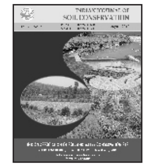
Vol. 47, No. 1, pp 55-62, 2019
Indian Journal of Soil Conservation
Online URL : http://indianjournals.com/ijor.aspx?target=ijor:ijsc&type=home



Factors affecting extent of adoption of soil and water conservation technologies: Case of two semi-arid watersheds of South-eastern Rajasthan

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ARTICLE INFO

Article history:
Received : November, 2018
Revised : April, 2019
Accepted : April, 2019

Key words:
Adoption,
Attitude,
Conservation,
Motivation,
Risk,
Technologies

ABSTRACT

This study describes factors influencing extent of adoption of soil and water conservation (SWC) technologies implemented on farmers' field under two watershed management projects in semi-arid region of Rajasthan. A sample of 50 beneficiary farm households owning fields treated with SWC technologies under a watershed management project was selected randomly from each watershed as respondents in the study. Multi-variate regression model was employed to identify factors influencing extent of adoption. Farm size and economic motivation factors significantly affected extent of adoption in Chhajawa watershed. In Badakhera watershed, farm size, mechanical power, scientific orientation were the factors which positively influenced adoption, while farm implements, farmer innovativeness and risk perception had a negative effect on extent of adoption. Pooled analysis of both watersheds identified farm size, economic motivation, and scientific orientation as positive factors, whereas risk perception and extension contact were the factors which negatively influenced the adoption extent. Variation in factors affecting the extent of adoption in both the watersheds located in the same region suggests that any technological intervention for SWC in an area ought to begin with cognizance of local factors, which may influence technology adoption.

1. INTRODUCTION

Preserving the natural resources for future generations is the top challenge of the world, especially in developing countries like India. India is inhabited with about 17% of world human population and 15% of livestock population on only 2.4% of total land resource of the world. A study reported that 120.72 M ha area is degraded in India due to various forms of land degradation, with water erosion being the chief contributor (69%) followed by chemical degradation (20%), wind erosion (10%) and chemical degradation (Sharda, 2010). New agricultural technologies are being generated continuously by research institutes, universities, private companies, and by the farmers themselves. Agricultural extension agencies are expected to disseminate these technologies among the clients. However, due to weak linkages between research and extension, the dissemination rate is often prolonged. Therefore, the improved SWC technologies are not widely adopted by farmers in developing countries like India, which has attracted much attention from policymakers because land degradation is a crucial challenge for enhancing agricultural production. In developing countries, constraints such as lack of credit, limited access to information, risk aversion, labour and capital shortages are responsible for low adoption (Feder *et al*., 1985; Ellis, 1988). Bagdi *et al*. (2018) indicate various reasons of discontinuance or disadoption of various SWC technologies in watersheds across India. Several studies also dealt with farmers' adoption of SWC practices in various crops or cropping systems around the world, which highlighted various constraints and factors determining adoption (Rezvanfar *et al*., 2009; Wauters *et al*., 2010; Mariano *et al*., 2012; Jara-Rojas *et al*., 2013; Arslan *et al*., 2014; Ashoori *et al*., 2017). Prokopy *et al*. (2008) inferred that producers of younger age with diverse farming operations, higher educational levels, access to labour, and those that have more acreage, income, and capital were more likely to adopt conservation practices. Studies conducted by Asafu-Adjaye (2008); Paudel *et al*. (2008); Lamba *et al*. (2009) have indicated that higher farm income and lower financial stress have a positive influence on adoption of conservation practices. To summarize, scanned literature clearly shows that factors affecting adoption of SWC technologies vary from place to place and are context specific, and the relative importance of each factor differs across sites which makes it impossible to identify universal determinants of adoption (Laper and Pandey, 1999; Paudel and Thapa, 2004; Knowler and Bradshaw, 2007; De Graaff *et al*., 2008).

