.750	1	5.000	20	28.260
Total		48	176	79.770	118	199.500	17	58.290	9	48.190	320	385.750



The total number of beneficiaries comes to 1625. About 48.37% of the beneficiaries are holding area less than one acre, 36.68% are holding area one acre or more but less than 3 acres, 9.54% are holding area 3 acre or more but less than 5 acres and 5.41% of the beneficiaries are holding area of more than 5 acres. In order to compare the benefits of the implemented Soil Conservation Programmes, control plots were also selected. Its distribution is 55%, 36.88%, 5.31% and 2.81% 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 Soil erosion and after effects

Soil erosion is the displacement of upper layer of soil. It is one form of soil degradation. Soil erosion as “soil cancer” is a complex process and its multiple obvious and hidden social and environmental impacts are threat for the human existence.

Soil erosion is one of the most serious environmental problem in the world today and with decreased soil fertility causes the destruction of our natural eco system. In an over view of global erosion and sedimentation stated that more than 50% of the world’s forest land and about 80% of agricultural land suffer from significant erosion.

The main problems caused by soil erosion include risk to food security, decline in aesthetic landscape beauty, increase in the probability of flood in the flood planes, reduce the quality of water and loss of aquatic biodiversity in rivers and lakes by pollution eutrophication, decrease in soil fertility and productivity, transformation of land into fallow land etc. In India about 53% of the total land area is prone to erosion and has estimated that about 5334 metric tons of soil is being detached annually due to various reasons.

Soil erosion is most prevalent in Western Ghats mountain sides of Kerala. In Kerala 48% of the total land area is highland and 40% of the total land area is in midland. High intensity of rain fall and steepness of slope have contributed in general to the higher soil loss in certain pockets of the state. 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. Studies showed that major portion of Kerala (51.98%) falls in 0-5 tons ha/1 year/ 1 soil loss categories and less than 5% of the area is subjected to severe form of soil erosion.

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 less 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. 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 residue in the soil and 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 for 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;

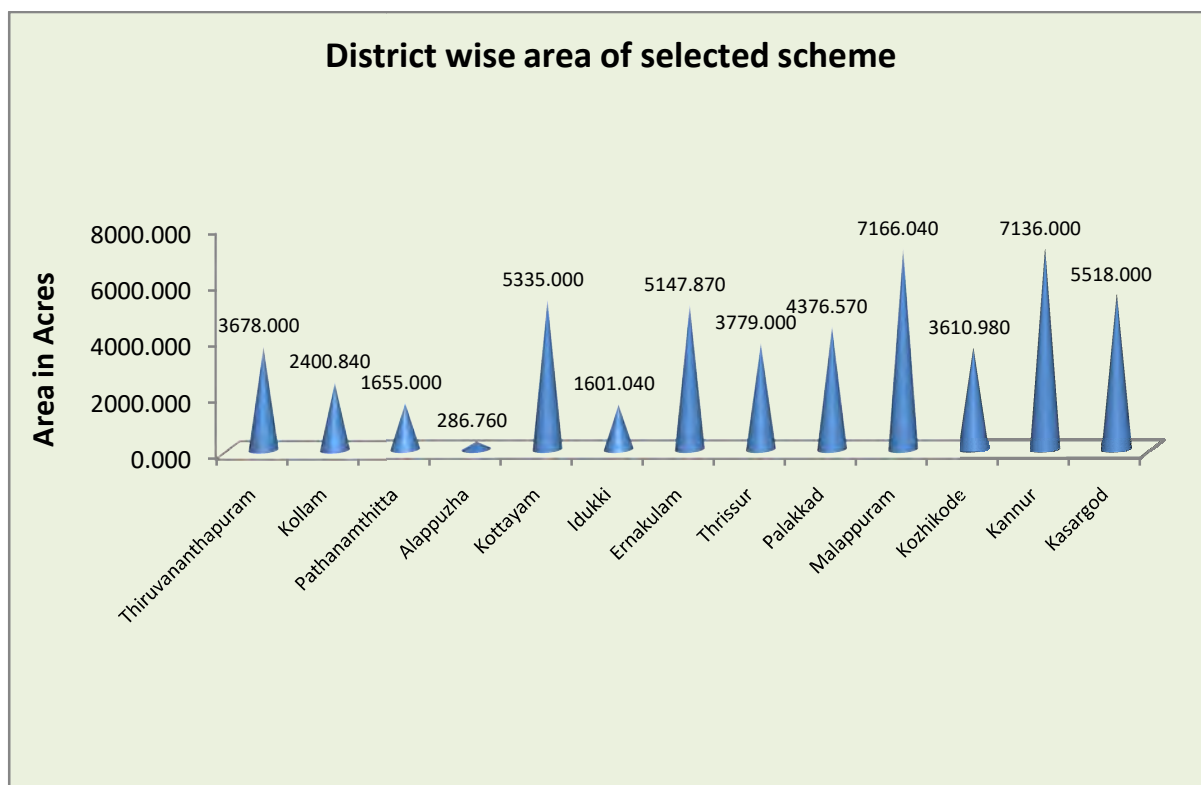
Soil can be well maintained through bundling (mechanical and mechanical-cum-vegetative barriers), deep ploughing, levelling, smoothening, etc. Bunding was accepted by farmers to strengthen existing bunds without any obstruction in their plot. Moisture conservation on measures increased yield magically.

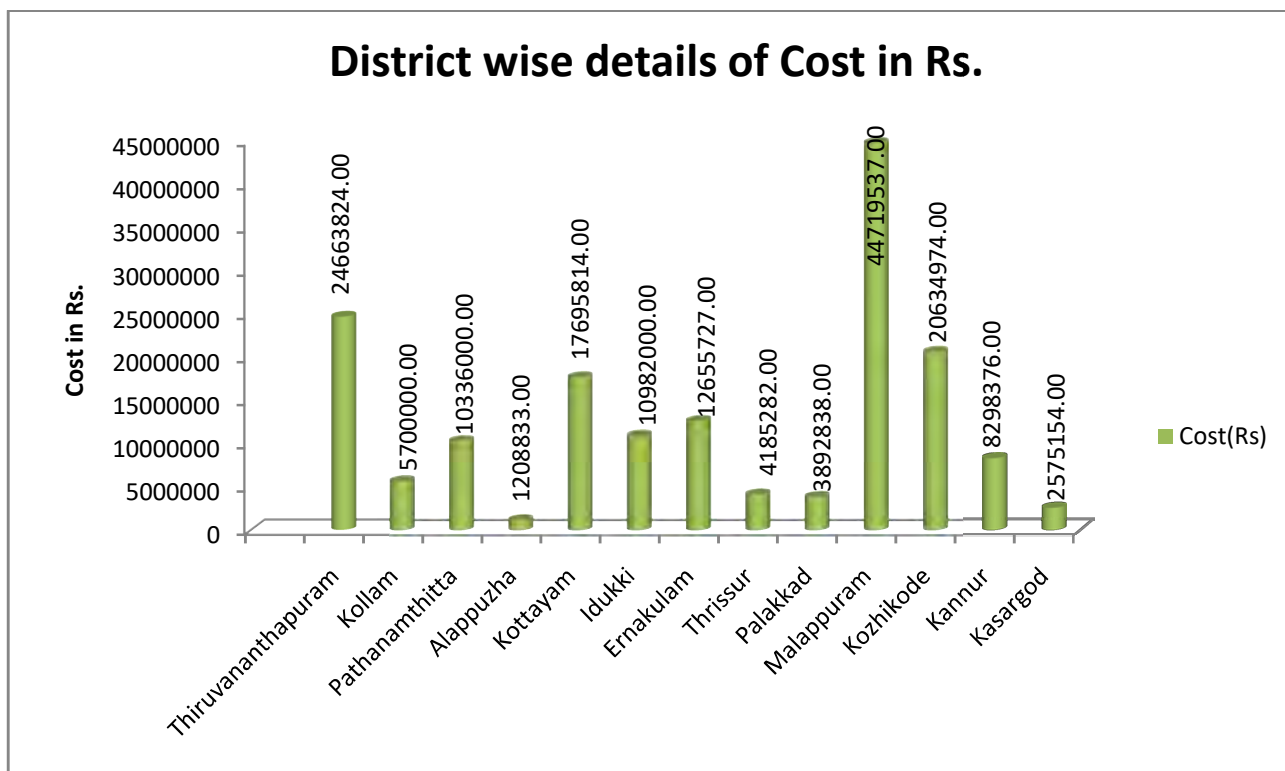
Farmers in different parts reported that the sustainability of agriculture is only possible by soil and water conservation measures. They also reported that soil erosion can be minimized and irrigation potentials can be improved through soil and water conservation measures. In addition, vegetation covering 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 cultivation.

Table – 2
District wise details of area, cost and number of beneficiaries

Sl No.	District	Area(Acres)	Cost(Rs)	Number of beneficiaries	
				Total	Selected
1	2	3	4	5	6
1	Thiruvananthapuram	3678.000	24663824.00	125	125
2	Kollam	2400.840	5700000.00	125	125
3	Pathanamthitta	1655.000	10336000.00	125	125
4	Alappuzha	286.760	1208833.00	125	125
5	Kottayam	5335.000	17695814.00	153	125
6	Idukki	1601.040	10982000.00	347	125
7	Ernakulam	5147.870	12655727.00	125	125
8	Thrissur	3779.000	4185282.00	152	125
9	Palakkad	4376.570	3892838.00	162	125
10	Malappuram	7166.040	44719537.00	300	125
11	Kozhikode	3610.980	20634974.00	283	125
12	Kannur	7136.000	8298376.00	244	125
13	Kasargod	5518.000	2575154.00	255	125
Total		51691.100	167548359.00	2521	1625





Land Use particulars of Beneficiary plots

Table No. 3 and 3(a) shows the land use particulars of beneficiary plots and control plots respectively. There is no increase in cultivated area after soil conservation work. Area decreased from 2198.74 acres to 2197.05 acres. That is 1.69 acres of land not cultivated after SC Work. In other words area under cultivation has decreased from 91.78% to 91.71% by increasing the current fallow from 2.54% to 2.61%.

While examining the district wise data, an increase in area is noted only in Thiruvananthapuram, Idukki, Palakkad and Kannur. But this increase is only 1.64, 0.58, 0.51 and 0.40 Acres respectively. While in Kollam and Malappuram area is decreased.

**Table-3 Land use particulars of Beneficiary Plots
(Area in Acres)**

Sl No.	Districts	Area Cultivated				Current fallow				Other use				Area not Cultivated				Total			
		Before SC Work		After SC Work		Before SC Work		After SC Work		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	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Thiruvananthapuram	40.05	85.39	41.69	88.89	0.72	1.54	0.14	0.30	4.93	10.51	4.87	10.38	1.20	2.56	0.20	0.43	46.90	100.00	46.90	100
2	Kollam	55.59	88.99	54.87	87.83	0.00	0.00	0.00	0.00	6.83	10.93	7.55	12.09	0.05	0.08	0.05	0.08	62.47	100.00	62.47	100
3	Pathanamthitta	57.84	99.72	57.84	99.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.28	0.16	0.28	58.00	100.00	58.00	100
4	Alappuzha	187.72	98.83	187.04	98.47	0.06	0.03	0.06	0.03	1.98	1.04	2.66	1.41	0.19	0.10	0.19	0.10	189.95	100.00	189.95	100
5	Kottayam	173.75	93.72	173.74	93.72	0.18	0.10	0.18	0.10	7.20	3.88	7.21	3.89	4.26	2.30	4.26	2.30	185.39	100.00	185.39	100
6	Idukki	189.52	86.57	190.10	86.84	4.17	1.90	4.13	1.89	16.24	7.42	15.82	7.23	8.99	4.11	8.87	4.05	218.92	100.00	218.92	100
7	Ernakulam	113.25	95.02	113.25	95.02	3.15	2.64	3.15	2.64	2.42	2.03	2.42	2.03	0.36	0.30	0.36	0.30	119.18	100.00	119.18	100
8	Thrissur	130.04	91.08	130.04	91.08	0.00	0.00	0.00	0.00	12.74	8.92	12.74	8.92	0.00	0.00	0.00	0.00	142.78	100.00	142.78	100
9	Palakkad	277.82	96.96	278.33	97.14	3.38	1.18	2.82	0.98	1.39	0.49	1.39	0.49	3.93	1.37	3.98	1.39	286.52	100.00	286.52	100
10	Malappuram	315.91	91.88	312.53	90.90	18.28	5.32	21.30	6.19	4.55	1.32	4.91	1.43	5.09	1.48	5.09	1.48	343.83	100.00	343.83	100
11	Kozhikode	153.35	98.00	153.32	97.98	0.00	0.00	0.00	0.00	3.08	1.97	3.11	1.99	0.05	0.03	0.05	0.03	156.48	100.00	156.48	100
12	Kannur	223.86	86.99	224.26	87.15	7.20	2.80	6.95	2.70	19.73	7.67	19.58	7.61	6.54	2.54	6.54	2.54	257.33	100.00	257.33	100
13	Kasargod	280.04	85.38	280.04	85.38	23.75	7.24	23.75	7.24	8.01	2.44	8.01	2.44	16.19	4.94	16.19	4.94	327.99	100.00	327.99	100
Total		2198.74	91.78	2197.05	91.71	60.89	2.54	62.48	2.61	89.10	3.72	90.26	3.76	47.01	1.96	45.94	1.92	2395.73	100.00	2395.73	100

