
A study on adoption of low-cost and no-cost technologies of watershed management by tribal farmers of Navsari district of South Gujarat

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ABSTRACT

Farming in India largely depends upon vagaries of monsoon causing dwindling in the production. Now a day's Watershed Management is a new avenue for developing the rainfed areas. Government has launched ambitious watershed management activities for development of rainfed areas started science from July 1986, covering 16 states of India and 99 districts of Gujarat state as a new trust to improve village economy with an objective to promote holistic growth of the agricultural and allied sector through area based regionally different strategies; to increase and stabilize the agricultural production and narrowing down regional socio-economic imbalance in rainfed areas through development of natural resource base, diversify the rainfed farming system, tapping the local resource potential to attain higher productivity and services for improving standard of living of rural poor and tribal.

The present study is carried out to find up to what extent tribal farmers had adoption of low-cost and no-cost technologies of watershed management. For generating information on this dimension, this study is the modest attempt in developing sound and systematic knowledge.

Keeping in view above facts present study entitled "Adoption of low-cost and no-cost technologies of watershed management by tribal farmers of Navsari district" was planned with specific objectives ,to study the profile of tribal farmers, to know the level of knowledge of respondents regarding no-cost and low-cost technologies of watershed management, to study the extent of adoption of respondents regarding no-cost and low-cost watershed management technologies, to ascertain the relationship between profile of tribal farmer and extent of knowledge and adoption of no-cost and low-cost watershed management technologies. **The important findings of the study are summarized as under:**

Half of the tribal farmers belonged to the age group of 36 to 50 years. Less than two-fifth of the tribal farmers were illiterate. Great majority of the tribal farmers had low level of experience in farming. Slightly less than half of the tribal farmers had membership in two organizations in case of social participation. Slightly more than half of the tribal farmers were trained. Slightly more than one third of the tribal farmers had medium level of mass media exposure. Less than half of the tribal farmers had very high level of extension contact. Slightly more than two third of the tribal farmers were dependent on farming with animal husbandry. Slightly more than half of the tribal farmers were found with small size of land holding. Slightly more than half of the tribal farmers came under very low level of annual income. Slightly less than half of the tribal farmers had high level of scientific orientation. Slightly less than half of the tribal farmers had medium level of overall knowledge about no-cost and low-cost technologies of watershed management. Slightly more than half of the tribal farmers had medium level of overall adoption about no-cost and low-cost technologies of watershed management. Independent variables studies viz., only age of tribal farmers had negative and significant correlation with adoption

whereas, rest of the variables like education, farming experience, social participation and training received, mass media exposure, extension contact, occupation, land holding, annual income and scientific orientation were positive and significantly correlated with adoption of no-cost and low-cost technologies of watershed management.

Methodology

The present study was conducted in four tribal talukas of Navsari district in South Gujarat. Important and relevant low-cost and no-cost technologies of watershed management in two major areas of technologies (I) Soil and water conservation technologies, and (II) Crop production technologies were selected under study through expert opinion. With the help of random sampling method four villages were selected from each of selected tribal talukas. From each selected village, ten tribal farmers were randomly selected which constituted a total sample size of 120 tribal respondents. The data were collected with the help of well structured pre-tested interview schedule incorporating all items pertaining to specific objectives of the study. The independent variables were measured with the help of appropriate scales used by other researcher with some modification. The dependent variable was measured by developing adoption index with the help of structure schedule developed by researchers. The collected data were compiled, tabulated and analyzed to get proper answer for specific objectives of the study with the help of various statistical tools to test the hypothesis under study. The statistical tools such as arbitrary method, percentage, and mean, co-efficient of correlation were used.

Results and Discussion:

The information related to this study was collected from beneficiary farmers of selected watershed area, by means of structured interview schedule. The collected information was classified, tabulated and analyzed in light of the objectives of the study. The facts and findings derived after analyzing the information have been presented under following heads:

1. Profile of tribal farmers

Half (50.00 per cent) of the tribal farmers belonged to the age group of 36 to 50 years. Less than two-fifth (39.17 per cent) of the tribal farmers were illiterate. Great majority (79.17 per cent) of the tribal farmers had low level of experience in farming. Slightly less than half (48.34 per cent) of the tribal farmers had membership in two organizations in case of social participation. Slightly more than half (56.67 per cent) of the tribal farmer were trained. Slightly more than one third (34.17 per cent) of the tribal farmers had medium level of mass media exposure. Less than half (40.84 per cent) of the tribal farmers had very high level of extension contact. Slightly more than two third (68.34 per cent) of the tribal farmers were dependent on farming with animal husbandry. Slightly more than half (52.50 per cent) of the tribal farmers were found with small size of land holding. Slightly more than half (55.83 per cent) of the tribal farmers came under very low level of annual income. Slightly less than half (45.83 per cent) of the tribal farmers had high level of scientific orientation.