Rainfed agriculture accounts for 65% of India's cropped area. Watershed management is the only viable option where erratic precipitation often results in low crop yields or crop failure as well as encourages land degradation in the rainfed areas of the country. Government of India from early 1970s has implemented various SWC technologies on watershed basis for holistic development of rainfed areas. In order to develop soil conservation strategies that will enhance sustainability of agricultural production systems, the improved SWC technologies executed under various watershed management programmes of Indian Government need to be assessed in terms of their acceptability by end-users. Yaron *et al*. (1992) suggested that extrapolations of adoption results should be avoided and that wherever possible, region-specific studies should be encouraged. Therefore, to examine adoption behaviour and identify the factors influencing extent of adoption of SWC technologies by beneficiaries in selected treated watersheds was the primary purpose of this study. Minimal studies had focused on variables which affect the extent of adoption, especially when technologies were disseminated through a developmental project like integrated watershed management programme. Measurement of soil and water conservation technologies is a difficult task. Therefore, technologies can be considered as adopted if the farmer continues to utilize, maintain or upscale some of the technologies or measures on their fields after the watershed project withdrawal. Status of adoption and identification of different factors influencing the extent of adoption will provide a useful guide for future in designing appropriate and sustainable soil conservation programs for the semi-arid areas.

2. MATERIAL AND METHODS

Study Area

The present study was conducted in two selected watersheds, namely Chhajawa and Badakhera in Baran and Bundi districts, respectively located in semi-arid region of South-eastern Rajasthan (Fig.1). Chhajawa watershed was treated by State Soil Conservation Department of Government of Rajasthan under the technical guidance and supervision of ICAR-Indian Institute of Soil and Water Conservation formerly known as Central Soil and Water Conservation Research and Training institute (CSWCRTI), Research Centre, Kota while Badakhera watershed was developed by ICAR-IISWC, Research Centre, Kota itself.

Chhajawa watershed, covering an area of 454 ha and located at 25°05'N latitudes and 76°25'E longitudes on Baran-Atru road, was treated during 1985-86 to 1989-90 with a total cost of ₹ 10.66 lakh with the objective of mitigating soil erosion and to enhance productivity of rainfed arable lands in the region, while Badakhera watershed, situated at 25°36'N latitude and 76°15'E longitude is having an area of about 682.5 ha with the typical feature of multi-directional slopes (2-10%) prior to treatment. Out of 682.5 ha, private agricultural lands occupy 378.9 ha (56%) and remaining 303.6 ha (44%) was community lands. The execution of works was carried out during 1997-98 to 2002-2003 with total project cost of ₹ 27.33 lakh. Both watersheds are strongly depend on the monsoon; mean annual precipitation in these watersheds was observed to be about 800 mm. About 90% of precipitation occurs between June and September. These watersheds were saturated with field demonstrations of SWC technologies and crop improvement packages under rainfed as well as limited irrigation conditions. Special emphasis during the project implementation was given to people's participation besides educating and motivating farmers for adopting the improved package of practices.

Data

The two watersheds, Chhajawa and Badakhera, were purposively selected for present investigation because both the watersheds were developed by ICAR-IISWC, Research Centre, Kota with twin objectives i) to rehabilitate degraded area of watersheds, and ii) to develop as demonstration site for State line department engaged in soil and water conservation. Moreover, these watersheds are representative in terms of topography, agricultural production system and

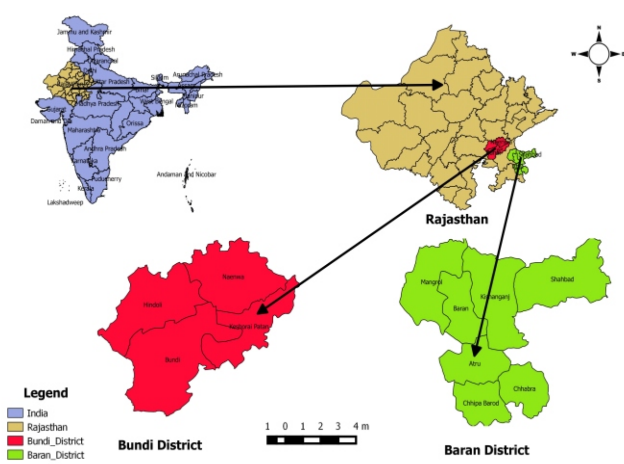

Fig. 1. Location map of study area (watersheds)