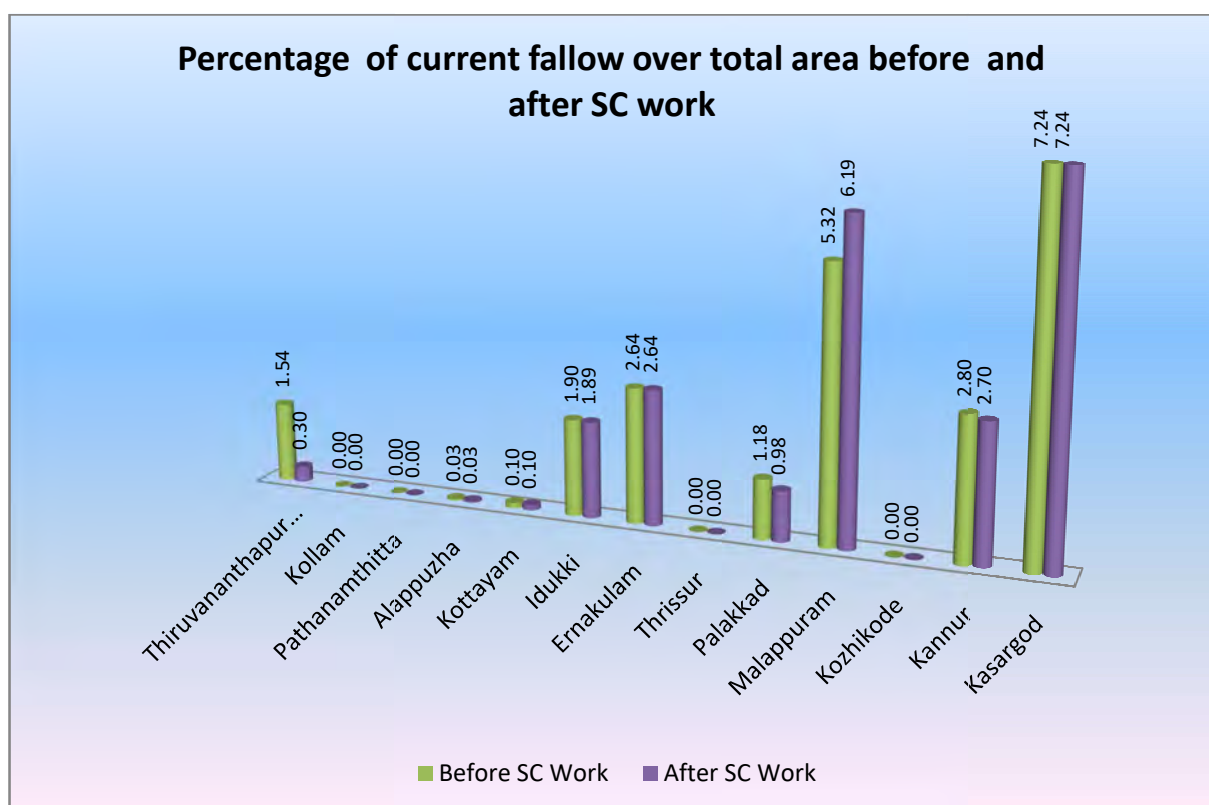
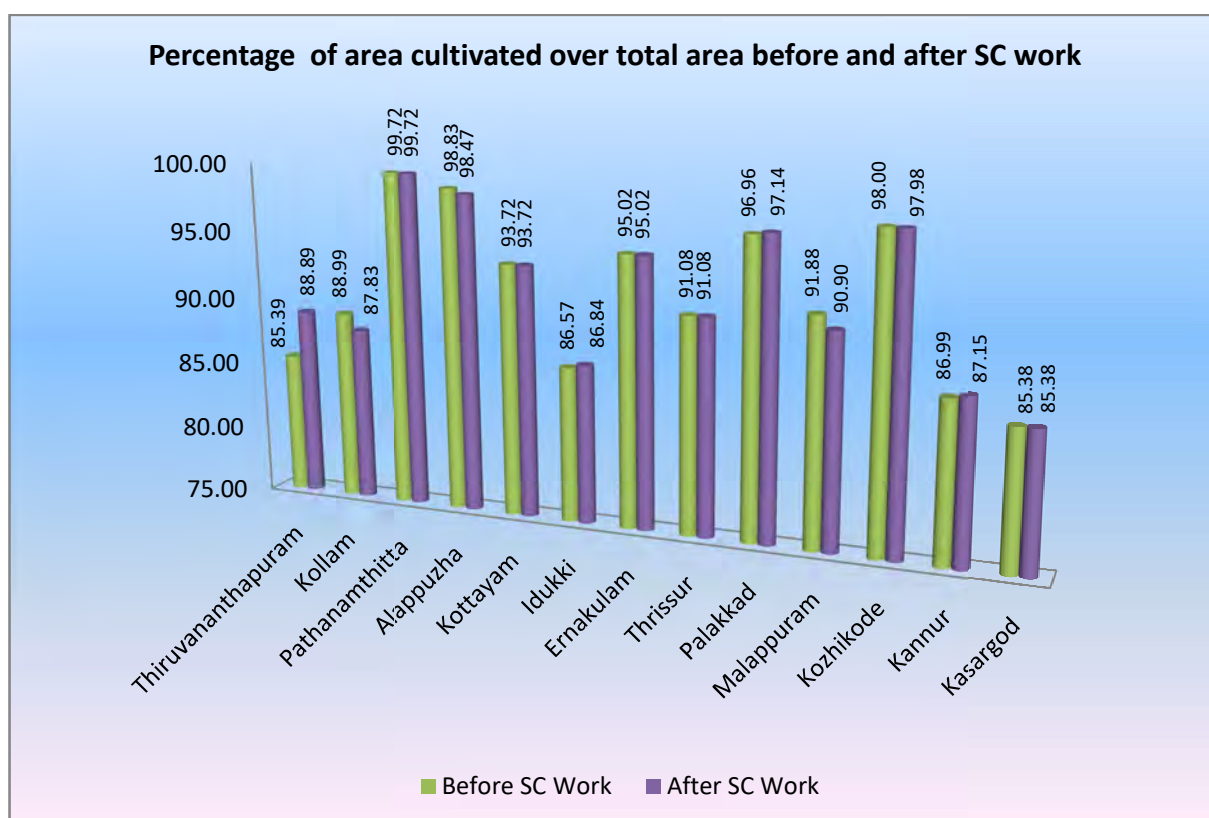
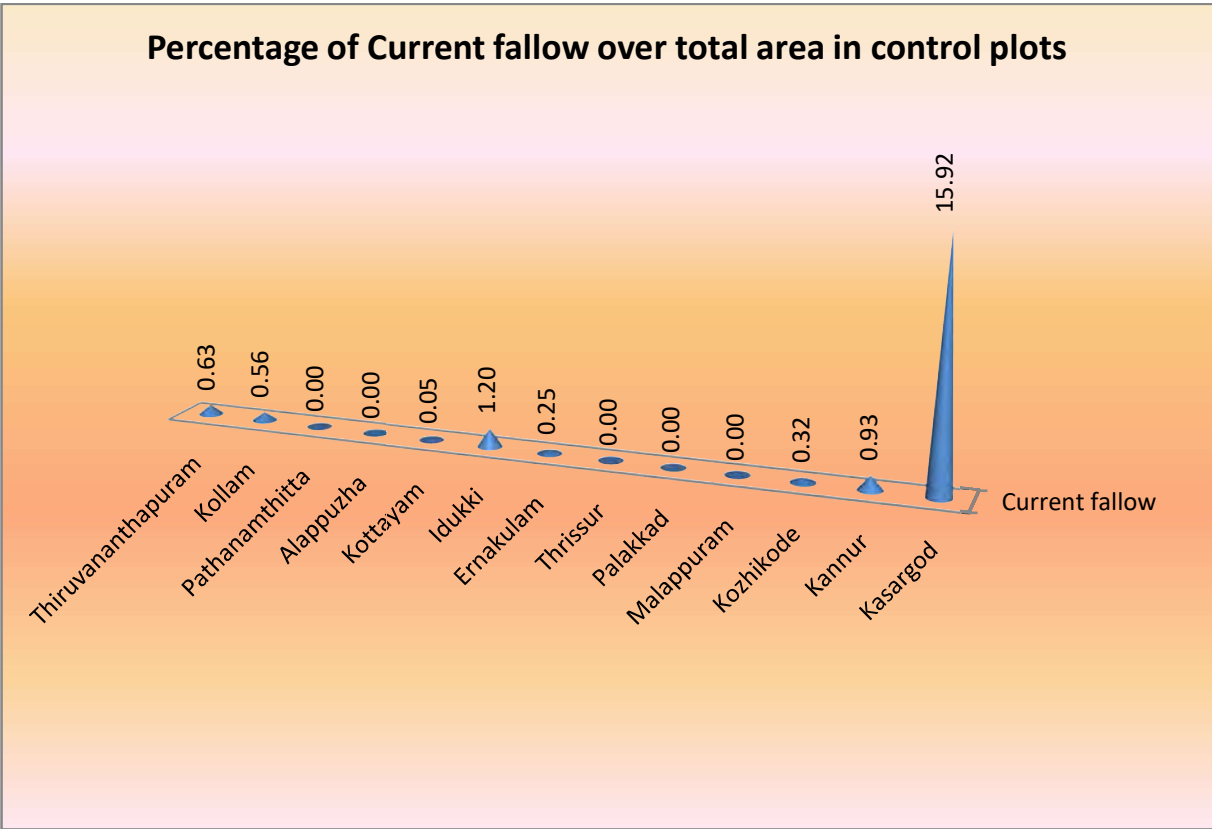
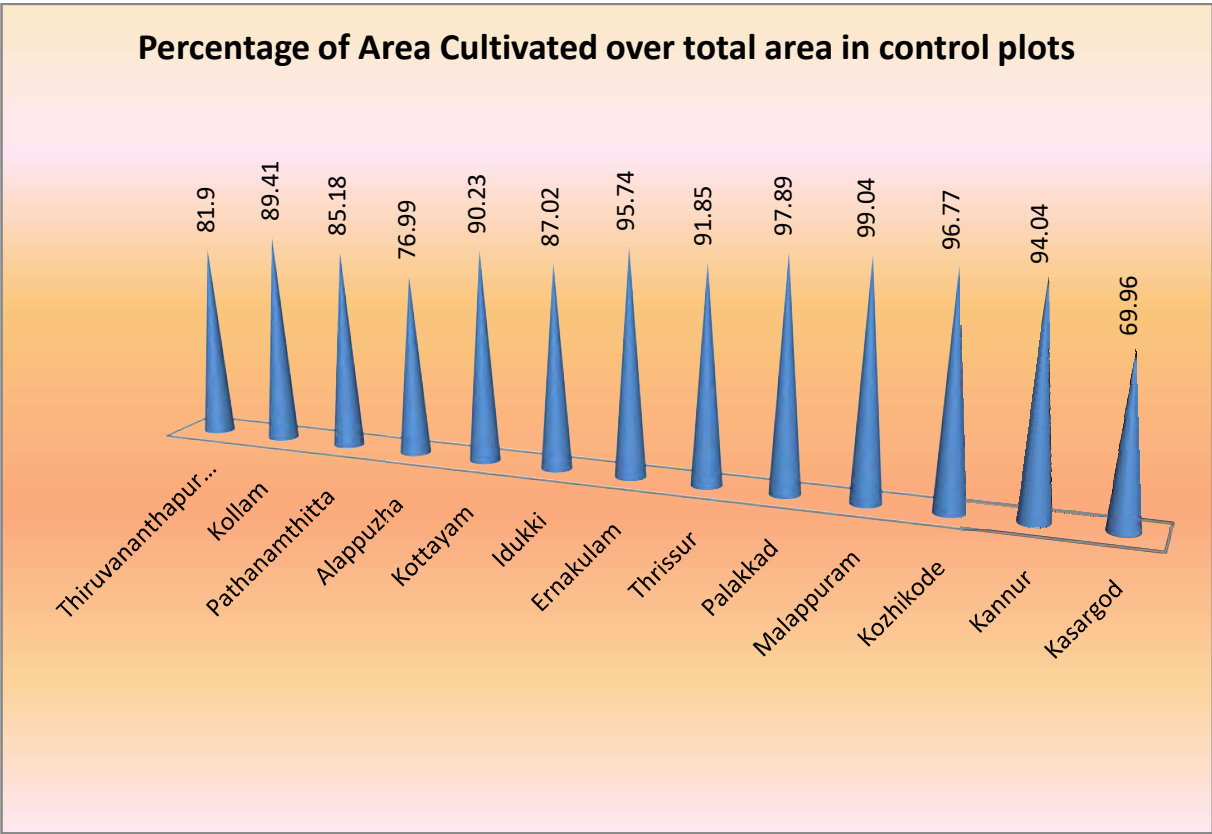


Table-3a											
Land use particulars (Control Plots) in Acres											
Sl No.	Districts	Area Cultivated		Current fallow		Other use		Area not Cultivated		Total	
		Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	7.740	81.90	0.060	0.63	1.130	11.96	0.520	5.50	9.450	100.00
2	Kollam	15.880	89.41	0.110	0.56	1.550	8.73	0.230	1.30	17.760	100.00
3	Pathanamthitta	13.100	85.18	0.000	0.00	2.280	14.82	0.000	0.00	15.380	100.00
4	Alappuzha	6.390	76.99	0.000	0.00	1.710	20.60	0.200	2.41	8.300	100.00
5	Kottayam	38.160	90.23	0.020	0.05	2.560	6.05	1.550	3.67	42.290	100.00
6	Idukki	34.850	87.02	0.480	1.20	2.920	7.29	1.800	4.49	40.050	100.00
7	Ernakulam	19.530	95.74	0.050	0.25	0.740	3.63	0.080	0.39	20.400	100.00
8	Thrissur	24.680	91.85	0.000	0.00	2.190	8.15	0.000	0.00	26.870	100.00
9	Palakkad	35.200	97.89	0.000	0.00	0.760	2.11	0.000	0.00	35.960	100.00
10	Malappuram	65.830	99.04	0.000	0.00	0.640	0.96	0.000	0.00	66.470	100.00
11	Kozhikode	30.600	96.77	0.100	0.32	0.920	2.91	0.000	0.00	31.620	100.00
12	Kannur	40.380	94.04	0.400	0.93	2.160	5.03	0.000	0.00	42.940	100.00
13	Kasargod	19.770	69.96	4.500	15.92	1.340	4.74	2.650	9.38	28.260	100.00
Total		352.110	91.28	5.720	1.48	20.900	5.41	7.030	1.82	385.750	100.00



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-storage 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 area of the humid tropics this higher level tree cover the soil which 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. Table- 4 shows that the area under perennial crops has increased from 68.26% to 68.57%. That is no remarkable increase in the area of perennial crops. Kollam, Alappuzha, Kottayam, Palakkad, Malappuram and Kannur show slight increase in percentage of area of perennial crops. In Thiruvananthapuram, area of perennial crops is seen decreased from 46.94% to 43.77%. At the same time area of seasonal crops in Thiruvananthapuram increases from 53.06% to

56.23%. Pathanamthitta, Idukki, Ernakulam, Trissur, Kozhikode and Kasargod show light increase in area of seasonal crops. In other districts, farmers show negative tendency to cultivate seasonal crops. Total value of area under seasonal crops decreased from 31.74% to 31.43%. From this we can arrive at conclusion that 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.

