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Development of Scheduled caste farmers through integrated farming system in Ramanagara district of southern Karnataka

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Abstract

The study was conducted in purposively selected Ramanagara district, a total sample of 275 Respondents were purposively selected for the study. Data was collected by using pretested structured interview schedule and analyzed by using appropriate statistical tools. The results revealed that, majority of the respondents belonged to low level of education, cropping pattern, livestock possession, innovativeness, mass media exposure, extension participation followed by medium level of cosmopolitanism, training undergone, willingness towards agriculture and high level of social participation, level of aspiration and risk orientation. It was observed that, Livelihood Security improved to 34 per cent from 28.33 per cent after implementation in „highly satisfied category“ out of seven dimensions maximum increase It was observed that maximum per cent increase was noticed ecological security (49.45%), economic efficiency (47.97%), social equitability (46.15%), coping strategies against stress (44.53%), employment security (38.32%), assets (34.90%), living amenities (27.86%) and Overall Livelihood Security was found to be

38.97 per cent after implementation of project. Livestock and crop component generated 428.32-man days of employment per annum and Rs.83580.52 net income to beneficiary farmers. The average gross income of Rs.119709.55 from both crop and livestock enterprises. As such, for every one-rupee investment under IFS farmers earned Rs.3.31 income. The characteristics such as such as land holding, cropping pattern, livestock possession, cosmopolitanism, innovativeness, mass media exposure, extension participation, level of aspiration, training undergone and willingness in agriculture had positive and significant relationship with livelihood security. The R² value indicated that, all the 13 independent variables had contributed to the tune of 64.40 per cent of variation in livelihood security. Hence, encourage the farmers to practice IFS, which helps to increase their livelihood by organizing focused extension educational programmes by giving more emphasis towards amplification of these characteristics to enhance livelihood security of farmers practicing IFS by concerned developmental departments.

Keywords: Integrated farming system, schedule caste and livelihood security

Introduction

India is predominantly an agricultural country and the livestock is an integral and indispensable component of our agricultural system. The majority of farmers (86.2%) in India are small and marginal farmers (Kumar *et al.*, 2020) [3]. Most of the scheduled caste farmers comes under small and marginal category of land holding and agricultural labourers. In general, these farmers practice subsistence farming where they want to produce a continuous, reliable and balanced supply of foods along with cash for basic needs and recurrent farm expenditure. It is difficult to achieve sustainable livelihood security for these farmers with a single farm enterprise without turning to Integrated Farming Systems. Due to explosion of population and unplanned colonization, rapid fragmentation of landholdings and shrinkage in fertile cultivated land has occurred and there is no further scope for horizontal expansion of land for agriculture. Vertical integration of land based enterprises is the need of the hour. Under these circumstances of shrinking land holding size, it is quite essential to integrate

various enterprises such as dairy, poultry, beekeeping, fishery along with field and horticultural crops to make farming a more profitable and dependable option for the farmers. At the ICAR and State Agricultural Universities level, lot of efforts have been made aiming at increasing the productivity of different components of farming system *i.e.* crops, horticultural crops, livestock, apiculture, sericulture, mushroom cultivation, organic manures production, bio-gas etc. individually but not in integrated farming system approach. Hence, 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 farmers to bring them into mainstream through educating and monitoring them about efficient management of soil, water, crop and IPM practices in crop husbandry. Further, it integrates all the agriculture and allied enterprises with crop

husbandry, which increases the overall net income. With this background, the present study is conceptualized with the following objectives:

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

Methodology

The study was conducted in purposively selected Ramanagara 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 UAS (B) during 2014-15 to 2018-19. Three panchayaths were selected from two taluks based on maximum number of SC farm families. From each panchayath, three to four villages were selected based on maximum number of SC farm families and all the farm families having 1 to 5 acres land were considered as beneficiaries (respondents) for the project. Total sample of 275 respondents were purposively selected for the study. Data were collected using structured interview schedule and analyzed using mean, percentage, standard deviation, correlation coefficient and regression coefficient.

