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Land use
Sri Lanka | Horagala | Nilwala

Technolgy Adoption in Tea Land Conservation and Development in the Horagala Sub Watershed

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1. Introduction

Tea is the dominant crop in the Upper Nilwala watershed. It covers about 40 per cent of the total land area in the watershed. The main occupation of farmers in the watershed therefore is tea cultivation. Almost every family whatever their land size is engaged in tea cultivation. Therefore, naturally the conservation and development of tea lands has become the major intervention area of the SCOR project in the Nilwala watershed. There are 10 main technologies coming under this intervention area of conservation and development of tea lands. (Annex. 1).

Horagala is one of the four sub-watersheds included under the SCOR project. Similarly, as in the whole upper watershed the main occupation of farmers in Horagala sub watershed is tea cultivation and all of them are engaged in it. Tea cultivation covers the area of 308ha. (78 per cent) out of the total 393 ha. lands under cultivation in the Horagala sub-watershed. (Source: SCOR data base). Unlike in the other three sub watersheds where a substantial area under tea cultivation is coming under tea estates most of the tea cultivation in Horagala sub watershed is limited to tea small holdings. On the other hand the Horagala sub watershed had been remained somewhat isolated from other areas due to poor access facilities and the contacts between farmers and relevant agency officials had been at a very low level. With these peculiarities, the SCOR interventions in related to conservation and production in tea lands were much more important for the Horagala sub watershed.

2. Objectives of the Study

The SCOR intervention for the improvement of the tea small sector is included of a package of tea technologies which include both the conservation and production related activities. The main objective of this study is to evaluate the adoption of these technologies by farmers of the Horagala sub watershed in related to the level of their knowledge and the level of adoption of them. The overall objective of this study is to assess the involvement of the SCOR project in the development of the tea small sector for introducing, and improving of technologies for conservation and production of tea lands in the Horagala sub watershed.

3. Methodology

3.1. Indicators

The adoption of the technologies was evaluated on the two indicators of the ***level of knowledge*** and ***level of adoption.*** Both the indicators were calculated as composite values of 12 sub-indicators related to each of the 10 technologies (Annex 2.). Weights were not given to sub indicators in calculating the main indicators since these technologies are considered as a total package. Next, it was learned after consulting some subject matter personnel particularly those of the TRI such grading cannot be done on these technologies as each of them is important under different situations and conditions. Both the level of knowledge and level of adoption level are evaluated on the ranking as follows.

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Exceptional	Above .80
Very High	.61 - .80
High	.41 - .60
Average	.21 - .40
Weak	Below .20

3.2. Data Collection Methodology

Data was collected through a questionnaire survey.

3.3. Sample selection

A sample of 35 was selected out of the total 328 tea small holding farmers in the Horagala sub watershed using the simple random method. Data was collected during second quarter of 1977.

4. Findings of the Study

4.1. Training

Overall 18 farmers (51 per cent) out of the sample had received training on tea cultivation technologies. The training received by these 18 farmers under different technologies was as follows.

No. of training provided

Subject	No. of farmers	%
Fertilizer application	14	40
Conservation	09	26
Plucking	08	23
Pruning	08	23
In-planting	06	17
Nursery management	03	09

The TI, the SCOR catalyst and the TRI had involved in providing these training to farmers.

4.2. Technology Adoption

Shade Tree management

Total of 34 sample members (97 per cent) knew the technology in shade tree management. Five out (13 per cent) of them had learned the technology within the period of SCOR project. How they had gained the knowledge in the technology in shade tree management is as follows.

Learning the technology of shade tree management

How learned	No. of farmers	%
By experience	24	70
By experience + SCOR Catalyst	04	12
TI + SCOR catalyst	03	09
TI + By experience	02	06
SCOR Catalyst	01	03
Total	34	100

The level of knowledge in the technology of shade tree management was at .71 which was within the ranking of Very High. The level of adoption of the technology of shade tree management was calculated as .54 which was within the ranking of High. All the 34 sample farmers said that they would continue this technology.

Mulching

Total of 15 sample farmers (44 per cent) knew the technology in Mulching. Seven out of them (47 per cent) had gained that knowledge during the SCOR project period. These 15 farmers had received the knowledge in mulching in following ways.

Learning the technology of Mulching

How learned	No. of farmers	%
By experience	08	53
SCOR Catalyst	06	40
TI + SCOR catalyst	01	07
Total	15	100

Four (27 per cent) out of those 15 who knew the technology said that they were not following it. Two out of them said that they were not following it due to shortage of material while the other two said that they had no time to follow it. All the remaining 11 farmers who were following the technology said that they would continue it.

