DOI: 10.15740/HAS/AU/12.3/338-346
Agriculture Update
Volume **12** | Issue 3 | August, 2017 | 338-346
Visit us : *www.researchjournal.co.in*
e ISSN-0976-6847

RESEARCH ARTICLE :

Chi^2 analysis of economic factors in agroforestry adoption: Which economic factors influence farmers and which do not?

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ARTICLE CHRONICLE :
Received :
25.05.2017;
Revised :
05.06.2017;
Accepted :
19.06.2017

SUMMARY : This paper presents empirical evidence on the influence of economic factors on the adoption of agroforestry practices by the farmers in Haridwar, India. An exploratory survey was done to collect data from all three tehsils of Haridwar, one of the important farming regions of north India. Total 426 farmers were selected using random sampling at multistage level among which 365 were agroforestry adopters and rest 61 were non adopters. Data were analyzed using Chi^2 test of independence. Results have shown that land holding, land ownership, farming as main occupation, sources of income, tree produces as fuel, monthly income status, importance of income from farm, sale of farm produces significantly influence while earning member in the family does not influence adoption of agroforestry. Overall agroforestry farmers were found in better economic conditions than that of non agroforestry farmers who were practicing agriculture alone. Research findings also indicated that farmers with low poor level of income could not invest in long term projects of tree plantation in agroforestry. They could be provided finance support from relevant authority side which could encourage them to adopt agroforestry. Since, the respondents had an agreed understanding of all studied economic parameters. Therefore, each of the studied variables should be addressed at both; more or less to positive or negative way to which they affect the farmers' decision to adopt agroforestry practices.

KEY WORDS :
Adoption, Agroforestry, Economic, Factors, Influence

How to cite this article : Himshikha and Singh, Charan (2017). Chi^2 analysis of economic factors in agroforestry adoption: Which economic factors influence farmers and which do not?. *Agric. Update*, **12**(3): 338-346; **DOI : 10.15740/HAS/AU/12.3/338-346.**

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BACKGROUND AND OBJECTIVES

Adoption of agroforestry by the farmers needs an assessment from economic points of view since resources are scarce and farmer cultivates trees and other crops mainly for benefit and livelihood support. Historically, trees have played a vital role in shaping the economic framework and income generation /support to farmers. In order to understand how farmers would respond to agroforestry practices, it is essential to know farmers perception about agroforestry as we know that farmers in the same society may have different objectives and livelihood strategies, and so respond differently to same management practices like agroforestry.

In India, the second largest populated and

one of the fastest growing economy in the world, having several socio-economic issues, which cannot cope with the pace of economic growth. There is a commonly saying in India that "India lives in villages" and it is true that approximately 70 per cent of the population are residing in rural areas and the tremendous growth in economy does not truly benefits the rural people (Singh, 2010). Socio-economic status of a farmer consists of many variables which can be categorized in to; social variable and economical variables. Economic variables or factors can be described as monthly income, source of income, farming as main/secondary occupation, land holding, land ownership type, earning members in the family, importance of farm income, sale of farm produces etc. these factors can be considered as indicators of status of economic resources and economic conditions of the farmers. All these factors play either direct or unseen role in certain land management practices such agroforestry. The main purpose of this study was to determine major economic factors influencing adoption of agroforestry by the farmers in Haridwar, North India.

A clear understanding of the influential factors in farmer's decision making related to the adoption and maintenance of agroforestry is important. This study is concerned about the idea as proposed by Rai *et al.* (2006) that generally; the socio-economic conditions are usually hard to identify and assess, as they are related to the human beings and their characteristics, which usually differ widely within the same community and from one community to another. Importance of socio-economic study (like this) is also supported by Irshad *et al.* (2011) who mentioned that socio-economic study of farmers and their relationship to the agroforestry is highly important as this would help to ascertain the opportunities for the development of agroforestry system.

