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A Study on Farmers Reaction to Agroforestry

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Abstract - The practice of agroforestry, which includes the growing of trees and the improvement of grassland, is essential to the protection and enhancement of our natural world. When it comes to alleviating poverty and protecting the planet, agroforestry plays a key role. Yet, the connection between agroforestry and the well-being of farmers is little understood. smallholder farmers' incomes and how agroforestry is changing their industry. Whether or not the land is terraced, the age and education level of the farmers, and the farmers' involvement in social activities, cooperatives, and farmers' organizations all had a positive and substantial effect on the adoption of agroforestry. The pollution of our world has endangered all forms of life. As a result, everyone is on high alert and doing all in their ability to preserve the ecological balance that has been established. Both measures of subjective well-being are significantly improved by the implementation of agroforestry. Agroforestry's positive effects on farmer happiness were more noticeable in those who really implemented the practice. Agroforestry is an approach that can help farmers in the long run.

Keywords - Farmers, Reaction, Agroforestry, Forests, Degradation.

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INTRODUCTION

Forests comprise just about 23.81 percent of the country's land area, compared to the National Forest Policy's target of 33 percent in 2012. to meet the country's demand for lumber and other forest products; only around 14% of the land area is under production forestry. The remaining forestland has been designated as either possibly utilizable or empty (Dhanya, 2014). Approximately 13% of the land area is thought to be covered by potentially productive wasteland. To achieve the aforesaid need, a projected expansion of normal forests would be required. Environmental contamination has occurred from the shrinkage of arable land on the one hand, and deforestation on the other, as a result of the population explosion, expanding urbanization, quick industrialization, and hastened speed of development of the country and its people (Deswal, 2014).

Environmental degradation and the rapid decline of natural habitats are posing a danger to the continued survival of life on Earth as we know it. Nature has a high tolerance for environmental stress, but human activities in the recent past have exceeded all threshold values, with results visible in the form of accelerated climate change, deteriorating air and water quality, and the transformation of once fertile lands into ecological deserts and wasteland. Since there are no institutional arrangements in place to regenerate the threat to the remaining forest, which is also being threatened by submergence, rehabilitation, mining, road construction, industrialization, etc., the majority of rural communities' fuel-wood requirements must be met from sources other than forests (Poonam, 2011). Thus, forests are contending with a scenario in which forest boundaries are retreating, tree growth outside of forests is rapidly declining, and demand for fuel-wood is rising dramatically. For example, the National Commission on Agriculture (1976) noted that "apart from climatic degradation, uncontrolled deforestation and overgrazing had exposed the top rich soil layer to strong wind and water." Reduced soil fertility and an increase in the amount of barren land caused by these soil losses have serious consequences for farming (Singh, 2011).

Agroforestry

Agroforestry, which generally refers to the cultivation of tree species and the development of pasture land, plays a critical role in the preservation and improvement of the natural environment. The success of the agroforestry programme hinges on the active and direct participation of the local population. The concept of agroforestry, according to Negi (1986), is that it is forestry that is done by and for the people. A healthy ecosystem and a well-balanced biological system can only be maintained by trees and vegetation (Kala, 2010). Many enterprises, transportation vehicles, and townships have mushroomed without adequate planting and considerable attention to pollution control in our country. the fast population growth over the last few decades has increased the demand for food and

wood several-fold. Village forests and other vegetation in the immediate area of the village or urban population were found to be a convenient short-term solution to address these increased demands. Even the government was on board because there were no immediate consequences to the loss of village woodlands at the time. But today we can see the results of our constant tree-cutting and other vegetation-clearing efforts. Every living thing on the planet has been threatened by our polluted environment. Therefore, everyone is extremely cautious and doing everything in their power to maintain a healthy environment and an ecological system that is in a good state of equilibrium (Sayamiji, 2010).

Degradation of forests

The removal of these local woods has resulted in a scarcity of fuel wood, fodder, and a variety of nutrient-rich fruits and vegetables in the communities, but it has also triggered a number of other natural disasters in the area. Forest/tree cover removal has led to more frequent and severe flooding and droughts, as well as increased windstorms, which have exacerbated soil erosion and altered rainfall patterns. Due to the continuous loss of village woods along canal systems, waste logging and alkali formation have become an issue. Village trees operated as a biological pump in these places, preventing the production of alkali soil and assisting in the preservation of dry areas. Villagers have also been using cow dung instead of organic manures as a primary source of energy due to the depletion of village/local woods. In addition to causing the aforementioned issue, the progressive shrinkage of low forest areas has also limited the number of job opportunities for rural residents (Agarwal, 2010).