ongoing land management practices in the region, and are characterized by water scarcity and soil degradation. The total number of beneficiary households in Chhajawa watershed was 108, and 136 in Badakhera at the time of project implementation. A sample of 50 beneficiary farmer households from the original beneficiaries list, whose fields were treated with SWC technologies under the watershed management project, was selected randomly from each watershed as respondents in the study. Qualitative and quantitative data regarding personal, psychological and post-adoption behaviour variables was collected on specially designed and pre-tested questionnaire by interviewing the respondents personally during 2013-14. Field visits for verifying SWC technologies adopted on selected sample households was also conducted in order to ensure validity of information obtained from the respondents. Data were analyzed by using the Stat Graphics Centurion version 17.1.06 and MS-Excel. An analysis of the relationship between number of technologies adopted by an individual farmer household and a factor influencing its adoption involves a mixed set of qualitative and quantitative data. The statement based qualitative data were measured on three point-continuums to derive the score for inclusion in regression analysis. The final list of factors that affect the extent of adoption of SWC technologies were identified using step-wise multiple linear regression analysis.

Explanation of Variables and Specification of Model

Multiple linear regression model was used to identify the factors influencing the extent of adoption in the study sites. This model helps to explore the degree and direction of relationship between dependent and independent variables for defining the extent of adoption of SWC technologies at household level. The dependent variable, the extent of adoption of SWC technologies, was hypothesized as being influenced by a set of independent variables: X_1----X_n (as given below). The model may be specified as follows:

$$Y = b_0 + b_1X_1 + b_2X_2 + \dots\dots\dots + b_nX_n \quad ...(1)$$

Where, Y is the dependent variable (extent or number of technologies adopted by a household), b_0 is the intercept, b_1, b_2 ...b_n are the coefficients of explanatory variables X_1, X_2 ....X_n, respectively.

The major objective of this study was to identify those factors which affect the number of technologies adopted by a household. The selections of factors were based on variables used by the researchers (Pattanayak *et al*., 2003; Knowler and Bradshaw, 2007; Akudugu *et al*., 2012) across the world and likely to be suitable for the region. The following twenty variables were included in the context of the present study:

Age: Age of a farmer reflects experience in farming and better understanding about SWC practices.

Education: Education creates a favourable mental attitude for acceptance of new technologies by bridging the information gaps.

Family Size: The size of a family to some extent relates directly to availability of farm labour which enhances the possibility of adoption, as SWC technologies are deemed to be labour intensive.

Farm Size: Larger land holding is expected to have a positive relationship with the probability of adoption of SWC technologies because of better investment opportunities and resources.

Livestock: Livestock could be used in the production process or exchanged for cash, or other productive assets. Larger number suggests a positive influence on conservation decision. It is expressed in a unit as “standard livestock unit” (SLU).

Mechanical Power: It was hypothesized that SWC technologies adoption require more mechanical power.

Irrigation: Farmer with irrigation facilities would be more likely to adopt SWC technology because he shall be in a position to invest more money to adopt a higher number of technologies in view of sustainable assured income.

Farm Implements: It is expected that a higher number of farm implements available with a farmer will encourage technology adoption and have a positive relationship.

Material Possession: Higher material possessions indicate sound financial condition of farmers who can invest money to adopt more number of SWC technologies.

Income: Income from farming can serve as a source of cash to invest in SWC practices and finally leading to better and continued use of conservation practices.

Social Participation: Participation of farmers in social activities develops right attitude towards developmental activities and exposure to new information and technologies.

Economic Motivation: Profit is a prime force to adopt any new technology. If a farmer is economically motivated by perceiving the economic returns expected from conservation practices to be adopted, then there is a strong possibility to adopt SWC measures.

Mass Media: Exposure to mass media is relevant in adoption as these sources expose the potential adopter to the technology.

Extension Contact: It has a positive impact on adoption, as it reduces information gap.

Extension Participation: Farmer's participation in extension activities taken up by government agencies in an area may lead to more information about implemented technologies and perceived benefits.

Scientific Orientation: Farmer having scientific orientation increases the probability for adopting improved or new SWC technology due to better perception about erosion problems and probable benefits of improved technology adoption.

