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**EVALUATION STUDY  
ON  
SOIL CONSERVATION  
1997-98**

Department of Economics & Statistics  
Thiruvananthapuram  
2003



## PREFACE

The peculiar topography and high rainfall of the State influences soil erosion and loss of soil fertility. Soil conservation improve the productivity of agricultural land in Kerala. By realising this importance both State and Central Governments have implemented various schemes to prevent soil erosion in the State through Soil Conservation Department every year. The grant in aid earmarked by the local bodies in their Annual Plan during 1997-98 was Rs.30 crores which reveals the extent of problem in the State. Evaluation of the results of these programmes are very useful for the success of the decision process.

The Evaluation study of schemes implemented by Soil Conservation Department has been done by the Staff of Department of Economics and Statistics.

This report relates to the survey results of the 51 schemes already completed by the Soil Conservation Department. The field Survey was conducted during the agricultural year 1997-98. The Schemes completed by the Soil Conservation Department before five years are taken up for study so that the full benefit of the scheme could be evaluated and assessed.

It is hoped that this evaluation study highlight various aspects which are useful for Administrators, Statisticians, Research Scholars and Agricultural Geologists.

The tabulation and consolidation of data were done in the Evaluation Division and the report was prepared by Dr.T.Bhavana, Deputy Director.

In this context, I acknowledge my thanks to the staff of Soil Conservation Department who have given whole hearted co-operation for the successful conduct of the survey. Suggestions for improvement are solicited.

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Thiruvananthapuram,

15/03/2003

## CONTENTS

	<b>Chapter - I</b>	<b>Page</b>
1.1	Introduction	3
1.2	Objectives and Methodology	3
1.3	Problems of Soil Erosion	5
1.4	Methods of Soil Conservation Programmes	6
	<b>Chapter - II</b>	
2.1	Impact of Soil Conservation Programmes	7
2.2	Cost Benefit Analysis of the Soil Conservation Programme	20
	<b>Chapter - III</b>	
3.1	General Observations	24
3.2	Occupational Profile	25
3.3	Summary of Findings	26

# EVALUATION STUDY ON SOIL CONSERVATION 1997-98

## Chapter – I

### 1.1 Introduction

Over the years Kerala has developed a wide soil conservation network. This would include both centre and state account. Evaluation study on expenditure on this sector would enable us to make proper feed back. It is also helpful to compare the state of situation before and after the implementation of the soil conservation projects.

Soils of Kerala are briefly classified as (1) soils of hills and uplands (2) Soils of Central Sahyadri (3) Soils of Eastern parts of Malappuram and (4) Soils of South Sahyadri

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

Soil Conservation generally means applying of all necessary practices to maintain the capability of the land for which it is suited and to improve the productivity of agricultural land in Kerala. The measures adopted for conserving soil are bunding, gully plugging, terracing, grassing of waterways and spillways.

### The main objectives of the Soil Conservation Schemes include

1. Rebuilding the lost fertility of land due to soil erosion
2. Conservation of moisture in Grid region
3. Proper and effective water management
4. Promoting surface and subsoil drainage in badly drained areas and
5. Other management practices to optimise the benefit from investment on land.

### 1.2 Objectives and Methodology of the Survey.

The main objectives of the evaluation study are:

- i) To assess the benefit of the programme particularly in relation to the cultivation of seasonal and perennial crops.
- ii) To throw light on various aspects like cost benefit analysis, production potential etc.
- iii) To estimate the extent of additional area brought under cultivation consequent on the implementation of the programme.
- iv) To study the effects of the work carried out by the soil conservation Department in this direction.

The present survey (1997-98) collects the details of 51 schemes already completed by the Soil Conservation Department during 1992-93. The study covered all the districts of the State except Wayanad where the same is directly done by the Central Government. The list of beneficiaries under each scheme is obtained from the Soil Conservation Department. The beneficiaries are selected by stratified random sampling method on the basis of the area of the holding. The holdings are stratified into four strata namely

Holdings with less than 1 acre	- Stratum – i
Holdings with 1 acre to less than 3 acres	- Stratum II
Holdings with 3 acres to less than 5 acres	- Stratum III
Holdings with 5 acres and above	- Stratum IV

## Selection of Beneficiaries

Selection of beneficiaries is done by the District level Officers from the list of beneficiaries collected from Soil Conservation Department. A total number of 25 beneficiaries are selected from each scheme by simple random sampling covering all the above 4 strata with at least 6 from each stratum. If in any stratum, the total number of beneficiaries in the frame is less than the number to be selected, this short fall is compensated from another stratum with the nearest area holding. If the beneficiaries in a scheme are less than 25, all of them are selected. For the purpose of comparison 5 control plots are also selected from the scheme area, where the Soil Conservation works are not carried out under any scheme.

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

**Table - 1 - Statement showing stratum wise distribution of selected beneficiaries**

Sl.No	Districts	No. of scheme selected	Stratum I		Stratum II		Stratum III		Stratum IV		Total	
			No.	Area in Acre	No.	Area in Acre	No.	Area in Acre	No.	Area in Acre	No.	Area in Acre
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	4	66	16.98	21	32.82	-	-	-	-	87	49.80
2	Kollam	5	111	24.36	13	15.45	1	3.25	-	-	125	43.06
3	Pathanamthitta	2	12	4.82	4	7.19					16	12.01
4	Alappuzha	4	74	6.42	-	-					74	6.42
5	Kottayam	4	42	6.34	-	-					42	6.34
6	Idukki	3	21	11.14	9	11.12	15	62.50	3	16.00	48	100.76
7	Eranakulam	3	60	6.38	-	-					60	6.38
8	Thrissur	6	123	23.68	3	3.26					126	26.94
9	Palakkad	6	87	16.69	4	4.26					91	20.95
10	Malappuram	5	57	21.29	9	10.39			1	5.00	67	36.68
11	Kozhikode	3	75	10.56	-	-					75	10.56
12	Kannur	3	24	6.76	34	40.68	1	3.00	2	13.36	61	63.80
13	Kasaragod	3	17	7.85	22	31.45					39	39.30
	Total	51	769	163.27	119	156.62	17	68.75	6	34.36	911	423.00

Table - I (a) - Statement showing stratum wise distribution of Control Plot

(Area in acres)

Sl. No	Districts	No. of scheme selected	Stratum I		Stratum II		Stratum III		Stratum IV		Total	
			No.	Area in Acre	No.	Area in Acre	No.	Area in Acre	No.	Area in Acre	No.	Area in Acre
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Thiruvananthapuram	4	16	3.94	4	4.50					20	8.44
2	Kollam	5	25	3.49							25	3.49
3	Pathanamthitta	2	7	3.75	3	5.80					10	9.55
4	Allappuzha	4	20	0.80							20	0.80
5	Kottayam	4	20	3.70							20	3.70
6	Idukki	3	8	3.75	6	9.50	1	3.00			15	16.25
7	Eranakulam	3	15	1.47							15	1.47
8	Thrissur	6	29	3.14	1	1.10					30	4.24
9	Palakkad	6	28	5.40	2	2.64					30	8.04
10	Malappuram	5	22	5.10	2	3.35			1	5.25	25	13.70
11	Kozhikode	3	15	1.43	-						15	1.43
12	Kannur	3	7	3.15	6	8.35	1	3.00	1	7.50	15	22.00
13	Kasaragod	3	11	4.43	4	4.70					15	9.13
	Total	51	223	43.55	28	39.94	2	6.00	2	12.75	25	102.24

From 13 districts a total number of 911 beneficiaries are selected. The stratum wise distribution of these beneficiaries shows that 84% belongs to Stratum I, 13% in Stratum II, 2% in Stratum III and only 1% of the beneficiaries are having holdings of more than 5 acres, i.e. Stratum IV. In order to compare the benefits of the implementation of soil conservation programmes 255 control plots are also selected. Its distribution is 87%, 11%, 1% and 1% respectively.