2. Knowledge levels of tribal farmers regarding no-cost and low-cost technologies of watershed management.

In the present study, knowledge refers to know-how about different no-cost and low-cost technologies of watershed management possessed by the tribal farmers. Knowledge regarding these technologies influences overt and covert behaviour of an individual and acts as precursors of their adoption. Knowledge was measured with the help of teacher made test developed for the purpose and the knowledge score regarding no-cost and low-cost technologies of two important watershed

management practices for each tribal farmers was calculated with the help of knowledge index. Bhagat, P.R. (2004) reported the same.

2.1 Practice wise knowledge of no-cost and low-cost technologies of watershed management

On the basis of practice wise knowledge score obtained by the tribal farmers the practice wise knowledge index was calculated, so (I) soil and water conservation technology and (II) crop production technology were grouped into five categories and data regarding this aspect were presented in Table-1.

Table: 1 Practice wise knowledge level of no-cost and low-cost technologies of watershed management among the tribal farmers

n=120

Sr. No.	Categories	Practices			
		(I) Soil and water conservation technology		(II) Crop production technology	
		Frequency	Percentage	Frequency	Percentage
1	Very low	00	0.00	00	0.00
2	Low	00	0.00	27	22.50
3	Medium	38	31.67	77	64.17
4	High	37	30.83	12	10.00
5	Very high	45	37.50	04	3.33
Total		120	100.00	120	100.00

2.1.1 Soil and water conservation technology

Different Soil and water conservation technologies are an important part of rainfed farming management. Adequate and proper soil & water conservation practices helps in maintaining soil fertility and increases the production in rainfed area. Whereas, poor soil and water conservation can be a valuable factor for low productivity of land of rainfed area. It is apparent from the data presented in Table-13 that, less than half (37.50 per cent) of tribal farmers found with very high level of knowledge, followed by 31.67 per cent and 30.83 per cent of tribal farmers found with medium and high level of knowledge regarding soil and water conservation technology. None of the tribal farmers fall under the categories of very low and low level of knowledge regarding soil and water conservation technology. Bhagat, P.R. (2004) and Patel, J.B. (1995) reported the same.

On the basis of the above result, it can be concluded that cent per cent of tribal farmers were found with very high to medium level of knowledge regarding soil and water conservation technology, which is attributed to fact that nearly two third of tribal farmers were literate, well socially participated had medium to high level of mass media exposure and very high level of extension contact with regular training provided regarding watershed management technologies by GSLDC, Watershed Management Unit, K.V.K., SAUs and NGOs.

2.1.2 Crop production technology

Different Crop production technologies constitute an important part of rainfed farming management. Adequate and proper crop production technology helps into maintain optimum production of land of rainfed area. Whereas, poor crop production technology can be a valuable factor for low productivity of land of rainfed area.

It is evident from the data reported in Table-13 that, nearly two third (64.17 per cent) of tribal farmers found with medium level of knowledge, followed by 22.50 per cent, 10.00 per cent and 3.33 per cent of tribal farmers found with low, high and very high level of knowledge regarding crop production technology. None of the tribal farmers fall under the categories of very low level of knowledge regarding crop production technology.

Thus, it appears that majority (86.67 per cent) of tribal farmers were found with medium to low level of knowledge regarding crop production technology, which is due to fact that majority of tribal farmers failed to understand the importance of knowledge about proper use of short durational crop varieties, mid season correction, use of organic manures and fertilizers like neem coated urea *viz.*, stands against leaching, inter culturing, inter-cropping, weed management, supplementary irrigation and tree plantation etc.

2.2 Overall knowledge level of no-cost and low-cost technologies of watershed management among the tribal farmers

On the basis of total knowledge score obtained by the tribal farmers the knowledge index was calculated, they were grouped into five categories and data regarding this aspect were presented in Table- 2.

