Association between Farmer's Knowledge on Integrated Farming System and their background characteristics

ABSTRACT

The majority of India's farmers are either small or marginal. And with the increase in population, the per capita availability of land is decreasing. Thinking of increasing population and decline in per capita availability of land in the country and realizing the benefit of IFS, the marginal farmers are to be encouraged to go for IFS to increase their cost of production. But the adoption of IFS system, the farmers need to know the system of IFS in details. Before making the farmers knowledgeable on IFS, their existing knowledge on IFS must be assessed. To find out the association between respondents' knowledge and independent variables. For the present study, six Development Blocks in Jorhat district out of which 50 percent i.e., three blocks were considered. Twenty farmers were selected randomly as respondents from each of the selected village. Thus, there were 180 respondents for the present study. The study revealed that 37.22% of the total respondents belonged to the age group 36-46 years. 43.33% of the total respondents attained education upto high school level. A large majority i.e., 90 per cent of the total respondents were married. The study depicted that 37.78% belonged to Other Backward Classes. It was evident from the present study that 52.22% of the respondents were from joint family system. Nearly 70 per cent of the total respondents (63.89%) stayed in semi pucca houses. Majority of the total respondents i.e., 85 per cent were in the range of Rs (50,000-1,00,000) in terms of their annual income. A higher percentage of the total respondents (95.00%) practice farming as their occupation for livelihood. Nearly 100 per cent of the total respondents owned mobile phone. More than half of the total respondents, (55.00%) had organizational membership. A large majority (95.00%) of the respondents were marginal farmer. None of the respondents cultivate through Integrated Farming System. In all three assessed blocks 98.89 % of respondents did not receive any trainings on Integrated Farming System. All the respondents (100.00%) were interested in receiving trainings on Integrated Farming System. Knowledge of the respondents was highly significantly associated with educational qualifications of the respondents.

Keywords: - Marginal farmers, integrated farming system, by product, knowledge, sustainability etc.

INTRODUCTION

India is a developing nation where the majority of people (86%) are small and marginal farmers. About 60% of Indians directly rely on agriculture and related industries for their livelihood. Population growth causes many issues in a nation like India, including difficulties in expanding the land horizontally, a decline in the amount of cultivable land, and threats to people's survival. Small and marginal farmers make up the majority of the farming community in India (85%), although they only own 44% of the country's total arable land. Meeting the needs and demands of the population's constant growth is quite challenging in the current situation. Unfortunately, in a developing nation like India, small and marginal farmers comprise the majority of the food-producing industries, including agriculture, cattle, fisheries, etc. As a result, they are unable to raise additional money or engage in intensive farming to satisfy the demands of this expanding population. Agriculture also demands a lot of labour and manpower and is quite labor-intensive. But despite their best efforts, they still fail to achieve their goals. It is necessary to think of a different solution in order to satisfy the basic needs of these farm families for food, feed, fodder, fiber, and fuel. India's operational farm holding is decreasing, and there is basically no capacity for horizontal agricultural land development as a result of the nation's ever-increasing population and declining per capita land availability. An alternative kind of farming must be used and preached in order for farmers to use it for increased productivity, financial gain, and sustainability. This is necessary to meet the food and nutritional needs of this growing population. Therefore, a productive agricultural system should have an Integrated Framing System with appropriate soil, water, crop, and pest management techniques that are both economical and environmentally beneficial. After cultivation and harvesting, the land usually remains barren which leads to erosion and degradation of the quality of the land. Not only environmental factors but also the economical and physical wellbeing of the farm family is also at stake. But if the farmer starts and accepts the Integrated Farming System (IFS) model of farming, round the year money comes into the family even if one of the components fail the farmers can earn well from the other component and it also takes care of the supply of important and nutrient based food products to the family and takes care of the nutritional security of the farm families. Most of the marginal farmers are at loss, as the cost of production is more compared to the money earned from the output. But in case of IFS cost of production is not expensive as the components are integrated and the waste of one component can be used as

manure or fodder for the other and thus, it is a profitable venture. The goal of integrated farming systems (IFS), a comprehensive method of farming, is to satisfy the many demands (impart farm resilience, farmer livelihoods, food security, ecosystem services, and making farms adaptive and resilient etc.). IFS refers to agricultural systems that combine fish and livestock production or combines livestock and grain production in the same piece of land, with the same management strategy, and also referred to as integrated bio systems. This method employs a network of interconnected enterprises so that waste from one component can be used as an input by another. This lowers costs, boosts output and income, and meets the needs of small and marginal farmers by improving their socioeconomic circumstances. The IFS strategy promotes ecological intensification and seeks to minimize anthropogenic inputs while increasing ecosystem functioning, such as nutrient recycling, soil formation, soil fertility augmentation, and environmental performance (Salton et al., 2014). As a result of the advantages of enterprise synergy, product diversification, and ecological reliability, efficiently managed IFS are anticipated to be less dangerous (Behera & France, 2016). Residue recycling and the use of the organic matter in Integrated Farming are its two key components.