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

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

### 1.3 Problem of Soil Erosion:

When compared to other parts of the country the State experiences a good favourable weather conditions. Even though the State receives a high rate of rainfall we are not yet been succeed in the fullest utilization of water received through rainfall. This is mainly due to lack of proper soil and water conservation measures. The peculiar topography of the State necessitated soil conservation. It is estimated that out of 22.8 lakh hectare of cultivated land about 9.5 lakh is prone to erosion. Land being the scarcest resource in Kerala needs to be handled in the most economical manner.

#### 1 Responsibility for prevention of erosion:

Data on land use pattern during 1996-97 and 1997-98 in the State reveals that cropping intensity has been showed a negative growth from 133.17 per cent to 130.7%. Land put to non-agricultural uses increased from 317871 hectare to 320307 hectare respectively. Likewise current fallow also increased from 55532 hectare to 58499 hectare during the period under review. In spite of the rich water availability we could not achieve any reordable impact in increasing the area under irrigation. Here necessities the importance and responsibility of soil erosion.

#### **1.4 Methods of Soil conservation Programme:**

Soil conservation practices are mainly grouped into two categories viz., Agronomic and Mechanical. The Agronomic practices are such as crop rotation, cover cropping, strip cropping etc. to protect the fertility of the soil and the mechanical practices includes various engineering aspects that supplement the effect of agronomic measures. The various mechanical practices are contour bunding, contour cultivation, terracing, bench terracing etc.

#### **Extent of problem in the State:**

The grant in aid earmarked by the local bodies in their Annual plan during 1997-98 was 30 crores which reveals the extent of problem in the State. The land use pattern of the State also is an indicator to this problem. The total geographical area of the state excluding Wayanad district is 3672937 hectares, of which forest occupies 1002722 hectare (27.3%) land put to non-agricultural use shares to 310658 hectares(8.46%), barren and uncultivable land accounts to 38322 hectares (1.04%). Net area sown is 2153522 (58.63%). The cultivable waste shares to 62761 hectares (1.70%) fallow other than current fallow and current fallow accounts to 83861 hectares (2.28%), land under miscellaneous tree crops shares to 20538 hectares (0.56%). When compared to 1996-97 land put to non-agricultural uses, cultivable waste, fallow other than current fallow and current fallow, etc. has been increased. Land under miscellaneous tree crops had declined from 25214 hectares in 1996-97 to 20538 during 1997-98.

#### **Soil conservation programmes:**

During Eighth Five Year Plan onwards soil conservation programme was assisted by Government of India besides the departmental programmes. In decentralized planning local bodies also paid much attention to the soil conservation activities. During Ninth Plan the National Watershed Development Project for Rainfall Areas targeted an area of 1.37 lakh hectare coming under 114 watersheds. An evaluation study on the benefits derived from these programmes is very useful for the decision makers and planning process.

This study is confined to the Soil Conservation measures undertaken in the Kerala State except in Wayanad District.



## CHAPTER - II

## 2.1 Impact of Soil Conservation Programme on land use and cropping pattern

Adoption of various soil erosion measures have its own impact upon land use and cropping pattern. During the year under review 51 schemes were selected for the evaluation of soil conservation programme in the State. The details of the study such as area, cost, the total number of beneficiaries and number of selected beneficiaries etc. are furnished below;

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

Sl.No	Districts	Area (acre)	Cost (Rs.)	No. of beneficiaries	
				Total	Selected
1	2	3	4	5	6
1	Thiruvananthapuram	49.80	217647	108	87
2	Kollam	43.06	212729	132	125
3	Pathanamthitta	12.01	108831	16	16
4	Allappuzha	6.42	82000	74	74
5	Kottayam	6.34	141607	42	42
6	Idukki	100.76	416135	48	48
7	Eranakulam	6.38	316953	60	60
8	Thrissur	26.94	217147	126	126
9	Palakkad	20.95	236270	89	91
10	Malappuram	36.68	195041	109	67
11	Kozhikode	10.56	80562	100	75
12	Kannur	63.80	165661	61	61
13	Kasaragod	39.30	94930	39	39
	Total	423.00	2485513	1004	911

The above table reveals that 911 beneficiaries are selected out of total 1004 beneficiaries (91% of the total beneficiaries) and they occupy 423 acres of land. The cost incurred for the 51 schemes is Rs.2485513.

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

Table-3 - Land use particulars of Beneficiary plots

Districts	Area Cultivated						Current Fallow						Other Use					
	Before		After		Before		After		Before		After		Before		After			
	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%		
1	2	3	4	5	6	7	8	9	10	11	12	13						
Thiruvananthapuram	43.30	86.95	48.18	96.75	8.31	16.69	2.22	4.46	1.49	2.99	1.59	3.19						
Kollam	39.03	90.64	38.86	90.25			0.04	0.01	2.40	5.57	2.40	5.57						
Pathanamthitta	10.87	90.51	10.87	90.51	0.40	3.33	0.90	7.49	0.76	6.33	0.76	6.33						
Allappuzha	1.39	21.65	1.39	21.65	1.05	16.36	1.05	16.36	1.29	20.09	1.29	20.09						
Kottayam	4.99	78.71	4.79	75.55	0.09	1.42	0.09	1.42	1.31	20.66	1.51	23.82						
Idukki	94.89	94.18	96.69	95.96	0.50	0.55	-	-	3.66	3.63	3.66	3.63						
Ernakulam	5.04	79.00	5.01	78.53	-	-	-	-	1.34	21.00	1.37	21.47						
Thrissur	22.50	83.52	22.50	83.52	0.44	1.63	0.44	1.63	4.03	14.96	4.03	14.96						
Palakkad	14.51	69.26	14.51	69.26	0.68	3.25	0.68	3.25	4.09	19.52	4.07	19.43						
Malappuram	22.52	61.40	27.92	76.12	1.22	3.33	1.22	3.33	3.72	10.14	2.38	6.49						
Kozhikode	6.98	66.10	7.41	70.17	-	-	-	-	2.02	19.13	2.02	19.13						
Kannur	48.87	76.60	54.68	85.71	12.00	18.81	10.35	16.22	4.84	7.59	4.02	6.30						
Kasaragod	31.23	79.46	31.17	79.31	2.60	6.62	2.70	6.87	1.21	3.08	1.23	3.13						
Total	346.12	81.83	363.98	86.05	27.29	6.61	19.654	4.76	32.16	7.60	30.33	7.17						

(Area in Acres)