The overall level of the knowledge in the technology in Mulching was at .24 which was within the ranking of Average. The adoption level of the technology was at .14 which was within the ranking of Weak.

Infilling Vacant Patches

Total of 22 sample farmers (65 per cent) knew the technology of infilling vacant patches. Fourteen (64 per cent) had gained the knowledge after the SCOR project. Gaining of the knowledge in the technology in infilling vacant patches was as follows.

Learning the technology of Infilling Vacant Patches

How learned	No. of farmers	%
By experience	09	41
SCOR Catalyst	09	41
TI + SCOR catalyst	04	18
Total	22	100

Nine farmers (41 per cent) out of the total 22 who knew the technology were not following it. The reasons given for not following the technology were as follows.

Reasons for not following the technology of infilling vacant patches

Increase of insect population	2
Difficulty for plucking	1
Labour shortage	4
Not benefit	1
Not necessary	1

The remaining 13 farmers said that they would continue the technology.

The overall level of the knowledge in the technology of infilling vacant patches was at .39 which was within the ranking of Average. The adoption level of the technology was at .20 which was within the ranking of Weak.

Live Bund Establishment

Total of 21 sample farmers (62 percent) knew the technology of live bund establishment. All of them had learned this technology after the SCOR project direct from the SCOR catalyst. Eight out of them (38 per cent) said they were not following it. The reasons given for not following this technology by those farmers were as follows.

Reasons for not following the technology of live bund establishment

Labour shortage	4
No benefit	3
Not necessary	1

The rest of the 13 farmers said that they would continue the technology.

The overall level of the knowledge in the technology of live bund establishment was at .19 which was within the ranking of Weak. The adoption level of the technology was at .17 which was in the ranking of Weak.

Weeding

The total number of the sample farmers knew the technology of weeding. Eight had learned it during the SCOR project period. How they had gained the knowledge in weeding was as follows.

Learning the technology of Weeding

How learned	No. of farmers	%
By experience	20	57
Experience + SCOR Catalyst	05	14
SCOR catalyst	04	11
TI	04	11
Experience + TI	01	03
TRI	01	03
Total	35	100

All the 35 sample farmers said that they would continue the technology.

The overall level of the knowledge in the technology of weeding was at .78 which was within the ranking of Very High. The adoption level of the technology was at .67 which too was within the ranking of Very High.

Desilting Contour Drains

The total number of the sample knew the technology of desilting contour drains. Two out of them had learned it after the SCOR project. Total of 33 farmers had learned the technology by their own experience. Out of the other two one had learned it from the TI and the other had learned it from the SCOR catalyst. Total of 34 farmers were following the technology. The remaining farmer was not following it as there was no contour drains in his land. All the 34 farmers who knew the technology said that they would continue applying it.

The overall level of the knowledge in the technology of desilting contour drains was at .83. The adoption level of the technology was at .82. Both were within the ranking of Exceptional.

Pruning

The total number of the sample farmers knew the technology of pruning. Eight of them had gained that knowledge after the SCOR project. The total sample were following this technology. How they had learned the knowledge in pruning was as follows.

Learning the technology of Pruning

How learned	No. of farmers	%
By experience	23	65
TI	04	11
Experience + TI	02	06
Experience + SCOR catalyst	02	06
TRI	02	06
TRI + TI + SCOR catalyst	01	03
TI + SCOR catalyst	01	03
Total	35	100

The overall level of the knowledge in the technology of pruning was at .88 while the adoption level of the technology was at .85. Both were within the ranking of Exceptional.

Establishment of terraces and contour drains

The total number of the sample farmers knew the technology of establishment of terraces and contour drains. Thirty four of them knew the technology by their own experience. One had learned it after the SCOR project through the TI. All the sample farmers were following the technology.

The overall level of the knowledge in the technology of establishment of terraces and contour bunds was at .50 which was in the ranking of Good. However, the adoption level of the technology was at .87 which was in the ranking of Exceptional. The adoption level was higher than the knowledge as this technology had been applied mostly by hiring the local skilled labourers.

Fertilizer Application

The total number of the sample farmers knew the technology of fertilizer application. Total of 10 farmers (29 per cent) had learned this technology after the SCOR project. How they had learned this technology was as follows.

