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Integrated farming system: Need and interest of farmers

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Abstract
The present study was conducted in Yamunanagar and Sirsa district of Haryana state. An analysis of the data revealed that 'IFS is a sustainable system' occupied top rank with mean score of 2.81 followed by 'IFS increases production and productivity per unit area' (mean score of 2.28). The results indicated that the family income (r =0.4351), land holding (r =0.4153), source of irrigation (r =0.1924), farming system (r =0.4921), extension contact (r =0.5214), training attended (r =0.4917), innovativeness (r =0.5454) and mass media exposure (r=0.5602) were positively and significantly correlated (at 0.05 level of probability) with the need and interest of respondents towards IFS. The results of the study indicated that the multiple regression coefficient of family income, land holding, source of irrigation, extension contact, training attended, innovativeness and mass media exposure had significant "b" values in case of need and interest of farmers in adoption of integrated farming system.

Keywords: Integrated farming system, adoption, need and interest, sustainable agriculture

Introduction
The integrated farming system in Indian conditions is sustainable for development of famers and farming community. In view of enormous benefits accruing due to adoption of feasible farm enterprise combinations, efforts should be made to help farmers to adopt more integrated and resource efficient farming systems that maintain agricultural productivity and profitability while protecting the environment, farm and family health (Ponnusamy *et al.*, 2009) [4]. In the integrated farming system the use of diverse plants and animals broadens possible sources of income generation and reliable way of obtaining high productivity. Small and marginal farmers can take a suitable crop along with horticulture, animals, fisheries and other components that would minimize risks and provide additional income and employment from the same piece of land per unit time, apart from improving soil fertility over a period of time. The primary objective of the IFS is to maintain production of food and other goods and services that contribute to food security and income generation to the rural poor (Kumar *et al.*, 2016) [1]. Keeping in view the above facts, the present study was conducted with the objective of 'need and interest of farmers in adoption of Integrated Farming System'

Materials and method
The present study was conducted in Yamunanagar and Sirsa district of Haryana state. Two blocks i.e. Radaur and Jagadhri from Yamunanagar, Rania and Nathusari chopta from Sirsa districts were selected randomly. From each block, eight villages were selected by random sampling technique. From the selected area total 176 respondents were selected for taking the responses against the statements of need and interest of the farmers in adoption of integrated farming system. The responses of farmers were obtained on three-point continuum scale as 'strongly agree (3)' 'agree (2)' and 'disagree (1)' against each statement. The scores for each statement were summed up. Aggregate total weighted score was calculated for each statement and on the basis of so calculated score, total weighted score and weighted mean score were obtained. Finally, rank orders were assigned according to the obtained weighted mean score.

Results and discussion
An analysis of the data from Table 1 revealed that 'IFS is a sustainable system' occupied top rank with mean score of 2.81 followed by 'IFS increases production and productivity per unit area' (mean score of 2.28). However, 'IFS meets the rising need of food, feed, fiber, fuel and

fertilizer' (mean score of 2.25) and 'Different combinations of enterprises help in maximizing the annual income' (mean score of 2.23) fetched III[rd] and IV[th] ranks, respectively. Both 'IFS is environment friendly' and 'IFS provides employment round the year' obtained V[th] and VI[th] ranks with mean score of 2.22 and 2.19, respectively.

The statement 'IFS helps to decrease global warming' got VII[th] rank with mean score of 2.18 followed by 'IFS builds the self-confidence of farmers' was ranked VIII[th] with mean score of 2.16 and 'IFS ensures nutritional requirement of family' was ranked at IX[th] position with mean score of 2.15 by the respondents. 'IFS helps in increasing rate of precipitation' was ranked X[th] in order with mean score of 2.14 followed by 'IFS increase soil organic content' was ranked XI[th] with mean score of 2.12 and 'Trees in IFS are used for fencing and boundary demarcation' was ranked XII[th] as statements occupied the mean score i.e., 2.10.'IFS helps poor farmers to reduce their vulnerability to climate-related hazards' was ranked at XIII[th] position with mean score of 2.09 followed by 'IFS provides great opportunity to produce diversified products' was ranked XIV[th] with mean score of 2.07. The statement 'IFS makes recycling of farm waste in efficient way' and 'IFS provides opportunity for the growth of agri-oriented industries' got XV[th] and XVI[th] ranks with mean score of 2.05 and 2.04, respectively.