Table: 2 Distribution of tribal farmers according to their overall knowledge level of no-cost and low-cost technologies of watershed management n=120

Sr. No.	Overall knowledge level categories	Tribal farmers	
		Frequency	Per cent
1	Very low (Up to 20 score)	00	0.00
2	Low (21 – 40 score)	00	0.00
3	Medium (41 – 60 score)	55	45.83
4	High (61 – 80 score)	40	33.34
5	Very high (Above 80 score)	25	20.83
Total		120	100.00

The distributional analysis pertaining to overall knowledge level of the tribal farmers mentioned in Table-2 indicated that nearly half (45.83 per cent) of the tribal farmers had medium level of overall knowledge followed by 33.34 per cent and 20.83 per cent had high and very high level of overall knowledge. None of the tribal farmers fall under the categories of low and very low level of overall knowledge about no-cost and low-cost technologies of watershed management.

Thus, it can be concluded that cent per cent of tribal farmers had medium to very high level of overall knowledge about no-cost and low-cost technologies of watershed management. The probable reason for medium level of knowledge of farmers might be due to their very high level of extension contact and medium to high level of mass media exposure, besides their primary to secondary level of formal education might have encouraged them to take interest in various awareness programmes run by State Agricultural Department, SAUs, Watershed Management Agencies, K.V.K. and NGO's. Soleiman and Saeid . (2015) reported the same..

2.3 Extent of adoption regarding no-cost and low-cost technologies of watershed management.

Adoption is not an instant decision. An individual passes through several mental stages in adopting certain idea. Adoption is a process through which an individual passes from first hearing of an innovation to its final adoption. With a view to find out the level of adoption of no-cost and low-cost technologies of watershed management by tribal farmers, the respondent were asked to indicate at what extent they adopted no-cost and low-cost technologies of watershed management. The findings regarding overall adoption level are given in Table-3.

2.3.1 Item wise adoption of tribal farmers about no-cost and low-cost technologies of watershed management.

Item wise adoption of tribal farmers about no-cost and low-cost technologies of watershed management here two technologies were already classified as soil and water conservation technology and crop production technology.

In this study an attempt has been made to assess the item wise adoption of tribal farmers about no-cost and low-cost technologies of watershed management. For this purpose intensity of each of the technology was calculated based on frequency of the respondent against each technology and per cent & rank was given from higher to lower per cent having as under and the findings are presented in Table-3.

Table: 3 Item wise adoption of tribal farmers about no-cost and low-cost technologies of watershed management.

Sr No	Practices	Frequency	%	Rank
I	Soil and water conservation technologies			
1	Sowing across the slops	112	93.33	II
2	Sowing as per recommended spacing	68	56.66	XIII
3	Summer ploughing	118	98.33	I
4	Contour sowing	91	75.83	V
5	Vegetative bunds	70	58.33	XI
6	Dividing field with small bunds	82	68.33	VIII
7	Small earthen bunds	80	66.67	IX

8	Land leveling	100	83.33	IV
9	Tillage across the slops	109	90.83	III
10	Stubble and agro waste plucking	85	70.83	VII
11	Natural grasses on boundaries and waterways.	73	60.83	X
12	Afforestation	69	57.5	XII
13	Recharge trench	89	74.17	VI
14	Irrigation in alternative row and furrow	--	--	--
II	Crop production technologies			
1	Selection of short durational variety	91	75.83	I
2	Timely sowing	80	66.66	V
3	Intercropping	58	48.33	VII
4	Mid season correction	53	44.16	VIII
5	Use of organic manures	82	68.33	IV
6	Use of neem coated chemical fertilizer as urea	60	50.00	VI
7	Interculturing	86	71.67	II
8	Weed management			
	(i) Hand weeding	85	70.83	III
	(ii) Use of herbicides	21	17.50	XI
9	Supplementary irrigation	47	39.16	IX
10	Planting of tree on farm boundary / in waste land	41	34.16	X

It is observed from Table-3 that, among various soil and water conservation technologies viz., summer ploughing was adopted by 98.33 per cent tribal farmers and was ranked first, followed by sowing across (93.33 per cent) and tillage across slope (90.83 per cent) were ranked second and third, respectively. The technologies viz., land leveling (83.33 per cent) and contour sowing (75.83 per cent) were assigned fourth and fifth rank, respectively. Sixth rank was assigned to recharge trench (74.17 per cent). Seventh rank was assigned to stubble and agro waste plugging (70.83 per cent), while dividing field with small bonds (68.33 per cent), small earthen bunds (66.67 per cent), natural grasses on boundaries (60.83 per cent), vegetative bunds (58.33 per cent), afforestation (57.50 per cent) and sowing as per recommended spacing (56.66 per cent), were ranked 8th, 9th, 10th, 11th, 12th and 13th, respectively. Bhutia, Khorla (1993) and Chauhan, V.P. (2008) reported the same.