Agroforestry scheme should be treated as an instrument around rural development where small and marginal farmers as well as landless people may be the maximum beneficiaries. This scheme envisages planting of fruit trees like mango, guava, Jamun, ber, etc. Afforestation of marginal lands would improve the fertility of those areas by breaking sub-surface soil pan and returning the nutrients through leaf litter. Large scales afforestation in the vicinity of village will solve the fuel wood and fodder situation there are several constraints that impede the participation of people in any development programme. Studies conducted so far have evidently proved the importance of human factors, which govern the participation of an individual in any new programme. It was therefore, thought imperative to have a study of human and other related factors responsible for participation on agroforestry programme (Roy, 2009).

Conservation of forests through agro forestry practices

Ecological sustainability and future generations' needs and ambitions must be taken into consideration when deciding how to use the biosphere for human benefit. Consequently, conservation is a positive embrace of the natural environment's protection, upkeep, sustainable use, restoration and augmentation (Kumar, 2013). Resources for life Plants, animals, and microorganisms, as well as the nonliving environment on which they rely, are the focus of conservation. It has become increasingly difficult to sustain life on Earth due to the rapid demise of natural habitats as a result of human activity. A strong capacity to absorb environmental stress, yet human activity has exceeded all threshold values, resulting in sudden climate shifts, degradation of air and water quality, and enormous productive regions being converted to ecological deserts or wastelands. Since there are no institutional arrangements in place to regenerate the remaining forests, which are also under pressure from other factors such as submersion, rehabilitation, mining, road construction, and industrialization, rural areas must rely on non-forest sources to meet their fuel-wood needs. Therefore, the forests face a scenario where forest boundaries are retreating, tree growth outside forests is rapidly decreasing, and the need for fuel-wood is growing significantly (Guillerme, 2011).

LITERATURE REVIEW

Dhanya et al., (2014) According to a study from Karnataka, native trees give greater direct and indirect advantages than exotic tree species, regardless of changes in system type, area scope, and maintenance. Field data and farmer perspectives were used to evaluate ecological series. The study emphasizes the importance of native trees in maintaining the long-term viability of an agro forestry system.

Deswal et al., (2014) studied a poplar-based agroforestry system in Haryana's Faridabad area and reported on its findings. It took the farmer six years to earn Rs. 4.5 Lac/ha from poplar cultivation. Wheat intercropped with poplar yielded a gross revenue of Rs. 2.25 lacs per hectare. Agroforestry (Poplar+Wheat) brought in Rs 6.0 Lac/ha in profit. According to a year-to-year comparison, the net return from agroforestry was Rs. 1 Lakh/ha, compared to Rs. 44,000/ha from a sorghum-wheat rotation and Rs. 53,750/ha from a Paddywheat crop rotation. In comparison, paddy-wheat crop rotation yielded just a 26% increase in income. Thus, farmers in Haryana are embracing agroforestry.

Behera et al., (2013) Orissa was the site of extensive research on agroforestry techniques. They found that farmers who participated in Krishi vigyan Kendra's agroforestry trainings, demonstrations, and on-farm testing possessed agroforestry expertise, but non-participants did not. In Odisha's Boudh district, researchers looked at the use of agroforestry. The study found that 22% of farmers were able to successfully use agroforestry production technology, 70% had a medium degree of acceptability, and 8% had a poor level of acceptance. For non-participant farmers, the

acceptance level was low or "zero acceptances" in 20% of cases. The adoption index values of 62.11 percent for adopted farmers and 31.22 percent for non-adopted farmers, respectively, show a significant difference in agroforestry adoption.

Poonam et al., (2011) the agroforestry systems of Himachal Pradesh's Lahaul and Spiti districts were researched. agri-horticulture, agri-silviculture, silvipature, and hortipastorol were the names they gave to these practises. Willow, poplar, and apple trees dominate the landscape. Climate change and global warming might benefit greatly from these systems. Academia highlighted that agroforestry might be used as a traditional land use adaptation to help alleviate the effects of climate change by simultaneously producing both food and fodder and fuel.

Singh (2011) Farmers' enthusiasm for adopting agroforestry systems has grown as a result of continual persuasion and development initiatives such as water collection. To maximise land use and boost production and revenue, farmers in the Bundelkhand region of India are most interested in agro forestry.

Kala (2010) found that knowledge about the programme was one of the important factors stimulating people's participation.

