An Analysis of Livelihood Security of Scheduled Caste (SC) Farmers through Integrated Farming System (IFS) in Bengaluru Urban District

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A B S T R A C T

The study was conducted in purposively selected three taluks of Bengaluru Urban district. Total sample of 242respondents were purposively selected for the study. The data were collected by using structured interview schedule and analyzed by using appropriate statistical tools. It was observed that livelihood security of respondents in less satisfied category decreased by 12.39 per cent, satisfied category decreased by 2.07 per cent and highly satisfied category improved by 14.46 per cent after implementation of the project. Out of seven dimensions of livelihood security maximum increase observed in employment security (66.21%) followed by living amenities (65.57 %), economic efficiency (51.08 %), social equitability (44.16 %), ecological security (39.12 %), assets (36.46 %) and coping strategies against stress (35.15 %). Overall, 48.37 per cent increased after implementation of project. Livestock component generated 323mandays employment and provided additional net income of Rs. 68860 to beneficiary farmers. In 2018 reported that the average gross income of farmers increased to Rs. 118564 from both crop and livestock enterprises of IFS against Rs. 12062 before implementation of the project. In total farmers could realized Rs. 83807 net profit by adopting IFS. As such, farmers are getting 3.41 rupee income for every one rupee investment under IFS. The characteristics such as Cropping pattern, Innovativeness, Training undergone, Willingness towards IFS and Access to extension personnel exhibited positive and significant relationship with farmers livelihood security. Hence, the concerned development departments should organize the demonstrations, trainings, field days, exposure visits etc., to educate the farmers about IFS. The positive and significantly related characteristics need to be considered while selecting the farmers for the extension educational programmes to enhance their livelihood security.

Introduction

Agriculture has always been considered as the back-bone of our country. In India 58 per cent of rural population is engaged in agriculture and 80 per cent of population lives directly or indirectly on income derived from agriculture (Harshitha *et al.,* 2018). The operational farm holding in India is declining and over 85 million out of 115 million are below the size of 1.00 ha (Manjunatha *et al.,* 2014). Due to ever increasing population and decline in per capita availability of land in the country, practically there is no scope for

horizontal expansion of land for agriculture. Only vertical expansion is possible by integrating farming components requiring lesser space and time and ensuring reasonable returns to farm families. The Integrated Farming System therefore assumes greater importance for sound management of farm resources to enhance the farm productivity and reduce the environmental degradation, improve the quality of life of resource poor farmers and maintain sustainability. There are 115 million operational holdings in the country and about 80 per cent are marginal and small farmers (Manjunatha *et al.,* 2014). Most of the Scheduled Caste farmers comes under small and marginal category of land holding and agricultural labourers. The per capita land holding of SC farmers is 1.3 ha as against state average of 1.74 ha. These farmers are doing farming activity to fulfill the basic needs of house hold including food (cereal, pulses, oilseeds, milk, fruit, honey, meat, etc.), feed, fodder, fiber etc. But,t heir main focus was individual components but not in a integrated manner and this made attention about Integrated Farming System.

Efforts have been made at the ICAR and State Agricultural Universities level to increase the productivity of different components of farming system i.e. field crops, horticultural crops, live stock (dairy, goatry, piggery), poultry (chicken, ducks, quail, pigeons), apiculture, sericulture, mushroom cultivation, organic manures production, bio-gas etc. individually but lacking in their integration by following farming system approach. The integration is made in such a way that product of one component should be the input for other enterprises with high degree of complimentary effects on each other. The University of Agricultural Sciences, Bangalore 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) during the period from 2014-15- to 2018-19. The project aims at sustainable development of agriculture among SC farmers by bringing them to mainstream and also efficient management of soil, water, crop and IPM practices in crop husbandry. Further, it integrate dairy, poultry, sheep, piggery, fishery, sericulture, agro-forestry and other related enterprises with crop husbandry based on their needs which increases the overall net income. With this background, the present study is conceptualized to following objectives include to know the personal and socio-psychological characteristics of respondents. To measure the livelihood security of SC farmers practicing Integrated Farming System; To analyze the impact of Integrated Farming System on development of SC farmers; To know the relationship between personal and socio-psychological characteristics of respondents with their livelihood security.

