A Study on Adoption of Improved Farm Practices by Hill Farmers of Almora District in Uttrakhand

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ABSTRACT

Adoption of improved farm practices is being encouraged amongst hill farmers for their socio-economic development. The present study was conducted in Almora, Uttarakhand by taking a random sample of 60 farmers. The objectives were to know the extent of adoption of improved farm practices; relationship of the factors with adoption; and the constraints of adoption. Data were collected during 2011-12 by personal interview through pre-tested structured schedule. Findings showed that majority of the farmers belonged to medium adopter's category (55.95%). The highest adoption was found in improved varieties of vegetables (71.67%) and least adoption was reported in mushroom production technology (1.67%). Risk bearing ability, change-proneness, level of aspiration, annual income and economic motivation were found to be most significantly correlated factors of adoption. The most serious constraint was identified as weather vagaries (83.33%). The findings of the study can help selecting suitable innovations to diffuse amongst hill farmers of this area.

Keywords: Adoption, improved farm practices, extent of adoption, factors of adoption, constraints of adoption.

INTRODUCTION

Several improved farm practices suitable for Uttarakhand are already available and efforts are still taken for further development and improvement on every aspect of hill farming systems. These technologies if used in a holistic manner are capable of providing sustainable livelihood, food and nutritional security to the hill populace. In spite of the availability of the basket of suitable technology, the agricultural productivity in hills is very low as compared to the plains. Apart from the climatic and geographical reasons, non-adoption of improved farm practices is one of the important factors responsible for this low productivity. Most of the farmers are still practising traditional way of farming and most of them are not able to meet their own requirements of food and livelihood. So adoption of improved farm practices is being encouraged amongst hill farmers for their socio-economic development. Hence there is a need to know the status of adoption of these technologies amongst the farmers. In this context, the present study was formulated with the following objectives: (1) to know the extent of adoption of improved farm practices by the hill farmers; (2) to ascertain the relationship of the factors with adoption; and (3) to identify the constraints of adoption.

METHODOLOGY

The study was conducted in Dhauladevi block of Almora district in Uttarakhand taking a random sample of 60 farmers from two villages namely Bhagar Tola and Maniagar. The data were collected during 2011-12 by personal interview of farmers through a pre-tested structured interview schedule. Under each improved farm practice selected for study, several components for adoption were taken. For example: under "improved cultivation practices of cereals", the components for adoption were improved variety, seed treatment, line sowing, application of recommended doses of nutrients, herbicide application and plant protection measures. For scoring, score 1 was given for adoption of one technology and score 0 was given for no adoption. Suppose, if a farmer was found cultivating two improved varieties of cereals, he was given an adoption score of 2 under "improved cultivation practices of cereals". The scores of each component of a practice were summated to calculate the total adoption score of that practice for an individual farmer. The data thus obtained was subjected to appropriate statistical tests. Mean and standard deviation (SD) of the adoption scores of the sample farmers for each improved farm practice were calculated and respondents were placed in low, medium and high levels of adoption categories based on this calculation. Respondents whose adoption scores were found less than the value of (mean-SD), between the value of (mean-SD to mean + SD) and greater than the value of (mean + SD) were placed in low, medium and high level of adoption category, respectively. Adoption Index for each respondent was calculated by the following formula:

Adoption Index = (Obtained score/ Maximum obtainable score) X 100

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Pearson product moment correlation analysis was done to identify the factors correlated with adoption. Multiple regression analysis was done to know the degree to which the independent variables, individually or jointly contribute to the dependent variable.

RESULTS AND DISCUSSION

Extent of adoption of improved farm practices by hill farmers

The results show that (Table1) in case of "improved cultivation practices of cereals", 21.67 percent respondents belonged to high level of adoption category whereas most of the respondents (60.00%) belonged to medium level. In case of "improved cultivation practices of pulses", majority of the respondents (55.00%) showed medium level of adoption whereas 38.33 per cent of the farmers were belonged to low level of adoption category. It was found that pulses were mostly grown for only household consumption and most of the farmers used household seeds for sowing and traditional method of cultivation. Off-season vegetable cultivation is one of the major income generating sources of hill farmers. Most of the respondents (78.33%) were found to be medium (45.00%) and high (33.33%) adopters of vegetable cultivation technologies.