Sayamiji (2010) Farmers' agroforestry techniques were shown to include border plantings, a random mix of forest trees and crops, planting, and pest management. Of those who took part in the survey, 53.47 percent used all six of these strategies. There was a strong correlation between agroforestry adoption and a wide range of factors examined, including farm size, farming experience, total assets and capital assets, land tenure, credit perceptions, attitudes and social perceptions, as well as cosmopolitans and print media exposure.

RESEARCH METHODOLOGY

The success of any research effort is directly related to the relevance of the findings and the conclusions drawn from the investigation. For this study, the approaches used to collect data and other essential information.

Locale of the Study

The study could not be carried out at the state level because of the limited time and resources available to the researcher. chhatarpur & Panna districts was picked for study.

Sampling Techniques

A sample is a smaller representative of a larger whole. If each and every unit of the population has to be contacted for collection of data, it would require much time, men and material. Besides this, all the persons may not be available for contact, and because of larger numbers, exhaustive and intensive study would not be passable. Compared with these sapling enquiry provides significantly more accurate results with much less money and material and at the same time makes possible more intensive analysis of fewer cases. In view of the fact it was decided to use multi-stage sampling techniques in the study. First stage sampling technique consisted of selecting the forest ranges; at the second stage blocks was selected; at the third stage villages was chosen and at the final stage respondents, i.e. participants and non-participants in agro forestry programme was selected.

Pilot study

Before the schedule was finalized, a pilot study was done. When the investigator himself go to the division and block headquarters and villages, he talked to locals and farmers about their experiences and observations. The pilot study was inspired by the following considerations:

- Some independent factors that may play a substantial impact in the variety of inter-personal influence can be traced out in this first step.
- To learn about the topics on which farmers in the village most frequently seek the guidance and counsel of their fellow farmers.
- In order to acquire a general sense of the locality's communication infrastructure, the type and character of the respondents, topography, and agricultural trends.

The base-line survey

The major variables and their measurement schedules concerning the study was examined by the eminent social scientists and finalized in the light of the suggestions given by them. Then the first draft of structured personal interview schedule was used for pretesting in the villages which was not included in the samples. The pretesting observations was tabulated and analyzed. On the basis of this, the schedules was edited and finalized for the final data collection. All the scales which was developed by other researchers and used in this study was very carefully tested before their final use. The editing and modifications wherever considered necessary was followed. These modified or finally edited interview schedules was once again discussed with the key informants so as to ascertain the reliability of the responses. Then they finally edited schedules was used for data collection from each of the respondents.

Variables of the study

Dependent variables:

- Knowledge
- Attitude
- Entrepreneurship

Independent Variables:

- Age
- Education
- Social participation
- Socio-economic Status
- Size of family
- Size of holding
- Credit behavior
- Income
- Innovation proneness
- Economic motivation
- Risk orientation
- Sources of information

Field procedure and data collection

The Data was collected in structured interview schedule covering all aspects of the study investigator himself established rapport with each respondent at his residence or farm or wherever he could be available. Prior to it, about 15 months time was spent on selection of Forest ranges, Blocks, Farmers and preparation of proforma for data collection of individual farmers. Whole of this work was accomplished through field survey of study area.

Statistical Analysis

Quartiles, percentages, 't' tests, zero-order correlations, and multiple regressions and multiple correlations are some of the statistical metrics employed in this investigation.

RESULTS

Participants in the field survey research were found to be using three main types of agroforestry: agri-silviculture, agri-horticulture, and alley-cropping.

Table 1: Difference between participants and non-participant onselected personal profiles/independent variables

S. No.	Personal profiles/Independent variables	Mean score of participants	Mean score of non-participants	"t" value
(i)	Age	46.200	38.321	2.401*
(ii)	Education	3.425	1.988	5.713**
(iii)	Social participation	1.122	0.608	4.153**
(iv)	Socio-economic status	39.387	26.253	4.463**
(v)	Size of family	2.908	1.883	2.234*
(vi)	Size of holdings	2.183	0.645	4.257**
(vii)	Credit behavior	2.145	3.832	-2.305*
(viii)	Income	3.345	1.832	7.235**
(ix)	Innovation proneness	11.235	5.322	9.237**
(x)	Economic motivation	18.165	28.709	-6.321**
(xi)	Risk orientation	28.161	16.866	7.467**
(xii)	Source of information			
(a)	Formal Interpersonal information sources	10.967	4.431	7.690**
(b)	Informal Interpersonal information sources	1.064	3.173	-5.887**
(c)	Mass communication sources	12.419	5.120	9.673**

Table 1 show that the average score of participants was greater than that of non-participants on all independent variables except credit behavior and economic motive, where non-participants scored higher. there is a significant difference in all independent variables between the conduct of participants and non-participants.