Districts	Area Not cultivated						Total			
	Before			After			Before		After	
	Area	%	Area	%	Area	%	Area	%	Area	%
1	14	15	16	17	18	19	20	21		
Thiruvananthapuram	5.01	10.06	0.03	0.06	49.80	100	49.80	100		
Kollam	1.63	3.79	1.80	4.18	43.06	100	43.06	100		
Pathanamthitta	0.38	3.16	0.38	3.16	12.01	100	12.01	100		
Allappuzha	3.74	58.26	3.74	58.26	6.46	100	6.46	100		
Kottayam	0.04	0.63	0.04	0.63	6.34	100	6.34	100		
Idukki	2.21	2.19	0.41	0.41	100.76	100	100.76	100		
Eranakulam	-	-	-	-	6.38	100	6.38	100		
Thrissur	0.41	1.52	0.41	1.52	26.94	100	26.94	100		
Palakkad	2.35	11.22	2.37	11.31	20.95	100	20.95	100		
Malappuram	10.44	28.46	6.38	17.39	36.68	100	36.68	100		
Kozhikode	1.56	14.77	1.13	10.70	10.56	100	10.56	100		
Kannur	10.09	15.81	5.10	7.99	63.80	100	63.80	100		
Kasaragod	6.86	17.46	6.90	17.56	39.30	100	39.30	100		
Total	44.72	10.57	28.69	6.78	423.00	100	423.00	100		

Table-3 (a) - Land use particulars of (Control plots)

(Area in Acres)

Sl. No	Districts	Area cultivated		Current fallow		Other use		Area not cultivated		Total	
		Area	%	Area	%	Area	%	Area	%	Area	%
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	7.97	91.19	0.30	3.43	0.33	3.78	0.14	1.60	8.74	100
2	Kollam	2.79	79.93	-	-	0.50	14.33	0.20	5.74	3.49	100
3	Pathanamthitta	8.13	80.89	00.50	4.98	0.42	4.18	1.00	9.95	10.05	100
4	Allappuzha	0.57	71.25	-	-	0.20	25.00	0.03	3.75	0.80	100
5	Kottayam	3.13	79.64	-	-	0.57	20.36	-	-	3.70	100
6	Idukki	12.83	76.59	0.50	2.99	0.94	5.61	2.48	14.81	16.75	100
7	Ernakulam	1.16	78.91	-	-	0.27	18.37	0.04	2.72	1.47	100
8	Thrissur	3.53	83.26	-	-	0.62	14.62	0.09	2.12	4.24	100
9	Palakkad	6.99	86.94	-	-	0.73	9.08	0.32	3.98	8.04	100
10	Malappuram	8.20	56.55	0.80	5.52	1.35	9.31	4.15	28.62	14.50	100
11	Kozhikode	0.94	65.73	-	-	0.29	20.28	0.20	13.99	1.43	100
12	Kannur	15.80	61.59	3.65	14.23	0.83	3.24	5.37	20.94	25.65	100
13	Kasaragod	8.33	85.61	0.60	6.17	0.45	4.62	0.35	3.6	9.73	100
	Total	80.37	74.01	6.35	5.85	7.50	6.91	14.37	13.23	108.59	100

Land use particulars of beneficiary plots reveals a positive trend while comparing with the area before and after the soil conservation programme. An addition of area 17.86 acres of land has brought under cultivation which is not cultivated earlier. It can be stated that 5.16% 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 81.83% to 86.04% by decreasing the area of not cultivated from 10.57% to 6.78% (see table 3)

Land use particulars of control plots shows that 74.01% of the area is cultivated whereas the area not cultivated comes to 13.23%. Here more than the control plots. Likewise the area not cultivated percentage is also higher under control plots (See table 3 a)

### **Cropping Pattern**

One important consequence of the Implementation of Soil Conservation programme is the change in cropping pattern. This phenomenon shows an increasing trend towards the cultivation of perennial crops. The following tables reveals that the area under perennial crops has increased after the implementation of soil conservation measure by decreasing the area under seasonal crops. The area under perennial crops has increased from 295.56 hectares to 366.44 hectares in the scheme area after the implementation of the programme (see table 4) From this it can be observed that the farmers have a tendency to cultivate perennial crops in sloppy regions where the soil conservation measures are carried out. The cultivation of seasonal crops in such regions is likely to induce soil erosion.

The district wise figures of Idukki, Kottayam and Kannur shows high degree of change in the cropping pattern. The study displays that 24% of area is increased under perennial crops even though there are changes in the area among the crops. Details are appended below.

Table - 4 - Crop Pattern (Area wise)

Sl.No	Districts	Perennial Crops			Seasonal Crops			Total			
		Before SC Work	%	After SC work	%	Before SC work	%	After SC Work	%		
1	2	3	4	5	6	7	8	9	10	11	12
1	Thiruvananthapuram	30.39	70.18	38.48	71.05	12.91	29.82	15.68	28.95	43.30	54.16
2	Kollam	32.42	82.39	48.48	85.82	6.93	17.61	8.01	14.18	39.35	56.49
3	Pathanamthitta	10.72	95.80	13.89	92.23	0.47	4.20	1.17	7.77	11.19	15.06
4	Alappuzha	1.63	100	2.95	94.25	-	-	0.18	5.75	1.63	3.13
5	Kottayam	3.37	62.76	5.25	84.00	2.00	37.24	1.00	16.00	5.37	6.25
6	Idukki	69.86	81.84	76.02	86.05	15.50	18.16	12.32	13.95	85.36	88.34
7	Eranakulam	4.86	96.43	6.67	93.81	0.18	3.57	0.44	6.19	5.04	7.11
8	Thrissur	22.54	96.04	24.10	94.77	0.93	3.96	1.33	5.23	23.47	25.43
9	Palakkad	10.48	72.23	14.36	75.70	4.03	27.77	4.61	24.30	14.51	18.97
10	Malappuram	19.38	85.34	27.91	87.91	3.33	14.66	3.84	12.09	22.71	31.75
11	Kozhikode	7.94	99.75	9.45	99.58	0.02	0.25	0.04	0.42	7.96	9.49
12	Kannur	51.17	81.20	60.84	93.46	11.82	18.80	4.26	6.54	63.02	65.10
13	Kasaragod	30.80	95.83	38.04	95.99	1.34	4.17	1.59	4.01	32.14	39.63
	Total	295.56	83.24	366.44	87.06	59.49	16.76	54.47	12.94	355.05	420.91

Table - 5 Area under selected perennial crops

Sl. No.	Districts	Coconut			Arecanut			Cashew		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	3	4	5	6	7	8	9	10	11
1	Thiruvananthapuram	7.22	12.04	66.67	.48	.71	47.92	2.04	2.58	26.47
2	Kollam	13.16	16.27	23.63	.17	.34	100.00	1.19	1.80	25.00
3	Pathanamthitta	0.30	0.63	110.00	.80	2.48	210.00	.05	.31	520.00
4	Alappuzha	1.63	2.78	70.55	-	.02	-	-	-	-
5	Kottayam	1.31	2.39	82.44	.01	.03	200.00	-	.02	-
6	Idukki	9.37	12.25	30.74	1.70	1.81	6.47	.11	.27	145.00
7	Eranakulam	4.64	5.26	13.36	.08	.48	500.00	-	-	-
8	Thrissur	7.79	9.17	17.72	.61	.75	23.00	1.57	1.62	3.00
9	Palakkad	4.76	11.73	146.43	-	.01	-	.31	.16	-48.00
10	Malappuram	2.44	6.14	151.64	.11	.22	100.00	2.85	7.45	161.00
11	Kozhikode	6.73	7.82	16.20	.02	.26	1200.00	.07	.13	86.00
12	Kannur	5.95	12.02	102.02	1.15	3.10	169.00	8.08	10.81	34.00
13	Kasaragod	10.56	14.82	40.34	.35	.80	128.00	3.62	3.02	-16.57
	Total	75.86	113.32	49.38	5.48	11.01	100.91	19.89	28.17	41.63

