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Livelihood Security of Small and Marginal Farm Families through Integrated Farming System: A Sustainable Approach

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ABSTRACT

Integrated Farming System is mainly a combination of one or more enterprises with cropping, when carefully chosen, planned, and implemented, provides greater dividends than a monoculture approach or single enterprise, especially for small and marginal farm families. The present study was conducted in Uttar Pradesh, a state in India. A total sample of 100 farm families, i.e., 50 CFS and 50 IFS, were selected randomly. The findings of the study clearly indicate that the livelihoods of IFS farm families were more secure in comparison to those of CFS farm families. The livelihood securities of CFS and IFS farm families had positive and significant correlation with education, monthly family income, land holding, farming experience, livestock possession, possession of agricultural and household assets, social and extension participation, mass media exposure, training exposure, and exposure to e-services.

INTRODUCTION

India is an agricultural country where the majority of the farmers fall under the category of small and marginal farmers who hold less than two hectares of land. The small and marginal farm families are major contributors to the total production (78.00%), however weak in terms of generating sufficient income and sustaining their own livelihoods. Small holdings (below 0.8 ha) do not generate adequate income to keep a small and marginal farm family out of poverty, regardless of high productivity (Chand *et al.,* 2017). Achieving and sustaining livelihood security with a single enterprise is somewhat difficult for these farmers. Conventional farming systems refer to farming systems that incorporate the use of synthetic chemical fertilisers, herbicides, pesticides, and other continual inputs, genetically modified organisms, concentrated animal feeding operations, heavy irrigation, intensive tillage, or concentrated monoculture production Thus, conventional farming systems are normally highly resource and energy intensive, but also highly productive.

Now there is increasing realisation among agricultural scientists that, though conventional farming practises have led to the attainment of the target of self sufficiency in food production, it has been at the cost of the quality of food, the degradation of natural resources, and the deterioration of the environment. Therefore, there is a growing concern about the environmental, economic and social effects of chemical-dependent conventional farming systems, which has led the farming community to search for alternative systems that may make agriculture more cost-effective and sustainable. Among alternative farming systems, integrated farming systems are becoming more popular among farmers in India. Integrated farming is now becoming part of sustainable agriculture systems. Integrated farming systems are being

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promoted and are getting acceptance all over the world as part of the most recent efforts to promote agriculture systems that are ecologically, socially and economically sustainable. With the rising population, declining land-man ratio and increasing mechanisation in farm operations, agriculture alone is not able to provide adequate income and employment to households in India. Hence, farmer's income and food security would need to be expanded and enhanced by the adoption of different allied enterprises like horticulture (vegetables/ fruits/ flowers/ medicinal and aromatic plants), dairy, mushroom cultivation, fisheries, apiary, apiculture, etc. These integrated farming systems needed to be planned, designed, implemented and analysed for productivity. Integration of farm enterprises provides better livelihoods in terms of increased food production, higher net income, improved productivity, and a reduced income imbalance between agricultural labour and urban factory workers. Thus, it is worth mentioning that the contribution of integrated farming system leads to an improvement in the standard of living.

The word 'livelihood' conceptually indicates the activities, entitlements, means and assets by which people make a living. Assets are defined as natural or biological (i.e., water, land, resources, flora and fauna), social (i.e., social networks, family and community), human (i.e., health, nutrition, education and labour,) physical (i.e., markets, schools, roads, clinics and bridges) and economic (i.e., savings, jobs and credit facilities). The sustainability of livelihoods becomes a function of how small and marginal farm families make use of asset portfolios on both a short and long-term basis (Jirli *et al.,* 2008).

MATERIALS AND METHODS

Sampling procedure

The state of Uttar Pradesh was purposively selected for the proposed study. The state has nine agro-climatic zones and 75 districts. One district from the North Eastern Plain agro-climatic zone of Uttar Pradesh was selected randomly for the present study. The list of villages was procured from KVK after discussion with KVK scientists from selected district. Small and marginal farm families practising CFS and IFS for the past five years were selected randomly. An equal number (50) of CFS and IFS farm families were selected randomly, comprising a total of 100 respondents. Also, the researcher was well acquainted with the local language, culture, tradition and customs prevailing, which would have been helpful to build quick rapport and facilitate obtaining relevant information for meaningful data analysis. Data was collected with the help of a pre-structured interview schedule by the investigator from the heads of household of the farm families.

