Improvement in Livelihood Security of Scheduled Caste farmers through Integrated Farming Systems in Hassan District of Southern Karnataka, India

ABSTRACT

The study was conducted in the purposively selected Hassan district, a total sample of 223 respondents were purposively selected for the study. Data was collected by using pretested structured interview schedule and analyzed using appropriate statistical tools.The results revealed that, a majority of the respondents belonged to low category of education level, land holding, cropping pattern, livestock possession, innovativeness, mass media exposure and extension participation and then followed by medium category of cosmopoliteness, training undergone, willingness in agriculture and high category of social participation, level of aspiration and risk orientation.The Livelihood security of respondents in 'highly satisfied category' increased to 34.98 per cent from 23.77 per cent after implementation of the project. There was an improvement in livelihood security after the implementation of the project, out of seven dimensions, maximum increase was noticed in employment security (50.62%) followed by living amenities(49.86%),economic efficiency(40.89%),ecological security(39.82%), social equitability (35.56%),assets(35.37%)and coping strategies against stress (22.39%).Further,thecharacteristics such as land holding, cropping pattern, livestock possession, cosmopoliteness, innovativeness, mass media exposure, extension participation, level of aspiration, training undergone and willingness in agriculture had positive and significant relationship withlivelihood security.The findings conveyed that six independent variables such as land holding, cropping pattern, innovativeness, extension participation, level of aspiration, training undergone had contributed significantly to livelihood security of farmers. The R^2 value indicated that all the 13 independent variables had contributed to the tune of 64.40 per cent of variationinlivelihood security of the respondents.The results pertaining to economic analysis indicated thatBC ratio has been increased to 3.26 from 1.84in crop improvement and livestock components after the implementation. Hence, the concerned development departments require to organize the demonstrations, trainings, field days, exposure visits etc., to educate the farmers about IFS. The positive and significantly related characteristics needs to be considered while selecting the farmers for the extension educational programmesin order to enhance their livelihood security.

Keywords: Integrated Farming System, Scheduled Caste and Livelihood Security.

INTRODUCTION

"Agriculture is the most important livelihood option in India, with two third of the country's workforce depending on farming. Majority of them are small and marginal farmers, which has accounted for around 87 per cent of theoperational holdings are less than two hectares"(Kumar *et al.*,2020). "Increasing land fragmentation, diminishing natural assets, high costs for external farm inputs, indebtedness and pesticide-related health issues have threatened the livelihoods of many farm families. About 58 per cent of rural Indian population depend on agriculture for their livelihood and this sector contributes 18.30 per cent to the country's GDP" (Anon,2023).The smaller share of agriculture in national GDP is getting distributed among a larger number of people who depend on agriculture for their livelihood and even credit. Integration of farm enterprises provides better livelihood in terms of increased food production, higher net income and improved health, habitat, educational and social status. Therefore introduction of appropriate farming systems is going to be one of the important approaches to achieve better growth in agriculture and securing livelihoods of major segment of society. Through Integrated Farming System (IFS) it is possible to reach the high level of productivity in more sustainable way with proportionately less input. The University of Agricultural Sciences (UAS), Bangalore has implemented the project entitled "Livelihood Improvement of Scheduled Caste (SC) Farm Families through Integrated Farming System (IFS)" with the financial support from the Government of Karnataka under Scheduled Caste Sub Plan (SCSP). "The project aims at sustainable development of agriculture among the SC farm families to bring them to mainstream and also efficient management of soil, water, crop and Integrated Pest Management practices in crop husbandry. Further, it integrate dairy, poultry, sheep, piggery, fishery, sericulture, agro-forestry and other related enterprises with crop husbandry which increases the overall net income" [Prasad et al. 2021]. Livelihood security is operationally defined as adequate and sustainable access to income and resources to meet basic needs like food, portable water, health education, community participation and social integration of SC farmers.