Materials and Methods

The study was conducted in purposively selected Bengaluru Urban district of Karnataka based on the implementation of the project entitled "Livelihood Improvement of Scheduled Caste (SC) Farm Families through Integrated Farming System (IFS)".Three taluks namely Anekal, Bangalore North and Bangalore South were selected. Two Grama Panchayats from each taluk and 3 to 4 villages from each Grama Panchayat were selected based on maximum number of SC farm families. All the farm families having land holding 1 to 5 acres were considered as beneficiaries (respondents) under the project. Total sample of 242respondents were selected for the study. The data were collected by using structured interview schedule and analyzed using mean, percentage, standard deviation, correlation coefficient and regression coefficient. Livelihood security measured by using five point continuum scale

developed by Mamathalakshmi (2013) with slight modification before and after implementation of the project.

Results and Discussion

It was observed in Table 1 indicates that the majority respondents belongs to medium level of education, land holding, cropping pattern, livestock possession, mass media exposure, extension participation, social participation, scientific orientation, training undergone, participation in development programme, willingness towards agriculture and access to extension personnel. This finding can be explained on the basis of the fact that the the rural social environment was the major cause for such trend. As the SC people are still traditional bound, they don't prefer to continue their children education, the distance of higher study centres from villages might have prevented the parents to encourage higher education to their children. Participation in extension activities and development programmes provided opportunities for them to improve their knowledge about IFS technologies and to be rational in decision making and in adoption of new technologies. Further, the villages have more number of social organisations such as Grama Panchayats, Taluk Panchayats, Farmer Co-operatives etc., might have made them to take part in it. Further, the government reservation policy in these organizations might have enhance their participation in social organizations. The above trend in cropping pattern and livestock possession are noticed because all respondents received inputs like improved seeds, planting material and livestock components like cow, sheeps and poultry birds through the project free of cost and got optimum production, productivity and net income. The study results were supported by the findings of Jayanta Roy (2012), Mamathalakshmi (2013), Rokonuzzaman (2013), Sujay Kumar (2018) and Harshitha (2018).

The study conferred that respondents belongs to high category of innovativeness, management orientation, risk orientation, level of aspiration and access to resources. High level of innovativeness, risk orientation, management orientation and level of aspiration due to the fact that most of the respondents were aware about new ideas, as they attend different training programs and field visits which were conducted by development departments and State Agricultural Universities which make opportunity to exploit the potentialities of IFS enterprises. Such individuals would be possessing more entrepreneurial characteristics like innovativeness, achievement motivation etc.Further, low level of cosmopoliteness. It could be due to the fact that the village does not had better road connectivity and transport facilities, which enabled the respondents not to visit city to sell their produce, to purchase inputs, to meet the officers of developmental departments / project staff to seek advice or to derive benefits as well as for domestic and entertainment purposes.

A critical appraisal of Table 2 indicates that the livelihood security of respondents in less satisfied category decreased by 12.39 per cent, satisfied category decreased by 2.07 per cent and highly satisfied category improved by 14.46 per cent after implementation of the project.

The data depicted in Table 3 indicates that out of seven dimensions of livelihood security maximum increase was observed in employment security(66.21%) followed by living amenities (65.57 %), economic efficiency (51.08 %), social equitability (44.16 %), ecological security (39.12 %), assets (36.46 %) and coping strategies against stress (35.15 %). Overall, 48.37 per cent increase was observed after implementation of project (Fig. 1).

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

The findings in the Table 4 imply that five out of 18 characteristics found to have positive and significant relationship with livelihood security. The characteristics such as cropping pattern, innovativeness, training undergone, willingness towards IFS and access to extension personnel exhibited positive and significant relationship with farmers livelihood security. Cropping pattern and innovativeness had positive and significant relationship with livelihood security, the possible reasons might be farmers mainly depend on farming for their livelihood, increasing the cropping intensity gives better income. This in turn influences livelihood security of the respondents. The innovativeness of an individual is closely associated with change, adopting innovative ideas and practices leading to security for the life. The exposure of respondents to training increases their confidence level and skills to do varied works as a result earning also increases. Hence, training received positive and significant relationship with livelihood security of respondents. It is clear from the results that there was a positive and significant relationship between willingness in agriculture and livelihood security. As farmers mainly depend on farming, willingness to do agriculture, to utilization of available resources, which leads to higher productivity, profitability, generates employment and finally income of farm. This in turn influences livelihood security of respondents. The access to extension personnel of the respondents was found to be significantly correlated with their livelihood security. The respondents had regular contact with the agriculture officers, KVK scientists and farm scientists of UAS, Bangalore through project. Due to their regular contact with the extension professionals and benefit availed under the project to the respondents might have developed favourable attitude towards the IFS and other side improving their livelihood. The findings are in conformity with the results obtained by Mamathalakshmi (2013), Sujay Kumar (2018) and Harshitha (2018).