Innovativeness: An innovative mind exposes farmer with different sources of information about new technology and skills which induced technology adoption.

Risk: Farmers in rainfed areas are risk averter and avoid investment in SWC technologies until and unless they are fully aware about soil erosion problems and its effects on crop productivity.

Knowledge of Innovations: Accurate knowledge about innovation has been identified as the necessary condition for adoption.

Attitude: Positive attitude towards SWC practices is decisive for adopting introduced practices.

3. RESULTS AND DISCUSSION

Sample Characteristics

The sample profile of farmers showed that 56% of them were between the age of 50-75 years and all of them were having vast experience of farming. The mean number of persons per household was 7 which ranged from 2 to 30 members. It was noted that none of the houses was headed by a female. A good number of persons (81%) in sample households were literate. The schooling ranged from 0 to 16 years with a mean of 3 years. On an average, the land area cultivated was 5.08 ha (SD = 4.70) by the sample households. The majority (56%) of the households had farms that were <4 ha size, while 15% had >8 ha of cultivated area. Except for few marginal farmers, all households (92%) supplemented their income by rearing animals. The average numbers of animals in SLU maintained by the farmers was observed to be 3.71 (SD = 3.45). The mean annual income per household was higher in Chhajawa watershed (₹ 4,38,638/-) in comparison of Badakhera (₹ 2,66,176/-). The primary reason for higher income in Chhajawa was mainly because of bigger farm size.

Status of Technologies Adoption

The most common SWC technologies adopted by farmers under the watershed programs was bunding, land levelling and summer ploughing (Table 1). The reason for adoption of these technologies on a large scale is attributed to the fact that majority of farmers were acquainted about above practices as a traditional practice but were not sure about expected benefits prior to implementation of watershed projects. The data showed that 94% of farmers adopted bunding technology followed by land levelling (64%), summer ploughing (62%) and masonry check dams (36%) in Chhajawa watershed. In Badakhera watershed, maximum farmers (70%) preferred to adopt land levelling followed by summer ploughing (68%), bunding (60%), and masonry check dams (60%).

Extent of Adoption of SWC Technology

The success of the implemented watershed projects can be measured in terms of the extent (numbers) to which the implemented SWC technologies were adopted by an individual farmer. Distribution of respondents by the extent of technology adoption revealed (Table 2) that an average number of technologies adopted in Chhajawa and Badakhera watersheds was 3.56 (SD = 1.82) and 3.18 (SD = 1.53), respectively with an overall mean of 3.37 (SD = 1.69). The study further indicates that majority (45%) of the

Table: 1
Status of Soil and Water Conservation Technologies in selected watersheds (N = 100)

Type of technology	Chhajawa watershed		Badakhera watershed		Overall	
	Farmers adopted technology under watershed programme	Farmers currently using adopted technology	Farmers adopted technology under watershed programme	Farmers currently using adopted technology	Farmers adopted technology under watershed programme	Farmers currently using adopted technology
Contour farming	2	-	1	1	3	0
Intercropping	12	-	15	0	27	0
Green manuring	11	2	0	0	11	2
Mulching	1	0	0	0	1	0
Summer ploughing	31	31	32	32	63	63
Land levelling	32	32	35	35	67	67
Grassed waterway	-	-	1	1	1	-
Bunding	47	46	30	28	77	74
Masonry (Check dam, Waste weir)	18	15	30	30	48	45
Gully plug	6	6	3	3	9	9
Well recharge	-	-	1	1	1	1
Pond	-	-	3	3	3	3
Anicut	2	2	6	6	8	8
Loose boulder (Waste weir)	14	12	1	1	15	13
Plantation (agro-horti system)	2	2	1	1	3	3

sample respondents adopted between 3-4 technologies, while 32% adopted 1-2 technologies. Only 6% of farmers adopted > 7 technologies. The variation in the number of technologies between farmers may be because of various socio- economic factors besides farmers' perception and knowledge that some of the soil conservation technologies can only be beneficial if adopted in combinations. Watershed wise comparisons showed no significant variations in trends towards the extent of adoption among the sample households.