Sl. No.	Districts	Pepper			Rubber		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	12	13	14	15	16	17
1	Thiruvananthapuram	2.97	4.65	56.56	13.98	15.59	11.52
2	Kollam	4.80	5.67	18.13	10.00	19.40	94.00
3	Pathanamthitta	0.47	0.52	10.63	9.10	9.95	9.34
4	Alappuzha	-	-	-	-	-	-
5	Kottayam	0.20	.80	300	1.76	1.88	6.82
6	Idukki	6.72	7.40	10.12	42.75	43.25	1.17
7	Eranakulam	0.01	0.02	100	-	-	-
8	Thrissur	0.79	0.77	-2.53	9.51	9.45	.01
9	Palakkad	0.02	0.04	100	4.00	0.50	-87.50
10	Malappuram	0.44	1.81	312	13.00	11.70	-10.00
11	Kozhikode	0.11	0.17	54.55	-	-	-
12	Kannur	10.94	7.71	-29.52	24.05	26.20	8.94
13	Kasaragod	4.25	4.78	12.47	12.02	14.62	21.63
	Total	31.72	34.34	8.26	140.17	152.54	8.82

Table - 5 (Contd.)

Sl. No.	Districts	Others			Total		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	18	19	20	21	22	23
1	Thiruvananthapuram	3.70	2.91	-21.35	30.39	38.48	26.65
2	Kollam	3.10	5.00	61.29	32.42	48.48	49.54
3	Pathanamthitta	-	-	-	10.72	13.89	29.57
4	Alappuzha	-	.15	-	1.63	2.95	80.98
5	Kottayam	0.09	.13	44.60	3.37	5.25	55.78
6	Idukki	9.21	11.04	19.87	69.86	76.02	8.82
7	Eranakulam	.13	.91	600.00	4.86	6.67	37.24
8	Thrissur	2.27	2.34	+3.08	22.54	24.10	6.692
9	Palakkad	1.39	1.92	38.13	10.48	14.36	37.02
10	Malappuram	0.54	.59	9.25	19.38	27.91	44.01
11	Kozhikode	1.01	1.07	5.94	7.94	9.45	19.02
12	Kannur	1.00	1.00	0.00	51.17	60.84	18.90
13	Kasaragod	-	-	-	30.80	38.04	23.51
	Total	22.44	27.06	20.58	295.56	366.45	23.98



Table - 6 : Area under selected seasonal crops

Area in Acres

Sl. No	Districts	Paddy			Tapioca			Plantain		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	3	4	5	6	7	8	9	10	11
1	Thiruvananthapuram				5.90	6.12	3.72	3.19	4.30	34.81
2	Kollam				4.72	3.99	-15.47	1.00	1.30	30.00
3	Pathanamthitta				0.42	0.98	133.33	0.05	0.11	120.00
4	Alappuzha				-	0.01	-	-	0.16	-
5	Kottayam				1.88	0.60	-68.08	0.12	0.26	116.67
6	Idukki				10.89	7.94	-27.09	1.35	1.30	-3.85
7	Eranakulam				-	-	-	0.18	0.43	138.89
8	Thrissur				0.05	-	-	0.56	0.68	21.43
9	Palakkad				0.61	0.81	32.79	0.60	0.97	61.67
10	Malappuram				-	-	-	0.07	0.54	671.43
11	Kozhikode				-	-	-	0.02	0.04	100.00
12	Kannur				10.25	2.95	-71.22	1.30	1.08	-16.92
13	Kasaragod				0.82	0.88	7.31	0.19	0.31	63.16
	Total				35.54	24.28	-31.68	8.63	11.48	33.02

Sl. No.	Districts	Ginger			Others			Total		
		Before SC work	After SC work	% increase	Before SC work	After SC work	% increase	Before SC work	After SC work	% increase
1	2	12	13	14	15	16	17	18	19	20
1	Thiruvananthapuram	00	.05	164.71	3.82	5.21	36.38	12.91	15.68	21.46
2	Kollam	0.17	0.45		1.04	2.27	118.27	6.93	8.01	15.58
3	Pathanamthitta	-	0.05		-	0.03	-	0.47	1.17	148.94
4	Alappuzha	-	-		-	0.01	-	-	.18	-
5	Kottayam	-	0.02		-	0.12	-	2.00	1.00	-50.00
6	Idukki	-	-		3.26	3.08	-5.52	15.50	12.32	-20.52
7	Eranakulam	-	-		-	0.01	-	0.18	0.44	144.44
8	Thrissur	-	-		0.32	0.65	103.13	0.93	1.33	13.01
9	Palakkad	-	-		2.82	2.83	0.04	4.03	4.61	14.39
10	Malappuram	-	-		3.26	3.30	1.23	3.33	3.84	15.32
11	Kozhikode	-	-		-	-	-	0.02	0.04	100
12	Kannur	-	0.21		0.30	0.02	93.33	11.85	4.26	-64.00
13	Kasaragod	-	-		0.33	0.40	21.21	1.34	1.59	18.67
	Total	0.17	0.78	358.82	15.15	17.93	18.35	59.49	54.47	-8.44

Analysis of the area effect among the crops shows that after the introduction of soil conservation programme arecanut occupied the largest area under perennial crops, the percentage increase is 101.00% coconut comes next with an increase of 49.38%. Cashew and Pepper shown an increase of 41.63% and 34.34% respectively. One peculiarity of this analysis is that even though rubber occupies the highest area among various crops (152.54 acre) the percentage increase is only 8.82. Which shows the lowest impact of Soil Conservation Programme (See table 5.)

The trend in the cropping pattern of seasonal crop is also analysed (see table 6). In the case of seasonal crops a negative trend is observed. The decrease is calculated as 8.44 over the area under seasonal crops before Soil Conservation Programme. Among seasonal crops paddy is not seen anywhere in the scheme area. Area under tapioca recorded a decrease of 31.68%

**Impact of Soil conservation treatment on the yield of crops**

Impact of Soil Conservation treatment is directly visible on the yield crops. Hence an analysis of the type enables to assess the cost of the projects. For this purpose details regarding yield and value of crops are also collected from the beneficiaries in the scheme area. District wise details are furnished in Table - 7.

