

Watershed Management by Tribal Farmers of Navsari District of South Gujarat Through No- Cost and Low-Cost Technologies

Niraj . G. Patel¹ and N. M. Chauhan²

¹ P.G. Student, Department of Extension Education, NAU, Waghai - 394 730

² Associate professor., Department of Extension Education, NAU, Waghai - 394 730

Email : nikulsinh_m@yahoo.in

ABSTRACT

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. 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.

Keywords : Watershed management, Tribal Farmers, No-cost and low-cost technology

INTRODUCTION

Farming in India principally 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.

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

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.	Category	Practices			
		Soil and water conservation technology		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

I 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.

II 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-1 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.

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

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

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..

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

n=120

Sr. No.	Practices	Frequency	Percent	Rank
I	Soil and water conservation technologies			
1	Sowing across the slopes	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 slopes	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

Practice wise adoption of no-cost and low-cost technologies of watershed management**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			
		Soil and water conservation technology		Crop production technology	
		Frequency	Percentage	Frequency	Percentage
1	Very low	00	00.00	04	03.33
2	Low	01	00.83	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	08.33

I Soil and water conservation technology

Soil and water conservation technology like Sowing across the slops, Sowing as per recommended spacing, Timely sowing, Contour sowing, Vegetative bunds, Dividing field with small bunds, Small earthen bunds, Land levelling, Tillage across the slops, 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.

II 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.

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.

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

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

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.

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

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).

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.

Table 6: Relationship between profile of tribal farmers and their knowledge of no-cost and low-cost technologies of watershed management n=120

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

*= significant at 5% level of probability

**= significant at 1% level of probability

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)
X ₁	Age	-0.247**
X ₂	Education	0.307**
X ₃	Experience in farming	0.313**
X ₄	Social participation	0.252**
X ₅	Training received	0.216*
X ₆	Mass media exposure	0.455**
X ₇	Extension contact	0.438**
X ₈	Occupation	0.348**
X ₉	Land holding	0.326**
X ₁₀	Annual income	0.328**
X ₁₁	Scientific orientation	0.237**
X 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 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.

IMPLICATIONS

- (i) 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.
- (ii) 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.
- (iii) 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.
- (iv) 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.

REFERENCES

- Anonymous, (2014). Tribal development department of Gujarat, Govt. of Gujarat., Agricultural data of Gujarat, Indian Agricultural Census report. and World Statistical Data.
- Bhagat, P.R. (2004). Indigenous and scientific knowledge and adoption level of women for various use of neem in Vadodara taluka of Gujarat state. Thesis, (unpublished.) M.sc.(Agril.) special problem A.A.U.,Anand.
- Bhatt, S.R. (1990). Transfer of hybrid maize technology among tribal farmers of Girwa block in Udaipur district of Rajasthan state. M.sc. (Agri.) thesis (unpublished.), Guj.Agrl.Uni., Anand campus.
- Bhutia, khorla (1993). A study on adopted and non adopted farmers toward watershed development programme in Sikkim. M.sc. (Agri.) thesis (unpublished.), Guj. Agrl.Uni., Anand campus.
- Chauhan, V.P. (2008). A study on adoption of watershed crop production technology by beneficiaries under

- National Watershed Development Project for Rainfed area in Ahmedabad district of Gujarat state, M.sc. thesis. (unpublished) A.A.U.
- Jondhale, S.C.; Jadhav, S.R. and Fatak U.N. Reason for no-cost and low-cost technology in watershed development programme. *Maharashtra. J. Ext. Edu.*, XIX, 2000.
- Karkar, B.R. and Munsli, M.A. (2003). Coreletes of rainfed Agro-technological knowledge. *Guj. j. Ext. Edu.* 14:49-51.
- Kumar R; Sheoran, D. K. and Singh, J. (2014). People's participation in integrated watershed management programme in Haryana. *Annals of Biology.* 30(4): 754-757.
- Patel, J.B. (1995). Impact of watershed management technology in agricultural development in Panchmahals district of Gujarat state; M.sc. (Agri.) thesis (unpublished) Guj. Agri. Uni., Navsari campus.
- Patel, B.S. (2005). A study of peasantry modernization in integrated tribal development project area of Dahod District of Gujarat State, Ph.D. thesis (unpublished) A.A.U., Anand.
- Patel, R.C. (2000). A study on consequences of adoption of watershed management technology by beneficiary farmers in watershed area of kheda district of Gujarat state, Ph.d. thesis
- Pawar, K.P. (2004). Indigenous resources management by tribal farmwomen in Dangs District of Gujarat state Unpublished Ph.D. (Agri.) thesis, AAU, Anand..
- Rabari, S.N. (2006). A study on adoption of tomato recomonded technology of tomato growers in Anand District of Gujarat State. M.sc.(Agri.) Thesis (Unpub.) A.A.U., Anand.
- Rathod, J.S. (2001). A study on extent of adoption of recommended watershed crop production technology by the tribal farmers in watershed area of Melghat of Amravati District. M.sc.(Agri.) Thesis (Unpub.) A.A.U., Anand.
- Shinde, M.G. (2011). A Study on extent of adoption of improved cotton cultivation practices in Bellary district of A.P. M.sc.(Agri.) Thesis (Unpub.) U.A.S, Dharwad.
- Soleiman R. and Saeid F. (2015). Effective Factors on Rural People's Non-Participation of Mahabad's Dam Catchment in Watershed Management Projects. *International Journal of Agricultural Management and Development* 5(1): 19-26.
- Vaneetha, K.P. (2006). The characteristic of farm women participating in development programmes. *Rural India*, April (2006).
- Yadav, M.; Singh K. C.; Chouhan A.S. and Singh C.J. (2013). Techno-Economic Changes among the Farmers in Relation to Watershed Development Programme. *Indian Res. J. Ext. Edu.* 13 (1): 31-34.
- Zala, P.K. (2005). Indigenous and scientific knowledge of the tribal and non-tribal farmwomen about neem in middle Gujarat. Unpublished Ph.D. (Agri.) thesis, AAU, Anand.

Received : August 2015 : Accepted : October 2015