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

(N=242)

Sl. No.	Variables	Category	Number	Per cent
1.	Education	Low	48	19.83
		Medium	145	59.92
		High	49	20.25
2.	Land holding	Marginal	49	20.25
		Small	103	42.56
		Big	90	37.19
3.	Cropping pattern	Low	70	28.93
		Medium	101	41.74
		High	71	29.34
4.	Livestock possession	Low	82	33.88
		Medium	84	34.71
		High	76	31.40
5.	Cosmopoliteness	Low	89	36.78
		Medium	69	28.51

		High	84	34.71
6.	Innovativeness	Low	87	35.95
		Medium	64	26.45
		High	91	37.60
7.	Mass media exposure	Low	75	30.99
		Medium	98	40.50
		High	69	28.51
8.	Extension participation	Low	70	28.93
		Medium	102	42.15
		High	70	28.93
9.	Social participation	Low	64	26.45
		Medium	108	44.63
		High	70	28.93
10.	Scientific orientation	Low	63	26.03
		Medium	96	39.67
		High	83	34.30
11.	Management orientation	Low	78	32.23
		Medium	75	30.99
		High	89	36.78
12.	Level of aspiration	Low	70	28.93
		Medium	73	30.17
		High	99	40.91
13.	Risk orientation	Low	74	30.58
		Medium	79	32.64
		High	89	36.78
14.	Training undergone	Low	74	30.58
		Medium	126	52.07
		High	42	17.36
15.	Participation in the developmental programme	Low	49	20.25
		Medium	140	57.85
		High	53	21.90
16.	Willingness towards IFS	Low	75	30.99
		Medium	94	38.84
		High	73	30.17
17.	Access to extension personnel	Low	65	26.86
		Medium	105	43.39
		High	72	29.75
18.	Access to resources	Low	70	28.93
		Medium	84	34.71
		High	88	36.36

Table.2 Distribution of SC farmers practicing IFS according to their livelihood security

(N=242)

Sl. No.	Category	Before		After		Change in Per cent
		Number	**Per cent**	**Number**	**Per cent**	
	Less satisfied	107	44.21	77	31.82	-12.39
	Satisfied	80	33.06	75	30.99	-2.07
	Highly Satisfied	55	22.73	90	37.19	14.46
	Total	242	100.00	242	100.00	

Table.3 Dimension-wise analysis of livelihood security pattern among respondents

(N=242)

SI. No.	Dimension	Mean Value		% increase
		Before	**After**	
1	Assets	960	1310	36.46
2	Living amenities	822	1361	65.57
3	Economic efficiency	415	627	51.08
4	Ecological security	588	818	39.12
5	Social equitability	634	914	44.16
6	Coping strategies against stress	660	892	35.15
7	Employment security	728	1210	66.21
	Overall Livelihood Security	4807	7132	48.37

Table.4 Relationship between characteristics of respondents with their livelihood security

(N=242)

Sl. No.	Independent variables	Correlation co-efficient (r)
1.	Education	-0.041
2.	Land holding	-0.015
3.	Cropping pattern	0.169**
4.	Livestock possession	0.047
5.	Csmopoliteness	-0.085
6.	Innovativeness	0.353**
7.	Mass media exposure	-0.104
8.	Extension participation	0.103
9.	Social participation	0.053
10.	Scientific orientation	-0.007
11.	Management orientation	0.0176
12.	Level of aspiration	0.124
13.	Risk orientation	0.018
14.	Training undergone	0.337**
15.	Participation in the developmental programme	0.039
16.	Willingness towards IFS	0.204**
17.	Access to extension personnel	0.260**
18.	Access to resources	0.124

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

Table.5 Multiple regression analysis of characteristics of respondents with their livelihood security

(N=242)