**Table - 7 - Crop wise yields and value of perennial crops in scheme area.**

District	Name of Crop	Unit	Before SC work		After SC work		Value constant price	% Increase/Decrease
			Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
Thiruvananthapuram	Coconut	Nos.	15735	66087	28670	126945	123233	81.85
	Arecanut	Nos.	35950	11864	48000	20971	15841	33.52
	Cashew	Qtl.	15.65	31306	22.40	63803	44809	43.13
	Pepper	Qtl.	2.30	6018	5.38	93828	14077	133.91
	Rubber	Qtl.	21.00	50400	42.29	121511	23360	101.30
	Others		6.60	9190	13.58	17435	18867	105.30
	Total			174865	-	444493	240187	
Kollam	Coconut	Nos.	9405	39501	28016	124049	117766	197.75
	Arecanut	Nos.	2110	696	6556	2864	2163	210.71
	Cashew	Qtl.	2.34	4681	5.38	15324	10762	129.91
	Pepper	Qtl.	4.79	12530	19.35	337464	50577	307.36
	Rubber	Qtl.	0.90	2160	32.17	92438	115008	34.74
	Others		22.20	5036	77.16	19055	17504	247.00
	Total		-	64604	-	591194	313780	-
Pathanamthitta	Coconut	Nos.	237	995	527	2333	2213	122.36
	Arecanut	Nos.	8094	2671	16260	7103	5365	100.36
	Cashew	Qtl.	0.60	1200	0.90	2564	1800	100.88
	Pepper	Qtl.	3.75	9812	4.70	81968	12298	50.00
	Rubber	Qtl.	12.60	30240	18.10	52009	43440	43.65
	Others	Qtl.				-	-	-
	Total			44918	-	145977	65116	-
Alappuzha	Coconut	Nos.	141	592	592	2621	2486	319.8
	Arecanut	Nos.	-		18	8		
	Cashew	Qtl.	-					
	Pepper	Qtl.	-					
	Rubber	Qtl.	-					
	Others		-		2.50	1300		
	Total			592	-	3929	2486	-
Kottayam	Coconut	Nos.	2470	10374	4885	21629	20517	97.77
	Arecanut	Nos.	560	185	800	350	265	42.85
	Cashew	Qtl.	-	-	0.02	57		-
	Pepper	Qtl.	0.29	759	0.80	13952	2094	176.00
	Rubber	Qtl.	5.35	12840	6.80	19539	16320	2700
	Others		0.58	1050	1.68	2540	3041	189.00
	Total	Qtl.		25208	-	58067	42237	-
Idukki	Coconut	Nos.	27547	115697	22999	146113	138595	19.79
	Arecanut	Nos.	121961	40247	131169	57307	43286	7.55
	Cashew	Qtl.	1.02	2040	1.09	3105	2180	6.86
	Pepper	Qtl.	40.93	107097	47.43	827185	124105	15.88
	Rubber	Qtl.	127.50	306000	205.41	590235	492984	61.00
	Others	Qtl.	687.00	344342	833.87	798595	417957	21.00
	Total			915423		2422540	1219107	

District	Name of Crop	Unit	Before SC work		After SC work		Value constant price	% Increase/Decrease
			Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
Eranakulam	Coconut	Nos.	6799	28556	9500	42064	39900	39.72
	Arecanut	Nos.	65	21	1400	662	452	2053.85
	Cashew	Qtl.	-	-	-	-	-	-
	Pepper	Qtl.	-	-	-	-	-	-
	Rubber	Qtl.	-	-	-	-	-	-
	Others	Qtl.	0.80	190	1.2	1030	998	425.00
	Total							
Thrissur	Coconut	Nos.	18066	75877	29000	128406	121799	60.52
	Arecanut	Nos.	6460	2131	11320	4946	3734	75.23
	Cashew	Qtl.	3.60	7201	6.17	17574	12342	71.38
	Pepper	Qtl.	1.27	3323	1.88	32787	4919	48.03
	Rubber	Qtl.	9.10	21840	11.25	32326	27000	24.00
	Others	Qtl.	8.60	4570	14.18	9795	7865	65.00
	Total							
Palakkad	Coconut	Nos.	11525	48405	14870	65841	62454	29.02
	Arecanut	Nos.	-	-	150	66	-	-
	Cashew	Qtl.	2.32	4641	3.12	8887	6241	34.48
	Pepper	Qtl.	0.29	759	0.33	5755	864	13.79
	Rubber	Qtl.	-	-	-	-	-	-
	Others	Qtl.	33.12	89202	62.21	26985	167630	88
	Total							
Malappuram	Coconut	Nos.	2416	10147	4553	20159	19122	88.45
	Arecanut	Nos.	1820	601	3350	1464	1106	84.06
	Cashew	Qtl.	2.25	501	4.74	13501	9502	110.66
	Pepper	Qtl.	0.19	497	0.48	8371	1256	152.63
	Rubber	Qtl.	-	-	-	-	-	-
	Others	Qtl.	6.64	2152	7.53	3035	2490	13.00
	Total							
Kozhikode	Coconut	Nos.	10390	43638	13755	60904	57760	32.38
	Arecanut	Nos.	24500	8085	50500	22063	16665	106.12
	Cashew	Qtl.	-	-	0.25	712	-	-
	Pepper	Qtl.	0.03	79	0.14	2442	369	366.66
	Rubber	Qtl.	-	-	-	-	-	-
	Others	Qtl.	46.04	8653	49.21	11172	9249	-
	Total							
Kannur	Coconut	Nos.	5480	23016	19300	85456	81040	252
	Arecanut	Nos.	73450	24238	199000	86943	65462	171
	Cashew	Qtl.	24.48	48970	61.15	174175	122325	150
	Pepper	Qtl.	13.62	35638	11.94	208235	31242	-12
	Rubber	Qtl.	37.00	88800	39.50	113501	94800	7
	Others	Qtl.	-	-	-	-	-	-
	Total							
Kasaragod	Coconut	Nos.	8120	34104	14920	66085	62685	84
	Arecanut	Nos.	7300	2409	14900	6510	4017	104
	Cashew	Qtl.	33.60	67213	44.70	127321	89417	33
	Pepper	Qtl.	23.60	61751	35.75	623484	93543	51
	Rubber	Qtl.	-	-	1.00	2873	11324	-
	Others	Qtl.	-	-	-	-	-	-
	Total							
			-	165477		826273	261886	

District	Name of Crop	Unit	Before SC work		After SC work		Value constant price	% Increase/Decrease
			Quantity	Value	Quantity	Value		
	2	3	4	5	6	7	8	9
STATE	Coconut	Nos.	118331	496989	201592	892625	846684	70.36
	Arecanut	Nos.	282270	93963	483423	211257	160923	71.26
	Cashew	Qtl.	85.86	181753	149.92	427023	230054	74.61
	Pepper	Qtl.	91.06	238263	128.18	2235471	335389	25.23
	Rubber	Qtl.	213.45	512280	356.47	1024432	855528	66.00
	Others	Qtl.	811.58	464385	1070.06	892222	612287	31.85
	Total			1937633		5683030	3040865	57.00

During the period under support the crop wise yield and value of perennial as well as seasonal crops showed an increasing trend (see table 7). The total production of perennial crops is increased to 57%. The yield of cashew shows the highest increase of 74.61% on production. This is due to not only the area effect but also the increase in yield rate. The yield of cashew before SC work is 4.31 Ql/acre and it is 5.32 Ql/acre after SC work. In the case of arecanut even though it placed 1st rank in area effect. This crop is only received 2<sup>nd</sup> position in production trend. The productivity of this crop showed a decreasing trend from 51509 Nos./acre before SC work to 43908 Nos/acre after SC work. Coconut the oil seed of Kerala stands 2<sup>nd</sup> position in area effect but attains 3<sup>rd</sup> place in production trend. It is seen that the production of coconut increased from 1560 nuts/acre before SC work to 1779 nuts/ acre after SC work. Even though the productivity increased, it in 3<sup>rd</sup> place due to the low area effect. The production trend of rubber shows a praise worth trend even though its area effect is not good. The production increased from 1.52 Ql/acre before SC work to 2.34 Ql/acre after SC work.