REVIEW OF LITERATURE

Patra and Samal, (2018) in their research study entitled "Integrated farming system in India: A holistic approach to magnify the economic status of innovative farmers" found that the knowledge of Integrated Farming System in different climatic zones of India, would help to contribute towards the agenda of doubling farmers income as well as to address the issues of malnutrition.

Ponnusamy and Kousalaya (2017) in their research study entitled "Impact of Integrated Farming System Approach on Doubling Farmers Income" revealed that there was a lack of know – how on effective utilization of farm produces.

Garret et al., (2017) in their research article entitled "Social and ecological analysis of commercial integrated crop livestock systems: Current 8 knowledge and remaining uncertainty" found that knowledge existed in the profits, production, soil quality, crop production etc. But there was a gap in the knowledge about disease control, bio diversity, greenhouse gases, global warming and its mitigation etc.

Barua et al., (2019) in their research study entitled "Status and Scope of Integrated Farming System (IFS) in Upper Brahmaputra Valley Zone of Assam" found that Economic motivation and source of finance was significantly associated with adoption of IFS whereas age, education, land holdings, annual income, source of income, extension contact, training exposure, information source utilization, scientific orientation, risk preference and decision making ability were not significantly associated.

Kurniati (2021) in their study entitled "Adoption Level of Integrated Farming System Based on Rice–Cattle and Its Determinants Related to Sustainable Agriculture" found that income, land area, number of cattle and farmers' perceptions had a very significant association with the decision of farmers to adopt integrated farming system.

Moojen et al., (2022) in their research study entitled "A serious game to design integrated crop-livestock system and facilitate change in mindset toward system thinking" found that a game that was designed by the researchers and scientist (named SPIA game), which was used as a learning platform for the farmers, to facilitate the knowledge that already existed regarding integrated crop-livestock farming, which helped to provide better future and sustainability.

Whitefield et al., (2021) in their research study entitled "Combining local knowledge and soil science for integrated soil health assessments in conservation agriculture systems" found that the local knowledge combined with soil science proved to be a very good strategy on decision making on land management issues such as erosion, crop performance, moisture etc.

METHODOLOGY

The Jurisdiction of Jorhat Krishi Vigyan Kendra (KVK) of Assam Agricultural University (AAU) is the location of the present study. For selection of representative sample of the study a purposive cum random sampling is followed. There are six Development Blocks in Jorhat district out of which 50 percent i.e., three blocks namely, Kailapani Development Block, North west Jorhat Development Block (Dhekorgorah), East Jorhat Development Block (Selenghat) were considered for the present study. From each of the selected block, three villages adopted by KVK were selected randomly for the present study. Twenty farmers were selected randomly as respondents from each of the selected village by following equal allocation technique. Thus,

there were 180 respondents for the present study. The independent variables that included in the study are age, education, marital status, caste, family type, type of house, annual income, occupation of the head of the family, material possession, household assets, farm assets, livestock possession, communication and media possession, organizational membership, land holding size, cultivation through Integrated Farming System (IFS), training programme attended and interest of the people on receiving training on IFS.

FINDINGS AND DISCUSSIONS

Background profile of the respondents

Age

Table 1: Distribution of respondents according to their age

Category	Block 1 N=60		Block 2 N=60		Block 3 N=60		Total N=180	
	F	%	F	%	F	%	F	%
25-35 years	11	18.33	21	35.00	21	35.00	53	29.45
36-46 years	22	36.67	25	41.67	20	33.33	67	37.22
47 and above	27	45.00	14	23.33	19	31.67	60	33.33

The data in the Table 1 shows that more than 37.22% of the total respondents belonged to the age group 36-46 years followed by 33.33% of the total respondents from the age 47 and above (upto 60 years of age).

Educational qualification of the respondents

Table 2: Distribution of respondents according to their educational qualification

Category	Block 1 N=60		Block 2 N=60		Block3 N=60		Total N=180	
	F	%	F	%	F	%	F	%
Illiterate	0	0	3	5.00	1	1.67	4	2.22
Can read and	0	0	3	5.00	2	3.33	5	2.79

write								
Primary level	3	5.00	0	0	3	5.00	6	3.33
Middle school level	7	11.67	2	3.33	2	3.33	11	6.11
High school level	31	51.67	27	45.00	20	33.33	78	43.33
Higher Secondary Level	12	20.00	17	28.34	25	41.67	54	30.00
Graduate	7	11.66	8	13.33	7	11.67	22	12.22

The data in Table 2 shows that 43.33% of the total respondents attained education upto high school level, followed by 30 per cent of the total respondents received higher secondary level education. It is interesting to note that a very few i.e., only 1 person (1.67%) of the total respondents from block 3 were illiterate.

