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Adoption Behaviour of Tribal Farmers Towards Water Conservation Technologies on Watershed Basis

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According to Rogers, "adoption process is the metal 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). The adoption of soil and water conservation (SWC) technologies by rural farmers depends upon topography of land and resources available with the adopters. Some people in rural villages adopt innovations immediately and put them into practice. It may be due to that the technologies were suitable to their field conditions whereas, usually mechanical soil and water conservation technologies can be adopted on the basis of field contour lines and irrespective of farmer's field boundaries. Therefore, such technologies may be adopted on community basis. Under such situation, it is a major problem to have cooperation of all the farmers of their field lies under the contour lines so that the technologies may be adopted. This study was taken with the objective to assess the adoption behaviour of the farmers towards vegetative and mechanical soil and water conservation technologies.

METHODOLOGY

They study was carried out in Navamota watershed located in Khedbrahmma taluka of district Sabarkantha in Gujarat State during 1993. Sabarkantha is the northern most district bordering of Rajasthan and the watershed falls in the lower hills of Aravali belt having undulating topography. The watershed is located at 24° 13' North latitude and 73° 01' East longitude at a height of 204 m above mean sea level. The total area of the watershed is 313 hectares covering parts of the villages of Navamota, Umbora, Chhapra and Kheroj. The Navamota integrated watershed management programme was started in 1984-85. The management plan of the watershed was developed by Central Soil & Water Conservation Research & Training Institute, Research Centre, Vasad for implementation of works. The Gujarat State Land Development Corporation Limited, Ahmedabad, executed different land development works.

Survey of all fifty families living in the watershed was carried out with the help of a structure schedule. The data were computed to

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find out the adoption behaviour of farmers towards SWC practices. A three-point-continuum structured schedule was developed to measure the adoption behaviour of tribal farmers and scoring was done as score 0 for not aware; score 1 for aware but not adopting and score 2 for adopting. The adoption scores assigned to each respondent was sum totaled and the mean scores of adoption (X) and standard deviations (SD) were computed. Adoption behaviour was categorized into three level i.e. i) low level of adoption, if the total score of an individual respondent is below X - 1SD, ii) medium level of adoption, if the scores varies from X - 1SD to X + 1SD and iii) high level of adoption, if individuals score is above X + 1SD. To determine the overall extent of adoption of vegetative and mechanical soil and water conservation practices an adoption was developed as below:

Adoption quotient (A.Q.)

A schedule was prepared comprising vegetative and mechanical practices related to soil and water conservation. for quantifying data, each practice was given score as 0 for not aware, 1 for aware but not adopting and 2 for adopting responses. Thus, total score secured by an individual was the obtained adoption score. The adoption quotient was worked out for each respondent by following quotient and it was taken as the adoption score for individual respondent.

$$\text{Adoption Quotient (A.Q.)} = \frac{\text{Adoption score obtained by respondent}}{\text{Maximum possible adoption score}} \times 100$$

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

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

where,

A.Q. = Adoption quotient for ith respondents

N = Total number of respondents

FINDINGS AND DISCUSSION

Adoption behaviour of tribals towards vegetative technologies

Frequency distribution of different soil and water conservation practices adopted by tribal farmers in the watershed are presented in Table 1.

Table 1: Frequency distribution of vegetative SWC technologies adopted by tribal farmers

Sl. No.	Technology	Adoption behaviour	
		Number of respondent	Percentage
1.	Contour farming	45	90
2.	Intercropping	44	88
3.	Cover cropping	3	6
4.	Green manuring	8	16
5.	Mulching	—	—
6.	Summer ploughing	8	16
7.	Multiple cropping	4	8
8.	Strip cropping	—	—
9.	Grass waterway	1	2

It is observed from the Table 1 that the majority of farmers (90%) were adopting contour farming practice as vegetative soil and water conservation technology. The second most popular vegetative soil and water conservation practice among the tribals was intercropping and it was adopting by 88 per cent of farmers. The other important vegetative practices adopted by the farmers were green manuring and summer ploughing. The least adopted vegetative soil and

water conservation technologies were mulching, strip cropping and grass waterway. It may be due to unsuitability of these practices to the conditions of the area. Hence, it is revealed from the table that the most of the tribal farmers in the Navamota watershed were cultivating their agricultural crops in intercropping method on contour lines.