In Karnataka, the Scheduled Caste (SC) population comprised of 17.15 per cent and majority of them belongs to small & marginal farmersand agricultural labourers(Anon, 2018). They are directly or indirectly depend on agriculture for their livelihood. The per capita land holding of SC farmers is 1.3 ha as against state average of 1.74 ha. with fragile resource base, the agricultural production systems of these farmers largely dependent on monsoon, coupled with fragmentation of land resulted in low production and productivity. They are more exposed to the constant threat of poverty, illiteracy, hunger, starvation, malnutrition and migration to urban areas. Having understood the SC farmers have the potentiality to perform the diversified operations / practices of production systems, integration of appropriate possible number of farming system components out of the available alternatives (crop production, dairy, sheep, piggery,poultry, fisheries sericulture, apiculture, mushroom production, horticulture, agro-forestry, post-harvest and value additions etc.) with due considerations to improve their livelihood is the way out for betterment of SC farmers. With this background, the present study is undertaken with following objectives:

1. To know the personal and socio-psychological characteristics of respondents
2. To assess the livelihood security of SC farmers practicing Integrated Farming System
3. To measure the relationship between personal and socio-psychological characteristics of respondents with their livelihood security
4. To ascertain the economics of Integrated Farming System on development of SC farmers

METHODOLOGY

The study was conducted in purposively selected Hassan district of Karnataka based on the implementation of the project entitled "Livelihood Improvement of Scheduled Caste (SC) Farm Families through Integrated Farming System (IFS)" by University of Agricultural Sciences, Bangalore during 2014-15 to 2018-19.Ex-post facto research design was used in the study, three taluks namely Doddaballapura. Devanahalli and Hosakotewere selected from Hassan. Two GramaPanchayats from each taluk and three to four villages from each gram panchayat were selected based on maximum number of SC farm families. All the farm families having land holding 1 to 5 acres of dry land were considered as beneficiaries (respondents) under the project. Total sample of 223 respondents was purposively selected for the study. Data was collected by using a structured interview schedule and analyzed using mean, percentage, standard deviation and Pearson correlation coefficient. The respondents were categorized into three groups *viz.*, Low, Medium and High based on mean scores and standard deviation.

RESULTS AND DISCUSSION

Table 1: Distribution of respondents according to their personal, social, economic and psychological variables

(n=223)

Sl. No.	Variables	Category	Number	Percentage of the sample
1.	Education level	Low	103	42.91
		Medium	61	25.41
		High	76	31.68
2.	Land holding	Marginal	100	41.66
		Small	90	37.50
		Big	50	20.84
3.	Cropping pattern	Low	86	36.83
		Medium	69	28.75

Sl. No.	Variables	Category	Number	Percentage of the sample
		High	85	34.42
4.	Livestock possession	Low	86	35.83
		Medium	81	33.75
		High	73	30.42
5.	Cosmopoliteness	Low	57	23.75
		Medium	141	58.75
		High	42	17.50
6.	Innovativeness	Low	101	42.08
		Medium	41	17.08
		High	98	40.84
7.	Mass media exposure	Low	98	40.83
		Medium	51	21.25
		High	91	37.92
8.	Extension Participation	Low	93	38.75
		Medium	58	24.17
		High	89	37.08
9.	Social participation	Low	75	31.25
		Medium	77	32.08
		High	88	36.67
10.	Level of aspiration	Low	69	28.75
		Medium	80	33.34
		High	91	37.91
11.	Risk orientation	Low	73	30.41
		Medium	75	31.25
		High	92	38.34
12.	Training undergone	Low	62	25.83
		Medium	104	43.33
		High	74	30.84
13.	Willingness in agriculture	Low	77	32.08
		Medium	82	34.16
		High	81	33.76

The results in the Table 1 revealed that, majority of the respondents belonged to low category ofeducation level, land holding, cropping pattern, livestock possession, innovativeness, mass media exposure, extension participation followed by medium category of cosmopoliteness, training undergone, willingness in agriculture and high category of social participation, level of aspiration and risk orientation.The possible reason for low category of above mentioned variables could be due to poverty and other social stigma in the rural areas, respondents found to have low level of education and the land holding distribution is matching with the general trends in the country that more than 87 per cent of the land holding in the country are marginal and small holding and another supporting reason that could be attributed to this trend might be due to

fragmentation of land holding.The ancestral lands were broken into smaller units, due to increase in family size year by year.With respect to low level of mass media exposure and cosmopoliteness, the accessibility to the mass media such as television, radio, newspapers and farm magazines was found to be less. Farmers hardly have the habit of reading newspaper and farm magazines because majority of them had low education level and lack of time and interest in travelling to cities and exposing to mass media as well. The results of the present study are in conformity with the findings of Mamathalakshmi (2013),Harshitha*et al*., (2018) andVenkatareddy(2021).