RESOURCES AND METHODS

Study area, sampling, survey and data collection :

In this study, all the adopters and non-adopters of agroforestry were included in the survey done in district Haridwar during 2013-2014 to determine influence of factors on adoption and non-adoption of agroforestry by them. Random sampling (multistage level) ensures that the different socio-economic groups are included in the sample (Abdrabo and Hassaan, 2003). This method is being used by many researchers like Safa (2005) and hence; also used in this study to select sample respondents. A number of 12 villages were selected from each of three tehsils making total 36 villages as sample villages from three tehsils. 12 households were further selected randomly from each sample village for detailed survey. A sample size of 432 farmers was selected. 426 respondents including 365 agroforestry adopters and 61 non-adopters were finally selected for the study from each of the studied village. Six farmers' responses were discarded due to inadequacy and insufficient data. Questions on land holding level, ownership type, income status, main occupation, other sources of income, working members in the family, farm income, sale of farm produces, importance of income etc. were included in the administered questionnaires.

Chi-square statistics: test of independence :

Descriptive statistics was applied to test working hypothesis *i.e.,* economic factors influence adoption of agroforestry practices. It was proved by Chi-square analysis (test of independence). The status of respondent's level of adoption (adopters or non-adopters) was classified in groups with respect to each economic variable. A contingency table was drawn up then. Descriptive statistics were done by use of contingency table, percentage and frequencies while inferential statistics was applied using Chi-square statistical analysis at (α=0.05) 5 per cent level of significance as earlier applied by Lwayo and Martin, 2005). Chi-square values for different attributes were calculated using following formula:

$$\text{Chi - square } (\chi^2) = \sum \frac{(\text{Observed frequency} - \text{Expected frequency})^2}{\text{Expected frequency}}$$

or

$$\chi^2 = \sum \frac{[f_e - f_o)^2}{f_e}$$

where χ^2=Chi-square

F_o =Observed frequency

F_e= Expected frequency

Degree of freedom was calculated using formula (r-1) (c-1) where

r= Number of rows for any attribute

c= Number of columns for any attribute

A factor is considered statistically significant and associated with adoption if Chi^2 value exceeds critical value at 5 per cent (α=0.05) level of significance. Which means that influence adoption of agroforestry while a variable was considered statistically not significant and

if Chi² value lower than critical value at 5 per cent (α=0.05) level of significance. Which means that factor does not influence adoption of agroforestry.

OBSERVATIONS AND ANALYSIS

The results obtained from the present study as well as discussions have been summarized under following heads:

Land holding/farm size distribution :

Land status of the respondents was accessed to indicate their economic condition as it was mentioned as a socio-economic indicator by Islam *et al*. (2012). In study area, farmers having medium and large land holdings were reported more as agroforestry adopters while farmers having small or marginal land holdings were reported mostly as non-adopters. Result of Chi-square analysis has shown that land holding is statistically significant to adoption of agroforestry (Table 1). The low level of land holding acts as hindrance to farm households in adoption of agroforestry especially if they are large families' and depending upon farming for income generation and immediate benefits from farming like grain production, sale of left produces etc. This result has also favored the findings of Glover *et al*. (2013) that small land holding farmers have increased their interests in adoption and promotion of agroforestry. The other reason behind low adoption of agroforestry among small and marginal farmers is because for marginal and small land holdings, since land resources are scarce; farmers usually get less motivated to change their farming pattern or to adopt new farming practice type such as agroforestry practices. Opposite to this, farmers with medium or large land holdings as they have already stable economic returns from farm and since land resource are plentiful to them; they usually show flexibility in their attitude towards adoption of new technology. It also motivates them to take risk more frequently while making long term investments on such practices.

In study area, it was revealed during the discussion with the farmers that; farmers with enough land holding have sufficient land resources to practices agroforestry while farmers with marginal or only small land holding have not enough land resource to involve in agroforestry practices and in this case, these farmers may not want to take risk associated with yield reduction in initial years of agroforestry plantation as mentioned by these farmers. A percentage of adopters with large land holding as compared to non adopters also supports to Mombo *et al*. (2016) that large land holding owners are more likely to adopt agroforestry and any increases in farm size would increase probability of agroforestry adoption.

From result of Chi-square analysis (Table 1), it is confirmed that land holding/size is significant determinant to adoption of agroforestry as small land holding farmers cannot bear the economic loss due to yield reduction that occurs every season in initial and later years of adoption of agroforestry models. On the other way, farmers with large land holdings do not get affected much from long term returns and hence do not hesitate to adopt agroforestry. Also, farmers having marginal or small land holding cannot wait for long term economic returns that usually occur with rotation of tree species crop, especially when they are totally dependent on farm income for their livelihood. However, here it is suggested that small and marginal farmers should also be encouraged to adopt and increased level of short rotation agroforestry.