Table No. 5 reveals that after the introduction of soil conservation programmes, the area of perennial crops Pepper, Aracanut, Coconut, Rubber, Nutmeg Jack, Mango and Coffee shows a positive increase. These are 14.83%, 2.13%, 2.07%, 1.29%, 79.43%, 1.62%, 89.18% and 2.34% respectively. While the variation of area under Cashew have decreased 6.08% after the soil conservation programme.

In seasonal crops, the cultivation of Plantain, Banana, Tapioca, Cheera and Pineapple exhibited comparative increase. The respective percentage changes recorded as 20.37%, 5.21%, 8.82%, 66.67% and 18.98% respectively. While the variation of area under Paddy, Ginger, Elephant foot yam and Colocasia have decreased to 0.12%, 50.66%, 80.99%, and 0.81% respectively after the soil conservation programme.

On analysing 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)

Assessment Year - 2016-2017

Sl No.	Districts	Perennial Crops				Seasonal Crops				Total Gross area cropped			
		Before SC Work		After SC Work		Before SC Work		After SC Work		Before SC Work		After SC Work	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Thiruvananthapuram	29.91	46.94	28.723	43.77	33.805	53.06	36.893	56.23	63.715	100.00	65.616	100.00
2	Kollam	57.051	96.32	67.691	96.34	2.179	3.68	2.571	3.66	59.230	100.00	70.262	100.00
3	Pathanamthitta	66.087	99.84	65.608	99.75	0.104	0.16	0.164	0.25	66.191	100.00	65.772	100.00
4	Alappuzha	5.326	2.81	5.77	3.04	184.106	97.19	184.045	96.96	189.432	100.00	189.815	100.00
5	Kottayam	157.482	96.76	159.225	97.40	5.280	3.24	4.248	2.60	162.762	100.00	163.473	100.00
6	Idukki	129.488	97.75	138.453	97.73	2.984	2.25	3.216	2.27	132.472	100.00	141.669	100.00
7	Ernakulam	66.71	57.74	65.834	57.59	48.816	42.26	48.480	42.41	115.526	100.00	114.314	100.00
8	Thrissur	105.348	80.72	108.101	79.68	25.160	19.28	27.573	20.32	130.508	100.00	135.674	100.00
9	Palakkad	208.686	32.49	209.537	32.58	433.674	67.51	433.522	67.42	642.360	100.00	643.059	100.00
10	Malappuram	249.336	98.19	243.532	98.50	4.595	1.81	3.701	1.50	253.931	100.00	247.233	100.00
11	Kozhikode	118.13	99.27	115.88	98.82	0.871	0.73	1.389	1.18	119.001	100.00	117.269	100.00
12	Kannur	194.089	98.70	199.339	98.73	2.556	1.30	2.556	1.27	196.645	100.00	201.895	100.00
13	Kasargod	237.382	95.39	254.864	94.91	11.460	4.61	13.660	5.09	248.842	100.00	268.524	100.00
Total		1625.025	68.26	1662.557	68.57	755.590	31.74	762.018	31.43	2380.615	100.00	2424.575	100.00

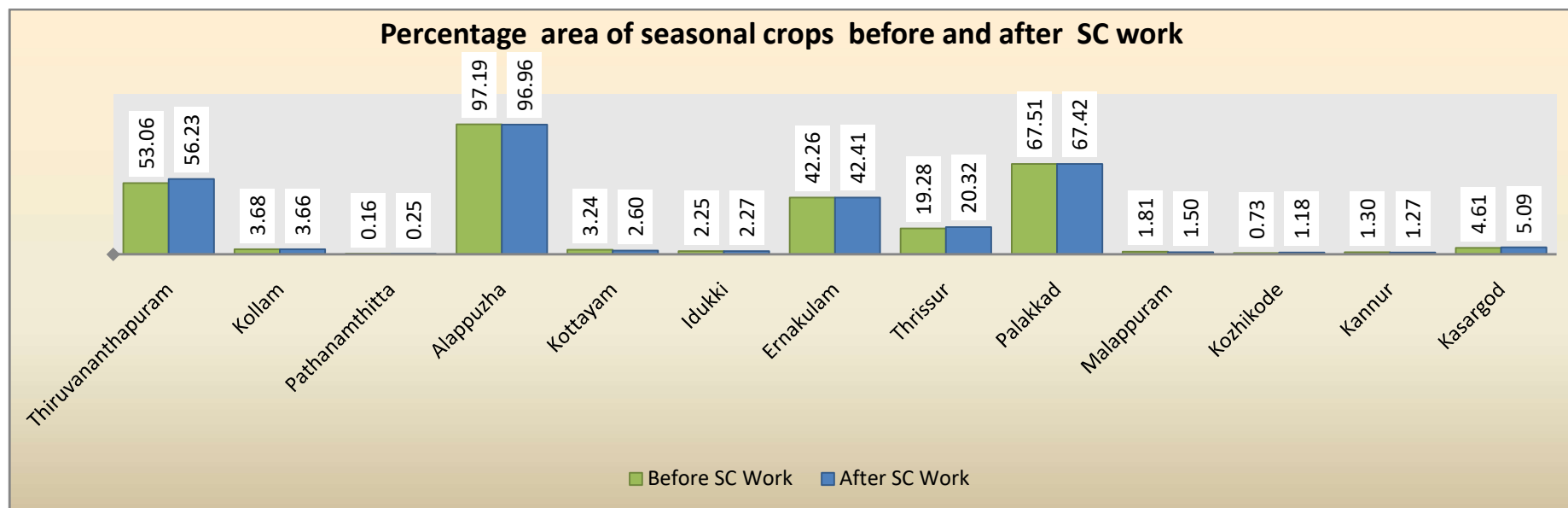
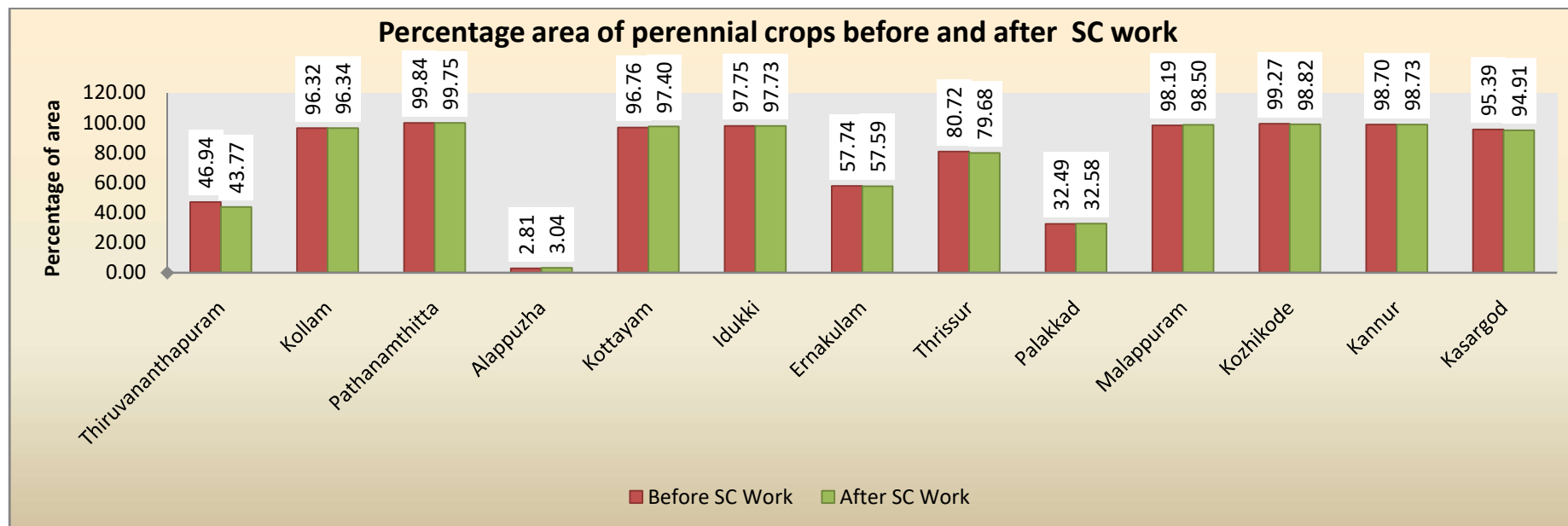


Table 5 – Area under selected perennial crops

SI No.	District	Aracanut			Coconut			Nutmeg		
		Before SC	After SC	%Increase	Before SC	After SC	%Increase	Before SC	After SC	%Increase
		Work	Work		Work	Work		Work	Work	
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>
1	Thiruvananthapuram	0.068	0.068	0	11.965	12.457	4.11			
2	Kollam	0.18	0.221	22.78	5.41	6.243	15.4			
3	Pathanamthitta	0.188	0.254	35.11	2.913	3.062	5.12	0.016	0.016	0
4	Alappuzha	0.075	0.085	13.33	4.581	4.945	7.95			
5	Kottayam	0	0.01	Infinity	7.389	7.343	-0.62	0.206	0.626	203.88
6	Idukki	1.454	1.626	11.83	28.927	32.637	12.83			
7	Eranakulam	1.452	1.407	-3.1	9.502	9.352	-1.58	0.65	0.65	0
8	Thrissur	8.812	9.294	5.47	59.831	61.569	2.9	0.527	0.559	6.07
9	Palakkad	7.037	7.013	-0.34	45.139	45.982	1.87	0.165	0.247	49.7
10	Malappuram	11.016	9.869	-10.41	77.118	76.84	-0.36	0.51	0.51	0
11	Kozhikkode	3.019	3.678	21.83	84.061	84.449	0.46	0.189	0.255	34.92
12	Kannur	3.197	3	-6.16	32.243	32.29	0.15	0.824	0.824	0
13	Kasaragod	26.537	27.851	4.95	72.141	73.196	1.46	0	1.852	Infinity
Total		63.035	64.376	2.13	441.22	450.365	2.07	3.087	5.539	79.43

Table 5 Contd.....

Sl No.	District	Cashew			Pepper(Garbled)			Rubber			Cardamom		
		Before SC	After SC	%Increase	Before SC	After SC	%Increase	Before SC	After SC	%Increase	Before SC work	After SC work	% increase
		Work	Work		Work	Work		Work	Work				
<i>1</i>	<i>2</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>	<i>17</i>	<i>18</i>	<i>19</i>	<i>20</i>	<i>21</i>	<i>22</i>	<i>23</i>
1	Thiruvananthapuram				0.258	0.309	19.77	17.519	15.789	-9.87			
2	Kollam	0.45	0.549	22	1.444	1.491	3.25	48.567	58.057	19.54			
3	Pathanamthitta	0	0.033		0.771	0.813	5.45	60.993	60.152	-1.38			
4	Alappuzha												
5	Kottayam				1.582	2.045	29.27	146.283	147.221	0.64			
6	Idukki				37.762	42.241	11.86						
7	Eranakulam	0.313	0.313	0	0.308	0.3	-2.6	53.407	52.714	-1.3	35.074	35.098	0.07
8	Trissur				0.04	0.047	17.5	36.138	36.632	1.37			
9	Palakkad	0.011	0.011	0	0.044	0.055	25	153.378	153.378	0			
10	Malappuram	2.082	1.781	-14.46	1.821	2.275	24.93	151.34	146.287	-3.34			
11	Kozhikkode	1.079	0.313	-70.99	0.697	1.055	51.36	26.711	23.598	-11.65			
12	Kannur	35.841	35.625	-0.6	1.81	1.831	1.16	117.891	117.546	-0.29			
13	Kasaragod	5.614	4.006	-28.64	6.592	8.547	29.66	116.988	129.862	11			
Total		45.39	42.631	-6.08	53.129	61.009	14.83	929.215	941.236	1.29	35.074	35.098	0.07

Table 5 Contd.....													
Sl No .	District	Jack			Mango			Coffee			Others		
		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	24	25	26	27	28	29	30	31	32	33	34	35
1	Thiruvananthapuram	0.1	0.1	0							0	0	0
2	Kollam	0.65	0.74	13.85	0.35	0.39	11.43				0	0	0
3	Pathanamthitta	1.09	1.12	2.75	0.03	0.07	133.33	0.086	0.088	2.33	0	0	0
4	Alapuzha	0.13	0.13	0	0.54	0.61	12.96				0	0	0
5	Kottayam	1.13	1.09	-3.54				0.892	0.89	-0.22	0	0	0
6	Idukki	0.88	0.89	1.14	1.07	1.1	2.8	24.247	24.771	2.16	0.074	0.09	21.62
7	Eranakulam	0.95	0.96	1.05	0.11	0.12	9.09	0.018	0.018	0	0	0	0
8	Thrissur										0	0	0
9	Palakkad	0.08	0.08	0	2.832	2.771	-2.15				0	0	0
10	Malappuram	3.52	3.63	3.12	1.921	2.312	20.35	0	0.02		0.008	0.008	0
11	Kozhikode	2.37	2.53	6.75				0.004	0.002	-50	0	0	0
12	Kannur	1.85	1.8	-2.7	0.391	6.331	1519.18	0.042	0.092	119.05	0	0	0
13	Kasaragod	9.51	9.55	0.42							0	0	0
Total		22.26	22.62	1.62	7.244	13.704	89.18	25.289	25.881	2.34	0.082	0.098	19.51

Table 5contd.....

