Assessment of Farmers' Knowledge on Integrated Farming System (IFS)

Kaberi Gogoi [a++*], Juliana Sarmah [a#] and Mayuri Bora [a†]

[a] Department of Extension Education and Communication Management, AAU, Jorhat, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Majority of Indian farmers are either small or marginal. With the increase in population, the per capita availability of land is decreasing. Increasing population and decline in per capita availability of land in the country raises the issue of food security. Realizing the benefit of Integrated Farming System (IFS), in terms of food security, environmental sustainability the farmers are to be encouraged to go for adopting the IFS in their own. The present study was conducted to assess the knowledge of the respondents on IFS and explore the association between respondents' knowledge and certain independent variables. Hence, three objectives was identified by the researcher for the following research and they are: To study the background information of the respondents. To assess the knowledge of the respondents on Integrated Farming System (IFS). To find out the association between respondents' knowledge and independent variables. The present study, was conducted in Jorhat district of Assam. A total of 180 respondents were selected from three development Blocks of Jorhat district. The study revealed that 37.22% of the total respondents belonged to the age group 36-46 years and 43.33% 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. Around 50.00 per cent of the respondents were from

---

[++] *Research Scholar;*
[#] *Retd. Professor;*
[†] *AICRP on Women in Agriculture;*
Corresponding author: E-mail: kaverigogoi585@gmail.com;

joint family system. Nearly 70 per cent of the total respondents 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. A large majority (95.00%) of the respondents were marginal farmer. None of the respondents cultivate through IFS. In all three assessed blocks 98.89 % of respondents did not receive any trainings on IFS. All the respondents (100.00%) were interested in receiving trainings on Integrated Farming System. Knowledge of the respondents was significantly associated with educational qualifications of the respondents.

1. 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, 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. 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. 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 by the farmers 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 IFS 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 quality degradation. Not only environmental factors but also the economical and physical wellbeing of the farm family is also at stake. But if the farmers starts and accepts the 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 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 [1]. Residue recycling and the use of the organic matter in Integrated Farming are its two key components. Since IFS is beneficial in terms of food security, livelihood generation, environmental sustainability and profitability it is imperative that farmer should adopt such farming model. However, knowledge about it is prerequisite before its adoption. Hence, the

present study was conducted to assess the knowledge of the respondents on IFS and explore the association between respondents' knowledge and certain independent variables.

2. REVIEW OF LITERATURE

Sasikala et al., (2015) in their study found that (47.3 %) was marginal farmers (with land holdings below 2.5 acres), majority of the farmers were middle aged and had achieved high level of education school and belonged to medium sized family.

Uddin and Anjuman (2016) in their study stated that the average age of the respondents was 38.5 years and belonged to middle age, the average farming experience was 19.81 years, average training exposure was 13.23 days and average knowledge of farming was 18.43 respectively. 63per cent of the women had either elementary, secondary, or higher education, indicating that the study area's literacy rate was greater than the country's average of 55.08%.

Garret et al., (2017) in their research article revealed 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 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 established 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 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., [2] in their research study affirmed 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.

3. METHODOLOGY

3.1. Study Area

The current study was under the jurisdiction of Jorhat Krishi Vigyan Kendra (KVK). There are six Development Blocks in Jorhat district out of which 50 per cent were considered for the present study. From each of the selected block, three villages adopted by KVK were selected randomly. 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 IFS, training programme attended and interest of the people on receiving training on IFS [3-5].

4. FINDINGS AND DISCUSSION

4.1 Background Profile of the Respondents

4.1.1 Age

The data in the Table 1 shows that 37.22% of the total respondents belonged to the age group 36-46 years followed age 47 years and above.

4.1.2 Educational qualification of the respondents

The data in Table 2 shows that 43.33% of the total respondents attained education upto high school level, whereas 30 per cent had 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.

4.1.3 Marital status

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.

4.1.4 Caste

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.

4.1.5 Family type

The data in Table 5 shows that around 50 per cent (52.22%), were from joint family system, followed by nuclear family (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 [6-8].

4.1.6 Type of house

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.

4.1.7 Annual income

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 %).

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

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 write	0	0	3	5.00	2	3.33	5	2.79
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

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

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

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

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

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

4.1.8 Occupation of the head of the family

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**.**

4.1.9 Organizational membership

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 have organizational membership in their community.

4.1.10 Land holding size

It is evident from Table 10 that a large majority (95.00%) of the respondents were marginal farmer. As 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.

4.1.11 Trainings received for integrated farming system

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.

4.1.12 Knowledge level of the respondents on Integrated farming system

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%).

In above table, chi square values indicates that the knowledge of respondents on IFS 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.

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

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

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 Ha)	4	6.67	0	0.00	1	1.67	5	2.78
Semi Medium Farmer (2.0 Ha-4.0)	2	3.33	0	0.00	2	3.33	4	2.22

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

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

Table 13. Age and educational background crosstabulation

Age * Education Crosstabulation									
Count									
		Education							Total
		0	1	2	3	4	5	6	
age	1	0	0	0	0	0	0	0	1
	1	0	2	2	2	1	19	20	7	53
	2	0	2	3	0	2	35	16	9	67
	3	0	0	0	3	8	24	18	7	60
Total		1	4	5	5	11	78	54	23	181

Chart 1. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	200.648[a]	21	.000
Likelihood Ratio	35.800	21	.023
N of Valid Cases	181		

a. 23 cells (71.9%) have expected count less than 5. The minimum expected count is .01.

Table 14. The association between knowledge of respondents with selected independent variables

Variables	χ^2
Age	.255
Education	.002 **
Marital Status	.719
Caste	.065
Family Type	.510
Type of house	.684
Annual Income	.157
Occupation of the head of the family	9.19(.163)
Organizational Membership	.092
Training programme attended	.611

***Significant at 0.01 level*

5. 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 is shown 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.

6. 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

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Behera UK, France J. Integrated farming systems and the livelihood security of small and marginal farmers in India and other developing countries, Advances in Agronomy; 2016.
DOI:10.1016/bs.agronAvailable:https://www.fao.org/india/fao-in-india/india-at-a-glance/en/

2. Whitefield S et al. Combining local knowledge and soil science for integrated soil health assessments in conservation agriculture systems, Journal of Environmental Management. 2021; 286:112192.

3. Choudhary AK. 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. 2013:122-134.

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

5. Siddeswaran K, Sangetha SP, Shanmugam PM. Integrated farming system for the small irrigated upland farmers of Tamil Nadu. Extended Summaries: 3rd International Agronomy Congress. 2012;26–30.

6. Available:https://doi.org/10.1007/s13593-022-00777-5

7. Available:https://doi.org/10.1051/e3sconf/202122600034

8. Patra S, Samal P. Integrated farming system in India: A holistic approach to magnify the economic status of innovative farmers, Journal of Pharmacognosy and Phytochemistry. 2018;7(3):3632-3636.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/109130