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Impact of non-formal trainings regarding soil and water conservation technologies on farmers of Mahi ravine area in Gujarat state

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ABSTRACT

The action research study on non-formal trainings to needy farmers was carried out during 2003 to 2006 in villages of Mahi ravine area under Anand and Baroda districts of Gujarat state with the objective to increase the knowledge and adoption behaviour towards Soil and Water Conservation (SWC) technologies for ravine reclamation. The pre-training status of farmers regarding knowledge, symbolic adoption and adoption was moderate, low and very low level, respectively. Under the study, Target Groups (TGs) of farmers were imparted non-formal trainings on ravine reclamation during 2003-2006 through the selected individual, group and mass contact extension training methods to impart knowledge, skills and motivate farmers about different ravine reclamation SWC technologies for promoting adoption. Consequently, farmers of Mahi ravine area initiated different soil and water conservation practices by their own efforts on their farms. The post-training status of farmers was also evaluated and it was found that the knowledge level of farmers regarding SWC technologies improved from moderate to high level; symbolic adoption increased from low to moderate level; and the actual adoption of soil and water conservation technologies also improved from very low to moderate level. The overall impact of the non-formal trainings on targeted farmers was measured quantitatively with the help of the Training Index (TI) and 30.1% improvement was observed.

1. INTRODUCTION

The ravine belt in Gujarat is extending from the southern bank of the Tapi to the near border of Rajasthan in the Mahi and Sabarmati valleys. The vast areas of land along the banks of rivers of Gujarat, namely Vatrak, Sabarmati, Mahi, Narmada, Tapi and their tributaries are affected by severe gully erosion. These ravine lands of Gujarat are called the Kotar land. In the Gujarat belt, nearly 4 lakh ha area is under the grip of ravines (Sharma *et al.*, 1981). Hence, the ravine reclamation in Mahi ravine area of Gujarat is very much required. The problem of soil erosion and degradation of ravines in Gujarat state attracted the attention of Government of India during the I Five Year Plan. Consequently, the Central Soil & Water Conservation Research & Training Institute, Research Centre, Vasad was established by Government of India in May, 1955. Since inception, this Centre has carried out many research studies regarding ravine reclamation on its 139 ha Research Farm. Several soil and water conservation (SWC) technologies for Mahi ravine reclamation have been developed and tested at Research Centre, Vasad for benefit of the farmers of Mahi ravine area.

Singh (1997) emphasized that if extension science was concerned with making desirable change in the clientele system; we should not be satisfied with just finding out the factors of change alone or describing the situations, which were favourable for change. What is required is to design an effective strategy for change and test it, modify it and prove it that the change occurred due to interventions. For this, he stressed upon action research as the appropriate strategic approach. Therefore, this action research study on non-formal trainings to farmers was conducted with the main objective to increase the knowledge of the needy farmers as well as to increase the adoption of soil and water conservation technologies for ravine reclamation.

Watershed management is a specialized area which encompasses not only the subjects related to soil and water conservation but also other land based activities for

sustainable development of natural, animal, and human resources following participatory bottom up approach. The agricultural extension officers perceived medium to high level of training need in the area of watershed development and management (Yadav *et al.,* 2012).

Education and training are especially important for those functions, which require adoption to change (Sloan, 1994; Chapman and Stemp, 1992; Bartel and Lichtenberg, 1987). Countries with higher levels of income generally have higher levels of education; human capital, which includes both formal education and non-formal on-the-job training, is a major factor in explaining differences in productivity and income among countries (Hicks, 1987).

Informal training of farmers can support quality improvement of farming. It can also help them to be more efficient and successful in their activities. And since farming is a complex and multidimensional job, farmers need different kinds of competencies, which can directly or indirectly be used in their career (Van den Ban, 1998).

Non-formal training can be described as a kind of training, in which the trainees were taught about a particular subject matter with the help of suitable extension methods in actual working situation at any convenient period of time to improve their knowledge and skill to perform better without leading to any certificate at the end. Non-formal trainings could be a better option for farmers of Mahi ravine to improve their knowledge and skill regarding soil and water conservation technologies for ravine reclamation. Therefore, an action research study was carried out to impart non-formal trainings regarding SWC technologies and assess the impact on farmers of Mahi ravine area in respect of their knowledge and adoption behaviour.