Learning the technology of fertilizer application

How learned	No. of farmers	%
By experience	16	46
TI	05	14
TI + SCOR catalyst	04	11
Experience + SCOR catalyst	04	11
Experience + TI	03	09
SCOR catalyst	02	06
TRI/TI/SCOR catalyst	01	03
Total	35	100

The overall level of the knowledge in the technology of fertilizer application was at .98 and the overall level of adoption of the technology was at .89. Both the level of knowledge and the level of adoption was within the ranking of Exceptional.

Application of Zinc Sulphate

Total of 8 out of the sample farmers (23 per cent) knew the technology of applying zinc sulphate. All of them had learned this technology after the SCOR project. Four of them had learned it direct from the SCOR catalyst while other four had learned it both from the SCOR catalyst and the TI. Total 06 of them were not following the technology. Five out of them said it was expensive. The other said it was not useful. The two farmers who were following the technology said that they would continue it.

The overall level of the knowledge in the technology of applying zinc sulphate was at .20 which was in the ranking of Weak. The overall adoption level of the technology was at .06 which was in the ranking of Weak.

Application of Dolomite

Total number of 34 of the sample farmers knew the technology. Eighteen (53 per cent) had learned it after the SCOR project. How they learned this technology was as follows.

Learning of technology of dolomite application

How learned	No. of farmers	%
By experience	14	41
SCOR catalyst	09	26
TI	05	15
TI + SCOR catalyst	04	12
Experience + SCOR catalyst	02	06
Total	34	100

Thirty two farmers were applying the technology. They said that they would continue the applying of the technology. The other two who were not following the technology said that it was expensive.

The overall level of the knowledge in the technology of applying dolomite was at .79 which was within the ranking of Very Good. The overall adoption level of the technology was at .65 that too was within the ranking of Very Good.

Plucking

The total number of the sample farmers knew the technology in plucking. Three of them had learned the technology after the SCOR project. How they had learned the technology was as follows.

Learning of technology of plucking

How learned	No. of farmers	%
By experience	25	71
Experience + TI	05	14
TI	02	06
Experience + SCOR catalyst	02	06
TRI/TI/SCOR catalyst	01	03
Total	35	100

The overall level of the knowledge in the technology of plucking was at .87 which was within the ranking of Exceptional. The overall adoption level of the technology was at .67 which was within the ranking of Very Good.

The level applying the technology of plucking was much lower than the level knowledge as most of farmers were used to coarse plucking. Further, farmers used to pluck at seven day intervals while the standard method is five day intervals.

Overall Level of Knowledge and Level of Adoption

The sub-indicator values and the total values of the two indicators of level of knowledge and the level of adoption in the tea land conservation and production technologies in the Horagala Sub watershed are as follows.

Indicator values in technology adoption under tea land conservation and production

Technologies	Level of knowledge	Ranking	Level of Adoption	Ranking
1. Shade tree management	.71	Very High	.54	High
2. Mulching	.24	Average	.14	Weak
3. Infilling	.39	Average	.20	Weak
4. Live bund establishment	.19	Weak	.17	Weak
5. Weeding	.78	Very High	.68	Very High
6. Desilting of contour drains	.83	Exceptional	.82	Exceptional
7. Pruning	.88	Exceptional	.85	Exceptional
8. Establishment of terraces & contour drains	.50	High	.87	Exceptional
9. Fertilizer Application	.98	Exceptional	.89	Exceptional
10.Application of Zinc Sulphate	.20	Weak	.06	Weak
11.Application of Dolomite	.79	Very High	.65	Very High
12.Plucking	.85	Exceptional	.68	Very High
Total value	(Knowledge) .61	Very High	(Adoption) .55	High

The overall level of knowledge in the technology is at the points of .61 which is in the ranking of Very High. The overall level of adoption of technology is at the points of .55 which is in the ranking of High.

Distribution of the level of knowledge and the level of adoption among the total number of sample farmers is as follows.

Level of knowledge and adoption of technology among sample farmers

Ranking	No. of farmers	
	Level of knowledge	Level of Adoption
Exceptional	01	-
Very High	15	10
High	18	22
Average	01	03
Weak	-	
Total	35	35

The number of farmers who learned the technologies after the SCOR Project is as follows.

Knowledge of the technologies

Technologies	known	%	After SCOR	%
1. Shade tree management	34	97	5	13
2. Mulching	15	44	7	47
3. Infilling	22	65	14	64
4. Live bund establishment	21	62	21	100
5. Weeding	35	100	8	23
6. Desilting of contour drains	35	100	2	6
7. Pruning	35	100	8	23
8. Establishment of terraces & contour drains	35	100	1	3
9. Fertilizer Application	35	100	10	29
10.Application of Zinc Sulphate	8	23	8	100
11.Application of Dolomite	34	97	18	53
12.Plucking	35	100	3	9

The involvement of the SCOR personnel in compared to other agency officials in giving the technology to farmers as per the number of farmers who gained that knowledge from them is as follows.