Table1: Extent of adoption of improved farm practices by hill farmers

n=60

Improved farm practices	Adoption category			Mean Adoption Index
	Low	Medium	High	
Improved cultivation practices of cereals	18.33	60.00	21.67	38.54
Improved cultivation practices of pulses	38.33	55.00	6.67	15.95
Improved cultivation practices of vegetables	21.67	45.00	33.33	40.44
Improved cultivation practices of millets	31.67	58.33	10.00	15.48
Growing of improved variety of fodder grasses and trees	26.67	48.33	25.00	32.5
Fruit tree plantation	26.67	58.33	15.00	32.5
Improved herd management	18.33	66.67	15.00	41.37
OVERALL	**25.95**	**55.95**	**18.10**	**32.83**

With respect to the "improved cultivation practices of millets", majority of the farmers were in medium and low level of adoption category (58.33% and 31.67%, respectively). Like pulses, it was also found that millets were mostly grown for only household consumption as an intercrop with soybean or *bhatt* (local black soybean) and most of the farmers used household seeds for sowing and traditional method of cultivation. In case of "growing of

improved variety of fodder grasses and trees", majority of the farmers were found to be in the category of medium level of adoption (48.33 %). It was observed that most of the hill farmers had local fodder trees like *baaz* and *bhimal* and some of the farmers planted improved variety of fodder grasses like hybrid napier. Majority of the farmers were found lying in medium and low level of adoption category in case of "fruit tree plantation" (58.33% and 26.67% respectively). Earlier hill farmers used to plant more fruit trees in their farms but in recent years this tendency has been drastically reduced due to severe monkey menace. In case of "improved herd management", 66.67 per cent of farmers were found to possess medium level of adoption in terms of rearing of high yielding milch animals, deworming *etc.*

The values of mean adoption indices clearly show that extent of adoption was found maximum in case of "improved herd management practices" (41.37%) followed by "improved cultivation practices of vegetables" (40.44%) and minimum in "improved cultivation practices of millets" (15.48 %) followed by "improved cultivation practices of pulses" (15.95 %). The overall extent of adoption was found 32.83 per cent.

In general the study revealed that majority of the farmers belonged to medium level of adoption category. Khatik (2001), Ranish *et al*. (2001), Roy *et al*. (2007), Singh and Chauhan. (2010), Singh *et al.* (2010), Singh and Varshney (2010) and Sivashankar and Shashidhar (2011) Singh and Singh (2012) in their respective studies reported majority of the respondents in medium level of adoption category. Five most and five least adopted technologies by the respondents are presented in Table 2.

Table 2: Five most and five least adopted technologies by the respondents

n=60

Technology	Percentage adopted	Rank
Five most adopted technologies		
Improved variety of vegetables	71.67	I
Improved variety of cereals	65.00	II
Improved variety of fodder	51.67	III
Water harvesting tanks	46.67	IV
Poly-house	43.33	V
Five least adopted technologies		
Mushroom production	1.67	I
Use of herbicides	18.33	II
Seed treatment	23.33	III
Line sowing	26.67	IV
Honey bee rearing	30.00	V

Improved variety of vegetables, improved variety of cereals, improved variety of fodder, water harvesting tanks and poly-house were found to be the five most adopted technologies ranking I, II, III, IV and V respectively. Five least-adopted technologies identified were mushroom production, use of herbicides, seed treatment, line sowing and honey bee rearing ranking I, II, III, IV and V respectively.

Relationship of the factors with adoption

It was found that out of the 14 factors studied, 11 factors *i.e.* category, occupation, landholding, annual income, material possessions, social participation, credit utilization pattern, change-proneness, level of aspiration, economic motivation and risk bearing ability were significantly correlated with adoption at 1 per cent level whereas the factor " occupation" was found to be negatively correlated with adoption. Level of education was also significantly correlated with adoption at 5 per cent level. Age and farming experience of farmer were found to be non-significantly correlated with adoption.