2. MATERIALS AND MEHODS

The action research study was initiated in 2003 and continued up to 2006 in selected five villages of Mahi ravine area under Anand and Baroda districts of Gujarat State. The five villages selected purposively were Kanwadi and Sarol from Anand district, and Angad, Dajipura and Rajupura from Baroda district, which were most affected and degraded by Mahi ravines. Target group (TG) of farmers, *i.e.* the farmers whose arable land was converted into ravine erosion by Mahi river, was selected purposively from each selected village. A sample of 111 farmers was selected purposively from five selected villages (Table 1). All the TG farmers were imparted non-formal trainings on SWC technologies for Mahi ravine reclamation according to their suitability. In training strategy, different kinds of extension training methods were used according to their suitability for farmers to impart informal trainings. Farm & home visit and office call were selected under individual contact methods. Result demonstration meeting, lecture meeting, and group discussion were selected under group contact methods. Documentary video film show and distribution of extension bulletin on ravine reclamation were selected under mass contact methods. An effort was made to impart non-formal trainings to selected target group of farmers at least once through each method of all the three categories.

Table: 1
Selection of villages and formation of target groups N=111

Sl.No.	Name of Village	No. of farmers in Target groups
	Anand District	
1.	Kahanwadi	18
2.	Sarol	23
	Baroda District	
3.	Angad	35
4.	Dajipura	15
5.	Rajupura	20
	Total	111

Data collection was done twice at the time of pre-training during 2003 and post-training during 2006 and responses of the respondents were recorded in the developed schedules through personal interview method. To measure socio-economic traits, the scale developed by Pareek and Trivedi (1963) was used with required modifications. To measure knowledge and adoption behaviour towards SWC technologies, the indices and scales developed by Bagdi (2005) as given below were used. The Chi-square (χ) was used to study the significance of change due to non-formal trainings intervention.

Knowledge Index

The knowledge index of a farmer has been worked out as follows:

$$K = \frac{X_1 + X_2 + X_3 + X_4 + X_5 + ...+ X_n}{N} \times 100$$

Where, K = Knowledge index of a farmer; $X_1 + X_2 + X_3 + X_4 +.....+ X_n$ = Marks obtained for correct answer; and N = Maximum possible marks in the schedule.

The overall knowledge index of all the respondents included in the study was computed as follows:

$$\text{Overall Konwledge Index} = \frac{\sum_{i=1}^{N} K_i}{N}$$

Where, K_i = Knowledge index for i^{th} respondents; and N = Total number of respondents.

Symbolic Adoption Index (SAI) for Individual

$$SAI = \frac{\text{Total score obtained by a respondent}}{\text{Maximum possible score}} \times 100$$

Where, SAI = Symbolic Adoption Index of i^{th} farmer.

Overall Symbolic Adoption Index

$$\text{Overall Symbolic Adoption Index} = \frac{\sum_{i=1}^{N} SAI_i}{N}$$

Where, SAI = Symbolic Adoption Index of i^{th} individual; and N = Total number of respondents.

Adoption Index (AI) for Individual

$$AI = \frac{\text{Number of SWC practices adopted}}{\text{Number of SWC practices recommended}} \times 100$$

Where, AI_i = Adoption index of i^{th} respondent.

Overall Adoption Index

$$\text{Overall Adoption Index} = \frac{\sum_{i=1}^{N} AI_i}{N}$$

Where, AI_i = Adoption index of i^{th} respondents; and N = Total number of respondents.

Training Index

$$TI = \frac{\text{Post Training Score - Pre Training Score}}{\text{Maximum Training Score - Pre Training Score}} \times 100$$

Where, TI_i = Training Index of i^{th} respondent.

Overall Training Index

$$\text{Overall Training Index} == \frac{\sum_{i=1}^{N} TI_i}{N}$$

Where, TI_i = Training index for i^{th} respondents; and N = Total number of respondents.