Results and Discussion

It was observed in Table 1 that, the majority of the respondents belonged to low level of education, cropping pattern, livestock possession, innovativeness, mass media exposure, extension participation followed by medium level of cosmopolitaness, training undergone, willingness towards agriculture and high level of social participation, level of aspiration and risk orientation.

This finding can be explained on the basis of the reason that, the rural social environment was the major cause for such trend as the rural people are still traditional bound, they don’t prefer to continue their children education, the distance of school/ colleges from villages also might have contributed to low level of education. Medium level of cosmopolitaness is due to the reason that, villages had better road connectivity and transport facilities, which enabled the respondents 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 Participation in social organisations and development programmes provided opportunities to improve their knowledge about IFS technologies and to be rational in decision making and in adoption of new technologies. Now a days villages have more number of social organizations such as Grama panchayath, taluk panchayath, farmer co-operatives, milk producers co-operative societies etc., might have made them to take part in it. Further, reservation policy in these organizations might have also enhanced their participation in social organisations. The above trend in

innovativeness, mass media exposure, cropping pattern and livestock possession was noticed because of conservatism mindset, less income and affordability of resource poor farmers might have contributed to this type of trend. Medium level of cosmopolitaness, training undergone, willingness towards agriculture is due to rural problems like lack of transportation facilities, accessibility to training institutes and irregular rainfall, non-profitability of farming affected the willingness of farmers to take up farming. High level of risk orientation was due to the reason that, essentiality of risk taking ability to earn money to lead a descent life even under uncertain conditions is pre-requisite in present day farming. Increase in cost of living and to lead a descent life in society might have contributed to higher level of aspirations among respondents. Similar findings were reported by Raksha (2012) [5], Jayanta roy (2012) [2], Sujay Kumar (2012) [7], Mamathalakshmi (2013) [4], Rokonuzzaman (2013) [6] and Harshitha (2018) [1].

Table 1: Distribution of respondents according to their personal and socio-psychological characteristics

Sl. No.	Variables	Category	Number	Per cent
1.	Education level	Low	105	43.75
		Medium	60	25.00
		High	75	31.25
2.	Land holding	Marginal	101	42.08
		Small	88	36.67
		Big	51	21.25
3.	Cropping pattern	Low	89	37.08
		Medium	70	29.17
		High	81	33.75
4.	Livestock possession	Low	89	37.08
		Medium	82	34.17
		High	69	28.75
5.	Cosmopolitaness	Low	53	22.08
		Medium	146	60.83
		High	41	17.08
6.	Innovativeness	Low	107	44.58
		Medium	41	17.08
		High	92	38.33
7.	Mass media exposure	Low	104	43.33
		Medium	53	22.08
		High	83	34.58
8.	Extension Participation	Low	98	40.83
		Medium	57	23.75
		High	85	35.42
9.	Social participation	Low	71	29.58
		Medium	74	30.83
		High	95	39.58
10.	Level of aspiration	Low	67	27.92
		Medium	78	32.50
		High	95	39.58
11.	Risk orientation	Low	68	28.33
		Medium	71	29.58
		High	101	42.08
12.	Training undergone	Low	63	26.25
		Medium	105	43.75
		High	72	30.00
13.	Willingness in agriculture	Low	71	29.58
		Medium	89	37.08
		High	80	33.33

Table 2: Distribution of respondents according to their livelihood security (n=240)

Category	Before		After		Change in Per cent
	Number	Per cent	Number	Per cent	
Less satisfied	127	42.33	102	34.00	-8.33
Satisfied	88	29.33	96	32.00	2.67
Highly Satisfied	85	28.33	102	34.00	5.67
Total	300	100.00	300	100.00	

A critical appraisal of Table 2 indicated that, livelihood security of respondents in less satisfied category“ decreased to 34 per cent from 42.33 per cent and in „highly satisfied category“ increased to 34 per cent from 28.33 per cent after implementation of the project. The benefits of IFS to farmers are numerous, as they include increased income

from crop cultivation and animal husbandry, reduced efforts required to dispose of waste, improved soil health, reduced use of chemical fertilizers and cost of production might have contributed for enhancement in livelihood security. The findings seek support from the studies of Venkatareddy (2021)^[8].