Selection of livelihood security parameters: The livelihood security has multidimensional aspects. It includes economic security, nutritional security, health security, food security, educational security, habitat security, infrastructure security, community participation, environmental security, etc. Therefore, it was important to select dimensions that were representative indicators of all these sectors of human-life. Based on the availability of authenticated literature and through discussion with experts of state agriculture department and Krishi vigyan kendras in relevant fields, out of seven livelihood security parameters, four were selected by using a three point continuum scale that is most relevant, relevant, and not so relevant by assigning 3, 2 and 1 respectively. Weighted mean scores, mean scores and ranks were calculated. The parameters falling under the most relevant (WMS 2.66) to relevant (WMS 2.0) category were selected; thus, out of seven parameters, four, namely (i) food security, (ii) economic security, (iii) agricultural security, and (iv) health security, were selected to study the livelihood security of small and marginal farm families.

Selection of livelihood security parameters

n=50

Sr.	Parameters	MS	WMS	Rank
1.	Food Security	133	2.66	I
2.	Economic Security	128	2.56	II
3.	Agricultural Security	125	2.50	III
4.	Health Security	100	2.0	IV
5.	Social Security	98	1.96	V
6.	Infrastructure security	92	1.84	VI
7.	Environmental security	90	1.80	VII

WMS: Weighted mean score, MS: Mean score

Statistical analysis and interpretation of the data

The collected data were classified and tabulated in accordance with the standards laid down in order to arrive at meaningful and relevant inferences as per the objectives of the study. The data were analyzed by using the following statistical tools:

Frequency and percentages: Frequency and percentages were calculated to draw inferences as per objectives.

Weighted mean score and rank: Weighted mean scores were calculated to rank various variables such constraints faced by respondents. Following formula was used to calculate weighted mean score:

$$WMS = \frac{\sum f_i c_i}{\quad}$$

N

Where,

Fi = Frequency in the ith cell

Ci = Cell scores of ith cell

N = Total number of respondents

Correlation coefficient: Pearson's coefficient of correlation was worked out for ascertaining the relationship between independent and dependent variables. The formula is as under:

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[\, n\Sigma x^2 - (\Sigma x)^2]\, [\, n\Sigma y^2 - (\Sigma y)^2]}}$$

Where,

r = Correlation coefficient

n = Number of respondents

Σxy = Sum of product of x and y

x and y = Dependent and independent variables

Σx = Summation of overall dependent variables

Σy = Summation of overall independent variables

Σx^2 = Sum of square of dependent variables

Σy^2 = Sum of square of independent variables

RESULTS AND DISCUSSION

Perceived food security of CFS and IFS farm families

Sources of food (for consumption purpose): The findings throw light on the food security of farm families. The results pertaining to food sources of CFS farm families presented in table-1 indicate that a considerable majority (62.00%) of households got their food from their own farm followed by their own farm+ market (32.00%) and rest of the houses i.e. 6.00 per cent got food by sharing food products. Similarly, the data regarding IFS farm families presented in the table-1 depicts that the majority of households (72.00%) got their food from their own farm followed by own farm+market (24.00%) and only 4.00 per cent got food by sharing of food products+own farm production.

Number of meals per day: Data regarding the number of meals consumed in the CFS families per day inferred that more than half (60.00%) of farm families had three meals in a day followed by two meals, that is breakfast and dinner (30.00%) and breakfast and lunch only 10.00 per cent. While data regarding the number of meals consumed in the IFS families presented in the table-1 showed that the majority of the farm families (62.00%) had three meals in a day followed by two meals a day (28.00%) that is breakfast and dinner and only 2.00 per cent had breakfast and lunch.

Frequency of vegetable intake: With respect to vegetable consumption of the CFS farm families, it is clear from the table-1 that a considerable majority (60.00%) of the households were consuming vegetables daily followed by twice or thrice a week (34.00%) and only 6.00 per cent households were consuming vegetables once a week. Data regarding the consumption of vegetables by IFS households presented in the table-1 indicate that 68.00 per cent of the households were consuming vegetables daily followed by twice or thrice in a week 32.00 per cent respectively.

Frequency of fruit intake: Data presented in table-1 shows that a little more than three-fourths (60.00%) of the CFS farm families consuming fruits once in a week followed by twice or thrice in a week (32.00%) and 8.00 per cent of the families were consuming fruits once in a month. Whereas data regarding consumption of fruits by IFS families depicts that a little more than half (52.00%) per cent of the households consuming fruits twice or thrice in a week followed by once in a week (22.00%), from the rest 7.00 per cent households were consuming fruits daily and 4.00 per cent once in a month.