Categorization of Indices Values Based on Class Interval Method

The value of an index can also be categorized based on the class interval method as described below:

$$CI = \frac{\text{Maximum Index Value - Minimum Index Value}}{\text{Number of classes}}$$

Where, CI = Class Interval; Maximum possible index value can be 100; Minimum possible index value can be 0 (zero); and Number of classes as per requirement of data (normally 3 to 5).

In this particular study, investigators categorized the indices into three classes such as low, moderate and high level. Therefore, according to the class interval method the indices values calculated regarding knowledge, symbolic adoption and actual adoption can be categorized into three categories according to the range of values as given below :

Class Interval	Index value range	Category level of variable
33.33	0 to 33.33	Low level
	33.34 to 66.66	Moderate level
	66.67 to 100	High level

3. RESULTS AND DISCUSSION

Pre-Training Status of Farmers of Mahi Ravine Area

Pre-training data collection was done to study the status of respondents before informal training regarding knowledge of SWC technologies, symbolic adoption of SWC technologies and actual adoption of SWC technologies.

Fig. 1 illustrates that the knowledge level of selected respondents before training was moderate (knowledge index value 48.61%). The overall extent of symbolic as well as actual adoption of SWC practices by the farmers was at low level (symbolic adoption index value 32.84% and actual adoption index was 18.94% only).

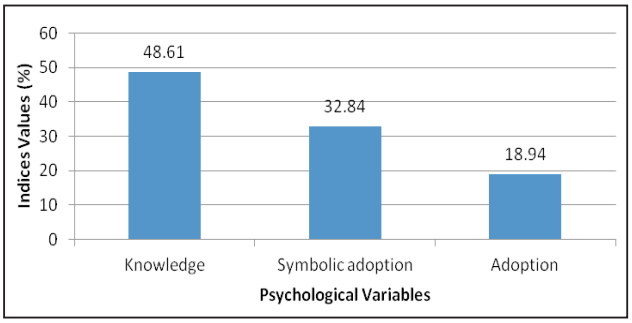

Fig. 1. Pre-training status of farmers of mahi ravine area

Non-Formal Training Activities

The non-formal training activities were carried out for target groups of farmers in the five selected villages regarding SWC practices for ravine reclamation for farmers of Mahi ravine area by using different extension methods.

It is evident from Table 2 that thirty seven farm and home visits, eight office calls, eleven result demonstrations, ten lectures, thirty one group discussion meetings, six documentary film shows for selected farmers of five adopted villages under the project area

were conducted about different SWC technologies for ravine reclamation. A total of 215 bulletins on SWC technologies in vernacular language were also distributed to the selected farmers to improve their knowledge.

Table 3 revealed that the farmers of Mahi ravine area implemented different soil and water conservation practices by their own efforts and money for ravine reclamation during the project period *i.e.* 2003-06. The engineering SWC practices adopted by the farmers were land levelling (16 ha), Checkdam constructed (8 nos.), Bunding (12.5 ha) and Farm ponds (15 nos.). The forestry SWC practices adopted by the farmers were 7 Bamboo nurseries, Bhabhar grass plantation on ravine slope in 5.5 ha area and bamboo plantation in ravine beds was done in 7.5 ha area. Farmers in Mahi ravine area also adopted horticulture plantation in their fields and planted 215 Aonla, 85 Mango and 243 numbers of Lemon trees.

Post Non-formal Training Status of Farmers

The extent of knowledge of Mahi ravine farmers regarding SWC technologies was improved from moderate to near high level due to non-formal trainings. The overall knowledge index was 66.07% after post non-formal trainings. The overall extent of symbolic adoption of SWC practices by the farmers increased from low level to moderate level and it was measured as 48.53% after post non-informal trainings on SWC technologies. Overall actual adoption of SWC technologies by the farmers in the Mahi ravine area for ravine reclamation also increased from low level to moderate level, and actual adoption index was calculated as 50.19% (Fig. 2).