Marital Status

Table 3: Distribution of respondents according to their marital status

Category Married	**Block 1 N=60**		**Block 2 N=60**		**Block 3 N=60**		**Total N=180**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Married	53	88.33	54	90.00	55	91.67	162	90.00
Unmarried	6	10.00	6	10.00	4	6.66	16	8.89
Widow	1	1.67	0	0.00	1	1.67	2	1.11

The data in Table 3 shows that 90 per cent of the total respondents were married and it was found that none of the respondents were divorced or separated.

Caste

Table 4: Distribution of respondents according to caste

Category	Block 1 N=60		Block 2 N=60		Block 3 N=60		Total N=180	
	F	%	F	%	F	%	F	%
ST	0	0.00	40	66.67	20	33.33	60	33.33
MOBC	13	21.67	19	31.66	0	0.00	32	17.78
OBC	27	45.00	1	1.67	40	66.67	68	37.78
General	20	33.33	0	0.00	0	0.00	20	11.11

The data in Table 4 shows that 37.78% of the people belonged to Other Backward Classes followed by Schedule Tribe caste people. It can also be seen that there were no respondents belonged to Schedule Caste in the present study.

Family Type

Table:5 Distribution of respondents according to their family type

Category	Block 1 N=60		Block 2 N=60		Block 3 N=60		Total N=180	
	F	%	F	%	F	%	F	%
Nuclear	37	61.67	21	35.00	19	31.67	77	42.78
Joint	18	30.00	37	61.67	39	65.00	94	52.22
Extended	5	8.33	2	3.33	2	3.33	9	5.00

The data in Table 5 shows that more than 52 per cent (52.22%), were from joint family system, followed by nuclear family system which is more than 42 per cent (42.78%) of the total respondents. It is interesting to note that a very negligible percentage i.e., only 5 per cent of the respondents belonged to extended family system.

Type of house

Table 6: Distribution of respondents according to their type of house

Category	Block 1 N=60		Block 2 N=60		Block 3 N=60		Total N=180	
	F	%	F	%	F	%	F	%
Katcha	15	25.00	4	6.67	8	13.33	27	15.00

Pucca	17	28.33	5	8.33	16	26.67	38	21.11
Semi Pucca	28	46.67	51	85.00	36	60.00	115	63.89

The data in the Table 6 indicates that nearly 70 per cent of the total respondents (63.89%) stayed in semi pucca houses, followed by the respondents that belonged to pucca houses i.e., 21 per cent of the total respondents and only 15 per cent of the total respondents stayed in katcha houses.

Annual Income

Table 7: Distribution of respondents according to their annual income

Category	**Block 1 N=60**		**Block 2 N=60**		**Block 3 N=60**		**Total N=180**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**
Rs (50,000-1,00,000)	50	83.34	50	83.34	53	88.34	153	85.00
Rs 1,00,000-2,00,000)	5	8.33	5	8.33	5	8.33	15	8.33
Rs (2,00,000 and above)	5	8.33	5	8.33	2	3.33	12	6.67

The data in Table 7 depicts that a higher percentage of the total respondents i.e., 85 per cent were in the range of Rs (50,000-1,00,000) in terms of their annual income. Followed by more than 8 per cent (8.33%) of the total respondents earned Rs (1,00,000-2,00,000) annually and a very small percentage (6.67%) of the total respondents earned Rs (2,00,000 and above) annually (6.66 %)

Occupation of the head of the family

Table 8: Distribution of respondents according to their occupation

Category	**Block 1 N=60**		**Block 2 N=60**		**Block 3 N=60**		**Total N=180**	
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**

Farming	54	90.00	60	100.00	57	95.00	171	95.00
Service	3	5.00	0	0.00	1	1.67	4	2.22
Daily wage earner	3	5.00	0	0.00	0	0.00	3	1.67
Independent profession	0	0.00	0	0.00	2	3.33	2	1.11

The data in Table 8 depicts that a higher percentage of the total respondent's practiced farming as a prime occupation for their livelihood (95%). Only 2.22% of the total respondents were service holders. Independent profession (bamboo, cane works etc.,) was practiced by on 1.11% of the total respondents.

Organizational Membership

Table 9: Distribution of respondents according to their organizational membership

Category	Block 1 N=60		Block 2 N=60		Block 3 N=60		Total N=180	
	F	%	F	%	F	%	F	%
Yes	45	70.00	25	38.33	29	45.00	99	55.00
No	15	25.00	35	58.33	31	51.66	81	45.00

The data in Table 9 shows that more than half of the total respondents, i.e., 55.00% had organizational membership in their community and 45 per cent of the total respondents did not belong to any organizational membership in their community.