Adoption behaviour of tribals towards mechanical technologies

Table 2: Frequency distribution of mechanical SWC technologies adopted by tribal farmers

Sl. No.	Technology	Adoption behaviour	
		Number of respondent	Percentage
1.	Marginal bunding	20	40
2.	Contour bunding	32	64
3.	Terracing	3	6
4.	Land leveling	5	10
5.	Peripheral bunding	—	—
6.	Checkdam	1	2
7.	Gully plug	—	—
8.	Spillway	—	—
9.	Dug out pond	—	—

The most important mechanical soil and water conservation practice adopted by rural tribal farmers was contour bunding (Table 2) and it was adopted by majority (64 per cent) of farmers. The another important technology adopted in the area was marginal bunding i.e. 40 per cent of tribals adopted the practice. The ten per cent farmers also leveled their field for cultivation of agricultural crops, whereas the other mechanical soil and water conservation technologies such as terracing and checkdam were adopted only by 6 and 2 per cent farmers respectively. It is also observed from the table 2 that the other important technologies such as peripheral bunding, gully plug, spillway and dug out pond were not adopted by any tribal farmer. The farmers may not be able to adopt these mechanical soil was water conservation practices on their fields due to high cost incurred in adoption or unsuitability to the field conditions.

Level of adoption of vegetative technologies

Table 3: Adoption level of vegetative SWC technologies by farmers of Navamota watershed

Adoption level	Number of respondents	Percentage	Mean	S.D.
Low level (below 4.3 scores)	7	14		
Medium level (between 4.3 to 7.94 scores)	31	62	6.120	1.82
High level (above 7.94 scores)	12	24		

The Table 3 represents the three different adoption levels of rural tribal farmers towards vegetative soil and water conservation technologies in Navamota watershed. It was found that the majority of respondents i.e. 62% were under the category of medium level adopters of vegetative SWC technologies in Navamota watershed. 24% respondents were having high level of adoption towards vegetative conservation technologies followed by 14% respondents hqving low level of adoption. It reveal that the majority of farmers were medium level adopters.

Levels of adoption of mechanical technologies

According to Table 4 the majority of respondents (64%) fell under the category of medium level adopters in respect of mechanical soil and water conservation practices and followed by 20% of respondents were having low level of

adoption towards mechanical SWC practices. The least number of respondents i.e. only 16% were having high level of adoption toward mechanical SWC practices.

It is observed from the Table 3 and 4 that the majority of rural tribal farmers were found under the category of medium level of adoption in both vegetative and mechanical SWC technologies. It is very important to note that in the category of high level of adopters, the more number (24%) of respondents were adopting vegetative SWC practices. The adoption level towards mechanical SWC practices may be due to the fact that mechanical conservation technologies require high cost in adoption and unsuitability to the field conditions.

Table 4: Adoption level of mechanical SWC technologies by farmers of Navamota watershed

Adoption level	Number of respondents	Percent-age	Mean	S.D.
Low level (below 3.57 scores)	10	20		
Medium level (between 3.57 to 7.31 scores)	32	64	5.44	1.87
High level (above 7.31 scores)	8	16		

Overall extent of adoption of vegetative and mechanical SWC technologies

The overall extent of adoption of both the vegetative and mechanical soil and water conservation technologies were calculated with the help of developed adoption quotient. It was found that the overall adoption level of vegetative SWC technologies was 34.18 per cent, whereas the overall adoption of mechanical SWC technologies was 30.22 per cent. It explained that in general the extent of adoption of vegetative soil and water conservation technologies was higher than the mechanical soil and water conservation technologies. It may be due to the high cost incurred in adoption of mechanical soil and water conservation technologies. It may also be due to the fact that the mechanical SWC technologies were adopted on the basis of field contour lines and at community level. Which requires joint participatory approach of local residents of watershed for adoption of mechanical technologies.

CONCLUSION

It may be concluded that the low cost or no-cost vegetative and mechanical soil and water conservation technologies suitable to small farm holdings should be developed for their easy adoption in tribal conditions. The technologies should be developed according to and feasibility of rural tribal farmers. The ultimate beneficiary farmers should be motivated for their collective participation in adoption of mechanical soil and water conservation technologies on watershed basis.

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