Farming as main/secondary occupation :

Respondent were asked if farming is their main (primary) occupation or they just had adopted it as secondary source of income (occupation). This is done to know their economic dependency upon farming/ agroforestry practices. Result is shown in Table 2.

This result has clearly shown the difference in the opinion of agroforestry and non-adopters regarding agroforestry. Result (Table 2) has shown that in study area adopters were more dependent upon farming for

Table 1 : Land holding/ farm size possessed by sample farmers

Land holding /land size	Adopters (n=365)			Non-adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi² value	Critical value	Degree of freedom	Significant/ not significant
Marginal (<1 ha)	69	18.90	77.11	21	34.43	12.89	10.32	7.81	3	Significantly
Small (1-2 ha)	107	29.32	108.81	20	32.79	18.19				associated
Medium (2-4 ha)	170	46.58	161.94	19	31.15	27.06				
Large (>4 ha)	19	5.21	17.14	1	1.64	2.86				

income generation and that's why they had considered it as main occupation for income generation and support whereas among non-adopters, they were less dependent upon farming and mostly adopted as secondary occupation. In agroforestry adopters, almost all favored to agroforestry adoption as they have mentioned farming as major income generating activity. So to achieve it, they support agroforestry adoption. Chi-square analysis has indicated that farmers regard to agroforestry /farming as main/secondary occupation significantly influenced adoption of agroforestry. This is due to the fact that, farmers who accept farming as their main occupation are likely to invest more time, energy and money into farming activities as farming is a key source of livelihood to them. And when it comes to adopt new land management practice like of agroforestry, perceiving its economic benefits, they show more interest in adoption of agroforestry.

Monthly income status of farming household :

Farmers revealed a range of income starting from below 10000/- to more than 50000/-. So, the income distribution of the respondent has been divided into six income groups. Result regarding income status of farmers and its influence upon adoption is provided in Table 3.

The income and wealth status of a family is important in agroforestry especially for market utilities and resource approach (Keil *et al.*, 2005). Table 3 has shown that the income of adopters is fairly evenly distributed; although majority of the farmers earned more than Rs. 50000 constituting one fourth of the entire adopters. Lowest income group farmers were reported more as non-agroforestry respondents. However, distribution of monthly income difference in this study depended upon a number of other variable such as land holding, land under agroforestry, fertilizer application, land fertility etc. Furthermore, the farmers having low income irrespective to land holding would not be able to invest in any long term activity, due to poverty. This no doubt is a hindrance to large scale adoption of agroforestry by the farmers in the region. From chi-square test it has confirmed that monthly income influences adoption of agroforestry practices. The study also confirmed that rich farmers preferred agroforestry practices more than other land uses. Farmers with high income adopt agroforestry practices because on one way, they are capable of bearing risks associated with long term investments like in agroforestry practices (as tree rotation period in agroforestry is higher than annual or perennial crop rotation period), on other way, agroforestry in return, also provide them additional money to invest further thus overall making farming more profitable to them. Farmers with low income level would either adopt agroforestry perceiving that it would increase their level of income or reject adoption of agroforestry as they don't have enough money to invest in such long-term practices. Reported good income status of adopters' families in this finding also supported Sharma and Kumar (2000) who reported significantly higher socio-economic status for the farmer adopting agroforestry than those of non-adopters. A

Table 2 : Farming as main/secondary occupation

Farming as main/secondary occupation	Adopters (n=365)			Non-adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
Main	276	75.62	271.61	41	67.21	45.39	3.92	3.84	1	Significantly
Secondary	89	24.38	93.39	20	32.79	15.61				associated

Table 3 : Monthly income status of family

Monthly income status of family in Rs.	Adopters (n=365)			Non adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
<10000	32	8.77	41.98	17	27.87	7.02	22.36	12.59	6	Significantly
10000-19999	74	20.27	71.97	10	16.39	12.03				influence
20000-29999	69	18.90	68.54	11	18.03	11.46				
30000-39999	46	12.60	47.98	10	16.39	8.02				
40000-49999	42	11.51	39.41	4	6.56	6.59				
50000->50000	100	27.40	93.39	9	14.75	15.61				
Unknown	2	0.55	1.71	0	0.00	0.29				

higher income status was also reported in adopters than non-adopters, favoring Minz and Quli (2000), who revealed a positive role of agroforestry in improving the socio- economic status. In this study, poor farmers were reported more as non adopters because they were not having sufficient capital to invest in tree planting. It also favors findings of Kabwe (2010) that farmers classified as poor and very poor had lower rates of adoption.