Factors Affecting Extent of Adoption of Conservation Technologies

Correlation analysis

A correlation analysis was performed to see whether the selected variables are correlated to dependent variable - extent or number of technologies adopted (Table 3). The results indicate that education, farm size, livestock, mechanical power, farm implements, material possession, income, social participation, and economic motivation were significantly correlated with the extent of technology adoption in Chhajawa watershed.

While seven variables, namely farm size, mechanical power, irrigation, income, scientific orientation, and knowledge were found significantly correlated with positive sign whereas only innovativeness - was negatively but significantly correlated with extent of adoption in Badakhera watershed. Correlation analysis of pooled data indicated altogether nine variables, namely farm size, livestock, mechanical power, irrigation, farm implements, material possession, income, economic motivation, scientific orientation to be significantly correlated with extent of technology adoption.

Factors affecting the extent of adoption

Stepwise multiple linear regression model was used to identify factors influencing the extent of adoption of SWC technologies at household level. The analysis was carried out firstly on individual watershed basis and then pooled data of both the watersheds. The results presented in Table 4 revealed that farm size and economic motivation decide the numbers of technologies to be adopted in Chhajawa watershed. Study reported a positive relationship between the size of farm land holding and economic motivation with the probability of adopting more numbers of SWC technologies. The R^2-statistics indicate that the fitted model explains 43.08% of the variability in number of technologies adopted (Table 4).

The coefficient value (0.18) of farm size indicates an 18% increase in the extent of adoption of SWC technologies with each additional unit in the farm area. The possible reason for the positive effect of farm size on the extent of adoption might be due to the facts that soil conservation technologies require land for interventions, and farmers who operate on larger farms may be in a position to allocate some part of the land under SWC technologies besides higher income which enhances the possibility to invest in SWC measures. These findings are in agreement with earlier studies by Pattanayak *et al*. (2003), Sood and Mitchell (2009) and Dhakal *et al*. (2015) who observed positive influence of farm size on agroforestry adoption. Amsalu and Graff (2007) asserted that farmers who have a more massive farm are more likely to invest in SWC measures. The other variable which significantly influenced the extent of technologies was identified as economic motivation (b=0.40). Results clearly show that household adopted and sustained those SWC technologies in multiple numbers which generated sufficient economic returns,

Table: 2
Distribution of sample households by numbers of technologies adopted

Numbers of technology adopted	Chhajawa watershed		Badakhera watershed		Overall	
	Number	%	Number	%	Number	%
1-2	17	34	15	30	32	32
3-4	20	40	25	50	45	45
5-6	8	16	9	18	17	17
7-8	5	10	1	2	6	6
Mean	3.56	--	3.18	--	3.37	--
SD	1.82	--	1.53	--	1.69	--

Table: 3
Correlation of household-specific variables with an extent of technology adoption

Variables	Watersheds		Pooled data set
	Chhajawa	Badakhera	
Y- Nos. of technologies adopted	1.000	1.000	1.000
X_1- Age of head of household	0.057	-0.099	-0.025
X_2- Education	0.325**	-0.091	0.141
X_3- Family size	0.151	0.182	0.172
X_4- Farm size	0.613*	0.388*	0.531*
X_5- Livestock (SLU)	0.532*	0.037	0.375*
X_6- Mechanical power	0.460*	0.454*	0.447*
X_7- Irrigation	0.267	0.270**	0.281*
X_8- Farm implements	0.438*	-0.008	0.299*
X_9- Material possession	0.437*	0.054	0.272*
X_{10}- Income	0.609*	0.382*	0.530*
X_{11}- Social participation	0.317**	-0.186	0.177
X_{12}- Economic Motivation	0.306**	0.226	0.237**
X_{13}- Mass media	0.130	-0.225	-0.092
X_{14}- Extension contact	0.137	-0.262	-0.011
X_{15}- Extension participation	-0.013	0.065	-0.020
X_{16}- Scientific orientation	0.012	0.497*	0.293*
X_{17}- Innovativeness	0.058	-0.305**	-0.117
X_{18}- Risk	-0.009	-0.186	-0.056
X_{19}- Knowledge	0.118	0.283**	0.146
X_{20}- Attitude	-0.152	-0.136	-0.158