The data in Table 1 further revealed that 'IFS reduces the production cost of components through input recycling' (mean score of 2.03), 'IFS increases standard of living of beneficiaries' (mean score of 2.02), 'IFS is efficient technique for best utilization of farm resources' (mean score of 2.01) and 'IFS improves water holding capacity of soil' (mean score of 1.99) were listed at XVII[th], XVIII[th], XIX[th], and XX[th] ranks, respectively.

Table 1: Mean score of need and interest of respondents towards integrated farming system (n=176)

S. No.	Statement	S.A (3)	A (2)	D.A (1)	T.W.S	W.M.S	Rank order
1.	IFS is a sustainable system	150 (85.23)	18 (10.23)	08 (04.55)	494	2.81	I
2.	IFS has potential for maximum returns	25 (14.20)	121 (68.75)	30 (17.05)	347	1.97	XXII
3.	IFS is environment friendly	71 (40.34)	72 (40.90)	33 (18.75)	390	2.22	V
4.	IFS reduces risks due to biotic and abiotic stress	22 (12.50)	111 (63.07)	43 (24.43)	331	1.88	XXVI
5.	IFS increases standard of living of beneficiaries	31 (17.61)	117 (66.48)	28 (15.91)	355	2.02	XVIII
6.	IFS helps in natural resource conservation	45 (25.56)	69 (39.20)	62 (35.22)	335	1.90	XXV
7.	IFS solves the energy crises	35 (19.89)	103 (58.52)	38 (21.59)	349	1.98	XXI
8.	IFS ensures nutritional requirement of family	55 (31.25)	93 (52.84)	28 (15.90)	379	2.15	IX
9.	IFS builds the self-confidence of farmers	59 (33.52)	87 (49.43)	30 (17.04)	381	2.16	VIII
10.	IFS makes recycling of farm waste in efficient way	37 (21.02)	111 (63.07)	28 (15.91)	361	2.05	XV
11.	IFS provides employment round the year	69 (39.20)	72 (40.90)	35 (19.88)	386	2.19	VI
12.	IFS increases soil organic content	36 (20.45)	125 (71.02)	15(8.52)	373	2.12	XI
13.	IFS reduces the production cost of components through input recycling	30 (17.05)	121 (68.75)	25 (14.20)	357	2.03	XVII
14.	IFS helps in increasing rate of precipitation	64 (36.36)	72 (40.9)	40 (22.72)	376	2.14	X
15.	Different combinations of enterprises help in maximizing the annual income	71 (40.34)	74 (42.04)	31 (17.61)	392	2.23	IV
16.	The manure and organic waste obtained from IFS farm reduce fertilizers requirement	49 (27.84)	70 (39.77)	57 (32.38)	344	1.95	XXIV
17.	IFS provides great opportunity to produce diversified products	35 (19.89)	118 (67.05)	23 (13.07)	364	2.07	XIV
18.	IFS provides opportunity for the growth of agri-oriented industries	38 (21.59)	107 (60.80)	31 (17.61)	359	2.04	XVI
19.	IFS increases production and productivity per unit area	77 (43.75)	72 (40.90)	27 (15.34)	402	2.28	II
20.	IFS helps poor farmers to reduce their vulnerability to climate-related hazards	38 (21.59)	115 (65.34)	23 (13.07)	367	2.09	XIII
21.	IFS meets the rising need of food, feed, fiber, fuel and fertilizer	74 (42.04)	72 (40.90)	30 (17.04)	396	2.25	III
22.	IFS improves water holding capacity of soil	45(25.57)	84 (47.73)	47 (26.70)	350	1.99	XX
23.	IFS is efficient technique for best utilization of farm resources	35 (19.89)	107 (60.8)	34 (19.32)	353	2.01	XIX
24.	IFS is adopted for diversification of agriculture	34 (19.32)	101(57.39)	41 (23.30)	345	1.96	XXIII
25.	Trees in IFS are used for fencing and boundary demarcation	63 (35.79)	68 (38.63)	45 (25.56)	370	2.10	XII
26.	IFS helps to decrease global warming	59 (33.52)	90 (51.13)	27 (15.34)	384	2.18	VII