Table 2: Distribution of respondents according to their livelihood security

(n=223)

Category	Before		After		Change in Per
	Number	Per cent	Number	Per cent	
Less satisfied	96	43.05	53	23.77	-19.28
Satisfied	74	33.18	92	41.26	8.08
Highly Satisfied	53	23.77	78	34.98	11.21
Total	**223**	**100.00**	**223**	**100.00**	

A critical appraisal of Table 2 indicated that, livelihood security of respondents in 'less satisfied category' decreased to 23.77 per cent from 43.05 per cent and in 'highly satisfied category' increased to 34.98 per cent from 23.77 per cent after implementation of the project.IFS approach used by respondents improved their income as farm resources are used more effectively and helped in increased benefit-cost ratio and employment generation. Availability of cereals/vegetable/ fruit/meat./poultry/ etc. around the year improved standard of living for achieving better livelihood security**.** The findings seek support from the studies ofSujay Kumar (2018) andShwetha and Shivalingiah (2019).

Table 3: Dimension-wiseimpact analysis of livelihood security among respondents

(n=223)

SI. No.	Dimension	Mean Value		Percentage in increase
		Before	After	
1	Assets	786	1064	35.37
2	Living amenities	734	1100	49.86
3	Economic efficiency	384	541	40.89
4	Ecological security	452	632	39.82
5	Social equitability	478	648	35.56
6	Coping strategies against stress	545	667	22.39
7	Employment security	721	1086	50.62
	Overall Livelihood Security	**4100**	**5738**	**39.95**

The data depicted in Table 3 indicatedthat, the improvement in different dimensions of livelihood security after the implementation of the project in Hassan district. Out of seven dimensions, maximum increase was noticed in employment security (50.62%) followed by living amenities (49.86 %), economic efficiency (40.89 %),ecological security (39.82 %), social equitability (35.56%),assets(35.37%) and coping strategies against stress (22.39%) and overall livelihood security increased by 39.95 per cent after implementation of the IFS project. The integrated farming system is an approach wherein emphasis was given on diversification of cropping system has been found successful to bring improvement in economic conditions of respondents by improving their income.Employment generation round the year might have contributed to above mentioned findings.Similar results were reported by Venkatareddy(2021).

Table 4:Relationship between personal and socio-psychological characteristics of respondents with their livelihood security.

(n=223)

Sl. No.	Independent variables	Correlation co-efficient (r)
1.	Education level	-0.057 ^{NS}
2.	Land holding	0.418**
3.	Cropping pattern	0.405**
4.	Livestock possession	0.411**
5.	Cosmopoliteness	0.196**
6.	Innovativeness	0.373**
7.	Mass media exposure	0.107**
8.	Extension participation	0.377**
9.	Social participation	0.083 ^{NS}
10.	Level of aspiration	0.143*
11.	Risk orientation	-0.004 ^{NS}
12.	Training undergone	0.291**
13.	Willingness in agriculture	0.193**

NS: Non-Significant; *: Significant at 5% level; **: Significant at 1% level.

Relationship between personal,socio-economic and psychological characteristics of respondents with their livelihood security.