Table 3: Dimension-wise impact analysis of livelihood security among respondents (n=240)

Sl. No.	Dimension	Mean Value		Percentage in increase
		Before	After	
1	Assets	1103	1488	34.90
2	Living amenities	1321	1689	27.86
3	Economic efficiency	542	802	47.97
4	Ecological security	631	943	49.45
5	Social equitability	624	912	46.15
6	Coping strategies against stress	667	964	44.53
7	Employment security	749	1036	38.32
	Overall Livelihood Security	5637	7834	38.97

The data presented in Table 3 indicated that, the change in different dimensions of livelihood security before and after the implementation of project. It was observed that maximum per cent increase was noticed ecological security (49.45%), economic efficiency (47.97%), social equitability (46.15%), coping strategies against stress (44.53%), employment security (38.32%), assets (34.90%), living amenities (27.86%), and Overall Livelihood Security was found to be

38.97 per cent after implementation of project. Similar findings were reported by Sujay Kumar (2012)^[7], Mamathalakshmi (2013)^[4] and Harshitha (2018)^[1].

Table 4: Relationship between personal and socio-psychological characteristics of respondents with their Livelihood Security (n=240)

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

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

The findings in the Table 4 implied that, ten out of 18 characteristics found to have significant relationship with livelihood security. The personal, socio-economic and

psychological characteristics such as land holding, cropping pattern, livestock possession, cosmopolitaness, 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 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 have positive and significant relationship with livelihood security, as farmers mainly depends on farming, increased in cropping pattern and adopting the new technologies advocated by the scientists and project personnel led to higher productivity, profitability fetching higher income and generated employment. Training undergone had positive and significant relationship with livelihood security the possible reason for such result might be due to the reason that, respondents spent greater amount of time in IFS to fulfill their aspirations such as multiple cropping, dairy, piggery, sheep rearing and poultry etc. The participation in training programmes enhanced the knowledge about IFS due to exposure to different components of IFS in each of the training programmes, respondents directly influenced by the training undergone. Regular contact with the project personnel, scientists of agriculture university and hence the respondents might have developed favourable attitude towards IFS. Being an IFS farmer effective utilization of available resources leads to higher productivity, profitability, employment generation and farm income. The findings are in conformity with the results obtained by Mamathalakshmi (2013)^[4], Harshitha *et al.*, (2018)^[1] and Venkatareddy (2021)^[8].

Table 5: Multiple regression analysis of independent variables of respondents with their attitude towards IFS (n=240)

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.	Cosmopolitaness	-0.026	0.200	-0.129
6.	Innovativeness	0.320	0.131	2.450*
7.	Mass media exposure	0.057	0.135	0.423 NS
8.	Extension participation	1.206	0.323	3.736**
9.	Social participation	0.159	0.107	1.485 NS
10.	Level of aspiration	0.936	0.325	2.883**
11.	Risk orientation	-0.093	0.135	-0.690 NS
12.	Training undergone	0.546	0.274	1.993*
13.	Willingness in agriculture	-1.555	0.401	-3.875 NS

R²= 0.6440, F =15.26**; NS: Non-Significant; *: Significant at 5% level; **: Significant at 1% level.

The contribution of independent variables to livelihood security of the respondents was assessed and illustrated in the Table 5. The findings conveyed that six independent variables such as land holding, cropping pattern, innovativeness, extension participation, level of aspiraton, training undergone had contributed significantly towards livelihood security of the respondents. The R² value indicated that all the 13 independent variables had contributed to the tune of 64.40 per cent of variation in livelihood security. The possible reason with regard to the

extent of contribution of independent variables to variation in attitude 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 to livelihood security. Independent variables have synergic effects to one another, supplemented and complimented each other to have a major extent of contribution towards livelihood security of farmers.