While analyzing the value of different crops at constant price it is seen that pepper ranks first i.e. the value of this crop before SC work is Rs. 2616/Ql increased to Rs.19573/Ql after SC work. Second in this field is cashew. It increased from 1535/Ql before SC work to Rs. 2848/- Ql after SC work. Third in position is arecanut (33 Ps to 43 Ps) and fourth is coconut from Rs.4.19 to Rs. 4.42 after SC work.

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

District	Name of Crop	Unit	Before SC work		After SC work		Value constant price	% Increase/Decrease
			Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
Thiruvananthapuram	Paddy	Qtl	-	-	-	-		
	Tapioca	Qtl	114.50	21450	213	63265	39903	86.03
	Ginger	Qtl						
	Plantain	Qtl	87.60	30134	17505	95087	60216	99.00
	Others	Qtl	1.10	627	1.03	848	587	-6
	Total	Qtl	203.20	52211	389.08	159200	100706	9147
Kollam	Paddy	Qtl				71870		
	Tapioca	Qtl	179.59	33644	241.97	16177	45330	34.73
	Ginger	Qtl	1.14	2839	3.47	4003	4558	204
	Plantain	Qtl	3.97	1365	7.37	3075	2534	86
	Others	Qtl	2.25	1282	3.70	95125	2108	64
	Total	Qtl	186.95	39130	256.51		54530	37.22
Pathanamthitta	Paddy	Qtl				13009		
	Tapioca	Qtl	14.15	3020	43.80	1865	8207	171
	Ginger	Qtl			0.40	3840		
	Plantain	Qtl	2.45	842	7.07	232	2430	188
	Others	Qtl			0.28	6	4740	
	Total	Qtl	17.60	3862	51.55	1894	15377	192.89
Allappuzha	Paddy	Qtl						
	Tapioca	Qtl			0.14	42.00		
	Ginger	Qtl						
	Plantain	Qtl			0.88	302.00		
	Others	Qtl			0.34	292.00		
	Total	Qtl			1.36	636.00		

District	Name of Crop	Unit	Before SC work		After SC work		Value constant price	% Increase/Decrease
			Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
Kottayam	Paddy	Qtl						
	Tapioca	Qtl	30.80	5770	10.20	3030.00	1911	-66
	Ginger	Qtl			0.10	446.00		
	Plantain	Qtl	11.80	4059	32.55	17681.0	11196	175
	Others	Qtl			0.35	294		
	Total	Qtl	42.60	9829	43.20	21451		141
Idukki	Paddy	Qtl						
	Tapioca	Qtl	487.83	99390	954.4	283475	178797	96
	Ginger	Qtl			73.02	39664	25119	30
	Plantain	Qtl	55.90	19230	2.12	1760	1208	-34
	Others	Qtl	3.25	1853	1029.54	324899	205124	88.22
	Total	Qtl	546.98	112473				
Ernakulam	Paddy	Qtl						
	Tapioca	Qtl						
	Ginger	Qtl						
	Plantain	Qtl	12.82	4410	30.88	16774	10622	141
	Others	Qtl			0.87	722		
	Total	Qtl	12.82	4410	31.75	17496	10622	147.66
Thrissur	Paddy	Qtl						
	Tapioca	Qtl	0.25	47				
	Ginger	Qtl						
	Plantain	Qtl	43.37	14919	70.5	38296	24252	63
	Others	Qtl	1.45	527	2.02	1676	734	39
	Total	Qtl	45.07	15493	72.52	39972	24986	60.90
Palakkad	Paddy	Qtl						
	Tapioca	Qtl	28.85	5405	34.10	10128	6388	18
	Ginger	Qtl	2.10	5230	2.65	12354	6600	26
	Plantain	Qtl	280.06	96341	431.35	234309	148385	54
	Others	Qtl	1.26	720	2.17	1805	+1240	72
	Total	Qtl	312.27	10769.6	470.27	258596	162613	50.6
Malappuram	Paddy	Qtl						
	Tapioca	Qtl						
	Ginger	Qtl						
	Plantain	Qtl	1.65	568	4.15	2254	1428	152
	Others	Qtl	1.14	650	1.46	1212	832	28
	Total	Qtl	2.79	1218	5.61	3466	2260	101.07

District	Name of Crop	Unit	Before SC work		After SC work		Value constant price	% Increase/Decrease
			Quantity	Value	Quantity	Value		
1	2	3	4	5	6	7	8	9
Kozhikode	Paddy	Qtl						
	Tapioca	Qtl						
	Ginger	Qtl						
	Plantain	Qtl	0.17	58	0.17	92	58	100
	Others	Qtl						
	Total	Qtl	0.17	58	0.17	92	58	
Kannur	Paddy	Qtl						
	Tapioca	Qtl	215	40278	69	20494	12926	-67
	Ginger	Qtl		-	2.92	13613		-
	Plantain	Qtl	39.5	13588	34.5	18740	11868	-13
	Others	Qtl	0.95	427	1.17	971	526	23
	Total	Qtl	255.45	54293	107.59	53813	25320	-57.88
Kasargod	Paddy	Qtl						
	Tapioca	Qtl	11.00	2061	18.15	5391	3401	65
	Ginger	Qtl				-		-
	Plantain	Qtl	5.68	1954	13.23	7186	4551	133
	Others	Qtl	1.27	725	1.26	1046	719	0.01
	Total	Qtl	17.95	4740	32.64	13623	5271	81.84
STATE	Paddy	Qtl						
	Tapioca	Qtl	1083.97	203065	1583.79	470704	296698	46
	Ginger	Qtl	3.23	8069	9.94	44455	24813	207
	Plantain	Qtl	544.17	187468	880.72	448228	303410	61
	Others	Qtl	12.67	6811	16.77	13879	9015	32
	Total	Qtl	1644.04	405413	2491.22	107266	633936	52

The production particulars of seasonal crops are given in Table 8. It is noted that even after 8.44% decrease in area under seasonal crops, the production has increased by 52% showing that SCP has helped to increase the quantity of the soil productivity of seasonal crops per acre before SC work is 28 Ql while it is increased to 46 Ql per acre after SC work. The productivity increase per acre showed 64%. The value received per acre before SC work is Rs.6817 while it increased to Rs.18492 after SC work District level production details showed a decrease in Kottayam (66%) and Kannur (67%) districts under tapioca. This is due to decrease in area under the crops and not due to decrease in area under the crops and not due to productivity.

## 2.2 Cost Benefit Analysis of Soil Conservation Programme

An important objective of a project evaluation is to estimate the various impacts of its operation such as income, etc. Soil Conservation Programmes has to be assessed in terms of production and productive benefits. These benefits are to be further compared with the investments to arrive at benefit cost ratio which gives an indication of the viability of the programme implemented.

Productive benefits are the direct returns from the programmes implemented. In regular agricultural lands, increase in the yield provides the productive benefits. In addition, production from degraded land, which are cultivated after the soil conservation measures are also taken in to consideration.

Productive 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. The increase in the land value is to be assessed from the data collected.

From the 911 beneficiaries in the 51 selected schemes it is seen that the cost incurred for the soil conservation works comes to Rs.2485513/- including the maintenance work. (See table 2) the productive benefits obtained from the cultivation of land with various perennial crops and seasonal crops can be assessed from the table given below:

The benefits obtained from the cultivation of land with various perennial crops and seasonal crops can be assessed from the table given below.