**Significant at the 0.05 level of significance; **Significant at the 0.01 level of significance*

Table: 4
Factors affecting the extent of technology adoption

Parameter/variables	Regression coefficients	Coefficient of determination (R^2)	Standard Error of Estimate	Mean absolute error	t-test	P-value
Chhajawa watershed						
b_0 - Intercept	-4.01	0.4308	1.40	1.13	-1.35	0.1850
X_3 - Farm size	0.18**				5.28	0.0000
X_{12} - Economic motivation	0.40*				2.12	0.0389
Badakhera watershed						
b_0 - Intercept	5.70	0.6315	0.98	0.75	2.92	0.0056
X_3 - Farm size	0.15*				2.15	0.0372
X_6 - Mechanical power	0.28**				2.91	0.0057
X_8 - Farm implements	-0.23**				-2.83	0.0070
X_{16} - Scientific orientation	0.27**				4.50	0.0000
X_{17} - Innovativeness	-0.25**				-2.99	0.0046
X_{18} - Risk	-0.18**				-4.35	0.0001
Pooled data (Overall)						
b_0 - Intercept	-3.53	0.4539	1.27	1.00	-2.09	0.0398
X_3 - Farm size	0.20**				7.02	0.0000
X_{12} - Economic motivation	0.26**				3.07	0.0028
X_{14} - Extension contact	-0.08*				-2.21	0.0297
X_{16} - Scientific orientation	0.23**				3.46	0.0008
X_{18} - Risk	-0.07*				-2.06	0.0418

**Significant at the 0.05 level of significance; **Significant at the 0.01 level of significance*

besides controlling soil erosion in Chhajawa watershed. The impact studies conducted by Singh *et al.* (2005) and Prasad *et al*. (1997) in Badakhera and Chhajawa watersheds supported the view that farmers of these watersheds adopted and sustained a number of technology because they were motivated enough about the expected benefits to be realized over time as a result of different SWC technologies executed under the watershed management programme.

In Badakhera watershed, farm size, scientific orientation, mechanical power, and risk variables have more significant effect in making decision about number of SWC practices adoption as these four variables explain 79% of the total variation (63.15%) while other three variables namely farm implements, innovativeness, and risk contributed only 21% of the total variation. The R^2 statistics show that the fitted model explains 63% of the total variation in the extent of adoption. The coefficient value of mechanical power and scientific orientation presented in Table 4 indicates that there is a chance of more number of technologies to be adopted by about 28% and 27% with a change in each additional unit in mechanical power and scientific orientation, respectively. It is evident that scientific orientation leads to knowledge acquisition and adoption of innovative technologies. Therefore, scientifically oriented farmer perceived the soil erosion problem and possible economic losses quickly, which makes him to systematically proceed from problem identification to a solution, thus rendering the decision making more efficient. A positive effect of scientific orientation in adopting more technologies reflected the excellent attitude towards adoption of new technologies in future as well. The variable mechanical power took the hypothesized positive sign and implies impact of availability of heavy machinery and equipment on adoption and maintenance of SWC measures in a cost effective manner. Innovativeness and farm implement in Badakhera watershed were other significant variables which show a negative relationship with the extent of technologies adoption against the hypothesized positive relationship as a farmer with innovative mindset exposes himself to different sources of information about new technologies and skills which induceds technology adoption. The role of innovativeness and farm implements did not positively affect the adoption extent in the studied watershed because technologies adopted by the farmers were given under the watershed programme and at the time of implementation of programme, large number of farmers were not ready to execute multiple technologies on their fields as suggested.