Land holding size

Table 10: Distribution of respondents according to their land holding size

Category	Block 1 N=60		Block 2 N=60		Block 3 N=60		Total N=180	
	F	%	F	%	F	%	F	%
Marginal Farmer (Below 1.0 Ha)	54	90.00	60	100.00	57	95.00	171	95.00
Small Farmer (1.0 Ha – 2.0	4	6.67	0	0.00	1	1.67	5	2.78

Ha)								
Semi Medium Farmer (2.0 Ha-4.0)	2	3.33	0	0.00	2	3.33	4	2.22

It is evident from Table 10 that a large majority (95.00%) of the respondents were marginal farmer. As Integrated Farming System (IFS) reduces cost and improves income, which will help in catering to the needs of the small and marginal farmers by raising their socio-economic conditions. Hence, if an intervention is to be imparted on IFS, the respondents under the study may be considered.

Trainings received for Integrated Farming System

Table 11: Distribution of respondents according to whether they have received any trainings related to IFS

Category	Block 1 N=60		Block 2 N=60		Block 3 N=60		Total N=180	
	F	%	F	%	F	%	F	%
Yes	2	3.33	0	0.00	0	0.00	2	1.11
No	58	96.66	60	100.00	60	100.00	178	98.89

The data in Table 11 shows that more than 98 per cent (98.89%) of the total respondents did not receive any trainings related to Integrated Farming System whereas only 1 .11 per cent of the total respondents received training for Integrated Farming System. Hence the respondents should be provided training on Integrated Farming System.

Knowledge level of the respondents on Integrated Farming System

Table 12: Distribution of respondents according to their knowledge level

Knowledge level	Block 1 N=60		Block 2 N=60		Block 3 N=60	
	F	%	F	%	F	%
Low	15	25.00	3	5.00	7	11.67

Medium	37	61.67	47	78.33	37	61.66
High	8	13.33	10	16.67	16	26.67

It is revealed from the Table 12 that a higher percentage of respondents had medium level of knowledge on Integrated Farming System (Block 1- 61.67%, Block 2- 78.33%, Block 3- 61.66%)

Association between knowledge of the respondents and selected independent variables.

Table 13: The association between knowledge of respondents with selected independent variables

Variables	
Age	5.33 (.255)
Education	3.85 (.002) **
Marital Status	2.08 (.719)
Caste	11.85 (.065)
Family Type	3.29 (.510)

Type of house	2.28 (.684)
Annual Income	6.62 (.157)
Occupation of the head of the family	9.19 (.163)
Organizational Membership	4.77 (.092)
Training programme attended	.986 (.611)

***Significant at 0.01 level*

In above table, chi square values indicates that the knowledge of respondents on Integrated Farming system was significantly associated with educational qualifications of the respondents. It might be due to the fact that education helps them to gather more information. Also, knowledge of the respondents was not significantly associated with other independent variables such as age, marital status, caste, family type, type of house, annual income, occupation of the head of the family, organizational membership and training programme attended by the respondents.

CONCLUSION

It is well evident from the present study that most of the respondents had upto high school level educational qualification where number of illiterate respondents was negligible. The findings of the present study, indicate that knowledge of the respondents on Integrated Farming System (IFS) is of moderate level. It can also be revealed from the present study that majority of the respondents, did not receive any formal training on Integrated Farming System. They have a very keen interest in receiving training and guidance from experts and scientist. Therefore, it can be concluded that this is a very good opportunity for concerned authorities should take up measures to provide necessary trainings and organize various programme on IFS, for successful

implementation and practice of IFS, which is an economically viable farming system. Thus, it will help to fulfill the country's desire for doubling farmers income.

RECOMMENDATIONS

• Trainings should be organized by Krishi Vigyan Kendra's and Department of Agriculture in association with veterinary and fishery experts, for the farmers.

• Awareness campaign should be conducted for popularizing Integrated Farming System, so that the people know the importance of Integrated Farming System (IFS)

• Similar study can be conducted covering some other districts of the state to know the people's perspective as well as status of IFS

REFERENCES

Choudhary A.K., (2013), Integrated farming systems for enhancing productivity and profitability under hill and mountain agro-ecosystems, Integrated Farming System, for Livelihood Security of Small and Marginal Farmers, pp.122-134

Behera, U.K., and France J., (2016), Integrated Farming Systems and the Livelihood Security of Small and Marginal Farmers in India and Other Developing Countries, Advances in Agronomy, DOI:10.1016/bs.agron

https://www.fao.org/india/fao-in-india/india-at-a-glance/en/