Sl No.	District	Total		
		Before SC Work	After SC Work	%Increase
<i>1</i>	<i>2</i>	36	37	38
1	Thiruvananthapuram	29.91	28.723	-3.97
2	Kollam	57.051	67.691	18.65
3	Pathanamthitta	66.087	65.608	-0.6
4	Alappuzha	5.326	5.77	8.34
5	Kottayam	157.482	159.225	0.9
6	Idukki	129.488	138.453	6.92
7	Eranakulam	66.71	65.834	-1.43
8	Thrissur	105.348	108.101	2.61
9	Palakkad	208.686	209.537	0.41
10	Malappuram	249.336	243.532	-2.33
11	Kozhikkode	118.13	115.88	-1.9
12	Kannur	194.089	199.339	2.71
13	Kasaragod	237.382	254.864	9.41
Total		1625.025	1662.557	2.31

Table 6 - Area Under Selected Seasonal Crops

Sl No.	District	Plantain			Banana			Pineapple		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>
1	Thiruvananthapuram	4.236	4.817	13.72	24.919	25.206	1.15	0.050	0.050	0.00
2	Kollam	0.759	0.969	27.67	0.034	0.034	0.00	0.209	0.209	0.00
3	Pathanamthitta	0.104	0.164	57.69						
4	Alappuzha	0.456	0.615	34.87						
5	Kottayam	0.291	0.527	81.10	0.669	1.021	52.62	0.040	0.300	650.00
6	Idukki	0.675	0.735	8.89	1.469	1.595	8.58			
7	Eranakulam	0.898	0.920	2.45	5.018	4.580	-8.73	0.890	0.970	8.99
8	Trissur	5.221	7.597	45.51	0.099	0.136	37.37			
9	Palakkad	0.125	0.118	-5.60	0.029	0.034	17.24			
10	Malappuram	0.553	0.602	8.86	0.549	0.585	6.56			
11	Kozhikkode	0.501	0.739	47.50				0.020	0.020	0.00
12	Kannur	1.613	1.613	0.00	0.316	0.316	0.00			
13	Kasaragod	4.920	5.082	3.29	2.524	3.969	57.25	0.793	0.833	5.04
Total		20.352	24.498	20.37	35.626	37.476	5.21	2.002	2.382	18.98

Table 6 –Contd...

SL No.	District	Tapioca			Cheera			Paddy		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
<i>1</i>	<i>2</i>	<i>12</i>	<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>	<i>17</i>	<i>18</i>	<i>19</i>	<i>20</i>
1	Thiruvananthapuram	4.600	6.820	48.26						
2	Kollam	1.140	1.322	15.96						
3	Pathanamthitta									
4	Alappuzha	0.000	0.200	Infinity	0.100	0.300	200.00	183.440	182.760	-0.37
5	Kottayam	3.780	2.400	-36.51						
6	Idukki	0.840	0.886	5.48						
7	Eranakulam	5.450	5.450	0.00	0.200	0.200	0.00	36.070	36.070	0.00
8	Thrissur							19.840	19.840	0.00
9	Palakkad							433.520	433.370	-0.03
10	Malappuram	0.800	0.800	0.00						
11	Kozhikkode	0.350	0.630	80.00						
12	Kannur	0.627	0.627	0.00						
13	Kasaragod	2.823	3.076	8.96						
Total		20.410	22.211	8.82	0.300	0.500	66.67	672.870	672.040	-0.12

Table 6 – Contd.....										
SL No.	District	Ginger			Yam			Elephant Foot 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	21	22	23	24	25	26	27	28	29
1	Thiruvananthapuram									
2	Kollam	0.027	0.027	0.00	0.010	0.010	0.00			
3	Pathanamthitta									
4	Alappuzha									
5	Kottayam	0.500	0.000	-100.00						
6	Idukki									
7	Eranakulam	0.050	0.050	0.00						
8	Trissur									
9	Palakkad									
10	Malappuram	0.010	0.010	0.00				1.210	0.230	-80.99
11	Kozhikkode									
12	Kannur									
13	Kasaragod	0.400	0.400	0.00						
TOTAL		0.987	0.487	-50.66	0.010	0.010	0.00	1.210	0.230	-80.99

Table 6 – Contd.....

SL NO.	District	Colacasia			Turmeric			Tamarind			Chenai		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
<i>1</i>	<i>2</i>	<i>30</i>	<i>31</i>	<i>32</i>	<i>33</i>	<i>34</i>	<i>35</i>	<i>36</i>	<i>37</i>	<i>38</i>	<i>39</i>	<i>40</i>	<i>41</i>
1	Thiruvananthapuram												
2	Kollam												
3	Pathanamthitta												
4	Alappuzha										0.110	0.170	54.55
5	Kottayam												
6	Idukki												
7	Eranakulam												
8	Trissur												
9	Palakkad												
10	Malappuram	1.240	1.230	-0.81	0.050	0.050	0.00	0.183	0.194	6.01			
11	Kozhikkode												
12	Kannur												
13	Kasaragod				0.000	0.300							
TOTAL		1.240	1.230	-0.81	0.050	0.350	600.00	0.183	0.194	6.01	0.110	0.170	54.55

Table 6 – Contd.....

SI No.	District	Others			Total		
		Before SC Work	After SC Work	% of Increase	Before SC Work	After SC Work	% of Increase
<i>1</i>	<i>2</i>	<i>42</i>	<i>43</i>	<i>44</i>	<i>45</i>	<i>46</i>	<i>47</i>
1	Thiruvananthapuram	0.000	0.000	0.00	33.805	36.893	9.13
2	Kollam	0.000	0.000	0.00	2.179	2.571	18.22
3	Pathanamthitta	0.000	0.000	0.00	0.104	0.164	57.69
4	Alappuzha	0.000	0.000	0.00	184.106	184.045	0.08
5	Kottayam	0.000	0.000	0.00	5.280	4.248	-19.55
6	Idukki	0.000	0.000	0.00	2.984	3.216	7.77
7	Eranakulam	0.240	0.240	0.00	48.816	48.480	-0.66
8	Trissur	0.000	0.000	0.00	25.160	27.573	9.59
9	Palakkad	0.000	0.000	0.00	433.674	433.522	0.72
10	Malappuram	0.000	0.000	0.00	4.595	3.701	-15.13
11	Kozhikkode	0.000	0.000	0.00	0.871	1.389	59.47
12	Kannur	0.000	0.000	0.00	2.556	2.556	0.00
13	Kasaragod	0.000	0.000	0.00	11.460	13.660	19.20
TOTAL		0.240	0.240	0.00	755.590	762.018	0.85

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 reveal 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 Kasargod district, total gross cropped area is more increased. In this district, gross cropped area before soil conservation work was 248.842 Acres. It is increased to 268.524 acres after the implementation of soil conservation measures. The increase in area is accounted as 19.682 acres. The percentage of increase recorded as 7.91. When we analyse the yield of perennial crops in Kasargod district, it can be seen that production of Coconut, Aracanut and Rubber 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. Four districts Kollam, Alappuzha, Idukki and Thrissur all the perennial crops show positive increase.

In Thiruvananthapuram, Kollam, Idukki, Trissur, and Kannur districts before soil conservation work the total gross cropped area were 63.715, 59.23, 132.472, 130.508 and 196.645 acres respectively. It is increased 65.616, 70.262, 141.669, 135.674 and 201.895 and respectively after the implementation of soil conservation work. Increase in area accounted as 1.90, 11.03, 9.197, 5.17 and 5.25 respectively.

While in Pathanamthitta, Ernakulam, Malappuram and Kozhikode total gross cropped area is decreased after soil conservation works. State total from table 5 and 6 reveals that productions of almost all perennial crops and seasonal crops are increased, except cashew, paddy, ginger, Colacasia, elephant footyam, after soil conservation works.

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	9
Thiruvananthapuram	Pepper(dry)	Quintal	0.54	10710	0.69	42676.5	13685	27.778
	Rubber (Garbled)	Quintal	358.85	7845358.15	333.85	3402141.76	7298795.63	-6.967
	Coconut(with husk)	Nos.	28155	218764.35	29855	331390.5	231973.35	6.038
	Coconut(without husk)	Nos.	270	2033.1	275	2865.5	2070.75	1.852
	Aracanut	Nos.	3700	2146	3975	6121.5	2305.5	7.432
	Jack	Quintal	9.3	1116	9.5	6322.53	1140	2.151
	Total			8080127.6		3791518.29	7549970.22	
Kollam	pepper(Pepper dry)	Quintal	0.08	1548.48	0.255	15901.73	4935.77	218.75
	pepper(Pepper green)	Quintal	3.962	27658.05	6.361	120328.91	44405.06	60.55
	Rubber(Rubber garbled)	Quintal	1.2	23829.37	2	21926.56	39715.62	66.667
	Rubber(Rubber ungarbled)	Quintal	546.526	10612398.14	507.838	5308435.67	9861157.66	-7.079
	coconut(With husk)	Number	15691.5	153776.7	20225	316925.75	198205	28.891
	coconut(Without husk)	Number	510	4794	520	8086	4888	1.961
	Aracanut	Number	8906	5165.48	11940	17193.6	6925.2	34.067
	Jack	Quintal	14.73	8056.41	21.035	17305.71	11504.88	42.804
	mango	Quintal	4.99	4767.1	7.5	19987.5	7164.98	50.301
	Cashew	Quintal	3.65	25550	5.55	48548.63	38850	52.055
	Total			10867543.73		5894640.06	10217752.16	

Pathanamthitta	pepper(Pepper dry)	Quintal	4.24	88090.17	9.44	608557.41	196125.16	122.642
	pepper(Pepper green)	Quintal	0.2	1314.17	0.5	9583.34	3285.41	150
	Rubber(Rubber garbled)	Quintal	6.86	138444.33	10.78	119813.45	217555.38	57.143
	Rubber(Rubber ungarbled)	Quintal	219.79	4236498.39	297.85	2940646.23	5741121.3	35.516
	coconut(With husk)	Number	709	6324.28	2134	28552.92	19035.28	200.987
	coconut(Without husk)	Number	12	114	120	1718.4	1140	900
	Arecanut	Number	624.00	305.76	1891.00	2760.86	926.59	203.045
	Total			4471091.1		3711632.61	6179189.12	
Alappuzha	coconut(With husk)	Number	9531	78821.37	10722	130701.18	88670.94	12.496
	Arecanut	Number	3802.06	1824.99	4650.08	7672.63	2232.04	22.304
	mango	Quintal	21.61	32847.2	24.74	54840.15	37604.8	14.484
	Total			113493.56		193213.96	128507.78	
Kottayam	pepper(Pepper dry)	Quintal	15.1	325464.83	8.015	720187.91	172754.99	-46.921
	Rubber(Rubber garbled)	Quintal	23	464628.75	60	512437.9	1212075	160.87
	Rubber(Rubber ungarbled)	Quintal	1745.98	33682869.94	1442.5	14622146.5	27828233.98	-17.382
	coconut(With husk)	Number	22215	186606	29009	382048.53	243675.6	30.583
	coconut(Without husk)	Number	1170	10342.8	1528	21132.24	13507.52	30.598
	Jack	Quintal	16.2	4079.16	27	11880	6798.6	66.667
	Nutmeg	Quintal	0.27	7625.34	0.41	8116.36	11579.22	51.852
	coco(with husk)	Quintal	4.05	3760.7	3.44	5618.64	3194.28	-15.062
	coco(without husk)	Quintal	2.5	8411.45	2.7	11769.39	9084.37	8
	coffee(Dry robusta)	Quintal	6.65	31767.6	9.02	56575.43	43089.26	35.639
	Total			34725556.57		16297799.99	29543992.81	

Idukki	pepper(Pepper dry)	Quintal	84.99	1835695.6	104.5	6699465.68	2257091.32	22.956
	coconut(Without husk)	Number	77317	671884.73	97331	1475537.96	845806.39	25.886
	Aracanut	Number	197039	104430.67	232592	216310.56	123273.76	18.044
	Jack	Quintal	165.06	20632.5	197.37	32072.62	24671.25	19.575
	mango	Quintal	116.15	116150	129.91	129910	129910	11.847
	clove	Quintal	0.04	16.3	0.054	39.16	21.99	35
	coffee(Dry robusta)	Quintal	365.06	1727635.55	425.17	2477440.08	2012104.27	16.466
	Cardamom	Quintal	109.79	11097682.99	173.58	10057919.52	17545639.98	58.102
	Total			15574128.34		21088695.58	22938518.97	
Eranakulam	pepper(Pepper dry)	Quintal	1.135	24089.19	1.955	120969.69	41492.84	72.247
	Rubber(Rubber ungarbled)	Quintal	438.3	8409789.2	485.66	4786179.3	9318499.26	10.805
	coconut(With husk)	Number	12538	108579.08	15574	179256.74	134870.84	24.214
	coconut(Without husk)	Number	17151	146984.07	21814	263731.26	186945.98	27.188
	Aracanut	Number	146368	84893.44	172717	151990.96	100175.86	18.002
	Jack	Quintal	66.4	16600	85.4	53802	21350	28.614
	mango	Quintal	3.3	4686.46	4.75	9143.75	6745.66	43.939
	Cashew	Quintal	4.3	24999.72	5.53	42846.44	32150.81	28.605
	Nutmeg	Quintal	10.81	297610.11	13.62	272495.34	374972.22	25.994
	coco(without husk)	Quintal	16.65	52910.02	21.86	93132.59	69466.27	31.291
	Total			9171141.29		5973548.07	10286669.74	
Thrissur	pepper(Pepper dry)	Quintal	0.09	1818.73	0.17	10448.04	3435.39	88.889
	Rubber(Rubber garbled)	Quintal	102.4	1947164.67	273.5	3151803.07	5200679.08	167.09
	coconut(With husk)	Number	970	6479.6	1570	16563.5	10487.6	61.856
	coconut(Without husk)	Number	94432	645914.88	162777	1673347.56	1113394.68	72.375
	Aracanut	Number	204890	133178.5	372130	699604.4	241884.5	81.624
	Nutmeg	Quintal	0	0	0.49	9978.36	12949.23	
	Total			2734556.38		5561744.93	6582830.48	