S.A- Strongly Agree, A- Agree, D.A- Disagree, T.W.S-Total Weighted Score, W.M.S-Weighted Mean Score

'IFS solves the energy crisis' and 'IFS has potential for maximum return' were ranked at XXI[th] and XXII[th] position with mean of score 1.98 and 1.97**.** 'IFS is adopted for diversification of agriculture', 'The manure and organic waste obtained from IFS farm reduce fertilizers requirement', 'IFS helps in natural resource conservation' and 'IFS reduces risks due to biotic and abiotic stress' occupied XXIII[th], XXIV[th], XXV[th] and XXVI[th] ranks with mean score of 1.96, 1.95, 1.90 and 1.88, respectively.

The study revealed that overall majority of the respondents belonged to the medium category of need and interest in adopting IFS. This medium category of need and interest of the respondents towards IFS was due to 'IFS is a sustainable system', 'IFS increases production and productivity per unit area', 'IFS meets the rising need of food, feed, fiber, fuel and fertilizer', 'Different combinations of enterprises help in maximizing the annual income', and 'IFS is environment-friendly', etc. Mamun *et al.* (2011) [5] found that farmers generally practiced subsistence farming where they needed to produce a continuous, reliable and balanced supply of foods, as well as cash for basic needs and recurrent farm expenditure. Therefore, integrated farming system is the best way for such farmers since single crop production enterprises are subject to a high degree of risk and uncertainty because of seasonal, irregular and uncertain income and employment to the farmers. Singh *et al.* (1993) [6] also stated that the small and marginal farmers had very limited land which is getting further fragmented with each generation and therefore farm enterprises requiring less land but higher productivity and employment opportunities, needed to be integrated with crop production. Crop diversification through improved varieties integrated with other components resulted in obtaining higher productivity and profitability of small and marginal farmers (Nagaraj, 2016) [3]. Therefore, medium need and interest significantly predicted respondents' decisions to adopt IFS.

Table 2: Correlation of independent variables with need and interest of the farmers towards IFS (n=176)

S. No.	Independent variable(s)	Need and interest
1.	Age	-0.3941*
2.	Family income	0.4351*
3.	Educational qualification	0.2625
4.	Land holding	0.4153*
5.	Farm implements	0.2851
6.	Source of irrigation	0.3924*
7.	Cropping system	0.2236
8.	Farming system	0.4921*
9.	Extension contact	0.5214*
10.	Training attended	0.4917*
11.	Innovativeness	0.5454*
12.	Mass media exposure	0.5602*

*Significant at 0.05 level of probability.

Correlation of independent variables with need and interest of the farmers towards IFS

The zero order correlation was computed to determine the relationship between background variable of respondents with the need and interest towards IFS and the results have been presented in Table 2. The results indicated that the age (r = -0.3941) was negatively and significantly correlated (at 0.05 level of probability) with the need and interest of respondents towards integrated farming system. Family income (r =0.4351), land holding (r =0.4153), source of irrigation (r =0.1924), farming system (r =0.4921), extension contact (r =0.5214), training attended (r =0.4917), innovativeness (r =0.5454) and mass media exposure (r =0.5602) were positively and significantly correlated (at 0.05 level of probability) with the need and interest of respondents towards IFS. The study revealed that the correlation coefficient of educational qualification (r =0.2625), farm implements (r =0.2851) and cropping system (r =0.2236) with the need and interest of respondents towards IFS were not found to be significant.

The results arrived so might be because of the fact that as level of extension contact, training attended, innovativeness and mass media exposure increased the people got exposed to various media and they could read and hear the pros and cons of the IFS which had helped in forming their interest towards IFS.