Adequacy of food: Multiple responses were recorded about the food adequacy of CFS and IFS farm families, and it can be seen from the table-1 that equal number of the respondents (66.00%) of the CFS farm families perceived that they had enough food to eat and availability of food throughout the year followed by sufficient stock of food for the future (64.00%), the quality of food available is good (44.00%) and 40.00 per cent households responded that nutritious food is affordable with family income. With respect to food availability for IFS farm families, it is clear from the table-1 that 86.00 per cent of the households responded that they had sufficient stock of food for the future followed by

availability of food throughout the year (84.00%), nutritious food affordable with family income (72.00%) and 68.00 per cent households perceived that the quality of food available is good.

Household diet diversity: Table-1 displays the percentage of farm families that consumed different food groups per day (diet diversity) over a period of 24 hours (whole day). The data presented in the table-1 depicts that cereals, milk & milk products were the most common food groups consumed by cent per cent and 88.00 per cent of the CFS farm families in the study area respectively. Similar findings have been reported by Rani (2015) who reported that daily consumption of cereals was higher than other food groups and Shakti *et al.* (2013) who also concluded that cereals were included in the daily diet of almost all the respondents (99.50%). Protein rich foods such as pulses, beans, peas, lentils, and nuts were found to be consumed by 78.00 per cent of the CFS farm families followed by vegetables (64.00%), meat/egg/fish (52.00%) and fruits (18.00%) respectively. The findings of the present study are in accordance with the study of Sati and Dahiya (2012) who reported that the daily consumption of seasonal fruits was less frequent due to the lack of awareness of the importance of these foods. As far as the diet diversity of IFS farm families was concerned it can be visualized from the table-1 that cent per cent (100.00%) of the households consumed cereals, milk & milk products followed by any pulses (92.00%), any vegetables (80.00%), egg/meat/fish (62.00%) and fruits 32.00 per cent respectively. The findings are also supported by Rajni (2016) who observed that IFS enhances profitability, productivity and nutritional security for farm families. IFS can be seen as a good resource management strategy to attain economic and sustained agricultural production to meet miscellaneous requirements of farm families and to assure food and nutritional security, and increase farm income. The researcher also noticed that, as there is no scope for horizontal expansion of land for agriculture and vertical expansion is only possible by integrated farming systems, the IFS model requires a lesser amount of time and space, while considerably ensuring reasonable returns to farm families.

Table- 1: Perceived food security of CFS and IFS farm families in Uttar Pradesh

(n=100)

Component	Uttar Pradesh	
	CFS (n=50) F(%)	IFS (n=50) F(%)
Sources of food (for consumption purpose)		
Own farm production	31(62.00)	36(72.00)
Own farm production + market	16(32.00)	12(24.00)
Sharing of food products+own farm production	3(6.00)	2(4.00)
Number of meals per day		
Breakfast-lunch-dinner	30(60.00)	32(62.00)
Breakfast and dinner	15(30.00)	14(28.00)
Breakfast and lunch	5(10.00)	4(800)
Frequency of vegetables intake		
Daily	30(60.00)	34(68.00)
Twice or thrice in a week	17(34.00)	16(32.00)
Once in a week	3(6.00)	-
Frequency of fruits intake		
Daily	-	7(14.00)
Twice or thrice in a week	16(32.00)	28(56.00)
Once in a week	30(60.00)	11(22.00)
Once in a month	4(8.00)	2(4.00)
Adequacy of food		
Enough food to eat	33(66.00)	40(80.00)
Availability of food throughout the year	33(66.00)	42(84.00)
The quality of food available is good	22(44.00)	34(68.00)
Nutritious food is available with my income	20(40.00)	36(72.00)
Sufficient stock of food for future	32(64.00)	43(86.00)
Household diet diversity (Food groups eaten during last 24 hours)		
Cereals and value added products of cereals	50(100.00)	50(100.00)
Vegetables and value added products of vegetables	32(64.00)	40(80.00)
Fruits and value added products of fruits	9(18.00)	16(32.00)
Pulses and value added products of pulses	39(78.00)	46(92.00)
Milk, milk products and value added products	44(88.00)	50(100.00)
Egg /meat / fish and products	26(52.00)	31(62.00)

Figures in parenthesis indicate percentage
*Multiple responses are possible

Perceived economic security of CFS and IFS farm families in Uttar Pradesh

Employment generation: A glance at the table-2 shows that less than half (44.00%) of the CFS farm families responded that the current farming system provides employment throughout the year, 34.00 per cent responded that the current farming system generates income throughout the year and 16.00 per cent respondents were forced to migrate for job. On the other hand 92.00 per cent farm families involved in IFS

responded that current farming system provides employment throughout the year and a considerable majority (86.00%) of the households responded that the current farming system generates income throughout the year.