Palakkad	pepper(Pepper dry)	Quintal	0.34	7061.06	0.39	24621.19	8099.45	14.706
	Rubber(Rubber garbled)	Quintal	36.8	733265.39	40.6	440679.3	808983.01	10.326
	Rubber(Rubber ungarbled)	Quintal	1381.35	26290654.39	1485.25	14929242.88	28268139.45	7.522
	coconut(With husk)	Number	239710	1608454.1	251300	2211440	1686223	4.835
	Aracanut	Number	911050	455525	936750	1386390	468375	2.821
	Jack	Quintal	0.98	794.85	1.12	922.13	908.4	14.286
	mango	Quintal	50.65	62625.21	57.9	154014	71589.3	14.314
	Cashew	Quintal	0.07	399.67	0.07	672.19	399.67	0
	Nutmeg	Quintal	0	0	0.03	664.14	768.09	
	Total			29158779.67		19148645.83	31313485.36	
Malappuram	pepper(Pepper dry)	Quintal	2.17	45560.94	2.67	168080.21	56058.87	23.041
	Rubber(Rubber garbled)	Quintal	646.13	12991251.35	752.39	8328016.89	15127741.44	16.446
	Rubber(Rubber ungarbled)	Quintal	194.4	3653909.33	44.4	442358.09	834534.85	-77.16
	coconut(With husk)	Number	8640	52444.8	9396	73852.56	57033.72	8.75
	coconut(Without husk)	Number	402160	2304376.8	439061	3455410.07	2515819.53	9.176
	Aracanut	Number	815645	350727.35	733763	873177.97	315518.09	-10.039
	Jack	Quintal	75.34	6022.65	73.37	45565.69	5865.2	-2.615
	mango	Quintal	8.02	9985.94	10.59	25283.66	13185.93	32.045
	Cashew	Quintal	15.8	100362.87	4.67	44689.29	29664.21	-70.443
	Nutmeg	Quintal	1.22	25620	1.58	34298.64	33180	29.508
	Total			19540262.03		13490733.07	18988601.83	

Kozhikkode	pepper(Pepper dry)	Quintal	0.99	20787.25	1.59	99132.06	33385.58	60.606
	Rubber(Rubber ungarbled)	Quintal	318.9	6104055.34	311	3032250	5952841.67	-2.477
	coconut(With husk)	Number	256370	1556165.9	274800	2610600	1668036	7.189
	Aracanut	Number	100100	53053	125200	131460	66356	25.075
	Cashew	Quintal	4.9	32146.06	1	10100	6560.42	-79.592
	Nutmeg	Quintal	0.16	4714.4	0.32	6824.32	9428.8	100
	Total			7779021.95		5890366.38	7736608.47	
Kannoor	pepper(Pepper dry)	Quintal	5.52	115755.15	7.62	478080.95	159792.47	38.043
	Rubber(Rubber ungarbled)	Quintal	438.35	8305071.14	642.2	6272508.68	12167256.06	46.504
	coconut(With husk)	Number	106100	555964	129575	1142851.5	678973	22.125
	coconut(Without husk)	Number	800	4184	1000	9340	5230	25
	Aracanut	Number	420000	226800	474300	877455	256122	12.929
	mango	Quintal	8	10520	10	26250	13150	25
	Cashew	Quintal	119.62	841576.96	148.5	1551825	1044759.87	24.143
	Nutmeg	Quintal	0	0	0.3	7028.7	4200	
	coco(without husk)	Quintal	2.4	7986	7.05	35250	23458.88	193.75
	Total			10067857.25		10400589.83	14352942.27	
Kasaragod	pepper(Pepper dry)	Quintal	215.24	4454570.49	289.43	18026062.3	5989994.08	34.469
	Rubber(Rubber ungarbled)	Quintal	1047.67	19654729.23	1306.39	12955025.44	24508425.08	24.695
	coconut(With husk)	Number	291561	1863074.79	349227	3153519.81	2231560.53	19.778
	Aracanut	Number	3434295	3159551.4	3918270	6073318.5	3604808.4	14.092
	Cashew	Quintal	54.49	390114.61	67.68	717831.04	484546.84	24.206
	Nutmeg	Quintal	0	0	20.24	533202.56	432630	
	coco(without husk)	Quintal	0	0	96.02	506505.5	307264	
	Total			29522040.52		41965465.15	37559228.93	

Table 7 Contd.....

1	2	3	4	5	6	7	8	9
Kerala	pepper(Pepper dry)	Quintal	330.435	6931151.89	426.725	26806433.66	8950915.582	29.14
	pepper(Pepper green)	Quintal	4.162	28972.22	6.861	129912.25	47760.30789	64.849
	Rubber(Rubber garbled)	Quintal	1175.24	24143942.01	1473.12	16130456.03	30263540.94	25.346
	Rubber(Rubber ungarbled)	Quintal	6331.27	120949975.1	6523.09	65288792.79	124614465.9	3.03
	coconut(With husk)	Number	992191	6395454.97	1123387	10577702.99	7230636.288	13.223
	coconut(Without husk)	Number	593822	3790628.38	724426	6911168.99	4624331.458	21.994
	Aracanut	Number	6246419	4577601.59	6988178	10443455.98	5121189.402	11.875
	Jack	Quintal	348.01	57301.57	414.795	167870.68	68298.051	19.191
	mango	Quintal	212.72	241581.91	245.39	419429.06	278684.5849	15.358
	Cashew	Quintal	202.83	1415149.89	233	2416512.59	1625646.721	14.875
	Nutmeg	Quintal	12.46	335569.85	36.99	872608.42	996206.1598	196.87
	coco(with husk)	Quintal	4.05	3760.7	3.44	5618.64	3194.27358	-15.062
	coco(without husk)	Quintal	21.55	69307.47	127.63	646657.48	410473.8931	492.251
	clove	Quintal	0.04	1629.6	0.054	3915.76	21.9996	35
	coffee(Dry robusta)	Quintal	371.71	1759403.15	434.19	2534015.51	2055137.752	16.809
	Cardamom	Quintal	109.79	11097682.99	173.58	10057919.52	17545639.98	58.102
	Total			181797500		153408593.7	203836143.3	

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

District	Name of	Unit	Before SC Work		After SC Work		Value at constant price	% of Change Over Quantity
	Crop		Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
Thiruvananthapuram	plantain	Quintal	295.3	325813.33	345	451135.81	380648.85	16.83
	banana	Quintal	260.15	587018.07	285.1	1028438.38	643316.75	9.591
	tapioca(Tapioca raw)	Quintal	633.85	531489.58	980.35	1373842.89	822033.28	54.666
	Total			1444320.98		2853417.08	1845998.87	
Kollam	plantain	Quintal	71.18	75005.99	95.95	146763.18	101107.31	34.799
	banana	Quintal	3.15	6888.68	3.98	15984.68	8703.78	26.349
	pineapple	Quintal	12.14	14293.39	14.41	25073.4	16966.05	18.699
	tapioca(Tapioca raw)	Quintal	37.03	35199.98	49.14	58978.36	46711.5	32.703
	Ginger(Ginger green)	Quintal	0.85	2967.03	1	5998.75	3490.62	17.647
	yam	Quintal	0.2	444.11	0.24	814.62	532.93	20
	Total			134799.18		253612.99	177512.19	
Pathanamthitta	plantain	Quintal	4.62	4429.43	10.33	11797.67	9903.89	123.593
	Total			4429.43		11797.67	9903.89	
Alappuzha	plantain	Quintal	37.5	39160.11	61.94	74528.09	64682.08	65.173
	cheera	Quintal	1.11	2500.98	3.99	14347.36	8989.99	259.459
	Paddy(Paddy High yield)	Quintal	4072.8	5377602.91	4171.633	8760429.09	5508099.06	2.427
	Cucumber	Quintal	0	0	8	10748.56	5769.44	
	Ladies finger	Quintal	0	0	0.25	585	500	
	Bitter gourd	Quintal	0	0	2	7962.12	5838.2	
	Total			5419264		8868600.22	5593878.78	

Table 8 contd....								
1	2	3	4	5	6	7	8	9
Kottayam	plantain	Quintal	13.5	12383.41	32.3	38140.8	29628.47	139.259
	banana	Quintal	32.4	72756.15	60.88	210188.2	136709.69	87.901
	pineapple	Quintal	0	0	11	20533.26	11850.19	
	tapioca(Tapioca raw)	Quintal	264.7	279756.14	243.5	281444.6	257350.28	-8.009
	Total			364895.7		550306.86	435538.63	
Idukki	plantain	Quintal	57.65	55037.87	65.51	82194.09	62541.74	13.634
	banana	Quintal	124.685	247181.88	140.145	390654.27	277831.93	12.399
	tapioca(Tapioca raw)	Quintal	81.163	83572.71	89.87	102227.15	92538.24	10.728
	Total			385792.46		575075.51	432911.91	
Eranakulam	plantain	Quintal	79.92	77034.08	98.2	116168.64	94654	22.873
	banana	Quintal	385.71	803561.19	438.7	1363317.29	913956.87	13.738
	pineapple	Quintal	28.95	33155.28	37.6	70810.2	43061.78	29.879
	tapioca(Tapioca raw)	Quintal	485.95	487568.22	555.1	522526.73	556948.48	14.23
	cheera	Quintal	6.05	5402.47	9	13362.48	8036.73	48.76
	Paddy(Paddy High yield)	Quintal	655.77	784464.9	720.97	1212426.42	862460.36	9.943
	Cowpea	Quintal	68	174065.72	85	377334.54	217582.15	25
	Kovakka	Quintal	5	7364.6	6	17020.8	8837.52	20
	Bitter gourd	Quintal	26	63514.88	36	136879.92	87943.68	38.462
	Snake gourd	Quintal	9.5	10621.19	13.2	23633.02	14757.86	38.947
	Total			2446752.53		3853480.04	2808239.43	

Table 8 contd....								
1	2	3	4	5	6	7	8	9
Thrissur	plantain	Quintal	178.9	140958.89	373.4	371376.2	294209.33	108.72
	banana	Quintal	8	16586.64	11	35768.26	22806.63	37.5
	Paddy(Paddy High yield)	Quintal	310	370319.8	316	597290.64	377487.28	1.935
	Total			527865.33		1004435.1	694503.24	
Palakkad	plantain	Quintal	9.655	7736.07	15.6	19155.55	12499.5	61.574
	banana	Quintal	3.2	6149.79	3.5	9706.65	6726.34	9.375
	Paddy(Paddy High yield)	Quintal	2193.5	2589909.33	2300.5	4235795.66	2716246.36	4.878
	Paddy(Paddy Local)	Quintal	550.5	659069.61	581.5	1091824.4	696183.43	5.631
	Cowpea	Quintal	0	0	125	386510	219852.5	
	Bitter gourd	Quintal	4.5	7038	122.5	319546.15	191590	2622.222
	Total			3269902.8		6062538.41	3843098.13	
Malappuram	plantain	Quintal	23.99	23910.85	28.52	35798.3	28425.88	18.883
	banana	Quintal	32.81	63785.91	35.1	100724.71	68237.91	6.98
	tapioca(Tapioca raw)	Quintal	34.75	30883.02	39	35763.39	34660.08	12.23
	Ginger(Ginger green)	Quintal	0.6	1368.13	0.7	2673.61	1596.15	16.667
	Elephant Foot yam	Quintal	9.65	15466.34	9.65	21893.74	15466.34	0
	Colacasia	Quintal	8.55	15714.22	8.15	18795.94	14979.05	-4.678
	Cowpea	Quintal	2.3	5159.04	2.65	8045.7	5944.11	15.217
	Ash gourd	Quintal	3.47	3166.03	4.02	4237.73	3667.85	15.85
	Turmeric (Turmeric dry)	Quintal	0.48	6696	0.45	3634.69	6277.5	-6.25
	Tamarind (Tamarind without husk and with seed)	Quintal	1.35	3414.38	1.88	6902.72	4754.84	39.259
	Total			169563.92		238470.53	184009.71	

Table 8 contd....								
1	2	3	4	5	6	7	8	9
Kozhikkode	plantain	Quintal	14.93	15728.33	23.25	29692.06	24493.18	55.727
	tapioca(Tapioca raw)	Quintal	15.5	16156.58	34	36833.21	35440.24	119.355
	Total			31884.91		66525.27	59933.42	
Kannur	plantain	Quintal	52	52975.04	64.6	96451.04	65811.25	24.231
	banana	Quintal	16.3	33811.26	19.75	61416.97	40967.62	21.166
	tapioca(Tapioca raw)	Quintal	25.5	24658.75	30	35458.2	29010.3	17.647
	Total			111445.05		193326.21	135789.17	
Kasaragod	plantain	Quintal	219	215806.93	282.61	478670.8	278489.55	29.046
	banana	Quintal	214.65	426616.88	421.25	1291830.52	837234.38	96.25
	pineapple	Quintal	124.66	130893	180.42	378317.29	189441	44.73
	tapioca(Tapioca raw)	Quintal	111.65	105270.36	158.89	210529.25	149811.03	42.311
	Ginger(Ginger dry)	Quintal	4.05	56160.01	4.95	70339.5	68640.02	22.222
	Turmeric (Turmeric dry)	Quintal	0	0	3.6	39330	52200	
	Total			934747.18		2469017.36	1575815.96	