Risk may be defined as a situation where the probabilities of outcomes are not known, and the outcome is known or unknown. If a technology fails to deliver its expected outcome, it will result in financial, psychological, physical or social loss to the user. However, it is possible that risk perception about new technology may improve in the right direction with farming experience. If a farmer perceives a higher risk of a technology, then he will not come forward to adopt it. The significant negative relationship with the extent of adoption in the Badakhera watershed as well as in pooled analysis (Table 4) clearly supported the hypothesis made in the study that variation in adoption of SWC technologies might be due to the difference in perception towards risk. This result underscores the fact that productivity gains are necessary, but not sufficient to attract farmers to adopt new technologies and agricultural innovations. Risk implications matter. Technology and location-specific production-risk coping strategies need to be designed to successfully upscale profitable farm technologies across poor farm households in low-income areas. Just and Pope (1979) also had the similar view that when farmers depend solely on natural rain for their farming and cannot create a safety net to fall back during the times of bad outcome, they are hesitant to engage in any investment activity that involves some probability of downside risk, even if such activities promise higher returns.

Pooled analysis of data revealed that the regression value of economic motivation and scientific orientation was found to be significant at 1% level of significance while farm size, extension contact and risk at 5% level of significance (Table 4). All these variables together explained 45.39% of the variation. Pooled analysis shows the dominant effect of farm size and economic motivation variables which explain about 34.20% variation in the extent of adoption. Inclusions of other three significant variables, namely; scientific orientation, risk and extension contact - increased the explanatory power by 11%. Technical information through extension services is critical in promoting adoption of improved agricultural production technologies because it can counterbalance negative effect of lack of years of formal education in overall decision to adopt some technologies (Kubok, 2007). Contrary to expectation, extension contact variable had a negative influence on the extent of adoption in the present study, which was very surprising in the view that negative and significant contribution of extension contact suggests greater adoption extent among farmers with low contacts. The negative effect of extension contacts also implies that farmers having contacts with extension agents tend to reduce investment in conservation, which is counterintuitive. The discussion with farmers of the area revealed the fact behind the weak role of extension contact was that agricultural extension activities in the region was focused mainly on crops and livestock production and hardly emphasized upon SWC technologies. The negative effect of extension contacts on adoption and continued use of stone terrace practice for soil and water conservation in a highland watershed in Ethiopia was also reported by Amsalu and Graff (2007). Therefore, it is suggested that SWC technologies should be given priority in the extension system in order to positively influence the adoption decisions of farmers in the region. In general, it can be concluded from the analysis that the significant variables which affect the extent of adoption of SWC technologies in the studied watersheds were farm size, economic motivation, scientific orientation, mechanical power and risk perception associated with technology.

4. CONCLUSIONS

The study showed that bunding, land levelling, summer ploughing, masonry check dams, gully plugs, etc. were the main SWC technologies adopted by the farmers in the watersheds. Majority (45%) of the sample households adopted between 3-4 technologies. The study identified farm size as dominant factor which affects the extent of adoption positively in both the watersheds. However, it is difficult to increase landholding size in the future due to population growth and breaking up of joint families into nuclear families in the region. Therefore, for increasing adoption rates among resource poor farmers, it is desirable to develop and execute only those technologies which require the least resources and costs. The study also supported the findings of various studies that most of the SWC technologies are being adopted for economic reasons (economic motivation) than environmental quality improvement motives, which need efforts to make farmers aware about the importance of the environment. One of the surprising finding that farmers, having extension contacts adopted less number of SWC technologies is also contrary to majority of the studies which show the positive influence of extension contacts and services on level of adoption. Therefore, it is suggested that SWC technologies should be given priority in the extension system for influencing adoption decisions of farmers in the region. Information and communication technology (ICT) tools such as web portals, experts systems, multimedia modules, etc. may prove as good sources. Generally, all technologies have a degree of risks and majority of the farmers in rainfed areas are risk averter in nature, which needs some economic instruments for hedging against exposure to risks so that farmers can be motivated to adopt more number of technologies. Variation in factors affecting the extent of adoption in both the watersheds located in the same region suggested that any technological intervention for SWC in an area ought to begin with understanding local factors which may influence technology adoption.

ACKNOWLEDGMENTS

We are thankful to Dr. P.K. Mishra, Ex-Director, ICAR-Indian Institute of Soil and Water Conservation, Dehradun for providing guidance and necessary facilities. Thanks are also due to Mr. Kamlesh Kumar, Technical Officer, and Hariom Arya, Technical Assistant for assisting in collection of the data.

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