Savings: It is apparent from the table-2 that 60.00 per cent CFS farm families had savings in terms of money/ subsidy followed by savings in terms of food grains (26.00%) and in terms of investments (14.00%) respectively. Whereas in the case of IFS farm families 62.00 per cent of the respondents saved in terms of money/subsidy followed by in terms of investments (20.00%) and 18.00 per saved in terms of food grains.

Agriculture and allied insurance: It was noted from the table-2 that 92.00 per cent of the CFS farm families had insurance under Pradhan Mantri Kisan Samman Nidhi followed by Kisan credit card (88.00%), Pradhan Mantri Fasal Beema Yojna (86.00%), Pradhan Mantri Krishi Sinchai Yojna (68.00%)and Soil health Card (50.00%) respectively. Whereas the data regarding agriculture and allied insurance of IFS farm families presented in the table-2 depicts that an equal number (96.00%) of the respondents had insurance under Pradhan Mantri Fasal Beema Yojna and Pradhan Mantri Kisan Samman Nidhifollowed by Kisan credit card (80.00%), soil health card (60.00%)and Pradhan Mantri Krishi Sinchai Yojna 56.00 per cent respectively. The findings are in accordance with Dev (2012) who indicated that small and marginal farmers of Andhra Pradesh have to depend on 53.00 percent of their loans from informal sources and at the national level 68.00 percent from formal sources. Venkatesh *et al.* (2017) also revealed that 71.25 per cent of respondent farmers view the level of benefits of agricultural input subsidies at a moderate level followed by a high level (19.25%) and a low level (9.50%).

Household debt: Data in the table-2 portrays that more than half (66.00%) of the CFS farm families responded that they had a little amount of debt followed by moderate amount of debt (20.00%) and no debt (14.00%) respectively. On the contrary, with respect to IFS farm families, it is noted that 62.00 per cent respondents had no debt followed by a little amount of debt (30.00%) and no debt 8.00 per cent respectively.

Satisfaction with current financial condition: Data regarding satisfaction with current economic condition was recorded, and it was found that 44.00 per cent of the farm families involved in CFS were somewhat dissatisfied with their current financial condition followed by somewhat satisfied (34.00%) and satisfied (22.00%) respectively. On the other hand a little less than half (48.00%) farm families practicing IFS were satisfied with their current financial condition followed by somewhat satisfied (30.00%) and 22.00 per cent of IFS farm families were somewhat dissatisfied with their current financial condition.

Table -2: Perceived economic security of CFS and IFS farm families in Uttar Pradesh (n=100)

Component	Uttar Pradesh	
	CFS (n=50) F (%)	IFS (n=50) F (%)
Employment generation		
Current farming system provide employment throughout the year	25(44.00)	46(92.00)
Current farming system generate employment throughout the year	17(34.00)	43(86.00)
Forced to migrate for job	8(16.00)	-
Savings in terms of		
Money/Subsidy	30(60.00)	31(62.00)
Food grains	13(26.00)	9(18.00)
Investment	7(14.00)	10(20.00)
Agriculture Insurance and allied insurance		
Kisan credit card	44(88.00)	40(80.00)
Soil health card	25(50.00)	30(60.00)
Pradhan Mantri Fasal Beema Yojna	43(86.00)	48(96.00)
Pradhan Mantri Krishi Sinchai Yojna	34(68.00)	28(56.00)
PM- Kisan Samman Nidhi	46(92.00)	48(96.00)
Household debt		
No	7(14.00)	31(62.00)
Yes, a little	33(66.00)	15(30.00)
Moderate amount	10(20.00)	4(8.00)
Satisfied with current financial condition		
Satisfied	11(22.00)	24(48.00)
Somewhat satisfied	17(34.00)	15(30.00)
Somewhat dissatisfied	22(44.00)	11(22.00)

Figures in parenthesis indicate percentage
*Multiple responses are possible

Perceived agriculture security of CFS and IFS farm families in Uttar Pradesh

Adequacy of agricultural production: Data in table-3 portrays that cent per cent (100.00%) of the CFS farm families had adequate food grains followed by vegetables (62.00%), pulses (52.00%), fodder (40.00%), milk (36.00%) and fruits 8.00per cent respectively. Whereas in case of IFS farm families, cent per cent had adequate food grains followed by milk (90.00%) and pulses 86.00 per cent respectively. As far

as the adequacy of vegetables fruits and fodder of IFS farm families was concerned, it is manifested from the table-3 that 82.00 per cent of the households had adequate vegetables, 78.00 per cent had adequate fodder, and more than half (64.00%) of IFS farm families had adequate fruits.