Table 8 contd....								
1	2	3	4	5	6	7	8	9
STATE	plantain	Quintal	1058.145	1045980.33	1497.21	1951872.23	1479997.741	41.494
	banana	Quintal	1081.055	2264356.45	1419.405	4508029.93	2973057.677	31.298
	pineapple	Quintal	165.75	178341.67	243.43	494734.15	261922.8521	46.866
	tapioca(Tapioca raw)	Quintal	1690.093	1594555.34	2179.85	2657603.78	2056627.332	28.978
	cheera	Quintal	7.16	7903.45	12.99	27709.84	14338.80105	81.425
	Paddy(Paddy High yield)	Quintal	7232.07	9122296.94	7509.103	14805941.81	9471737.32	3.831
	Paddy(Paddy Local)	Quintal	550.5	659069.61	581.5	1091824.4	696183.43	5.631
	Ginger(Ginger dry)	Quintal	4.05	56160.01	4.95	70339.5	68640.01222	22.222
	Ginger(Ginger green)	Quintal	1.45	4335.16	1.7	8672.36	5082.601379	17.241
	yam	Quintal	0.2	444.11	0.24	814.62	532.932	20
	Elephant Foot yam	Quintal	9.65	15466.34	9.65	21893.74	15466.34	0
	Colacasia	Quintal	8.55	15714.22	8.15	18795.94	14979.05181	-4.678
	Cowpea	Quintal	70.3	179224.76	212.65	771890.24	542135.7783	202.489
	Cucumber	Quintal	0	0	8	10748.56	5769.44	
	Ladies finger	Quintal	0	0	0.25	585	500	
	Ash gourd	Quintal	3.47	3166.03	4.02	4237.73	3667.850317	15.85
	Kovakka	Quintal	5	7364.6	6	17020.8	8837.52	20
	Bitter gourd	Quintal	30.5	70552.88	160.5	464388.19	371270.0734	426.23
	Snake gourd	Quintal	9.5	10621.19	13.2	23633.02	14757.864	38.947
	Turmeric (Turmeric dry)	Quintal	0.48	6696	4.05	42964.69	56497.5	743.75
	Tamarind(Tamarind without husk and with seed)	Quintal	1.35	3414.38	1.88	6902.72	4754.840296	39.259
	Total			15245663.47		27000603.25	18066756.96	

Table – 9

Quantity and Value of Selected Perennial and Seasonal Crops for the year 2016-2017								
	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	pepper(Pepper dry)	Quintal	330.435	6931151.89	426.725	26806433.66	8950915.582	29.14
	pepper(Pepper green)	Quintal	4.162	28972.22	6.861	129912.25	47760.30789	64.849
	Rubber(Rubber garbled)	Quintal	1175.240	24143942.01	1473.120	16130456.03	30263540.94	25.346
	Rubber(Rubber ungarbled)	Quintal	6331.266	120949975.1	6523.088	65288792.79	124614465.9	3.03
	coconut(With husk)	Number	992190.500	6395454.97	1123387.000	10577702.99	7241120.503	13.223
	coconut(Without husk)	Number	593822.000	3790628.38	724426.000	6911168.99	4624331.458	21.994
	Aracanut	Number	6246419.060	4577601.59	6988178.080	10443455.98	5121189.402	11.875
	Jack	Quintal	348.010	57301.57	414.795	167870.68	68298.051	19.191
	Mango	Quintal	212.720	241581.91	245.390	419429.06	278684.5849	15.358
	Cashew	Quintal	202.830	1415149.89	233.000	2416512.59	1625646.721	14.875
	Nutmeg	Quintal	12.460	335569.85	36.990	872608.42	996206.1598	196.87
	coco(with husk)	Quintal	4.050	3760.7	3.440	5618.64	3194.27358	-15.062
	coco(without husk)	Quintal	21.550	69307.47	127.630	646657.48	410473.8931	492.251
	Clove	Quintal	0.040	16.296	0.054	39.1576	21.9996	35
	coffee(Dry robusta)	Quintal	371.710	1759403.15	434.190	2534015.51	2055137.752	16.809
	Cardamom	Quintal	109.790	11097682.99	173.580	10057919.52	17545639.98	58.102
	Total			181797500		153408593.7	203846627.5	

Table – 9 contd....

1	2	3	4	5	6	7	8	9
B. Seasonal	Plantain	Quintal	1058.145	1045980.33	1497.210	1951872.23	1479997.741	41.494
	Banana	Quintal	1081.055	2264356.45	1419.405	4508029.93	2973057.677	31.298
	pineapple	Quintal	165.750	178341.67	243.430	494734.15	261922.8521	46.866
	tapioca(Tapioca raw)	Quintal	1690.093	1594555.34	2179.850	2657603.78	2056627.332	28.978
	cheera	Quintal	7.160	7903.45	12.990	27709.84	14338.80105	81.425
	Paddy(Paddy High yield)	Quintal	7232.070	9122296.94	7509.103	14805941.81	9471737.32	3.831
	Paddy(Paddy Local)	Quintal	550.500	659069.61	581.500	1091824.40	696183.43	5.631
	Ginger(Ginger dry)	Quintal	4.050	56160.01	4.950	70339.50	68640.01222	22.222
	Ginger(Ginger green)	Quintal	1.450	4335.16	1.700	8672.36	5082.601379	17.241
	yam	Quintal	0.200	444.11	0.240	814.62	532.932	20
	Elephant Foot yam	Quintal	9.650	15466.34	9.650	21893.74	15466.34	0
	Colacasia	Quintal	8.550	15714.22	8.150	18795.94	14979.05181	-4.678
	Cowpea	Quintal	70.300	179224.76	212.650	771890.24	542135.7783	202.489
	Cucumber	Quintal	0.000	0	8.000	10748.56	5769.44	
	Ladies finger	Quintal	0.000	0	0.250	585.00	500	
	Ash gourd	Quintal	3.470	3166.03	4.020	4237.73	3667.850317	15.85
	Kovakka	Quintal	5.000	7364.6	6.000	17020.80	8837.52	20
	Bitter gourd	Quintal	30.500	70552.88	160.500	464388.19	371270.0734	426.23
	Snake gourd	Quintal	9.500	10621.19	13.200	23633.02	14757.864	38.947
	Turmeric (Turmeric dry)	Quintal	0.480	6696	4.050	42964.69	56497.5	743.75
	Tamarind(Tamarind without husk and with seed)	Quintal	1.350	3414.38	1.880	6902.72	4754.840296	39.259
	Total			15245663.47		27000603.25	18066756.96	
	All Crops			197043163.5		180409197	221913384.5	

2.2 Cost Benefit Analysis of the Soil Conservation Programmes

An important object 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 48 schemes is Rs.167548359/-

The total area under cultivation after soil conservation work was 2197.05 acres. The value of crops before the soil conservation programme comes to Rs.197043163.5/-. The value of crops after the implementation of soil conservation programme has also been calculated as Rs.180409196.55 /-. It is estimated that the value at constant price as Rs.221913384.5/- . Scheme cost is highest in Malappuram and lowest in Alappuzha .

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

They are:

- (i) Increase in productivity
- (ii) Diversification of cropping pattern

(i) Increase in Production

Area has no remarkable increase after SC work but production has positive change in the case of perennial crops. The percentage change over quantity of crops are Nutmeg 196.87%, Mango 15.36%, Rubber (garbled) 25.35%, Coco (without husk,) 492.25%, Pepper (garbled) 29.14%, Pepper (green) 64.85%, cardamom 58.10%. In the case of seasonal crops, percentage increase in production of crops are Tapioca 28.98%, Yam 20%, Cheera 81.43%, Cowpea 202.49%, Pineapple 46.87%, Plantain 41.49%, Bitter gourd 426.23%, Turmeric 743.75% and Banana 31.30 % respectively.

(ii) Diversification of cropping pattern

Soil Conservation Programmes increased the soil capacity 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 dissemination of new techniques of production, adequate provision of inputs and service which will promote the land to improve production.

In the scheme area, percentage increase in cultivation of perennial crops is 2.31% and that of seasonal crops is 0.85%. Growing of perennial crops will accelerate conservation of soil more effectively.

Table 10 Total Income,expenditure and net income of scheme area (Rs)							
Sl No.	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	9524448.58	6644935.37	2043960.00	2645260.00	7480488.58	3999675.37
2	Kollam	11002342.91	6148253.05	2850559.99	3558950.00	8151782.92	2589303.05
3	Pathanamthitta	4475520.53	3723430.28	1222560.00	1435620.70	3252960.53	2287809.58
4	Alappuzha	5532757.56	9061814.18	2697735.00	3944051.00	2835022.56	5117763.18
5	Kottayam	35090452.27	16848106.85	5333465.00	5113101.92	29756987.27	11735004.93
6	Idukki	15959920.80	21663771.09	8966750.84	12383061.00	6993169.96	9280710.09
7	Eranakulam	11617893.82	9827028.11	3962700.00	4342960.00	7655193.82	5484068.11
8	Thrissur	3262421.71	6566180.03	1405450.00	2816350.00	1856971.71	3749830.03
9	Palakkad	32428682.47	25211184.24	5122425.00	8414962.00	27306257.47	16796222.24
10	Malappuram	19709825.95	13729203.60	10615460.50	10708240.00	9094365.45	3020963.60
11	Kozhikkode	7802806.86	5956891.65	4669300.00	4929850.00	3133506.86	1027041.65
12	Kannoor	10179302.30	10593916.04	2795400.00	3843300.00	7383902.30	6750616.04
13	Kasaragod	30456787.70	44434482.51	5096737.00	8094958.00	25360050.70	36339524.51
Total		197043163.46	180409197.00	56782503.33	72230664.62	140260660.13	108178532.38

Net income Before and After SC Work

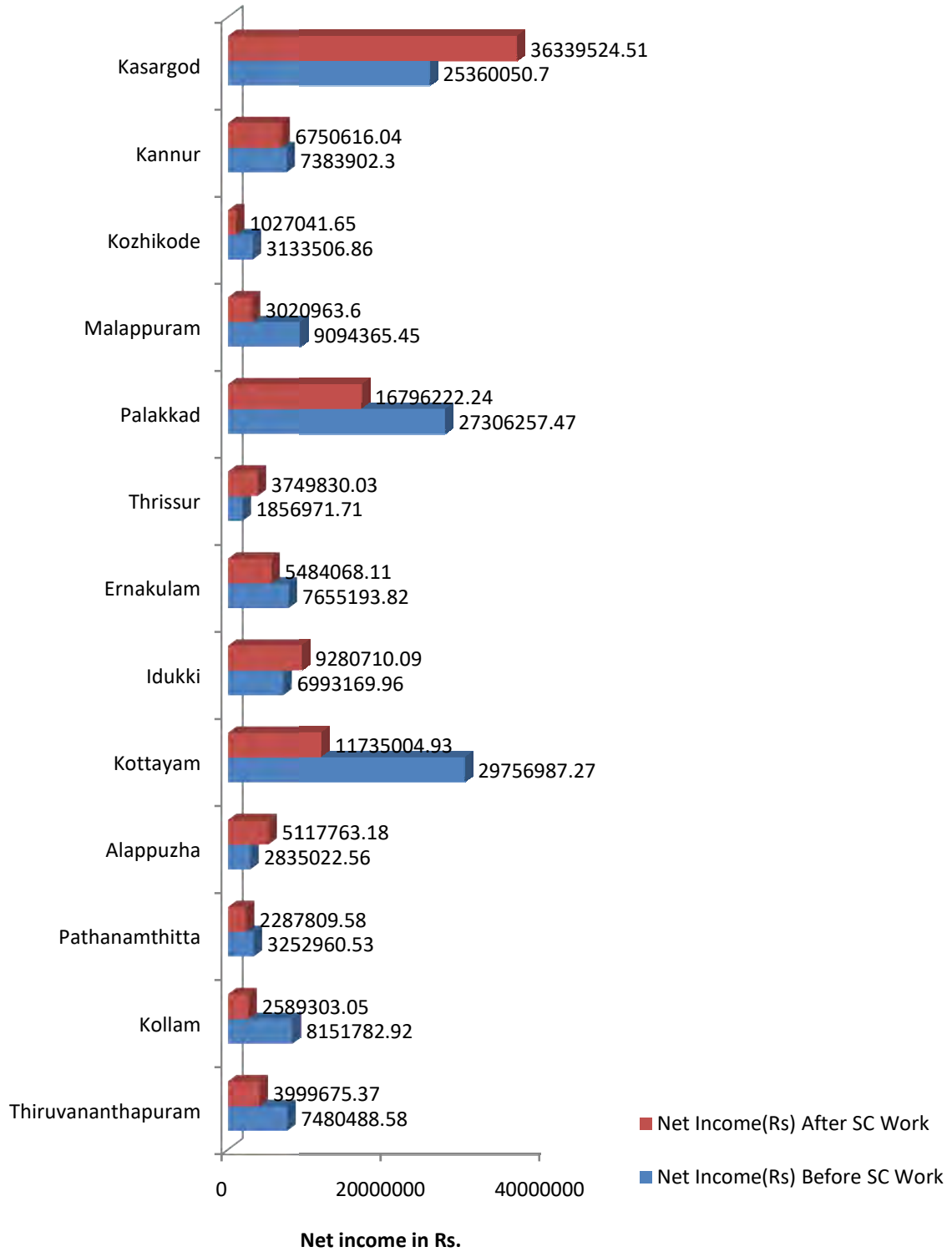


Table 10(A) Income, expenditure and net income of control plot (Rs)				
SI No.	Name of District	Income	Expense	Net Income
1	2	3	4	5
1	Thiruvananthapuram	1238016.18	501300.00	736716.18
2	Kollam	1847855.18	993000.00	854855.18
3	Pathanamthitta	890817.49	432200.00	458617.49
4	Alappuzha	274197.98	106422.00	167775.98
5	Kottayam	3367362.29	962050.00	2405312.29
6	Idukki	2602646.35	1477625.00	1125021.35
7	Eranakulam	1632336.71	702205.00	930131.71
8	Thrissur	940638.80	407890.00	532748.80
9	Palakkad	59932707.47	981850.00	58950857.47
10	Malappuram	2761016.41	2161190.00	599826.41
11	Kozhikkode	862833.74	308929.00	553904.74
12	Kannoor	1590340.07	755500.00	834840.07
13	Kasaragod	2563853.58	533528.00	2030325.58
Total		80504622.25	10323689.00	70180933.25