Table - 9 - Area, Quantity of value of selected perennial crops and seasonal crops

Type	Name of Crop	Unit	Before SC work			After SC work			Value constant price
			Area Acre	Qty	Value	Area Acre	Qty	Value	
	2	3	4	5	6	7	8	9	10
	Coconut	Nos.	75.86	118331	496989	113.32	201592	892625	846684
	Arecanut	Nos.	5.48	282270	93963	11.01	483423	211259	1060923
	Cashew	Qtl.	19.89	88.86	131753	28.17	149.92	427023	230054
	Pepper	Qtl.	31.72	91.06	238263	34.34	128.18	2235471	335389
	Rubber	Qtl.	140.17	213.45	512280	152.54	356.47	1024432	855528
	Others	Qtl.	22.44	811.58	464385	27.06	1070.06	892220	617287
	Total A	Qtl.	295.56		1937633	366.44	-	5683030	3040865
	Paddy	Qtl.	-						
	Tapioca	Qtl.	35.54	1084	203071	24.28	1584.76	470703	296698
	Ginger	Qtl.	0.17	3.23	8069	0.78	9.94	44455	24813
	Plantain	Qtl.	8.63	544.17	187468	11.48	880.72	478228	303410
	Others	Qtl.	15.15	12.67	6811	17.93	16.77	13879	9015
	Total B	Qtl.	59.49		405042	54.47	-	1007265	633936
	Grand Total A + B	Qtl.	355.05		2342675	420.91		6690295	3674801

The total area under cultivation have been calculated to 420.91 acres (see table 9). The value of crops before the soil conservation programme comes to Rs.2342675 /- the value of crop after the soil conservation programme has also been calculated with the price prevailed before the Soil Conservation Programme so as to eliminate price changes due to inflation and other factors such as demand and supply etc. which may affect the price. It is estimated as Rs. 3674801. Thus the annual additional benefits due to the implementation of soil conservation programme worked out as Rs.1332126/-. This shows that 54% of the cost of Soil Conservation Programme (including maintenance) has benefited in the year survey itself.

Among the various other benefits from the Soil Conservation Programme implementation, three of them are specially mentioned. They are

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

i) Extension of area under cultivation:-

On examining the collected data (Table 9) it is observed that 65.86 acres of land has been additionally brought under cultivation by cultivating area which were not cultivated before Soil Conservation Programme. This benefits is observed only due to the implementation of soil conservation measures.

ii) Increase in Productivity:-

From the survey results it is seen that the implementation of soil conservation programme increased the productivity of various crops. A comparison of income and expenditure and net income from the holding in the scheme area and control area will clearly indicate the benefits acquired due to the implementation of soil conservation programme. There particulars are given in table 10 and 10 (a).

**Table 10 – Income, Expenditure and Net Income of Beneficiary Holdings (in Rs.)**

Sl.No	Name of 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	250310	475195	78130	168275	172180	306920
2	Kollam	107030	403834	41235	149998	65795	253836
3	Pathanamthitta	75137	122848	37970	44825	37167	78023
4	Alappuzha	540	5198	100	1145	440	4053
5	Kottayam	38390	66020	6215	8183	32175	57837
6	Idukki	1046231	1960446	422882	710345	623349	1250101
7	Eranakulam	30451	58437	6183	13883	24268	44554
8	Thrissur	131496	292110	56035	87103	75461	205007
9	Palakkad	154572	208369	35975	43330	118597	165039
10	Malappuram-ram	20441	35217	10950	11850	9491	23367
11	Kozhikode	32081	71991	1700	4035	30381	67956
12	Kannur	206586	706953	81825	176540	124761	530413
13	Kasaragod	143171	363070	33610	65301	109561	297769
	Total	2236436	476968	812810	1484813	1423626	3284875

**Table 10(a) – Income, Expenditure and Net Income of Control Plots (in Rs.)**

Sl. No	Name of Districts	Income	Expenditure	Net Income
1	2	3	4	5
1	Thiruvananthapuram	84245	35780	48465
2	Kollam	35428	23349	12079
3	Pathanamthitta	122092	84980	37112
4	Alappuzha	1168	240	928
5	Kottayam	42384	10100	32284
6	Idukki	302104	193966	108138
7	Eranakulam	7579	1925	5651
8	Thrissur	56363	21802	34561
9	Palakkad	66347	20637	45710
10	Malappuram	22827	11972	10855
11	Kozhikode	5530	600	4930
12	Kannur	76712	22562	54150
13	Kasaragod	50270	11480	38790
	Total	873049	439393	433656

iii) Diversification of cropping pattern.

Cropping pattern of a particular area emerged due to the profit or loss received from various crops. Soil Conservation programmes increase the soil capacity of which facilitate the cultivation of more remunerative crops. This advantage can be utilised in full, only if the conservation programmes are followed properly i.e. the dissemination of new techniques of production, adequate provision of inputs and services which will promote productivity.

In the scheme area, cultivation of perennial crops has shown an encouraging performance. The area of perennial crops is increased by 24% compared to the area under the same before soil conservation programme. Growing of perennial crops will accelerate conservation of soil more effectively.

**Net Income Analysis**

The net income received from the beneficiary plot is Rs.3284871/- and from the control plot is Rs.433656/- The district wise net income per acre is given in table 11 and 11(a).



Table 11 – Income per Acre Before and After Soil Conservation Programme

(Income in Rs.)

Sl. No	Name of District	Before SC work			After SC work		
		Area	Income	Income Acre	Area	Income	Income Acre
1	2	3	4	5	6	7	8
1	Thiruvananthapuram	43.30	172180	3976	48.18	306920	6370
2	Kollam	39.03	65795	1686	38.86	253835	6533
3	Pathanamthitta	10.87	37167	3419	10.87	78023	7178
4	Alappuzha	1.39	440	316	1.39	4053	2916
5	Kottayam	4.99	32175	6448	4.79	57837	12075
6	Idukki	84.89	623349	7343	86.69	1250101	14420
7	Eranakulam	5.04	24268	4815	5.01	44554	8893
8	Thrissur	22.50	75461	3354	22.50	205007	9111
9	Palakkad	14.51	118597	8173	14.51	165039	11374
10	Malappuram	22.52	9491	421	27.52	23367	850
11	Kozhikode	6.98	30381	4353	7.41	67956	9172
12	Kannur	48.87	124761	2553	54.68	530413	9706
13	Kasaragod	31.23	109561	3349	31.17	297769	9554
	TOTAL	336.12	1423626	4235	353.98	3284871	9280

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

Sl. No	Name of Districts	Area in Acre	Net Income (Rs.)	Net Income Per Acre
1	2	3	4	5
1	Thiruvananthapuram	7.97	48051	6031
2	Kollam	2.79	12079	4329
3	Pathanamthitta	8.13	37122	4565
4	Alappuzha	0.57	928	1628
5	Kottayam	3.13	32234	10314
6	Idukki	12.83	108138	8429
7	Eranakulam	1.16	5654	4874
8	Thrissur	3.53	34561	9791
9	Palakkad	6.99	45710	6539
10	Malappuram	8.20	10855	1324
11	Kozhikode	0.94	4930	5245
12	Kannur	15.80	54150	3427
13	Kasaragod	8.33	38790	4657
	STATE	74.62	433656	5812

From the above tables it can be seen that the rate of income from the scheme area is high when compared to the income from the control plots. The net income per acre after implementation of soil conservation programme is Rs.9280/- while the net income per acre received from the control plot is only Rs.5812/-

## CHAPTER – III

## 3.1 General Observations

The staff of the Economics & statistics department have visited the selected beneficiaries and collected their opinions on the implementation of Soil Conservation Programme. At the time of plot visits, the following observations have been noticed.