Table-3: Perceived agriculture security of CFS and IFS farm families in Uttar Pradesh

(n=100)

Component	Uttar Pradesh	
	CFS (n=50) F (%)	IFS (n=50) F (%)
Adequacy of agricultural production		
Food grains	50(100.00)	50(100.00)
Pulses	26(52.00)	43(86.00)
Vegetables	31(62.00)	41(82.00)
Fruits	4(8.00)	32(64.00)
Milk	18(36.00)	45(90.00)
Fodder	20(40.00)	39(78.00)
Adoption of eco-friendly farming practices		
Adoption of inter copping for sustainability	33(66.00)	43(86.00)
Use of organic manure and bio-pesticides	30(60.00)	42(84.00)
Adoption of soil and water conservation practices	15(30.00)	36(72.00)
Growing leguminous crop at least once a year	31(62.00)	37(74.00)
Application of recommended fertilizers	29(58.00)	30(60.00)
Balanced diet to the animals/ birds	29(58.00)	40(80.00)
Timely and regularly vaccination to animals	27(54.00)	39(78.00)
Feeding recommended amount of mineral mixture to animals	25(50.00)	21(42.00)
Adopted any in-situ conservation technologies for productivity enhancement	10(20.00)	38(76.00)
Labour availability		
Adequate	30(60.00)	33(66.00)
Partially adequate	12(24.00)	15(30.00)
Shortage of labour due to MGNREGA	3(6.00)	2(4.00)

Figures in parenthesis indicate percentage
*Multiple responses are possible

Adoption of sustainable farming practices: Data regarding the adoption of sustainable farming practises by the CFS farm families presented in the table-3 portrays that more than half (66.00%) per cent CFS farm families were adopted intercropping systems for sustainability, and a considerable majority (62.00%) per cent of the farm families were growing leguminous crops at least once a year followed by using organic manure and bio-pesticides in their farms (60.00%). Equal numbers (58.00%) of the respondents gave balanced diets to the animals/birds and applied recommended fertilizers. Further exploration of the table-3 depicts that more than half 54.00 per cent of the respondents were practicing timely and regularly administered vaccination to animals followed by feeding concentrates on the basis of milk production (50.00%), adoption of soil and water conservation practices (30.00%) and adoption of *in-situ* conservation technologies 20.00 per cent respectively. As far as the adoption of sustainable farming practices by the IFS farm families concerned it can be observed from the table-3 that majority (86.00%) of the farm families practised intercropping systems for sustainability followed by the use of organic manure and bio-pesticides (84.00%), feeding a balanced diet to the animals/birds (80.00%),timely and regularly vaccination to animals (78.00%), adoption of *in-situ* conservation technologies (76.00%),growing leguminous crops at least once a year (74.00%), adoption of soil and water conservation practices (72.00%),application of recommended fertilizers (60.00%) and feeding concentrates on the basis of milk production 42.00 per cent respectively. The findings are in tuned with the observation given by Khan *et al.*(2015) who reported that integrated farming systems can be seen as a feasible approach to representing a suitable combination of farm enterprises, viz, horticulture, livestock, crop production, poultry, goatry, fishery, forestry, etc., in different farming situations to address the issues of sustaining economic growth. Therefore, IFS is viewed as a powerful tool for natural resource management and the rural livelihood security of farm communities in developing countries like India. This approach not only improves income and employment opportunities to farm families but also protects the environment through the recycling of animal waste and crop residue within the farm itself. Chaubey *et al.* (2018) also found that the adoption of mixed farming system approaches, which were combined with allied innovative enterprises, played a vital role in sustaining the livelihoods and meeting the needs of the farmers. It was also noticed that there was a need for transformation to provide a diverse set of services that support diversification by offering relevant technologies that are integrated with appropriate credit facilities, by supporting smart farming and high value crops, agricultural livelihoods, and policy implementation with minimum support price (MSP) reform. The researcher suggested that IFS is an eco-friendly approach that can be used to double farmer's income in which waste materials from one enterprise become input for another enterprise;

thus, it makes effective and sustainable use of all the farm resources.