Involvement of SCOR catalyst and other agency officials in giving technology

Technologies	Direct from SCOR catalyst	From SCOR catalyst with other Agency officers	From agency officers
1. Shade tree management	5	3	5
2. Mulching	6	1	1
3. Infilling	9	4	4
4. Live bund establishment	21	-	-
5. Weeding	9	-	6
6. Desilting of contour drains	1	-	1
7. Pruning	2	4	10
8. Establishment of terraces & contour drains	-	-	1
9. Fertilizer Application	6	7	13
10.Application of Zinc Sulphate	4	4	4
11.Application of Dolomite	11	4	9
12.Plucking	2	1	8

5. Summary and Conclusions

The knowledge in the four technologies of Desilting Contour Drains, Pruning, Fertilizer Application and Plucking is at the level of Exceptional. The knowledge in the three technologies of Shade Management, Weeding and Application of Dolomite is at the level of Very High. The knowledge of the Establishment of Terraces and Contour Bunds is at the level of High. The knowledge of the two technologies of Mulching and Infilling is at the level of Average. The knowledge of two technologies of Live Bund Establishment and Application of Zinc Sulphate is at the level of Weak. The overall knowledge of tea technologies is at the level of Very High.

The adoption of the four technologies of Desilting Contour Drains, Pruning, Establishment of Terraces and Contour Bunds and Fertilizer Application is at the level of Exceptional. The adoption of three technologies of Weeding, Application of Dolomite and Plucking is at the level of Very High. The adoption of the technology of Shade Tree Management is at the level of High. The adoption of four technologies of Mulching, Infilling, Live bund Establishment and Application of Zinc Sulphate is at the level of Weak. The overall level adoption of technologies is at the level of High.

The knowledge of the tea farmers in the Horagala sub watershed in some technologies had been at a better level before the SCOR project even though this area had been somewhat isolated. They had developed their skills in the technologies related some important areas of the tea cultivation such as pruning, establishment of terraces and contour drains, plucking and to some extent fertilizer application. Some of the technologies such as establishment of terraces and contour bunds had to be duly followed if the farmers were to be eligible for the TSHDA's subsidy scheme for re-planting and new-planting of tea.

However, substantial training and instructions had been provided to these farmers after the SCOR project. The TI had been involved mostly through the training programs and field visits organized by the TSHDSs. And these had been organized particularly after the SCOR project since these tea societies which had been remained inactive before had been revived during the project period. Most of the farmers had been individually met in these sessions. This had been helpful to increase the quality of many of the technologies already practiced at a better level.

The SCOR project particularly the catalyst had been involved in the giving technologies under the conservation and production of tea lands in four ways of: 1). reviving the TSHDSs which had been then used as a channel for providing necessary training, 2). organizing and coordinating the training and instructions given by respective agencies, 3). providing of training and instructions together with the agency personnel, and 4) providing training and instructions directly by the catalyst.

The involvement of the SCOR catalyst was much higher than the other agency officials in giving the technologies to farmers. He had involved together with agency officials and by himself. In both these instances the involvement of him had been very high in compared to agency officers.

Under the SCOR project new technologies had been introduced while the weak areas that needed improvements had been attended. Involvement was more in the technologies which were directly related to conservation such as mulching, infilling, weeding and live bund establishment.

The two technologies of live bund establishment and application of zinc sulphate had been introduced totally under the SCOR project. It is interesting to note that only the SCOR catalyst not any of the agency officials had involved in introducing the technology of live bund establishment. Apart from introducing these he had been involved in the expansion of the technologies such as application of Dolomite, infilling, and mulching. Attempts had also been taken to improvement of quality of other technologies such as fertilizer application, weeding and shade tree management. Farmers had been met individually by the SCOR catalyst where the improvements were necessary in the existing established technologies. This involvement was possible due to the low number of farmers in the sub-watershed in compared to other three. Much of the progress in the adoption of technologies in the Horagala sub watershed too could be attributed to this.

However, the least progress in the adoption of the technologies could be seen in the newly introduced two technologies of live bund establishment and applying zinc sulphate by the SCOR personnel. On the other hand the progress was low in the technologies which were directly associated with soil conservation in compared to others though the involvement of the SCOR project in that area was high. There was no immediate visible benefit for farmers in applying many of these conservation technologies and this was the major challenge to the SCOR project. However, adoption of such new technologies takes time.