The findings in the Table 4 implied that, 10 out of 13 characteristics found to have significant relationship with livelihood security. Thecharacteristics such asland holding, cropping pattern, livestock possession, cosmopoliteness, innovativeness, mass media exposure, extension

participation, level of aspiration, training undergone and willingness in agriculture had positive and significant relationship with livelihood security. The possible reasons for the positive and significant relationship between land holding and livelihood security might be due to land holding is the major asset which provides economic security to the respondents thereby it leads secured livelihood. Inputs such as seeds and livestock components were provided free of cost to respondents under the project which leads them to get engaged in rearing of livestock as subsidiary occupation and gets additional income by selling milk and meat apart from crop production. Cropping pattern had positive and significant relationship with livelihood security, as farmers mainly depends on farming, increased in cropping pattern and adoptedthe new technologies advised by the scientists led to higher productivity, profitability fetching higher income and generated employment. Higher level of mass media exposure would facilitate the members to develop habits of gathering more information about the improved IFSactivities.Level of aspiration and training undergone had positive and significant relationship with livelihood security the possible reason for such result might be due to, respondents spent more time in IFScomponents such as multiple cropping, diary, piggery, sheep rearing and poultry etc. to fulfil their aspirations. The participation in training programmes enhanced their knowledge about IFSand thus respondents directlyinfluenced by the training undergone. Regular contact with the project personnel, agriculture officers, scientists of agriculture universitymight have developed favourable attitude towards IFS.Being an IFS farmer effective utilization ofavailable resources leads to higher productivity, profitability, employmentgeneration and farmincome. The findings are in conformity with the results obtained byMamathalakshmi (2013),Harshitha*et al*., (2018)andVenkatareddy(2021).

Table 5: Multiple regression analysis of personal and socio-psychological characteristics of respondents with their livelihood security.

(n=223)

Sl. No	Variables	Regression coefficient (b)	Std. Error of regression co-efficient (SE_b)	't' value
1.	Education level	-0.523	0.314	-1.667^{NS}
2.	Land holding	2.114	0.675	3.133**
3.	Cropping pattern	0.117	0.037	3.159**
4.	Livestock possession	0.131	0.125	1.055^{NS}
5.	Cosmopoliteness	-0.026	0.200	-0.129^{NS}
6.	Innovativeness	0.936	0.325	2.883**
7.	Mass media exposure	-1.555	0.401	-3.875^{NS}
8.	Extension participation	1.206	0.323	3.736**
9.	Social participation	0.159	0.107	1.485^{NS}
10.	Level of aspiration	0.320	0.131	2.450*
11.	Risk orientation	-0.093	0.135	-0.690^{NS}
12.	Training undergone	0.546	0.274	1.993*
13.	Willingness in agriculture	0.057	0.135	0.423^{NS}

R2= 0.6440

F =15.26**

NS: Non-Significant; *: Significant at 5% level;**: Significant at 1% level.

The contribution of independent variables to the livelihood security of the respondents towards IFSwas assessedand illustrated in the Table 5.The findings conveyed that six independent variables such as land holding, cropping pattern,innovativeness,extension participation, level of aspiration and training undergone had contributed significantly to livelihood security of the respondents.The R^2 value indicated that all the 13 independent variables had contributed to the tune of 64.40 per cent of variation in livelihood security of the respondents. The possible reason with regard to theextent of contribution of independent variables to variation in livelihood security of the respondents is due to land holding, cropping pattern, innovativeness, extension participation, level of aspiration, training undergone characteristics of respondents were the factors going to influence directly onlivelihood security of the respondents. Independent variables have synergic effects to one another and complimented each other to have a major extent of contribution towards livelihood security of the respondents.

Table 6: Economic analysis of Integrated Farming System (IFS) components before and after implementation of project in Hassan district

(n=223)