Labour availability: Data regarding the labour availability of CFS farm families presented in the table-3 shows that 60.00 per cent farm families had adequate labour availability followed by partially adequate (24.00%) and only 6.00 per cent farm families were facing the problem of shortage of labour due to MGNREGA. With respect to the labour availability of the farm families involved in IFS, table-3 further depicts that 66.00 per cent of them had adequate labour availability followed partially adequate (30.00%) and only 4.00 per cent were perceived shortage of labour due to MGNREGA.

Perceived health security of CFS and IFS farm families in Uttar Pradesh

Accessibility of government/private hospitals: Data furnished in table-4 indicates that a half (50.00%) of the CFS farm families had accessibility to government and private hospitals within 2-4 kilometer followed by 0-2 kilometer (20.00%), 4-6 kilometer (14.00%), 6-8 kilometer (12.00%) and beyond 8 kilometer only 4.00 per cent respectively. Similar findings were also reported by Kumar (2014) that in rural India the average distance to the nearest PHC, CHC was 5 km, 8 km respectively and the average distance to the nearest private clinic and private hospital was 10 and 15 km, respectively. Data regarding the accessibility of government and private hospitals by the IFS farm families revealed that more a little more than half (52.00%) had accessibility of government and private hospitals within 2-4 kilometres, followed by 0-2 kilometer (28.00%) 4-6 kilometer (12.00%), and 6-8 kilometer 10.00 per cent respectively.

Household's ability to afford professional treatment: With respect to the ability of CFS farm families to afford professional treatment for serious illness, it was found that a good percentage (44.00%) of families reported that they could afford treatment by borrowing money followed by affordability with much difficulty (40.00%) and rest 16.00 per cent responded that they could afford treatment. Whereas in the case of IFS farm families 46.00 per cent of them reported that could afford treatment followed by households' ability to afford treatment by borrowing money (36.00%) and affordability with much difficulty 18.00 per cent respectively.
Health insurance: It is clear from the table-4 that 42.00 per cent CFS farm families had health insurance under the Ayushman Bharat Yojana followed by the Pradhan Mantri Suraksha Bima Yojana (40.00%) and insurance policies (18.00%) respectively. However, with respect to the health insurance of IFS farm families, it can be noted from the table-4 that a considerable majority (64.00%) had health insurance under the Ayushman Bharat Yojana followed by the Pradhan Mantri Suraksha Bima Yojana (44.00%) and insurance policy 20.00 per cent respectively.

Getting medical facilities and means of transport in case of emergency: The observation of the table-4 reveals that more than half (48.00%) of CFS farm families were sometimes getting medical facilities and means of transport in case of emergency followed by always (32.00%) and rest 20.00 per cent were never getting medical facilities and means of transport in case of emergency. On the other hand, in case of IFS farm families 50.00 per cent were always getting medical facilities and means of transport in case of emergency followed by sometimes (42.00%) and never (8.00%) respectively.

Table- 4: Perceived health security of CFS and IFS farm families in Uttar Pradesh (n=100)

Component	Uttar Pradesh	
	CFS (n=50) F (%)	IFS (n=50) F (%)
Accessibility of government/private hospital		
0-2 Km	10(20.00)	14(28.00)
>2-4 Km	25(50.00)	26(52.00)
>4-6 Km	7(14.00)	6 (12.00)
>6-8 Km	6(12.00)	4(8.00)
Beyond 8 Km	2(4.00)	
Household's ability to afford professional treatment		
Yes, household can afford it	8(16.00)	23(46.00)
Yes, by borrowing money	22(44.00)	18(36.00)
Yes, with much difficulty	20(40.00)	9(18.00)
Health insurance		
Ayushman Bharat Yojana	21(42.00)	31(62.00)
Pradhan Mantri Suraksha Bima Yojana	20(40.00)	22(44.00)
Insurance policy	9(18.00)	10(20.00)
Getting medical facilities and means of transport in case of emergency		
Always	16(32.00)	21(20.00)
Sometimes	24(48.00)	25(72.00)
Never	10(20.00)	4(8.00)
Incidence of acute diseases (cough, cold, fever,covid-19 etc.) to family members		
Once or twice in a week	20(40.00)	12(24.00)
A few times a month	26(52.00)	30(60.00)
Once or twice in a year	4(8.00)	8(16.00)
Incidence of chronic illness like Asthma, TB, Diabetes, Heart Problem etc. to family members		
Yes	27(54.00)	16(32.00)
No	23(46.00)	34(68.00)

Addicted to Alcohol/Tobacco		
Yes	13(26.00)	6(12.00)
No	37(74.00)	44(88.00)

Figures in parenthesis indicate percentage

Occurrence of acute diseases: The results presented in table-4 shows that 52.00 per cent of CFS farm families reported the occurrence of acute diseases like cough, cold, fever, COVID-19, etc. once or twice in a month followed by once or twice in a week (40.00%) and a few times in a year (8.00%) respectively. Concerning the IFS farm families, it was found that 60.00 per cent of them were experiencing the occurrence of diseases like cough, cold, fever, covid-19 etc. once or twice in a month followed by a few times in a year (24.00%) and once or twice in a week (16.00%) respectively.