Source of income/occupation :

Respondents were asked to reveal their various sources of income like agriculture, small business (contractors, shops, dairy etc.), local work (wage based), govt. service, labour works, other like pension etc or no source of income. Result is shown in Table 4.

During survey, it was noticed that households having agriculture as main occupation invest in farming practice like agroforestry, whereas households having other occupation as primary source of income give their consideration more upon those occupation types and hence tend to avoid adoption of agroforestry. Result (Table 4) has shown that there is not much difference between percentage of adopters and non adopters for each income source type. However, Chi-square analysis has shown that calculated value for this attribute was higher than critical value indicating it significantly associated with adoption of agroforestry (Table 4). Since, some of the farmers revealed that after practicing agroforestry for few years, their average income increased. In other forms of occupation like business, local work etc also tend to show influence upon farmer's decision whether adopt or not. It has confirmed from chi-square test where income source/occupation type has found influence upon adoption of agroforestry practices. This finding is similar to that of Surendra and Mahesha (2015) who too, found occupation type as significant socio-economic factor.

Land owner ship type :

This attribute was studied to know ownership type of sample respondents. Results are elaborated in Table 5.

Thus result has confirmed the percentage of own land holding is higher in adopters as compared to non-agroforestry land owners. While percentage of own and rented leased land holders was high in non-adopters may be because the farmers having rented/lased lands cannot take much risk in investing money in long term projects like agroforestry, hence show less interest in agroforestry. On the other hand own land holdings act as own land resource and having this, it gives back support to farmers when they try to adopt agroforestry or other new practice or technology in their fields. Farmers cultivating own and others land were reported only as non-adopters because to adopt or not to adopt agroforestry, they are more likely to be dependent on others choices to whom that land

Table 4 : Source of income/occupation

Sources of income/ occupation *	Adopters (n=365)			Non adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%*	E	O	%*	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
Agriculture	363	99.45	363.04	60	98.36	51.46	13.4	12.5	6	Significant
Small business	67	18.36	63.51	7	11.48	9.00				association
Local work	113	30.96	118.44	25	40.98	16.79				
Govt. service	46	12.60	44.63	6	9.84	6.33				
Labour work	10	2.74	12.87	5	8.20	1.82				
Other (pension etc.)	60	16.44	56.64	6	9.84	8.03				
None	1	0.27	0.86	0	0.00	0.12				

*Considering more than one source of income, most of the respondents provided responses for more than one sub categories, hence total percentage exceeded 100

Table 5 : Land owner ship type

Land owner ship type	Adopters (n=365)			Non-adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
Own	363	99.45	360.71	58	95.08	60.28	17.67	7.81	2	Significant
Others	2	0.55	1.71	0	0.00	0.29				association
Own and others	0	0.00	2.57	3	4.92	0.42				

belongs to. Farmers having own land and who had given land for leased to others were reported only as adopters (Table 5). These farmers are supposed to take their decisions regarding adoption on their own choices and hence it becomes upto them only whether they have to adopt agroforestry in their fields or not. On other way, availability of own an sufficient land holding acts as resources to be invested. This stimulates farmers to subsequently invest on tree planting. It is further confirmed by result of chi square analysis showing that land ownership type influences upon adoption of agroforestry practices by the farmers. This finding somehow is supported by Parwada *et al.* (2012) who mentioned that land ownership is also likely to influence adoption process.

Earning members in the family :

This was asked to know their capacity to earn money from out sources (apart from agriculture/ agroforestry). Table 6 shows results of earning members in sample households (adopters and non-adopters).