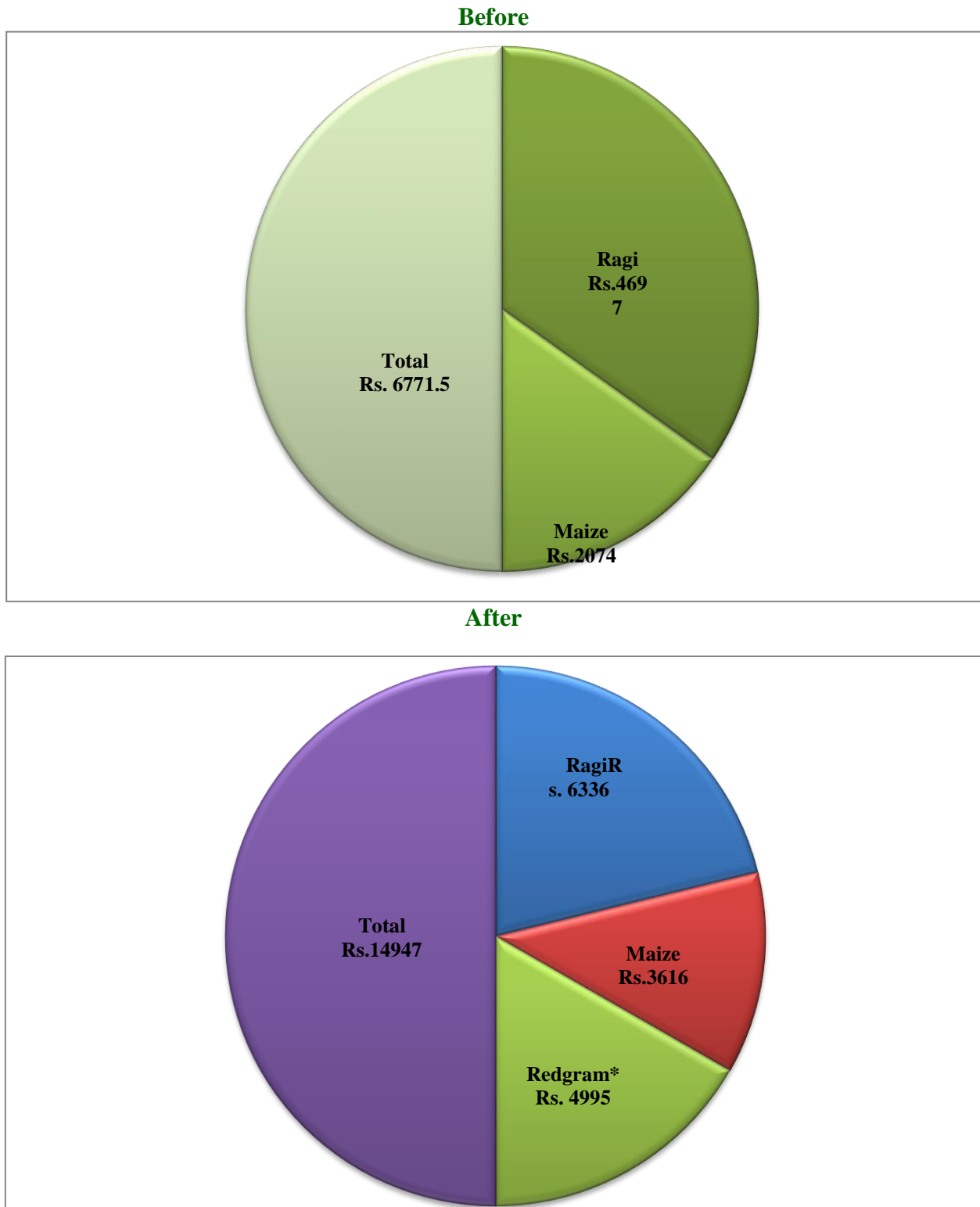| Sl. No	Variables	Regression coefficient (b)	Std. Error of regression co-efficient (SE$_b$)	't' value
1	Education	-.013	.254	-.050
2	Land holding	.247	.493	.501
3	Cropping pattern	.060	.028	2.095*
4	Livestock possession	-.023	.067	-.345
5	Cosmopoliteness	-.023	.157	-.148
6	Innovativeness	.526	.150	3.510**
7	Mass media exposure	-.077	.137	-.564
8	Extension participation	.315	.148	2.127*
9	Social participation	.023	.091	.250
10	Scientific orientation	-.173	.119	-1.451
11	Management orientation	-.331	.099	-3.353**
12	Level of aspiration	.046	.079	.587
13	Risk orientation	-.015	.088	-.172
14	Training undergone	.967	.267	3.616**
15	Participation in the developmental programme	.200	.340	.588
16	Willingness towards IFS	.004	.086	.051
17	Access to extension personnel	.290	.080	3.631**
18	Access to resources	.082	.066	1.234