Prevalence of chronic illness: As regards the prevalence of chronic illnesses like asthma, TB, diabetes, heart problem etc. in the family, it was disappointing to note that more than half (54.00%) of the CFS farm families having any cases of chronic diseases in the family and 46.00 per cent were admitted not having any case of chronic diseases in the family. On the contrary, in the case of IFS farm families, 68.00 per cent households were free from the prevalence of chronic diseases in the family and 32.00 per cent were suffering from one or more kinds of chronic diseases.

Addiction of Alcohol/Tobacco: Further exploration of the table-4 depicts that majority of farm families (74.00%) involved in CFS were not addicted to alcohol/ tobacco and it was disappointing to not that 26.00 per cent were addicted to any kind of alcohol/ tobacco. Likewise, in the case of IFS farm families, it was satisfying to note that 88.00 per cent were not addicted to alcohol/ tobacco and remaining, 12.00 per cent were addicted to any kind of alcohol/ tobacco.

Relationship between livelihood securities of farm families with independent variables in Uttar Pradesh

Relationships between livelihood securities of CFS and IFS farm families with independent variables in Uttar Pradesh are presented in the table-5 and it can be seen from the table it can be seen that livelihood securities of CFS farm families were positively significantly correlated with education of the respondent (r=0.814**), monthly family income (r=0.772**), land holding (r=0.860**), farming experience (r=0.874**), livestock possession (r=0.904**), possession of agricultural implements/ equipments (r=0.824**) and possession of household assets (r=0.875**) at 0.1 level of significance. Whereas age of the respondent (r=0.035^{NS}) and source of irrigation (r=0.076^{NS}) were found non significantly correlated with livelihood securities of the CFS farm families. With respect to the relationship between livelihood securities of IFS farm families, it was noted that livelihood securities of IFS farm families had positive significant correlation with the education of the respondent (r=0.953**), monthly family income (r=0.874**), land holding (r=0.943**), farming experience (r=0.934**), livestock possession (r=0.919**), possession of agricultural implements/ equipments (r=0.955**) and possession of household assets (r=0.895**) at the 0.1 level of significance. whereas the age of the respondent (r=0.048^{NS}) and source of irrigation (r=0.035^{NS}) had a non significant correlation with the livelihood securities of the IFS farm families. Similar findings were reported by Kabir *et al.* (2012) who revealed that livestock and poultry occupations are significantly associated with financial, physical and social capital. Findings of the present study showed that food and nutritional security were positively significant with family education status, occupation, annual income and size of land. Similar conclusions were also arrived by Mutisya *et al.* (2016) who examined that increased educational attainment and income were associated with an increased probability of being food secure.

Table-5: Relationship between livelihood securities of farm families with independent variables in Uttar Pradesh

Variable	Correlation coefficient (r-value)	
	CFS Uttar Pradesh	IFS Uttar Pradesh
Age	0.048 NS	0.035 NS
Education	0.814**	0.953**
Monthly family income	0.772**	0.874**
Land holding	0.860**	0.943**
Farming experience	0.874**	0.934**
Source of irrigation	0.076NS	0.090NS
Livestock possession	0.904**	0.919**
Possession of agricultural implements/ equipments	0.824**	0.955**
Possession of household assets	0.875**	0.895**

*-Significant at 0.5 level
**- Significant at 0.1 level
^{NS} – Not significant

Relationship between livelihood securities of farm families with communication and psychological variables in Uttar Pradesh

The relationship between livelihood securities of CFS and IFS

farm families with communication and psychological profiles of the respondents in Uttar Pradesh, presented in the table-6 depicts that livelihood securities of CFS farm families were positively significantly correlated with social participation (r=0.816**), extension participation(r=0.945**), mass media exposure (r=0.922**), training exposure(r=0.931**), exposure to e-services services(r=0.818**) and risk orientation (r=0.845*) respectively. With respect to the relationship between livelihood securities of IFS farm families with communication and psychological variables of the respondents, it was noted that social participation (r=0.918**), extension participation(r=0.961**), mass media exposure (r=0.954**), training exposure(r=0.966**), exposure to e- services(r=0.912**) and risk orientation (r=0.928*) had positive significant correlations. The findings are supported by Khatiwada *et al.* (2017) who concluded that education, access to credit, land holding, agriculture and skill training and proximity to the road and market center are the most important influencing factors on the adoption of higher returning livelihood strategies by farm families and Khusbu (2020) who also reported that livelihood security status of small and marginal farmers was positively and significantly correlated with mass media exposure, social participation, extension participation, risk orientation, economic motivation and innovativeness.

