

ADOPTION OF SOIL AND WATER CONSERVATION TECHNOLOGIES BY THE FARMERS OF SARDAR SAROVAR PROJECT CATCHMENT IN GUJARAT STATE

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ABSTRACT : All the respondents were of tribal origin with agriculture as main stay for their livelihood. The average family size in the area was 10.7 members. They were economically very poor. Farmers cultivate paddy, maize, sorghum, pearl millet, pigeonpea and urd in *kharif* season with primitive cultivation. Majority of farmers used bullocks for agricultural operations. Forest is the major source of fodder and fuel. Tribals also collect timru (*Diospyros melanoxylon*) and ashotri (*Bauhinia racemosa*) leaves, mahua (*Madhuca indica*) flowers, honey, gum etc. from forest for own consumption and for supplementing their earnings. The most important agency for awareness and motivation to tribals for adoption of soil and water conservation (SWC) practices was Forest Department. Common soil and water conservation practices adopted by farmers were intercropping, summer ploughing and gully plugging. Overall adoption level of recommended SWC practices in Sardar Sarovar Project area was 52.3 per cent. Finance was the major constraint for adoption of SWC practices.

Key words : Adoption ; Soil and water conservation technologies ; Tribal farmers

"Adoption is the mental process through which an individual passes from hearing about an innovation to final adoption". Adoption is a sequence of thoughts and actions, which an individual goes through, before he finally adopts a new idea (Reddy, 1987). Extent of Adoption of soil and water conservation technologies varies from farmer to farmer according to their knowledge and understandings. Adoption of soil and water conservation (SWC) innovations depends on situation, needs of the ultimate user, financial requirement and availability. The study was taken to assess the existing socio-economic situation and adoption behaviour of farmers towards SWC practices in the Sardar Sarovar Project catchment.

MATERIAL AND METHODS

A socio-economic survey was carried out in Sardar Sarovar Project catchment area during

1996-97. The five villages selected randomly were Dabka, Dharsimal, Dhmkhala, Gulwani and Mokhadi. The respondents were selected using stratified random sampling technique. The respondents of each village were grouped into four strata such as marginal, small, medium and large farmer on the basis of land holdings i.e. less than 1 ha, 1 to 2 ha, 2 to 4 ha and more than 4 ha respectively. From each stratum, five respondents were selected randomly. Thus, twenty number of respondents were selected from each village. In total 100 respondents were selected and data were collected through personal interview and analysed. An adoption quotient (A.Q.) was developed to measure adoption of SWC practices by the farmers. To achieve this a schedule was prepared comprising ten practices related to soil and water conservation. For quantifying data, each practice was given score as 1 for "yes" or 0 for "not" adopting responses. Thus, total score secured by an individual for "yes"

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answer was the adoption score. The adoption quotient was worked out for each respondent by following formula and it was taken as the adoption score for an individual respondent.

$$A.Q. = \frac{\text{No. of SWC practices adopted}}{\text{No. of SWC practices recommended}} \times 100$$

Overall adoption level in the area was also worked out by calculating the arithmetic mean of the adoption quotients of all the respondents.

$$\text{Overall adoption level} = \frac{\sum_{i=1}^N A.Q.}{N}$$

where,

A.Q. = Adoption quotient for *i*th respondents

N = Total number of respondents

RESULTS AND DISCUSSION

i. Socio-economic profile of farmers : The average age of the sample respondents was 50 years and it varied from minimum 25 years to maximum 80 years. All the respondents were of tribal origin and they were very poor and backward. About 90 per cent respondents had agriculture as their main occupation and 6 per cent of them were agricultural labour. Remaining 4 per cent were government employees. Thus, majority of farmers in Sardar Sarovar Project area were dependent on agriculture.

ii. Family size and education : The average family size of the respondents was 10.7 members. Table 1 reveals that the majority of respondents (61 per cent) had larger family size (more than 6 members). This is because the tribals in Sardar Sarovar Project area had joint family system. Literacy rate in the area was very low. Majority of respondents (82 %) were illiterate and only 18 per cent could read and write.