Table.6 Economic analysis of Integrated Farming System (IFS) components before and after implementation of project

(N=242)

Crop Component	Before									After								Change in yield (%)	Change in Income (%)	Emply. Gene. in (Mandays/ac.)	Emply. Gene. of Beneficiary farmers (Mandays)
	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				
Ragi (n1=139)	0.66	5.50	3.63	1550.00	5800.00	3828.00	8525.00	4697.00	2.23	9.00	5.94	1900.00	7500.00	4950.00	11286.00	6336.00	2.28	63.64	32.39	85.00	56.10
Maize (n2=103)	0.45	6.00	2.70	1310.00	3250.00	1462.50	3537.00	2074.50	2.42	9.50	4.28	1425.00	5500.00	2475.00	6091.88	3616.88	2.46	58.33	72.23	66.00	29.70
Redgram*										1.50	1.67	3800.00	1200.00	1332.00	6327.00	4995.00	4.75			6.00	6.66
Total						5290.50	12062.00	6771.50	2.28					8757.00	23704.88	14947.88	2.71		96.53		92.46
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=130)									1620.00		28.00		17000.00	45360.00	28360.00	2.67				228.00
Sheep (n2=112)									120.00		400.00		9000.00	48000.00	39000.00	5.33				95.00
Poultry*(n3=160)									10.00		150.00			1500.00	1500.00					
Total													26000.00	94860.00	68860.00	3.65				323.00
Grand total					5290.50		12062.00	6771.50	2.28					34757.00	118564.88	83807.88	3.41		96.53		415.46

* Inter crop

Fig.1 Income from crop component before and after implementation of project

Before

After

Extent of contribution of personal, psychological and socio-economic characteristics to livelihood security of respondents

The regression test was applied to ascertain the contribution of independent variables to the livelihood security of respondents and the results are presented in Table 5. The results of multiple linear regression analysis showed that variables such as cropping pattern, innovativeness, extension participation, management orientation, training undergone and access to extension personnel had significantly contributed. The R2 value of 0.313 indicated that all 18 variables had contributed to the tune of 31.3 per cent of variation in livelihood security.The possible reasons might be that the personal and socio-psychological variables of respondents are the deciding factors of their livelihood security. These characteristics have synergic effects to one another, helping each other to have a major extent of contribution to the livelihood security. The findings are in conformity with the results obtained by Sujay Kumar (2018) and Harshitha *et al.,* (2018).

Income of respondents after implementation of project

Data presented in Table 6 indicates that, after implementation of the project, the average yield of ragi and maize increased to 63.64 per cent and 58.33 per cent, respectively. The livestock component such as cow, sheep and backyard poultry and redgram as intercrop along with ragi and maize were introduced under the IFS project. Livestock component generated 323mandays employment and provided additional net income of Rs. 68860 to beneficiary farmers. In 2018 reported that the average gross income of farmers increased to Rs. 118564 from both crop and livestock enterprises of IFS against Rs. 12062 before implementation of the project. In total he

could realize about Rs. 83807 net profit by adopting IFS in their farm. As such, they are getting 3.41 rupee income for every one rupee investment under IFS. Similar results reported by Uddin (2015) and Kamble Anand Shankar *et al.,* (2017).

In conclusion, the findings of the study revealed that the livelihood security improved from less satisfied to highly satisfied level (14.46%), out of seven dimensions of livelihood security maximum increase was noticed in employment security (66.21%). Further, respondents earned Rs.3.41 income for every one rupee investment under IFS. The characteristics such as cropping pattern, innovativeness, management orientation, training undergone, willingness towards IFS and access to extension personnel exhibited positive and significant relationship. Hence, encourage the farmers to practice IFS which helps to increase their livelihood by organising extension educational programmes by the concerned development organisations. Further, they should give more emphasis towards amplification of these characteristics to enhance livelihood security of farmers practicing IFS.

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