The distribution of holding of the selected beneficiaries of the Soil Conservation Programme reveals that 84% of the beneficiaries have holding size class less than 1 acre and 13% have holding area between 1 acre to 3 acre. It is noted that about 2% of beneficiaries were possessing area over 3 acres to 5 acres and the rest only 1% have more than 5 acres.

The opinion of 911 selected beneficiaries were collected. Out of that 49% of the beneficiaries reported that contour bunds effectively controlled soil erosion and 51% opined that it moderately controls soil erosion of the soil. Nobody reported that contour bund has no effect.

Considering the fertility of the soil 31% of the beneficiaries are of opinion that soil conservation measures have improved the fertility remarkably while 69% reported that the fertility of the soil has improved moderately. It is interesting to note that no body has reported that it has no effect on the fertility of the soil.

Regarding the moisture retention about 37% of the beneficiaries have reported that the schemes have substantially increased moisture retention 63% reported that it moderately increased and the rest felt that the scheme had no effect on the moisture retention.

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

**Table 12 – Opinion of Cultivators about effectiveness of Bunds, Fertility of the Soil and Moisture Retention**

Sl. No	Name of District	Effectiveness of Contour Bund			Fertility Soil			Moisture Retention		
		Effectively Controlled	Moderately controlled	No effect	Remarkably Improved	Moderately Improved	No effect	Substantially Increased	Moderately increased	No change
1	2	3	4	5	6	7	8	9	10	11
1	Thiruvananthapuram	83	4		82	5		83	4	
2	Kollam	80	45		7	118			125	
3	Pathanamthitta	16	-			16			16	
4	Alappuzha	-	74			74			74	
5	Kottayam	9	33		5	37		6	36	
6	Idukki	45	3		42	6		43	5	
7	Eranakulam	33	27		14	46		14	45	1
8	Thrissur	32	94		34	92		30	95	1
9	Palakkad	59	32		19	72		19	72	
10	Malappuram	33	34		27	40		15	52	
11	Kozhikode	-	75		-	75		75	-	
12	Kannur	42	19		48	13		49	12	
13	Kasaragod	11	28		-	39			39	
	Total	443	468		278	633		334	575	2

The benefit of the construction of bund actually derives to the cultivators when it is in a good condition. The condition of the bunds has to be watched after construction. It is desired that about 66% of the bunds are in good condition 30% is partially damaged and 4% are seriously damaged. In general the work is satisfactory. District wise statement of the condition of the bunds is furnished in table 13.

Table – 13 – Conditions of Bund

Sl. No	Name of Districts	Good	Partially Damaged	Seriously Damaged
1	2	3	4	5
1	Thiruvananthapuram	25	35	27
2	Kollam	28	97	
3	Pathanamthitta	15	1	
4	Alappuzha	74	-	
5	Kottayam	16	26	
6	Idukki	48	-	
7	Eranakulam	51	9	
8	Thrissur	113	8	5
9	Palakkad	57	32	2
10	Malappuram	54	13	
11	Kozhikode	75	-	
12	Kannur	46	15	
13	Kasaragod	1	38	
	STATE	603	274	34

### 3.2 Occupational Profile

The present pattern of employment exhibits more diversification. Hence any type of analysis on the occupational profile is of much significant. The occupational profile of the selected beneficiaries shows that about 18% of the selected beneficiaries are engaged in agriculture and only 9% in non-agricultural activities. Agricultural labourers constitutes 45% of the total beneficiaries. The percentage share of non-agricultural labourers comes to 28%.

Table – 14 – Occupational Profile

Sl. No.	Districts	Occupation				Total
		Agriculture	Non-Agriculture	Agricultural Labourers	Non Agricultural Labourers	
1	2	3	4	5	6	7
1	Thiruvananthapuram	26	8	37	16	87
2	Kollam	39	12	51	23	125
3	Pathanamthitta	5	1	7	3	16
4	Allappuzha	24	7	35	8	74
5	Kottayam	-	8	24	10	42
6	Idukki	13	4	26	5	48
7	Ernakulam	20	5	29	6	60
8	Thrissur	11	13	56	46	126
9	Palakkad	1	1	60	29	91
10	Malappuram	-	14	20	33	67
11	Kozhikode	-	-	-	75	75
12	Kannur	18	5	29	9	61
13	Kasaragod	3	-	35	1	39
	TOTAL	160	78	409	264	911

The occupational profile of the control plots reveals that (table 14 (a)) 14% are engaged in agriculture, 12% in non-agriculture activities, and 53% are agricultural labourers and remaining 21% acts as non-agricultural labourers.

Table 14 (a) -Occupational Profile (Control Plots)

Sl. No.	Districts	Occupation				Total
		Agriculture	Non-Agriculture	Non-Agricultural Labours	Non Agricultural Labourers	
1	2	3	4	5	6	7
1	Thiruvananthapuram	8	2	9	1	20
2	Kollam	7	2	12	4	25
3	Pathanamthitta	2	1	6	1	10
4	Allappuzha	5	1	12	2	20
5	Kottayam	-	6	12	2	20
6	Idukki	3	2	8	2	15
7	Ernakulam	1	2	11	1	15
8	Thrissur	-	5	14	11	30
9	Palakkad	3	-	20	7	30
10	Malappuram	1	7	11	6	25
11	Kozhikode	-	-	-	15	15
12	Kannur	2	2	10	1	15
13	Kasaragod	4		11	-	15
	TOTAL	36	30	136	53	255

### 3.3 Summary of Findings

The data furnished in this report are collected through the Evaluation study on soil conservation 1997-98. The districts covered in this study are all the districts of the State except Wayanad. 51 schemes implemented by soil conservation department 5 years prior 1997-98 have been selected for the Evaluation study. The summary of findings are discussed below:

#### Benefit of the Programme

The benefit of the programme flowed to the people through increasing the productivity of Agricultural land and diversification of cropping pattern. Out of total 1004 beneficiaries 911 beneficiaries (91%) are selected and they possess 423 acres of land. The cost incurred for selected 51 schemes is Rs. 2485513/-

An area of 65.86 acres of land more could be brought under cultivation in the scheme area. In percentage comes to 19%.

The annual additional benefits due to the implementation of soil conservation programmes is worked out as Rs.1332126. This shows that 54% of the cost of Soil Conservation Programme has benefited in the year itself.

The cropping pattern diversified. Area under cultivation of perennial crops increased from 295.56 acres to 366.44 acres after Soil Conservation Programme. While the area under seasonal crops decreased from 59.49 acres to 54.47 acres during the same period. There is a positive trend with respect to the yield of perennial crops and seasonal crops.

From the evaluation study of the schemes implemented by soil conservation Department, it is deserved that the productivity of various crops increased and is maintained by checking soil erosion through proper planning. With this end in view Soil Conservation Department has to evolve suitable projects with the co-operation of the public.

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682