While irrigation in alternative row and furrow was not adopted by any respondent, the probable reason might be that lack of information and skill oriented farmer about irrigation in alternative row and furrow. Patel, R.C. (2000).

So, far as crop production technology is concerned the technologies *viz.*, use of improved / hybrid /short duration varieties was adopted by majority (75.83 per cent) of tribal farmers ranked first, followed by inter-culturing (71.67 per cent) and hand weeding (70.83 per cent) and were ranked second and third respectively. The technologies *viz.*, use of organic measure (68.33 per cent), timely sowing (66.66 per cent) and use of neem coated urea as chemical fertilizer (50.00 per cent) were found in fourth, fifth and sixth rank respectively. Seven and eight rank was assigned to intercropping (48.33 per cent) and mid season correction (44.16 per cent), respectively. The practices *viz.*, supplementary irrigation (39.16 per cent) and planting tree on fellow land / boundary (34.16 per cent) were ranked 9th, 10th, respectively and chemical method of weed control (17.50 per cent) *viz.*, ranked last. Karkar and Munsri, (2003) and Kumar *et al* (2014) also found the same results.

From above discussion, it could be concluded that, the use of improved/ hybrid /short duration varieties was the most adopted practices followed by inter culturing, hand weeding and use of organic manures, respectively. The probable reason might be that the farmers have increased their crop production per unit area by adopting improved / hybrid variety without bearing more expenses. Another reason might be that the improved varieties are being easily available at everywhere.

2.3.2 Practice wise adoption of no-cost and low-cost technologies of watershed management

On the basis of practice wise adoption score obtained by the tribal farmers the practice wise adoption index was calculated, so (I) soil and water conservation technology and (II) crop production technology were grouped into five categories and data regarding this aspect were presented in Table-4.

Table: 4 Practice wise adoption level of no-cost and low-cost technologies of watershed management among the tribal farmers n=120

Sr. No.	Categories	Practices			
		(I) Soil and water conservation technology		(II) Crop production technology	
		Frequency	Percentage	Frequency	Percentage
1	Very low	00	0.00	04	3.33
2	Low	01	0.83	29	24.17
3	Medium	32	26.67	37	30.84
4	High	59	49.17	40	33.33
5	Very high	28	23.33	10	8.33
Total		120	100.00	120	100.00

4.3.2.1 Soil and water conservation technology

Soil and water conservation technology like Sowing across the slopes, Sowing as per recommended spacing, Timely sowing, Contour sowing, Vegetative bunds, Dividing field with small bunds, Small earthen bunds, Land levelling, Tillage across the slopes, Stubble and agro waste plucking, Natural grasses on boundaries and waterways, and Afforestation etc. constitute an important part of rainfed farming management. Adequate and proper soil and water conservation helps into maintain optimum production of land of rainfed. Whereas, poor soil and water conservation can be a valuable factor for low productivity of land of rainfed area. Pawar, K.P. (2004)

The data presented in the above table concluded that, nearly half (49.17 per cent) of tribal farmers found with high level of adoption, followed by 26.67 per cent, 23.33 per cent and 0.83 per cent of tribal farmers found with medium, high and low level of adoption regarding soil and water conservation technology. None of the tribal farmers fall under the categories of very low level of adoption regarding soil and water conservation technology. Vaneetha, (2006) reported the same..

On the basis of the above result, it can be concluded that nearly cent per cent of tribal farmers were found with medium to very high level of adoption regarding soil and water conservation technology, which is due to fact that majority (62.50 per cent) of tribal farmers were literate, had cent per cent of social participation, medium level of mass media exposure and very high level of extension contact. So, they were aware to understand the importance of adoption of proper production technologies for rainfed farming.

4.3.2.2 Crop production technology

Crop production technology like use of short durational crop varieties, mid season correction, use of organic manures and fertilizers like neem coated urea *viz.*, stands against leaching, inter culturing, intercropping, weed management, supplementary irrigation and tree plantation etc. constitute an important part of rainfed farming management. Adequate and proper crop production technology helps into maintain optimum production of land of rainfed area. Whereas, poor crop production technology can be a valuable factor for low productivity of land of rainfed area. Patel, B.S. (2005) and Rathod, (2001) reported the same.