Table 2: Distribution of participants and non-participants on thebasis of their age

Categories of age	Participant (N = 120)		Non-participants (N = 120)	
	Frequency	Percentage	Frequency	Percentage
Young	32	26.67	59	49.17
Middle aged	55	45.83	34	28.33
Old	33	27.50	27	22.50

Table 2 shows that 45.83 percent of the participants were in the middle-age range, with the remaining participants being either very elderly (27.50 percent) or very young (26.67 percent). However, among those who chose not to participate, those in their twenties made up 49.17%, those in their thirties 28.33%, and those in their forties 22.50%.

Table 3: Distribution of participants and non-participants on thebasis of their education

Educational status	Participant (N = 120)		Non-participants (N=120)	
	Frequency	Percentage	Frequency	Percentage
Illiterate	10	8.33	38	31.67
Can readonly	07	5.83	12	10.00
Can read and write	04	3.33	18	15.00
Primary	16	13.33	31	25.83
Junior highschool	14	11.67	09	7.50
High school	19	15.83	07	5.83
Intermediate	33	27.50	03	2.50
Graduate	11	9.18	02	1.67
Post graduate and above	06	5.00	-	-

Table 3 shows that 27.50 percent of participants had completed only intermediate levels of education, followed by 15.83 percent who had completed high school, 13.33 percent who had completed primary/junior high school, 8.33 percent who had completed college, 5.00 percent who had completed graduate school, and 3.33

percent who had completed postgraduate study or higher. Of the people who did not take part, 31.67 percent were illiterate, followed by 25.83 percent who had completed elementary school, 15.0 percent who had completed middle school, 7.50 percent who had completed high school, 2.5 percent who had completed intermediate school, and 1.67 percent who had completed graduate school.

Table 4: Difference between participants and non-participants on (dependent variables) Level of knowledge, attitudeand entrepreneurship

Dependent variables	Mean score of participants	Mean score ofnon-participants	't' value
Level of knowledge	16.548	8.237	7.136**
Attitude	29.736	18.017	9.638**
Entrepreneurship	36.364	21.154	11.163**

From Table 4, it is clear that the average scores of the participants were far higher than those of the non-participants on all three of the independent factors. Implications for each variable are discussed below.

Table 4 shows the results of the data analysis. Table 5 shows that between 25.83 and 15.83 percent of respondents had a high degree of knowledge, while the remaining 58.34 percent had a medium level of knowledge. While 65% of participants had a poor level of understanding on agroforestry, 26% had a medium level of knowledge, and just 8% had a high level of knowledge.

Table 5: Distribution of participants and non-participants onthe basis of their level of knowledge about agroforestry

Level of knowledge	Participant (N = 120)		Non-participants (N=120)	
	Frequency	Percentage	Frequency	Percentage
High	31	25.83	10	8.33
Medium	70	58.34	32	26.67
Low	19	15.83	78	65.00

The average knowledge scores of the participants were 16.548, whereas those of the non-participants were just 8.237. It was determined, at the.01 probability level, that there was a statistically significant difference between the average knowledge scores of participants and non-participants. Consequently, indicating that participants and non-participants did not have substantially different levels of knowledge on agroforestry.

Table 6: Distribution of participants and non-participants onthe basis of their attitude towards agroforestry

Degree of attitude	Participant (N = 120)		Non-participants (N=120)	
	Frequency	Percentage	Frequency	Percentage
Less favourable	13	10.83	66	55.00
Favourable	67	55.83	35	29.17
Most favourable	40	33.34	19	15.83

Table 6 shows that among the respondents, the majority (55.83%) held a positive view on agroforestry, with 33.34 percent holding the most positive view. Even among those who were less enthusiastic about agroforestry, their percentage was tiny, at only 10.83%. However, the largest number, 55.00%, was identified in the group of less favorable attitude among non-participants, while only 29.17% had a positive attitude. Of those who did not take part, just 15.83% held a positive view of agroforestry.