Table-6: Relationship between livelihood securities of farm families with communication and psychological variables in Uttar Pradesh

Variable	Correlation coefficient (r-value)	
	CFS Uttar Pradesh	IFS Uttar Pradesh
Social participation	0.816**	0.918**
Extension participation	0.945**	0.961**
Mass media exposure	0.922**	0.954**
Training exposure	0.931**	0.966**
Exposure to e- services	0.818**	0.912**
Risk orientation	0.845**	0.928**

*Significant at 0.5 level
**- Significant at 0.1 level

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CONFLICTS OF INTEREST:

The authors declare no conflict of interest.

LITERATURE CITED

Chand, R., Jumrani, J., Pavithra S. 2017. "Achieving 4% Growth Rate in Agriculture During the Eleventh Five-Year Plan" in Pulin B Nayak, Bishwanath Golder and Pradeep Aggarwal (ed.), India's Economy and Growth, Essays in Honour of VKRV Rao (New Delhi: Sage Publications), pp 69-86.

Chaubey, D., Prakash, V., Yadav T.C., and Singh, G. 2018.Doubling of Farmer's Income though Integrated Farming System Approaches in Bihar. International *Journal of Current Microbiology and Applied Sciences,***3**(7): 1602-1611.

Dev, S. M. 2012. Small Farmers in India: Challenges and Opportunities. Indira Gandhi Institute of Development Research, Mumbai. http://www.igidr.ac.in/pdf/publication/WP-2012-014.pdf

Jirli, B., Bhati, D. S. and De, D. 2008. Diversifying cropping system with rapeseed mustard – An approach to sustain livelihood. In proceedings of international seminar on strategies for improving livelihood security of rural poor, Goa, India, pp: 201-202.

Kabir, M. S., Hon, X., Akther, R. 2012. Impact of small eterpreneurship on sustainable livelihood assets of rural poor women in Bangladesh. *International Journal of Economics and Finance*. Vol. **4**, no. 3,www.ccsnet.rg/ijef

Khatiwada, P. S., Zhang, J., Paudel, B., Deng, W. 2017. Agricultural land use intensity and determinants in different agro-ecological regions of central Nepal. In Land Cover Change and Its Eco-Environmental Responses in Nepal. Li, A.,Wei, D.,Wei, Z., Eds.; Springer: Chengdu, China, 2017; in press

Khan, N. Dubey, M. Tiwari, U.S. 2015. Integrated farming systems: An approach for livelihoodsecurity of small and marginal farmers. *International Journal of Science and Nature,***6**(3): 515-520.

Khusbu 2020. Assessment of integrated farming system in Haryana.M. Sc. Thesis CCS Haryana Agricultural University, Hisar, India.

Kumar, S. 2014. Does distance matter for institutional delivery in rural India? Applied Economics; 46:33, 4091-4103.

Mutisya, M. S., Moses W., Nagware, Kabiru, W. 2016. The effect of education on household food security in two informal urban settlements in Kenya: A longitudinal analysis. *Food Science,***8**: 743-756 DOI 10.1007/s12571-016-0589.

Rani, P. 2015. Assessment of nutritional status of rural school going children (10-12 years) of Fatehabad district. M.Sc. theiss, CCS

Haryana Agricultural University, Hisar.

Sati, V. and Dahiya, S. 2012. Nutritional Assessment of Rural School-Going Children (7-9 Years) of Hisar District, Haryana. Open Access Scientific Reports. http://dx.doi.org/10.4172/scientificreports.363

Shakti, Dubey, R. P. and Sheikhy, S. 2013. Assessment of food consumption pattern and nutritional status of school going children of Faizabad district. *Trends in Biosci.* **6**(6): 755-757.

Venkatesh, M., Kamakodi, K., Badrinath, V. 2017. A Study on Benefits of Agricultural Input Subsidies for Farmers in South India. *International Journal of Economic Research.***14** (11): 72-80.