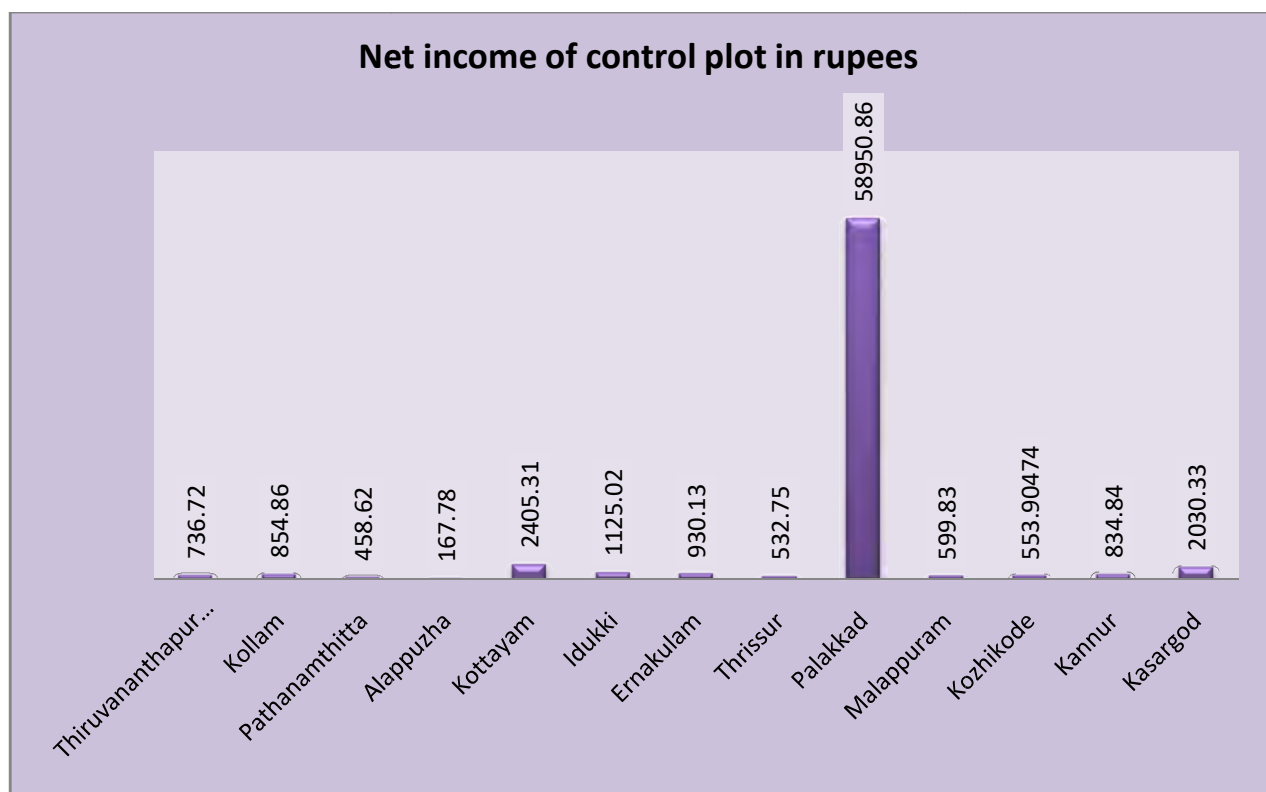


Table 11 - Income per acre before and after soil conservation programme

(Income in Rs.)							
Sl. No	District Name	Before SC work			After SC work		
		Area in acre	Net Income (Rs)	Net Income per acre(Rs)	Area in acre	NetIncome(Rs)	Net Income per acre
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
1	Thiruvananthapuram	40.050	7480488.58	186778.74	41.690	3999675.37	95938.48
2	Kollam	55.590	8151782.92	146641.18	54.870	2589303.05	47189.78
3	Pathanamthitta	57.840	3252960.53	56240.67	57.840	2287809.58	39554.11
4	Alappuzha	187.720	2835022.56	15102.40	187.040	5117763.18	27361.86
5	Kottayam	173.750	29756987.27	171263.24	173.740	11735004.93	67543.48
6	Idukki	189.516	6993169.96	36900.16	190.099	9280710.09	48820.40
7	Eranakulam	113.250	7655193.82	67595.53	113.250	5484068.11	48424.44
8	Thrissur	130.040	1856971.71	14280.00	130.040	3749830.03	28835.97
9	Palakkad	277.820	27306257.47	98287.59	278.330	16796222.24	60346.43
10	Malappuram	315.910	9094365.45	28787.84	312.530	3020963.60	9666.16
11	Kozhikkode	153.350	3133506.86	20433.69	153.320	1027041.65	6698.68
12	Kannur	223.860	7383902.30	32984.46	224.260	6750616.04	30101.74
13	Kasaragod	280.040	25360050.70	90558.67	280.040	36339524.51	129765.48
Total		2198.736	140260660.13	63791.50	2197.049	108178532.38	49238.11

Net income per acre Before and After SC Work

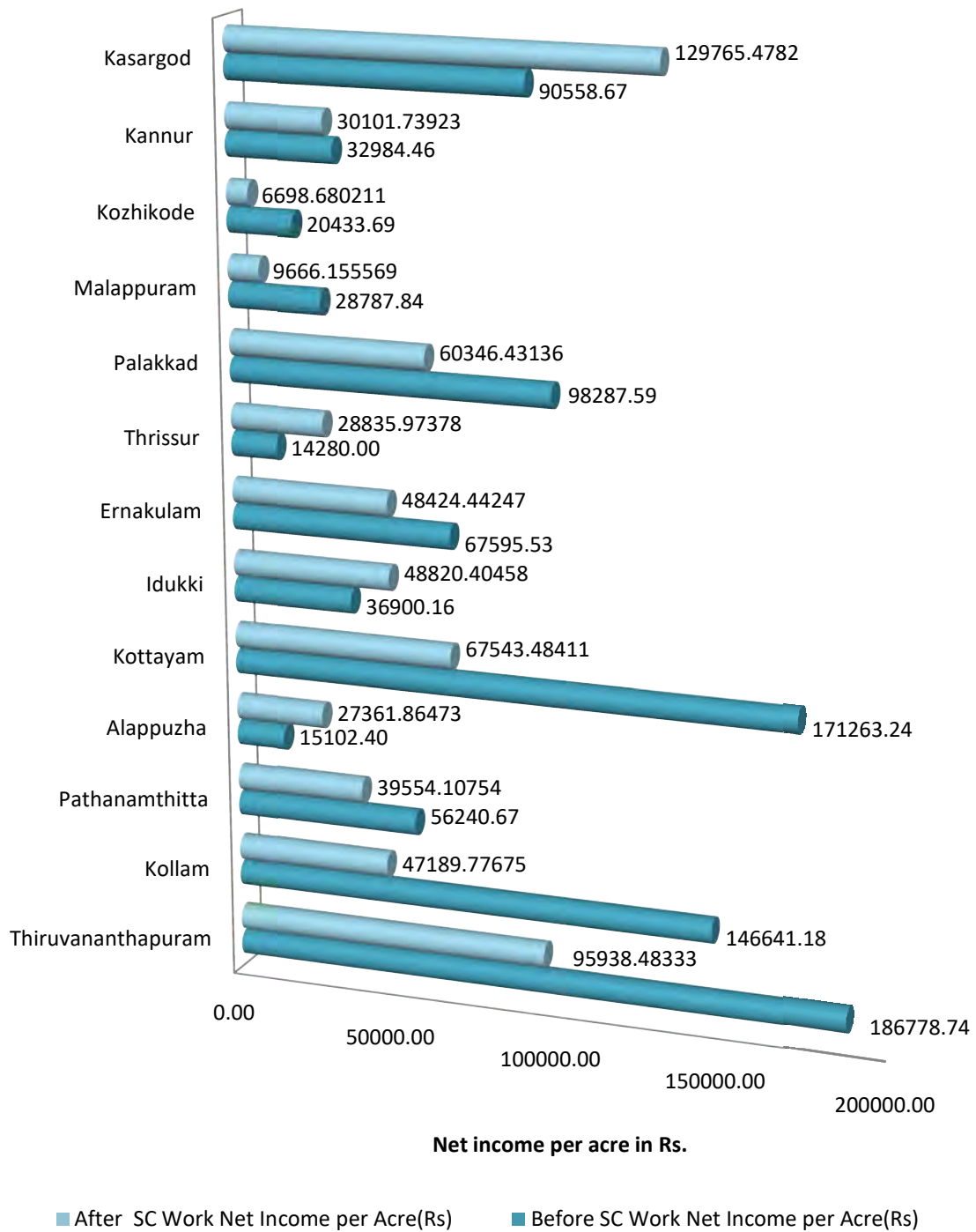
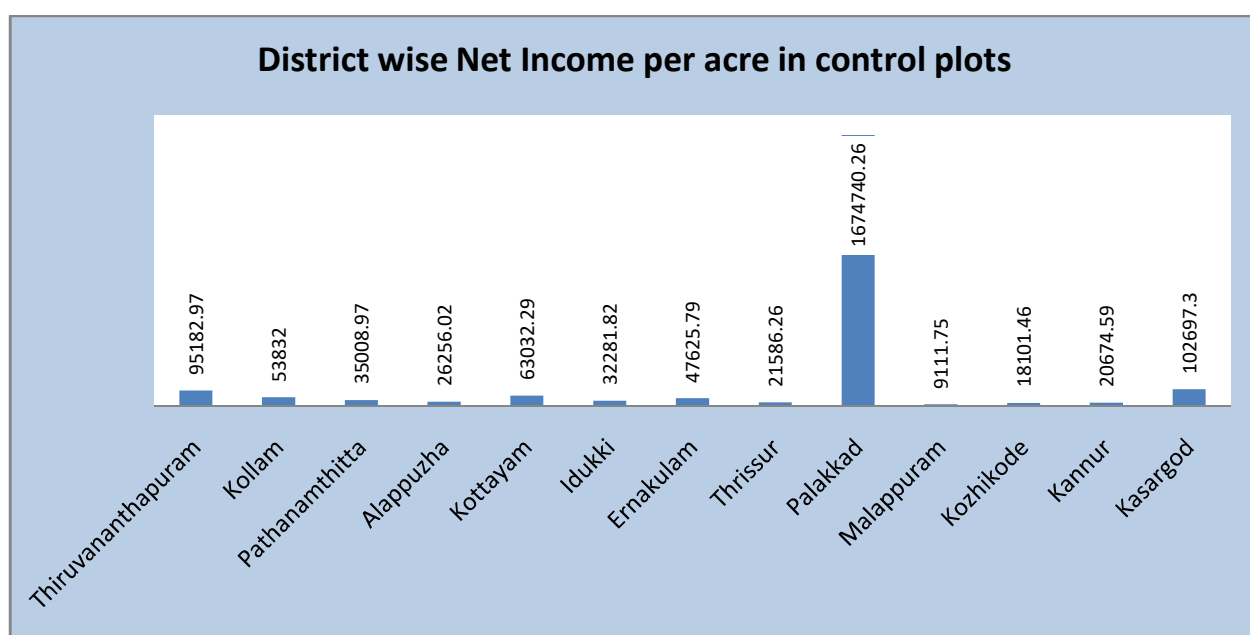
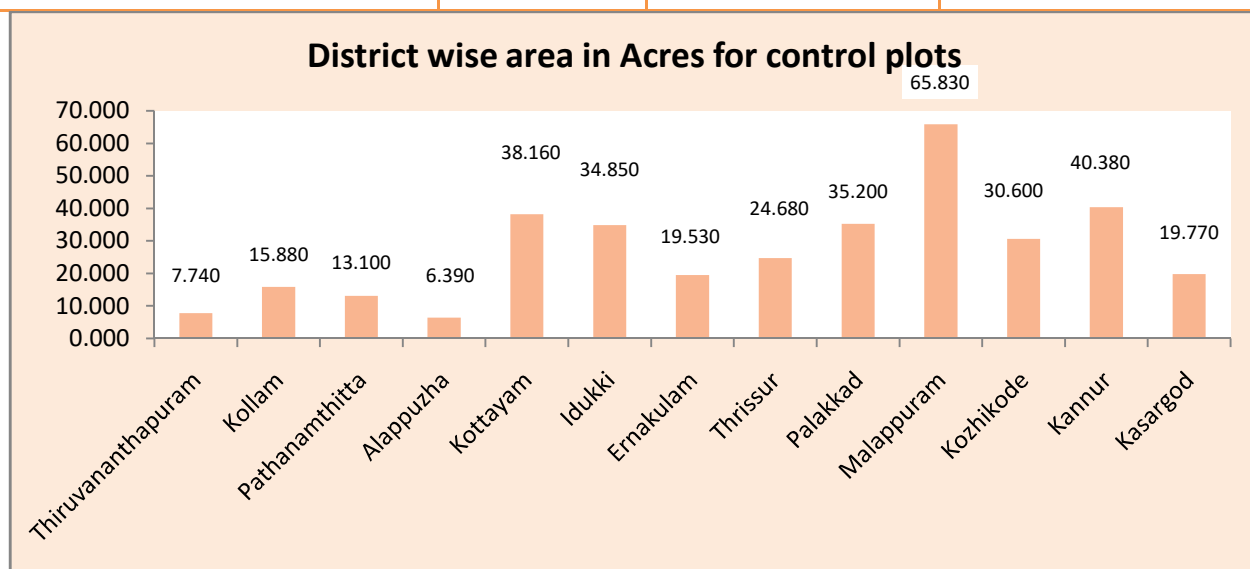


Table 11(A) - Income per Acre in the Control Plots

Sl No.	Name of District	Area in acre	Net Income (Rs)	Net Income per Acre (Rs)
1	2	3	4	5
1	Thiruvananthapuram	7.740	736716.18	95182.97
2	Kollam	15.880	854855.18	53832
3	Pathanamthitta	13.100	458617.49	35008.97
4	Alappuzha	6.390	167775.98	26256.02
5	Kottayam	38.160	2405312.29	63032.29
6	Idukki	34.850	1125021.35	32281.82
7	Ernakulam	19.530	930131.71	47625.79
8	Thrissur	24.680	532748.80	21586.26
9	Palakkad	35.200	58950857.47	1674740.26
10	Malappuram	65.830	599826.41	9111.75
11	Kozhikode	30.600	553904.74	18101.46
12	Kannur	40.380	834840.07	20674.59
13	Kasargod	19.770	2030325.58	102697.3
State		352.110	70180933.25	199315.36



CHAPTER III

3.1 General Observations

During the survey period the staffs of this department has visited all the beneficiary plots. Table-1 The distribution of holdings of the selected beneficiaries of the soil conservation programmes reveals that 48.37% of the beneficiary holding belongs to less than one acre, 36.68% have holding area between one acre to 3 acres. And above 3 acre were 9.54% and up to 5 acres were 5.41% respectively.