		Before								After											
Crop Component	**Avg. Land Holding (Acre.)**	**Avg. Yield (Ql./ac.)**	**Avg. yield of Beneficiary farmers (Ql./ac.)**	**Price (Rs./Ql.)**	**Prod. Cost/ac. (Rs.)**	**Prod. Cost of Beneficiary farmers(Rs.)**	**Gross Income (Rs./ac.)**	**Net Income (Rs./ac.)**	**B:C Ratio**	**Avg. Yield (Ql./ac.)**	**Avg. yield of Beneficiary farmers (Ql./ac.)**	**Price (Rs./Ql.)**	**Prod. Cost/ac. (Rs.)**	**Prod. Cost of Beneficiary farmers(Rs.)**	**Gross Income (Rs./ac.)**	**Net Income (Rs./ac.)**	**B:C Ratio**	**Change in yield (%)**	**Change in Income (%)**	**Emply. Gene. in (Mandays/ac.)**	**Emply. Gene. of Beneficiary farmers (Mandays)**
Ragi (n1=160)	1.20	5.50	6.60	1450.00	4800.00	5760.00	9570.00	3810.00	**1.66**	8.50	10.20	1900.00	7500.00	9000.00	19380.00	10380.00	**2.15**	**54.55**	**102.51**	86.00	103.20
Maize (n2=63)	1.17	6.00	7.02	1310.00	3784.00	4427.28	9196.20	4768.92	**2.08**	8.00	9.36	1400.00	4200.00	4914.00	13104.00	8190.00	**2.67**	**33.33**	**42.49**	68.00	79.56
Redgram*										1.50	3.56	3500.00	1000.00	2370.00	12442.50	10072.50	**5.25**			7.00	16.59
Total						**10187.28**	**18766.20**	**8578.92**	**1.84**					**16284.00**	**44926.50**	**28642.50**	**2.76**		**139.40**		**199.35**
Livestock Component	**Body live wt. or Ltrs/ sheep or poultry or pig or cow**		**Price/kg or Ltr**		**Cost**		**Gross Income (Rs.)**	**Net Income (Rs.)**	**B:C Ratio**	**Body live wt. or Ltrs/ sheep or poultry or pig or cow**		**Price/kg or Ltr**		**Cost**	**Gross Income (Rs.)**	**Net Income (Rs.)**	**B:C Ratio**	**Change in yield (%)**	**Change in Income (%)**	**Emply. Gene. (Mandays)**	**Emply. Gene. of Beneficiary farmers (Mandays)**
Cow (n1=67)										1485.00		28.00		17000.00	41580.00	24580.00	**2.45**				220.00
Sheep (n1=156)										110.00		400.00		7500.00	44000.00	36500.00	**5.87**				95.00
Poultry* (n2=130)										15.00		150.00			2250.00	2250.00					
Total														**24500.00**	**87830.00**	**63330.00**	**3.58**				**315.00**
Grand total					**10187.28**		**18766.20**	**8578.92**	**1.84**					**40784.00**	**132756.50**	**91972.50**	**3.26**		**139.40**		**514.35**

* Inter crop

The results pertaining to economic analysis of IFS componentswere presented in the Table 6 indicated that,Livestock and Crop component generated 514.35mandays of employment per annum and Rs. 91972.50 net income to beneficiary farmers. The average gross income of Rs.132756.50from both crop and livestock enterprises of IFS against Rs.18766.20 before implementation of the project. As such, for every one rupee investment under IFS beneficiaries got Rs. 3.26 rupee income. BC ratio was found to be enhanced to3.26 from 1.84.The probable reason for the observed trend is that, Integrated Farming system provided opportunity to utilize the resources efficiently. Crop diversification, integration of different farming systems provided regular income through the sale of different products and by-products such as milk, butter/ghee, egg and manure. Minimum use of off-farm inputs, maximum on-farm inputs and wastes recycling helped to increase and sustain profitability of farm.

CONCLUSION

Based on the findings it can be concluded that, the livelihood security improved from less satisfied to highly satisfied level, out of seven dimensions of livelihood security maximum increase was noticed in employment security. Thecharacteristics such as land holding, cropping pattern, livestock possession, cosmopoliteness, innovativeness, mass media exposure, extension participation, level of aspiration, training undergone and willingness in agriculture had positive and significant relationship withLivelihood Security.The R^2 value indicated that all the 13 independent variables had contributed to the tune of 64.40 per cent of variation in livelihood security.Hence, the concerned development departments shall promote and strengthen the IFS activities to enhance the livelihood security of resource poor farmers. The positive and significantly related characteristics needs to be considered while selecting the farmers for IFS programs to enhance their livelihood security.

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