The data reveals that age had negative and significant correlation with the need and interest of respondents in adopting integrated farming system. This might be due to the fact that higher age of respondents negatively affected the scientific temperament of the respondents. The study revealed that family income, land holding, source of irrigation, farming system, extension contact, training attended, innovativeness and mass media exposure of the respondents had positive and significant correlation with the need and interest of farmers in adoption of IFS. The correlation coefficients of educational qualification, farm implements and cropping system with the need and interest of farmers in adoption of IFS were not found significant. These finding were found to be partially supported by report of Morya (2015) [2].

Multiple regression coefficients of independent variables with need and interest of the farmers towards IFS

To predict the contribution of background variables on the need and interest of the respondents towards IFS, the data were subjected to multiple regression analysis. The results are presented in Table 3. The multiple regression coefficients of family income, land holding, extension contact, training attended, innovativeness and mass media exposure were significant (0.05% level of probability). In other words, one unit change in the family income, land holding, source of irrigation, extension contact, training attended, innovativeness and mass media exposure may lead to a corresponding change of 1.1411, 1.8159, 0.4770, 0.3998, 0.2058, 0.1134 and 0.1575 unit in the need and interest of the respondents towards IFS. While the educational qualification, farm implements, cropping system and farming system were not found to have the predication variable of significant level. The data also showed that all these variables collectively explained 51.86 per cent variation in need and interest towards integrated farming system. This showed that there might be some other variables responsible for variation of 48.14 per cent in need and interest of the respondents towards IFS. The data also showed that multiple regression coefficient of age had significant and negative trend, this lead to the conclusion that an increase in these variables by one unit would led to decrease in the favorable need and interest of the respondents towards the IFS.

Table 3: Multiple regression coefficients of independent variables with need and interest of the farmers towards IFS (n=176)

S. No.	Independent variables	'b' value	S.E.	't' value	'p' value
1.	Age	-0.4212*	0.1651	2.551	0.0118
2.	Family income	1.1411*	0.4811	2.372	0.0189
3.	Educational qualification	0.1200	0.1488	0.807	0.4210
4.	Land holding	1.8159*	0.8917	2.036	0.0434
5.	Farm implements	0.7274	0.7892	0.922	0.3598
6.	Source of irrigation	0.4770*	0.2243	2.126	0.0350
7.	Cropping system	0.1223	0.4119	0.297	0.7674
8.	Farming system	0.1562	0.3929	0.398	0.6921
9.	Extension contact	0.3998*	0.1714	2.332	0.0210
10.	Training attended	0.2058*	0.0939	2.190	0.0300
11.	Innovativeness	0.1134*	0.0584	1.939	0.0542
12.	Mass media exposure	0.1575*	0.0648	2.429	0.0162

*Significant at 0.05 level of probability. R^2=0.5186 Constant = 53.9276

The results of the study indicated that the multiple regression coefficient of family income, land holding, source of irrigation, extension contact, training attended, innovativeness and mass media exposure had significant "b" values in case of need and interest of farmers in adoption of integrated farming system. The remaining variables viz., educational qualification, farm implements, cropping system and farming system were not found significant. The value of coefficient of determinant (R^2) indicated that all the 12 variables jointly explained 51.86 per cent variation in need and interest of farmers towards integrated farming system. This showed that there might be some other variables responsible for variation of 48.14 per cent in need and interest of the respondents towards IFS. The data also showed that multiple regression coefficient of age showed negative trend. This led to the conclusion that an increase in this variable by one unit would lead to decrease in the favorable need and interest of the farmers in adoption of IFS. Interestingly, what this researcher observed in the process of data collection was the fact that the IFS was adopted as an income generating activity by most of the resourceful respondents. Most of the area being abounded by good quality of underground water, the interest of respondent built positive attitude toward IFS. These findings were also found to be partially supported by report of Morya (2015) [2].

Conclusion

Integrated farming system is an important for the marginal and small farmers under the changing scenario of global climate. In this context, better understanding of the nature and extent of the interactions among various enterprises and natural resources is essential for the economic benefits as well as livelihood security. Integrated farming system is capable of producing diverse social, economic and environmental benefits besides ensuring food security and employment opportunity. Integrated farming system also plays an important role for sustainable agriculture, because declining size of land holdings without any other source for generating income needs to adopt Integrated farming system farming for sustaining their life. The future of integrated farming system is bright.

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