Table 3: Correlation between adoption and independent variables
n=60

Independent variables	Correlation co-efficient (r)
Age of farmer	0.030NS
Level of education	0.270*
Category	0.519**
Occupation	-0.394**
Landholding	0.481**
Farming experience	-0.071^{NS}
Annual income	0.635**
Material possessions	0.542**
Social participation	0.532**
Credit utilization pattern	0.423**
Change-proneness	0.667**
Level of aspiration	0.656**
Economic motivation	0.599**
Risk bearing ability	0.668**

*Significant at 5% level, ** Significant at 1% level, NS= Non-significant

Chauhan (1979), Sethy (1982) and Anuradha, G (1983) in their studies found that age was non-significantly correlated with adoption. Mazumder *et al.,* (2011) in their study reported that variables *viz.* education, landholding, social participation and income were significantly correlated with adoption at 1 per cent level. Roy *et al.* (2007) found education to be significantly correlated with adoption at 5 per cent level and landholding, annual income, risk orientation, economic motivation to be significantly correlated with adoption at 1 per cent level. Sivashankar and Shashidhar (2011)

reported landholding and annual income significantly correlated with adoption at 5 per cent level.

Influence of independent factors on adoption

Multiple regression analysis was done to know the degree to which the independent variables, individually or jointly contribute to adoption of improved farm practices.

It can be depicted from Table 4 that a farmer with larger landholding and high level of aspiration tends to adopt more numbers of improved farm practices. R^2 value being significant at 1 per cent level shows that combined effect of several other independent variables also significantly influence the adoption of improved farm practices. The factors showing negative influence on adoption were found to be occupation, farming experience and economic motivation. This may be because hill farming being relatively more labour intensive and less remunerative as compared to the other occupations and the aged farmers tend to adopt new farm practices in less numbers.

Table 4: Multiple regression analysis between adoption and independent variables

n=60

Independent variables	Partial regression co-efficient (b)	" t" value
Age of farmer (X_1)	0.103	0.461
Level of education(X_2)	0.045	0.042
Category(X_3)	0.591	0.212
Occupation(X_4)	-3.446	-1.447
Landholding(X_5)	0.245	2.438**
Farming experience(X_6)	-0.189	-0.795
Annual income(X_7)	0.000	0.698
Material possessions(X_8)	0.204	0.497
Social participation(X_9)	0.596	0.454
Credit utilization pattern(X_{10})	2.228	2.032
Change-proneness(X_{11})	0.128	0.131
Level of aspiration(X_{12})	1.196	2.464**
Economic motivation(X_{13})	-1.111	-1.425
Risk bearing ability(X_{14})	0.838	1.879

R^2=0.796, F=12.29**

Y= -0.617+0.103 X_1+0.045X_2+0.591X_3 -3.446X_4+0.245X_5 -0.189X_6+0.000X_7+0.204X_8 +0.596X_9+2.228 X_{10}+0.128X_{11} +1.196X_{12} -1.111X_{13} +0.838X_{14}

The findings of the study are to some extent in conformity with the study by Sagar (1983) where he found level of aspiration of the farmers significantly contributed to the farmers' productivity of major field crops.

Constrains of adoption

Constraints limiting the adoption of improved farm practices were identified based on the severity of the problem (Table 5).

Table 5: Constraints of adoption as perceived by the respondents

n=60

Constraints	Percentage perceived	Rank
Weather vagaries	83.33	I
Lack of irrigation facility	73.33	II
Wild animal damage	68.33	III
Insect and disease attack	66.67	IV
Fragmented landholdings	55.00	V

Five most serious constraints were identified as weather vagaries, lack of irrigation facility, wild animal damage, insect and disease attack and fragmented landholdings. In the recent years farmers have been experiencing adverse climatic condition severely affecting their crops. During the main crop season severe draught conditions have become very common. The incidences of wildlife damage to agriculture have become very common and frequent. Due to lack of knowledge and awareness farmers face lot of difficulty in the control of insects and diseases. Due to unconsolidated landholdings it becomes very difficult to manage distantly located fields

Ranish *et al.* (2001) and Kumbhare and Singh (2011) in their studies identified inadequate irrigation facilities as one of the constraints. Singh and Varshney (2010) in their study reported pest and disease incidence as one of the constraints.

CONCLUSION

Animal rearing and off-season vegetable cultivation are major income generating sources of hill farmers. This could be the reason behind relatively higher adoption of improved herd management and vegetable cultivation practices. The study revealed that the variables like risk bearing ability, change-proneness, level of aspiration, annual income and economic motivation as most significantly correlated factors of adoption. The serious constraints of adoption were found to be weather vagaries, lack of irrigation facility, wild animal damage, insect and disease attack and fragmented landholdings. The findings of the study would be a guide to the change agents for selecting suitable innovation to diffuse amongst farmers of similar situation.

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