Result for this attribute has shown that as compared to non-adopters families, more adopters' families were having no such member who is earning from external sources of income (Table 6). These farmers have revealed to be mainly dependent on farming related activities for income generation and for this, they have planted tree species in their farmlands. Among non-adopters, the ratio is found quite more in different earning member categories. However, this does not act significantly upon adoption of agroforestry which is confirmed by chi-square analysis of determinants with farmers' group, where number of working members in the family did not found to be significantly associated with adoption of agroforestry (Table 6). Hence findings for this attribute have revealed that earning members also have no influence upon adoption process regarding agroforestry by them or their families. Rather it would more likely to be dependent upon all family members' choice whether they should adopt agroforestry or not.

Timber/pruned wood use as fuel in houesholds :

Timber and firewood as fuel are still supposed to be one of the sources of fuel in farm households in rural India and around the world. Timber/firewood as source of fuel not only fulfills their domestic demand but also supports their livelihood. Result is shown in Table 7.

This result has confirmed that as compared to non-adopters, more agroforestry adopters considered timber/ prunwood as a source of fuelwood. Further, Chi-square analysis has shown its significant association with adoption of agroforestry (Table 7). It means use of timber/ prune wood as fuel in household as obtained from trees significantly influences a farmer's choice to adopt agroforestry. This is because by utilizing these tree produces as fuel in this way farmers reduce their expenses on other sources of fuel like LPG, kerosene etc. required at their home and thus adopt tree plantation.

Income from farm produces :

Adoption of traditional as well as modern agroforestry practices extend with a farmer's aim for deriving benefits from agroforestry practice type which he desires to adopt. In study area sample respondents

Table 6 : Earning members in the family

Earning members	Adopters (n=365)			Non-adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
One	134	36.71	137.09	26	42.62	22.91	2.86	9.49	4	Not significantly
Two	85	23.29	86.54	16	26.23	14.46				associated
Three	17	4.66	15.42	1	1.64	2.58				
Four	3	0.82	3.43	1	1.64	0.57				
None	126	34.52	122.52	17	27.87	20.48				

Table 7 : Timber/lop-prune wood use as fuel in sample households

Timber/prune wood source of fuel	Adopters (n=365)			Non-adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
Yes	169	46.30	161.94	20	32.79	27.06	3.87	3.84	1	Significant
No	196	53.70	203.06	41	67.21	33.94				

were asked to reveal if they earn profits from farm produce which could support them economically (in terms of material like, firewood, grains, grasses etc). They elaborated importance of this income as emergency money, additional income, income support etc. The result is given in Table 8.

Result has shown that among sample farmers percentage of adopters receiving farm income was more than percentage of non adopters receiving farm income. Among non adopters, farmers have sold only agriculture produces/ fodder crop from their fields. Since the results for this attribute has shown that farm income is significantly associated with adoption (Table 8); and hence influence adoption of agroforestry practices by the farmers. Thus, this finding supports to the idea that well maintained farm income-cash flow motivates a farmer to adopt or continue more profitable farming/agroforestry practices. It is favored by Rahman *et al.* (2008) that agroforestry helps in increasing the output and farm household earnings. In this regards, "important" means this income is highest monetary support to them.

Sale of farm produces and its association with adoption of agroforestry :

In the same vein, sample farmers were asked that apart from income support they receive from farm produces, after fulfilling their domestic requirement of farm produces like timber, grains, fodder etc, whether they sale these produces or not. Table 9 has shown results of sale of farm produces and its association with adoption of agroforestry.

A significant difference is reported between adopters and non-adopters selling farm produces (Table 9). Among non-adopters, farmers have sold only agriculture produces/ fodder crop from their fields. Sale of farm produce indicates good income support from farming practices. Chi-square test confirmed that sale of farm produces from fields influence adoption. It is because in study area, as farmers mentioned that they were receiving additional income from sale of agroforestry produces than that of agriculture produces alone as practiced by non-adopters. So it not only motivated them to continue agroforestry or to being more land under agroforestry, but also attract neighbors, villagers to adopt agroforestry practices. This finding coincides with that of Dwivedi *et al.* (2007) that additional income was the major reason behind adoption of agroforestry.