Result from the Table-4 indicated that, less than half (33.33 per cent) of tribal farmers found with high level of adoption, followed by 30.84 per cent, 24.17 per cent, 8.33 per cent and 3.33 per cent of tribal farmers found with medium, low, very high and very low level of adoption regarding crop production technology, respectively. Shinde, (2011) reported the same..

From the foregoing discussion it can be stated that more than half of tribal farmers were found with medium to very low level of adoption regarding crop production technology, which is due to fact that majority of tribal farmers failed to understand the importance of adoption of short durational crop varieties, mid season correction, use of organic manures and fertilizers like neem coated urea *viz.*, stands against leaching, inter culturing, inter -cropping, weed management, supplementary irrigation and tree plantation etc.

4.3.3 Overall adoption level of no-cost and low-cost technologies of watershed management among the tribal farmers

On the basis of total knowledge score obtained by the tribal farmers the knowledge index was calculated, they were grouped into five categories and data regarding this aspect were presented in Table- 5.

Table: 5 Distribution of tribal farmers according to their overall adoption level of no-cost and low-cost technologies of watershed management n=120

Sr. No.	Overall adoption level categories	Tribal farmers	
		Frequency	Per cent
1	Very low (Up to 20 score)	00	0.00
2	Low (21 – 40 score)	01	0.83
3	Medium (41 – 60 score)	44	36.67
4	High (61 – 80 score)	63	52.50
5	Very high (Above 80 score)	12	10.00
Total		120	100.00

The distributional analysis pertaining to overall adoption level of the tribal farmers mentioned in Table-5 indicated that majority (52.50 per cent) of the tribal farmers had high level of overall adoption followed by 36.67 per cent, 10.00 per cent and 0.83 per cent had medium, very high and low level of overall adoption. None of the tribal farmers fall under the categories of very low level of overall adoption about no-cost and low-cost technologies of watershed management.

Thus, it can be concluded that nearly cent per cent of tribal farmers had medium to very high level of overall adoption about no-cost and low-cost technologies of watershed management. Jondhale, *et al* (2000) and Rabari, (2006). reported the same.

For high to medium level of adoption of tribal farmers the probable reason might be due to their very high level of extension contact and medium to high level of mass media exposure, besides their primary to secondary level of formal education might have encouraged them to take interest in various awareness programmes run by State Agricultural Department, SAUs., Watershed Management Agencies, K.V.K., NGO's and Vanbandhu Welfare Programmes of Tribal Development Department. Here, none per cent of tribal farmers had very low level of overall adoption which is mainly attributed to literacy, means understandable educational status.

4.4 Relationship between profile of tribal farmers and their knowledge and adoption of no-cost and low-cost technologies of watershed management.

4.4.1 Relationship between profile of tribal farmers and their knowledge of no-cost and low-cost technologies of watershed management

Table: 6 Relationship between profile of tribal farmers and their knowledge of no-cost and low-cost technologies of watershed management

Sr. No.	Independent Variables	Correlation Coefficient ('r' value)
1	Age	- 0.192*
2	Education	0.489**
3	Experience in farming	0.222*
4	Social participation	0.223*
5	Training received	0.198*
6	Mass media exposure	0.527**
7	Extension contact	0.363**
8	Occupation	0.401**
9	Land holding	0.281**
10	Annual income	0.374**
11	Scientific orientation	0.253**

*= significant at 5% level of probability, **= significant at 1% level of probability

It is apparent from the data presented in the Table-6 that, age had negative and significant correlation ($r = -0.192$) with the knowledge of no-cost and low-cost technologies of watershed management by the tribal farmers. Negative correlation was found in case of age and knowledge might be due to that the old aged tribal farmers were traditional, they were skeptical in nature and resist the change as well as reluctant to learn and set habit for thinking resulted into low acquisition of knowledge. This finding is opposite in the line with the results of Karkar and Munshi (2003), and Gosh (2003). Remaining all independent variables found positive and significant relationship between profile of tribal farmers and their knowledge of no-cost and low-cost technologies of watershed management.

4.4.2 Relationship between profile of tribal farmers and their adoption of no-cost and low-cost technologies of watershed management

The adoption of recommended no-cost and low-cost technology of watershed management is a complex process involving sequence and thought of action. The action of individual tribal farmers is governed by personal, social, economic, psychological and cultural factors involved in situation. Some tribal farmers adopt new technology of watershed management more quickly than others because of the difference in personal characteristics. Similarly, if there is a difference in economic factors, process of action is changed, there by changing the pattern of adoption. Thus, in nutshell it may be stated that the adoption of recommended no-cost and low-cost technology of watershed management differs when there are difference in personal, socio- economic and psychological characteristics of tribal farmers. Hence, considering the important of these characteristics and review of past research studies, an attempt has been made in this investigation to ascertain the relationship if any, between socio-personal, economic, communicational and psychological characteristics of the tribal farmers and extent of adoption of selected no-cost and low-cost technologies of watershed management. This was determined and tested with help of Karl Pearson's coefficient correlation test and results obtained are presented in Table-7.