Table 1. Family size in Sardar Sarovar Project area

Family size	Number of families	Percentage
Small family (upto 4 Nos.)	19	19
Medium family (5 to 6 Nos.)	20	20
Large family (> 6 Nos.)	61	61
Total	100	100

iii. Farm assets : About 49 per cent of respondents owned only a country plough, 16 per cent had only two agricultural implements and 5 per cent possessed maximum three implements for their agricultural operations. Thirty per cent did not own any agricultural implements. The data revealed the inadequacy of agricultural implements in the area and country plough was a common implement possessed by most of them.

iv. Livestock population : On an average, a tribal family kept 18.5 heads of animal. Almost all respondents (97%) owned at least one bullock and some had six or more bullocks for their agricultural operations. Cow, goat and hen were other popular domesticated animals in the sample groups.

v. Agricultural cultivation : *Crops* - Paddy, maize, sorghum, pearl millet, pigeonpea and urd during *khari* and wheat, maize, sorghum and groundnut during *rabi* are the major crops grown in the area. However, crop cultivation in *rabi* is restricted to assured irrigated area.

Trees - The important fruit plants grown in the area are *Mangifera indica* (Mango), *Annona squamosa* (Sitaphal), *Psidium guajava* (Guava), *Citrus* spp. (Lemon) and *Zizyphus jujuba* (Ber). Majority of farmers practice agroforestry systems by planting trees along their farm boundaries. The common plants grown in the area are *Madhuca indica* (Mahua), *Azadirachta indica* (Neem), *Phoenix sylvestris* (Tad), *Tamarindus indica* (Imli), *Moringa oleifera* (Sarguava), *Soymida febrifuga* (Rayan), *Dendrocalamus strictus* (Bamboo),

Table 2. Livestock population in Sardar Sarovar Project area

Animal	Population	Number of respondent
Buffalow	78	36
Cow	215	71
Bullock	320	97
Goats	417	66
Hen	820	63
Total	1850	100

Eucalyptus tereticornis (Eucalypts), *Tectona grandis* (Sagwan), *Dalbergia sissoo* (Sisham), *Diospyros melanoxylon* (Timbru) and *Bauhinia racemosa* (Asotri).

vi. Dependence on forest : Forest is the major source of fodder. About sixty one percentage of farmers were solely dependent while rest were partially dependent on forest for fodder. Collection of fodder from panchayat land or purchase from market was not observed in the sample. Similar situation was observed in case of fuel wood also (Table 3).

Table 3. Source of fodder and fuel for the livestock feeding

Source	Percentage of respondent depends for	
	Fodder	Fuel
Forest	61	82
Own farm	39	18

The tribal people of the area collected timbru and asotri leaves from the Sardar Sarovar Project forest catchment. The leaves of timbru and asotri are used for bidi making. They sold these leaves after drying at home in the village market for supplementing their income. They also collect mahua flowers, honey and gum from the forest for their domestic use and sale it in the market.

vii. Motivation for adoption of soil and waer conservation practices : The forest department

was the most important source of awareness and motivation among the tribal farmers for adoption of soil and water conservation measures (Table 4). The Gujarat State Land Development Corporation in motivation was also equally effective. But agricultural department and the village fellow farmers contributed very little in this regard.

Table 4. Motivation for adoption SWC measures in Sardar Sarovar Project area

Motivation source	Farmers frequency	Rank
Satage agricultural department	1	IV
Forest department	36	I
Gujarat State Land Development Corporation	29	II
Village fellow farmer	5	III

Majority of the respondents (80%) adopted intercropping practice on their farms, 64% practiced summer ploughing. Gully plugging, mulching and leveled their fields are the other soil and water conservation practices being adopted by the farmers (Table 5). Adoption level of engineering measures was relatively low as compared to agronomic practices. The overall adoption level of soil and water conservation practices in the project area was measured with the help of developed

Table 5. Adoption of SWC practices in Sardar Sarovar Project area

Family size	Farmers adopting	Rank
Agronomic practices		
Contour farming	32	IX
Intercropping	80	I
Cover cropping	39	VII
Mulching	47	IV
Summer ploughing	64	II
Engineering measures		
Land leveling	46	V
Contour bunding	42	VI
Terracing	34	VIII
Checkdam	10	X
Gully plug	48	III

adoption quotient and worked out to be 52.3 per cent.

The respondents in the Sardar Sarovar Project area had perceived finance and labour availability as a major constraints in adoption of soil and water conservation measures. Social factors and lack of awareness also contributed to non adoption of SWC measures.

ACKNOWLEDGEMENTS

The authors are very grateful to Sh. P.A. Malwade, Ex-C.C.F. and Dr. D.P.S. Verma, C.C.F., Gujarat State Forest Department, Sardar Sarovar

Plantation Project, for their valuable suggestions and help in data collection work by Forest Range Officers of the study area. The authors are also thankful to all the scientists of CSWCRTI, Research Centre, Vasad, for their valuable suggestions in improvement of the manuscript.

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Received : October, 1998 ; Revised : August, 2000 ; Accepted : November, 2000