Importance of income from agriculture/ agroforestry:

The participants during focus group discussion agreed that tree species provide income support to their

Table 8 : Income from farm produces

Income from farm produces	Adopters (n=365)			Non-adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
Yes	305	83.56	299.03	44	72.13	49.97	4.61	3.84	1	Significant influence
No	60	16.44	65.97	17	27.87	11.03				

Table 9 : Sale of farm produces

Sale of farm produce	Adopters (n=365)			Non-adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
Yes	273	74.79	263.04	34	55.74	43.96	9.43	3.84	1	Significant association
No	92	25.21	101.96	27	44.26	17.04				

Table 10 : Importance of income from agriculture/agroforestry and its association with adoption of agroforestry

Importance of income from farm produce	Adopters (n=365)			Non-adopters (n=61)			Statistical inference at (α=0.05) 5% level of significance			
	O	%	E	O	%	E	Chi^2 value	Critical value	Degree of freedom	Significant/ not significant
Very important	178	48.77	168.79	19	31.15	28.21	12.47	9.49	4	Significant association
Important	91	24.93	93.39	18	29.51	15.61				
Good	86	23.56	89.96	19	31.15	15.04				
Not so good	9	2.47	10.28	3	4.92	1.72				
Bad	1	0.27	2.57	2	3.28	0.43				

A=Adopters, NA= Non-adopters, O= Observed frequency, E= Expected frequency

livelihoods. From living standard point of view, sampled agroforestry farmer in the study area confirmed that agroforestry serves as income support by providing diverse products and benefits. Table 10 has shown responses of sample respondents on importance of income from agriculture/agroforestry. On basis of their responses, farmers (adopters and non adopters) were categorized in to those who considered it as very important, important, good, not so good and bad. Result is elaborated in Table 10.

It is quite evident from results that, to half of total adopters, income coming from agroforestry is very important. It is because they utilize this income in family and farming expenditures which further helps them in continuing farming activities or they may do not have any source of income to substitute income coming from agroforestry. Farmers who gained income from farming were practicing agroforestry more frequently than those farmers who did not gain income from farming. This additional income is meaningful in their livelihood as earlier reported by (Wijaya *et al.*, 2007). Result of Chi-square analysis has shown (higher calculated value than tabulated value) that farmers' consideration to importance of farm income has influence upon adoption of agroforestry (Table 10). Since more or less, agroforestry practices are considered to provide better economic supports, thus this importance of this income plays a determinant role in adoption of agroforestry. Its significance may also be due to the reason that farmers who considered it very important, important or good to them are likely to adopt agroforestry in their field, as tree species are supposed to provide them additional benefits. On the other hand farmers considering farm income as not so good or bad in amount do not prefer so much planting tree species on their land. It confirmed that farmers tend to adopt agroforestry until they receive good income support from farm produce. Contrary to this when farm producing becomes non profitable, farmers like to left agroforestry practice or do not tend to adopt it in their fields as agroforestry demands more inputs for additional management cultivation of tree species.

Conclusion and recommendation :

From these results, it is concluded that these studied factors play important role in adoption of agroforestry and all studied economic factors except number of earning members in the family influenced adoption of agroforestry practices by the farmers in the region. The respondents had understanding of all studied economic parameters. Agroforestry adopters were found in better economic conditions by consuming vital economic benefits of agroforestry adoption than that of non agroforestry farmers who were practicing agriculture alone. Therefore; each of the studied variables should be addressed at both level *i.e.,* more or less to positive or negative way in which it affects the farmers' decision to adopt agroforestry practices. The study also established that most important step to promote adoption of agroforestry practice is to know why farmers are adopting or not adopting agroforestry. And what economic hindrance they are facing with. In view of findings from results, the following recommendations were made:

– Since farmers with low poor level of income could not invest in long term projects like tree plantation in agroforestry; they could be provided finance support such as loans, from relevant authority which could encourage them to adopt agroforestry.

– Facilities, schemes could to be initiated regarding availability of credit to those farmers who are willing to adopt and have mere income level. Farmers should also be encouraged to get benefits from already initiated schemes and policies like kisan credit card, finance etc.

– Besides this government should also consider minimum price support policies for trees and fodder produces so that farmers could increase their farm output and income support from agroforestry produces as the main problem regarding price is poor price paid by middleman/contractors to farmers. It will ultimately attract more those farmers who still are away from adoption of agroforestry practices, or who due to some causes, consider agroforestry less beneficial to them.

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