Table: 7 Relationship between profile of tribal farmers and their level of adoption of no-cost and low-cost technologies of watershed management n=120

Sr. No.	Independent Variables	Correlation Coefficient ('r' value)
1	Age	-0.247**
2	Education	0.307**
3	Experience in farming	0.313**
4	Social participation	0.252**
5	Training received	0.216*
6	Mass media exposure	0.455**
7	Extension contact	0.438**
8	Occupation	0.348**
9	Land holding	0.326**
10	Annual income	0.328**
11	Scientific orientation	0.237**
12	Knowledge	0.666**

*= significant at 5% level of probability, **= significant at 1% level of probability,

It is apparent from the data presented in the Table-7 that, age had negative and significant correlation ($r = -0.247$) with the adoption of no-cost and low-cost technologies of watershed management by the tribal farmers. To epitomize the results of the study, it can be stated that young and middle aged farmers were more enthusiastic in nature with unique power of decision making. On other hand, old age farmers had greater reluctance to learn and had set habits in way of thinking which punctured in forming favorable attitude towards new innovation. This might have resulted into its influence on adoption of an innovation. This finding is in the line with the results of Bhatt (1990). The data presented in Table-7 make it clear that, remaining all independent variables found positive and significant or highly significant relationship between adoption of no-cost and low-cost technologies of watershed management by the tribal farmers. Yadav, *et al* (2013) and Zala, P.K. (2005).

Conclusion:

To epitomized the results it can be said that majority of the tribal farmers belonged to middle age group having primary to higher secondary level of education, medium to low level of experience in farming and completely participate in social participation, half of them found trained, which had medium level of mass media exposure and medium to very high level of extension contact. Majority of them had more than one or one subsidiary occupations and small to marginal size of land holding. As far as annual income is concern, majority of them got annually up to ` 72,000 income. While, majority of them had found under medium to high level of scientific orientation and overall knowledge level. The independent variables *viz.*, education, experience in farming, social participation, training received, mass media exposure, extension contact, occupation, land holding, annual income, scientific orientation and knowledge regarding no-cost and low-cost watershed management technologies had establish significant and positive relationship with their adoption whereas, reverse trend was observed in case of age. Less subsidy and lack of knowledge about recommended crop production technology were the major constraints faced by the tribal farmer in rainfed farming. Field demonstration of various innovative no-cost and low-cost technologies of watershed management and loan & subsidy should be easily available for rainfed farming were the major suggestions offered by the tribal farmers.

IMPLICATIONS AND RECOMMENDATIONS:

When, it is said and done the question of the action oriented men to provide some concrete steps remains to be answered. Based on the findings of the study one can safely recommend following implications.

1. These factors *viz.*, socio-personal, communicational, economical and psychological which affected the adoption of no-cost and low-cost technologies of watershed management should be reason while any programme of planned communication.
2. The finding of this study would facilitated in knowing the characteristics of the tribal farmers, which will serve as a guideline for the planners and extension agencies for planning and developing need based integrated watershed management technologies which prove more effectively in watershed area.
3. The tribal farmers overall adoption of no-cost and low-cost watershed management technology confined to the medium to high level. It indicates that implementing agencies of watershed management and agricultural department of the state had played significant role in adoption behaviour of the farmers. For improving the level of adoption of no-cost and low-cost watershed management technology, implementing agencies of watershed management, state agricultural department, SAUs., K.V.K. and NGOs. should give special attention for adoption of technologies namely irrigation in alternative row and furrow, sowing as per recommended spacing, afforestation, vegetative bunds and growing natural grasses on boundary & waterways in case of soil and water conservation technologies and use of herbicides, plantation of tree on farm boundary/waste land, supplementary irrigation, mid season correction and intercropping in case of crop production technologies during planning of farmers training programme.
4. The state Government, Agricultural Department, SAUs, Watershed Management Unit, K.V.K., N.G.Os., should continuously trying to increase the knowledge about no-cost and low-cost technologies of watershed management among the tribal farmers.

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