Table 7: Multiple regression analysis of independent variable with dependent variable knowledge of participant and non-participants

Independent Variables	Participant		Non-participant	
	Beta weight	't' value on partial 'b'	Beta weight	't' value on partial 'b'
X1 Age	0.017	1.235NS	-0.048	0.063NS
X2 Education	0.736	5.156**	0.628	5.769**
X3 Social participation	0.074	1.156NS	0.148	1.321NS
X4 Socio-economicstatus	0.573	6.172**	0.356	4.876**
X5 Size of family	0.041	0.076NS	0.150	1.120NS
X6 Size of holding	0.398	3.572**	0.351	5.213**
X7 Credit behavior	0.019	0.324NS	0.092	10.034NS
X8 Income	0.143	0.987NS	0.017	0.879NS
X9 Innovation proneness	0.625	5.782**	0.468	4.957**
X10 Economic motivation	0.031	1.006NS	0.079	1.236NS
X11 Risk orientation	0.215	0.416NS	0.096	1.632NS

Independent variables, such as X1 (age) and X2 (level of education), were plugged into a regression equation. Factors such as X3 social participation, X4 socioeconomic status, X5 family size, X6 holding size, X7 credit behavior, X8 income, X9 propensity for innovation, X10 economic motivation, X11 risk orientation, and X12 information sources accounted for 81.17 and 76.57 percent of the variance in the levels of knowledge about social forestry practices held by participants and non-participants, respectively. When comparing the F values of participants and non-participants, the former had a value of 31.98, while the latter had a value of 24.71. A significance level of 0.01 percent was reached with these values.

Table 8: Reasons of participation in agroforestry programme bythe participants

S. No.	Reasons	Participants N = 120		
		Frequency	Percentage	Rank order
1	Income obtained from wood	85	70.83	I
2	Availability of poles andlogs for house construction	82	68.33	II
3	Employment generation	79	65.83	III
4	Availability of fuel wood	75	62.50	IV
5	Availability of fodder andforage	69	57.50	V
6	Control of soil conservation	56	46.67	VI
7	Control of pollution	48	40.00	VII
8	Herbal medicine	41	34.16	VIII

Table 8 shows that the primary incentive for most people to engage in agroforestry was the potential for financial gain from selling the wood products produced as a byproduct. The availability of poles and logs for house construction (68.33%), the creation of jobs (65.83%), the availability of fuel wood (62.50%), the availability of fodder and forage (57.50%), the prevention of soil erosion (46.67%), the reduction of pollution (40.00%), and the use of herbal medicines (34.16%) followed by the reason for the increase in income. So, it can be stated that the most important factors which prompted the respondents to engage in the agroforestry programme were the availability of fuel wood, the prevention of soil erosion, and the generating of additional money from wood.

Table 9: Problem perceived by participants in acceptance ofagroforestry practices

S. No.	Problems	Participants N = 120		
		Frequency	Percentage	Rank order
1	High cost of seedlings for ornamental/commercial plants	63	52.52	VII
2	Lack of incentive/subsidy tothose who adopt agroforestry	53	44.16	IX
3	Lack of marketing facilitiesfor agroforestry products	58	48.33	VIII
4	Quality of plants supplied bygovernment nurseries are not good	73	60.83	IV
5	Damage of plant by incidence of diseases and insect-pest infestation	68	56.63	V
6	Damage of plants by stray animals	65	54.16	VI
7	Lack of adequate training in raising agroforestryplantation	92	76.67	I
8	Non-availability of sufficient number of plants/seedlings from government	79	65.83	III
9	Lack of knowledge inselecting suitable plant species for particular site	82	68.33	II
10	Insufficient technicalknowledge to start nurseries for agroforestry plantation	51	42.50	X

It can be deduced from the above that the major issues as seen by the farmers were a lack of training in raising agroforestry plantation, a lack of knowledge in selecting suitable plant species for a particular site, a lack of sufficient number of plants/seedlings from government nurseries at the optimal time of plantation, poor quality plants supplied by government nurseries, and plant damage due to the incidence of diseases and insect and pest infestation.

CONCLUSION

Alarming rate of deforestation is a matter of serious concern in present situation. To cheek environmental degradation, maintain ecological balance and meet the needs of rural people afforestation is inevitable. Efforts have been made by the governments to maintain the area under forest/tree cover scientifically necessary for pollution free environment through massive afforestation programme but due to lack of people's participation the results are not up to desired level. Tree/forest cover can only be achieved through an agro forestry programme in which people's participation is important at every stage. Participants' agro-forestry practices might be subjected to cost-benefit analyses in order to demonstrate the progaramme's applicability, particularly for small and marginal farms. In order to sustain rural life and the economy, the people who live there, as well as forestry, agriculture, and animal husbandry, are all interdependent.

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