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

Crop Component	Before									After									Change in yield (%)	Change in Income (%)	Emply. Gene. in (Mandays/ac.)	Emply. Gene. of Beneficiary farmers (Mandays)
	Avg. Land Holding (Acres.)	Avg. Yield (QL/a c.)	Avg. yield of Beneficiary farmers (QL/ac.)	Price (Rs./Ql.)	Prod. Cost/a Beneficiary (Rs.)	Prod. Cost of Beneficiary farmers (Rs.)	Gross Income (Rs./ac.)	Net Income (Rs./a c.)	B:C Ratio	Avg. Yield (QL/a c.)	Avg. yield of Beneficiary farmers (QL/ac.)	Price (Rs./Ql.)	Prod. Cost/a Beneficiary (Rs.)	Prod. Cost of Beneficiary farmers (Rs.)	Gross Income (Rs./ac.)	Net Income (Rs./ac.)	B:C Ratio					
Ragi (n1=200)	0.70	6.00	4.20	1500.00	3800.00	2660.00	6300.00	3640.00	2.37	9.50	6.65	1900.00	6800.00	4760.00	12635.00	7875.00	2.65	58.33	100.56	85.00	59.50	
Maize (n2=100)	0.61	5.00	3.05	1300.00	3010.00	1836.10	3965.00	2128.90	2.16	8.00	4.88	1410.00	4523.00	2759.03	6880.80	4121.77	2.49	60.00	73.54	65.00	39.65	
Redgram*										1.75	2.29	3500.00	1000.00	1310.00	8023.75	6713.75	6.13			7.00	9.17	
Total						4496.10	10265.00	5768.90	2.28					8829.03	27539.55	18710.52	3.12		168.29		108.32	
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 (n=186)							1640.00	28.00	17500.00	45920.00	28420.00	2.62				220.00						
Sheep (n2=114)							110.00	400.00	9800.00	44000.00	34200.00	4.49				100.00						
Poultry (n3=281)							15.00	150.00		2250.00	2250.00											
Total									27300.00	92170.00	64870.00	3.38				320.00						
Grand total				4496.10	10265.00	5768.90	2.28			36129.03	119709.55	83580.52	3.31		168.29	428.32						

* Inter crop

The results pertaining to economic analysis of IFS components were presented in the Table 6 indicated that, Livestock and crop component generated 428.32 man days of employment per annum and Rs.83580.52 net income to beneficiary farmers. The average gross income of Rs. 119709.55 from both crop and livestock enterprises of IFS against Rs.5768.90 before implementation of the project. As such, for every one rupee investment under IFS farmers

earned Rs.3.31 income where in BC ratio has been increased to 2.98 from 1.93 in crop component and with respect livestock component. BC ratio was found to be enhanced to 3.18 from 1.93. The probable reason for the observed trend is that, Integrated farming system provides opportunity to utilize the resources effectively. Crop diversification, integration of different farming systems provided regular income through the sale of milk, butter /ghee, egg and

manure. Minimum use of off-farm inputs, maximum used 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 results revealed that, majority of the respondents belonged to low level of education, cropping pattern, livestock possession, innovativeness, mass media exposure, extension participation followed by medium level of cosmopolitanism, training undergone, willingness towards agriculture and high level of social participation, level of aspiration and risk orientation. Livelihood Security improved to 34 per cent from 28.33 per cent after implementation in „highly satisfied category“, out of seven dimensions maximum increase was noticed in ecological security(49.45%) and Overall Livelihood Security was found to be 38.97 per cent after implementation of project. Further, Livestock and crop component generated 428.32 man days of employment per annum and Rs.83580.52 net income to beneficiary farmers. As such, for every one rupee investment under IFS farmers earned Rs.3.31 income. The characteristics such as such as land holding, cropping pattern, livestock possession, cosmopolitanism, innovativeness, mass media exposure, extension participation, level of aspiration, training undergone and willingness in agriculture had positive and significant relationship with livelihood security. The R² 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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