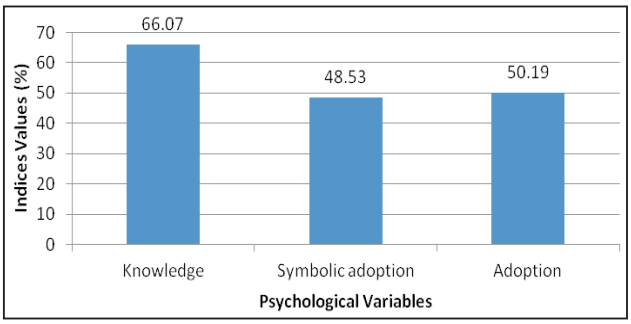

Fig. 2. Post-training status of farmers of Mahi ravine area

Impact of Non-formal Trainings

It is evident from Table 4 that the knowledge level of farmers regarding SWC technologies was improved from moderate (48.61%) to high level (66.07%), symbolic adoption was also increased from low level (32.84%) to moderate level (48.53%) and similarly the actual adoption of soil and water conservation technologies was also improved from very low (18.94%) to moderate (50.19%). The Chi-square (χ^2) values were also calculated to assess the impact of non-formal training on the farmers. It was found out that there was significant increase in actual adoption of SWC technologies due to the non-formal trainings and χ^2 value was computed as 13.92, which is significant at 1% level of significance. However, the change in knowledge and symbolic adoption behaviour of farmers after non-formal training was non-significant.

The overall impact of non-formal trainings on farmers in terms of actual pooled change in knowledge, symbolic adoption, and adoption behaviour of respondents was

Table: 2
Training activities carried out during 2003-06 in the study area of Mahi Ravine

Sl. No.	Non-formal Training by Extension Methods	Name of Village					
		Angad	Dajipura	Rajupura	Kanwadi	Sarol	Total
1.	Number of farmers selected	35	15	20	18	23	111
2.	Individual contact methods						
a	Farm and home visits	9	7	10	5	6	37
b	Office calls	3	2	1	2	0	8
3.	Group contact methods						
a	Result demonstration	3	2	3	2	1	11
b	Lecture	3	2	3	1	1	10
c	Group discussion	10	4	8	2	7	31
4.	Mass contact methods						
a	Documentary film show	1	1	2	1	1	6
b	SWC bulletin distributed to farmers (No. of farmers)	50	25	30	35	75	215

Table: 3
Mahi ravine reclamation works carried out by farmers with their own money due to non-formal trainings

Sl. No.	Practices adopted by farmers	Name of villages					Total
		Angad	Dajipura	Rajupura	Kahanwadi	Sarol	
1.	Land levelling (ha)	3	1	2	4	6	16
2.	Checkdam (no.)	3	--	1	1	3	8
3.	Bunding (ha)	3	1	0.5	6	2	12.5
4.	Farm pond (no.)	5	2	1	3	4	15
5.	Bamboo nursery (no.)	2	1	1	1	2	7
6.	Grass plantation on ravine slopes (ha)	2	1	0.5	--	2	5.5
7.	Bamboo plantation in ravine beds (ha)	1.5	0.5	4.0	1	0.5	7.5
8.	Aonla plantation (no.)	65	50	20	30	50	215
9.	Mango plantation (no.)	20	20	10	15	20	85
10.	Lemon plantation (no.)	110	-	113	20	-	243

Table: 4
Impact of non-formal training activities on farmers of Mahi ravine area regarding SWC technologies

Variables	Impact of Non-formal Training (%)		χ^2
	Pre-training status	Post-training status	Values
Knowledge	48.61	66.07	2.84 NS
Symbolic adoption	32.84	48.53	3.20 NS
Adoption	18.94	50.19	13.92**

** = Significant at 1% level of probability
NS = Non significant

assessed. The overall impact of informal trainings on farmers was measured with the help of the training index and the actual impact of non-formal trainings was observed to be 30.1%. Padaria, *et al.* (2003) also reported that action research/ action-oriented interventions were effective not only in developing conviction among the growers about the technology but also in accelerating the pace of knowledge and skill acquisition by end users.

4. CONCLUSIONS

It can be concluded from the study that the overall impact in terms of adoption behaviour of farmers towards SWC technologies improved significantly due to non-formal trainings. Therefore, the non-formal trainings for rural farmers could be an important strategy to improve knowledge and adoption of soil and water conservation technologies for ravine reclamation and natural resource conservation. The organization not having sufficient infrastructures for providing training to farmers or paucity of funds for training, in such situations the non-formal training could be the best possible solution.

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