The opinion of selected beneficiaries is collected. Out of this 29% of the beneficiaries reported that contour bunds effectively controlled soil erosion while about 71% rests in the opinion that it moderately controlled soil erosion.

About the fertility of the soil 11% are of the view that the conservation measures have improved the fertility of the soil remarkably while 89% reported that the fertility of the soil has improved moderately. No one mentions that it has no effect on the fertility of the soil.

Similarly regarding the moisture retention 9% reported that the scheme has substantially controlled moisture retention while 91% reported that the scheme can cause moisture retention moderately only.

Table 12
Opinion of Cultivators About 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	2	123	0	0	125	0	0	125	0	125
2	Kollam	67	56	2	6	119	0	2	122	1	125
3	Pathanamthitta	0	125	0	0	125	0	0	125	0	125
4	Alappuzha	5	120	0	2	123	0	3	122	0	125
5	Kottayam	3	122	0	3	122	0	0	125	0	125
6	Idukki	108	17	0	1	124	0	1	124	0	125
7	Eranakulam	54	71	0	55	70	0	55	70	0	125
8	Thrissur	0	124	1	0	125	0	0	125	0	125
9	Palakkad	107	18	0	59	66	0	46	79	0	125
10	Malappuram	34	91	0	1	124	0	0	124	1	125
11	Kozhikkode	4	121	0	0	125	0	0	125	0	125
12	Kannoor	2	123	0	0	125	0	0	125	0	125
13	Kasaragod	78	47	0	49	76	0	42	83	0	125
	State	464	1158	3	176	1449	0	149	1474	2	1625

Table 13
Conditions of Bunds
(Scheme Area)

Sl.No	District	Good	Partially damaged	Seriously damaged	Total
1	2	3	4	5	6
1	Thiruvananthapuram	122	3	0	125
2	Kollam	95	28	2	125
3	Pathanamthitta	124	1	0	125
4	Alappuzha	28	50	47	125
5	Kottayam	125	0	0	125
6	Idukki	89	36	0	125
7	Eranakulam	11	114	0	125
8	Thrissur	93	32	0	125
9	Palakkad	124	1	0	125
10	Malappuram	99	22	4	125
11	Kozhikkode	121	4	0	125
12	Kannoor	121	4	0	125
13	Kasaragod	83	42	0	125
State		1235	337	53	1625

Occupational Profile

The occupational profile of the selected beneficiaries reveals that 33% are engaged in agriculture job, 42% are accounted as non-agriculture 15% agricultural labourers and 10% are categorized as non-agricultural labourers. Details are presented in Table No. 14 and 14 (a).

Table 14 Occupational Profile (Scheme Area)						
Sl. No	Name of District	Occupation				
		Agriculture	Non-Agriculture	Agricultural-Labours	Non-Agri. Labours	Total
1	2	3	3	4	5	6
1	Thiruvananthapuram	10	57	18	40	125
2	Kollam	78	11	20	16	125
3	Pathanamthitta	0	125	0	0	125
4	Alappuzha	22	84	18	1	125
5	Kottayam	54	30	7	34	125
6	Idukki	22	62	29	12	125
7	Eranakulam	59	21	35	10	125
8	Thrissur	36	89	0	0	125
9	Palakkad	68	27	21	9	125
10	Malappuram	19	101	4	1	125
11	Kozhikkode	38	48	23	16	125
12	Kannoor	46	6	55	18	125
13	Kasaragod	92	19	14	0	125
State Total		544	680	244	157	1625

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	2	14	3	6	25
2	Kollam	15	4	2	4	25
3	Pathanamthitta	25	0	0	0	25
4	Alappuzha	0	17	5	3	25
5	Kottayam	12	7	3	3	25
6	Idukki	9	9	3	4	25
7	Eranakulam	7	11	3	4	25
8	Thrissur	14	11	0	0	25
9	Palakkad	12	5	4	4	25
10	Malappuram	5	18	2	0	25
11	Kozhikkode	5	6	9	5	25
12	Kannoor	15	1	8	1	25
13	Kasaragod	14	2	4	0	20
State Total		135	105	46	34	320

Conditions of Bund

While examining the condition of bund the study revealed that 76% of beneficiaries opinion is Bunds are in good condition, opinion of 21% are partially damaged and that of 3% 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 2016-2017. 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. Some of the findings of the study are given below:

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.

For the study purpose 48 schemes were selected. The total number of beneficiaries comes to 2521. Out of this 1625 number of beneficiaries were selected for the detailed study. Land use particulars of beneficiary plots reveals only few districts have slight increase in area. Other districts shows no change in area or negative increase in area. Finally the study reveals that 1.61 acres of land become uncultivated area.

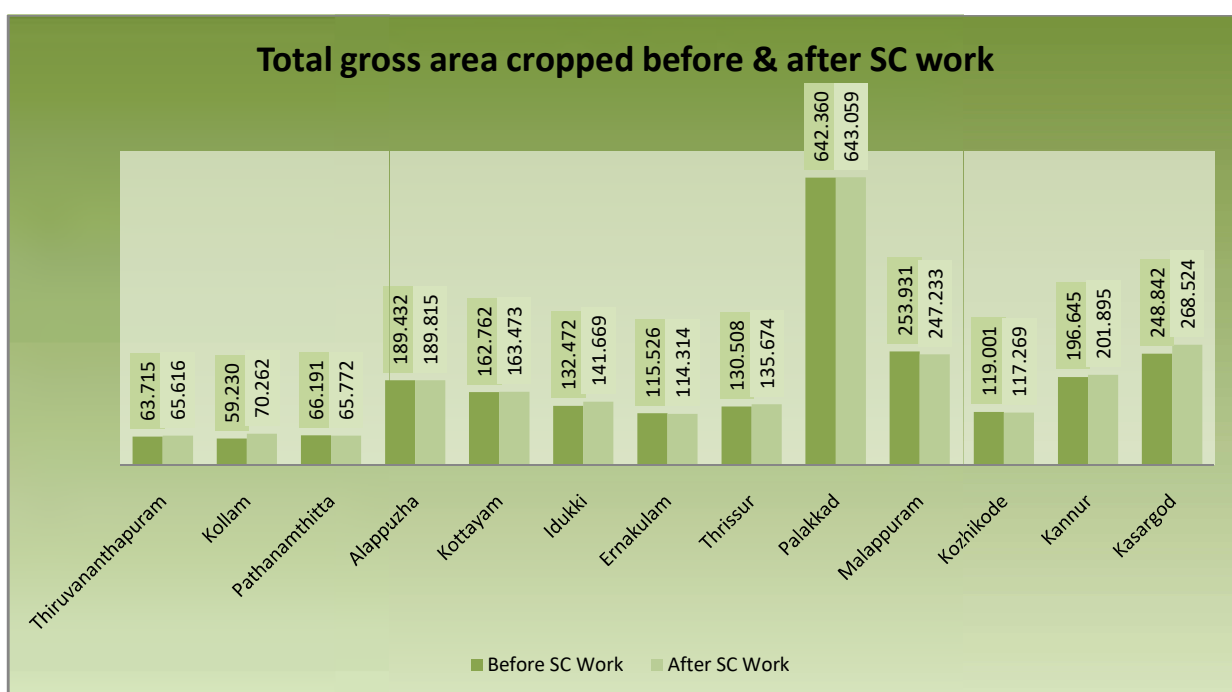
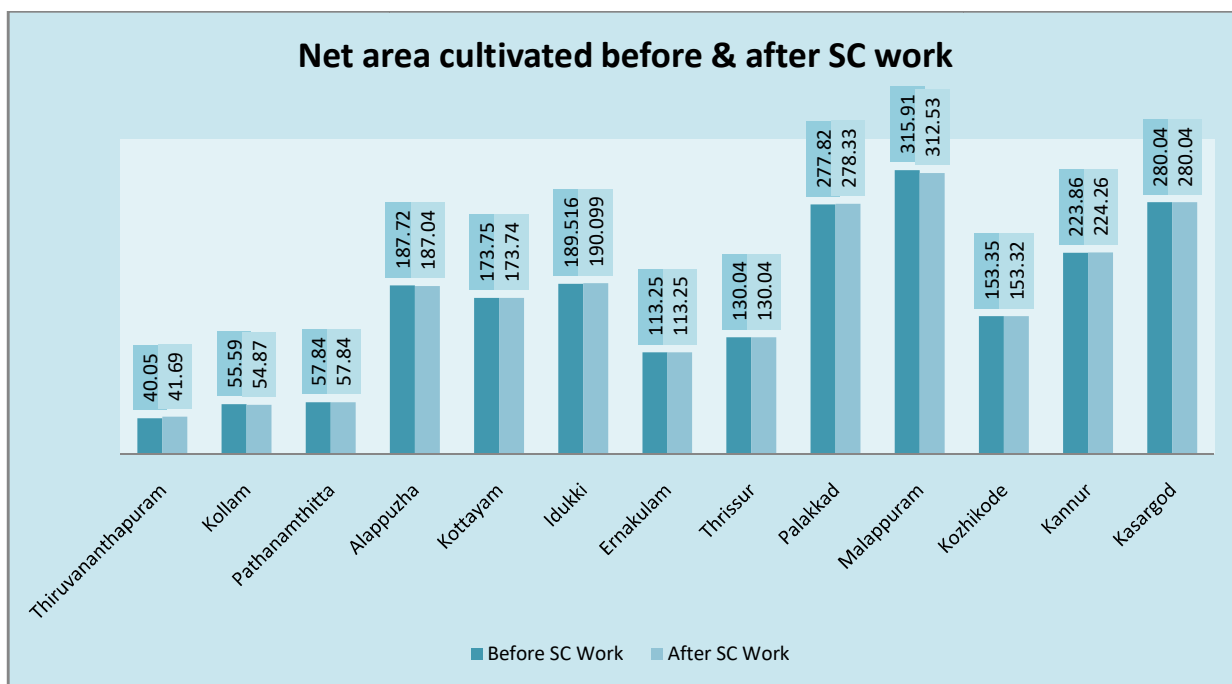
There is an increasing awareness of the importance of the soil conservation programme especially watershed management programme among the people in the scheme area. Besides Soil Conservation Department, Local Self Government implementing various programmes in this direction. WGDP, RIDF, TSP programmes are included for the 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 decreased to 23%. The production increased but decreased the price of rubber and cardamom badly affect the income. Price of Pepper, Aracanut, Jack, Mango and Coconut raised. Due to this, certain districts shows increase in income. It is estimated that the percentage decrease of net income per acre in beneficiary plots of the scheme area as 23%.

Analysis of data collected from the beneficiary and control plots reveals that the net income per acre, received from the beneficiary plot is Rs.49238/- and from the control plot is Rs.199315.36/- The district wise details are presented in Table No. 11 and 11 (a). Net income increased only in four districts Alappuzha, Idukki, Thrissur and Kasargod. Most of the Districts shows deflated income. Among these districts Thiruvananthapuram, Kollam, Kottayam, Palakkad and Kozhikode shows remarkable decrease. Table 10 reveals that expenditure increased 27% but the net income decreased 23%.

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	40.05	41.69	63.715	65.616	159.09	157.39
2	Kollam	55.59	54.87	59.230	70.262	106.55	128.05
3	Pathanamthitta	57.84	57.84	66.191	65.772	114.44	113.71
4	Alappuzha	187.72	187.04	189.432	189.815	100.91	101.48
5	Kottayam	173.75	173.74	162.762	163.473	93.68	94.09
6	Idukki	189.516	190.099	132.472	141.669	69.9	74.52
7	Eranakulam	113.25	113.25	115.526	114.314	102.01	100.94
8	Thrissur	130.04	130.04	130.508	135.674	100.36	104.33
9	Palakkad	277.82	278.33	642.360	643.059	231.21	231.04
10	Malappuram	315.91	312.53	253.931	247.233	80.38	79.11
11	Kozhikkode	153.35	153.32	119.001	117.269	77.6	76.49
12	Kannoor	223.86	224.26	196.645	201.895	87.84	90.03
13	Kasaragod	280.04	280.04	248.842	268.524	88.86	95.89
State Total		2198.736	2197.049	2380.615	2424.575	108.27	110.36



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 108.27% to 110.36%. Districtwise data reveals that Kollam has remarkable increase in cropping intensity, cropping intensity increased from 106.55 to 128.05. Idukki and Kasargod also shows positive cropping intensity compared to other districts. District wise details are presented in table No.15.