

Livelihood security of farm households under different farming systems in Kolar district of Karnataka – An economic analysis

H.V. Harishkumar^{1*}, K.B. Umesh¹, M. Satish Kumar¹ and D.N. Murali²

¹Department of Agricultural Economics, GKVK, UAS, Bengaluru –65, India

²Department of Agricultural Economics, UAS Raichur-584104, India

*Corresponding author: harishpal0083@gmail.com

Paper No. 443

Received: 19-1-2016

Accepted: 28-4-2016

Abstract

The study was undertaken in Kolar district of Karnataka state to assess the outcomes of livelihood security like Economic security, Food security, Educational security, Health security, Habitat security and Social network security. Four farming systems viz. Crop+Dairy, Crop+Sericulture, Crop+Dairy+Sericulture and Crop+Sheep were identified as major farming systems based on preliminary survey and previous studies in the area. The study based on the primary data from 120 farmers covering equal samples under major farming systems was elicited through survey method for the period 2010-11. The data was analyzed using Garrett ranking technique, Gini co-efficient and Conventional economic and simple statistical tools like ratios, percentage and indices etc. The result revealed that net annual income realized by a household was highest in C+D+S (₹ 3,58,880/-) farming system of which 43.78 per cent was from sericulture enterprise alone and least in C+Sh (₹ 46,281/-) farming system of which 59.95 per cent was from non-farm activities. When compared to Farm households of rainfed based farming systems (Crop+Sheep) irrigation based farming system (Crop+Dairy, Crop+Sericulture, Crop+Dairy+Sericulture) households are on par with Indian Council of Medical Research (ICMR) norms in cereal consumption. Public Distribution System (PDS) playing an important role in food security of farm households of rainfed farming systems through supplying food grains at cheaper prices. The overall livelihood security is high in case of C+D+S farm households.

Highlights

- Dairy farming needs to be promoted especially among households of rainfed farming system as it provides regular income and thereby their livelihoods can be sustained.

Keywords: Livelihood security, farming system, food security, garrett ranking technique, gini co-efficient, ICMR, PDS

Indian agriculture is known for its multi-functionalities of providing employment, livelihood, food, nutrient and ecological securities. But Agricultural growth in India is decelerating in recent years. 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, reduced income imbalances 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.

Farming system is the result of interaction among several interdependent components like crops, dairy, poultry, sericulture, piggery, sheep, goat, fisheries, bee-keeping etc... (Norman 1978). Livelihood security can be defined as “adequate flow of resources to meet the basic needs of the people, access to social institutions relating to kinship, family and neighborhood, village and gender bias free property rights required to support and sustain a given standard of living”. The outcomes

of livelihood security include Economic security, Food security, Educational security, Health security, Habitat security and Social network security.

The main motive of this paper is to analyze the overall livelihood security of the households practicing various farming systems encompassing enterprises like Crops, Dairy, Sericulture and Sheep etc. in Kolar district.

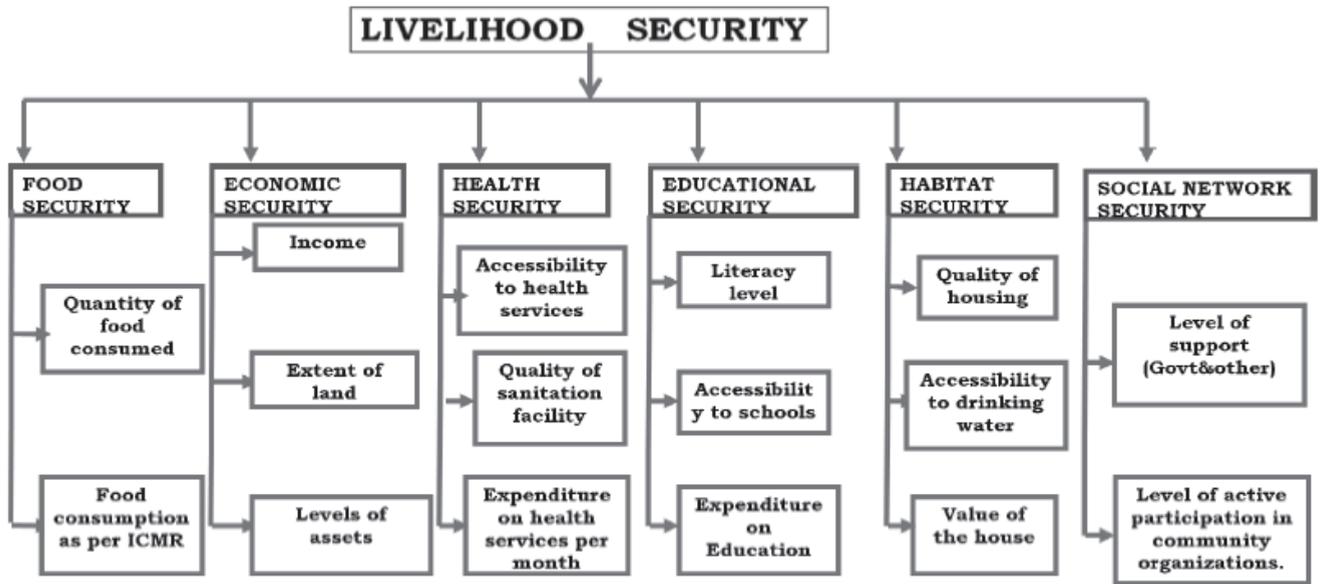


Fig. 1: Outcomes of Livelihood security and influencing parameters therein

Materials and methods

The study was carried out in Kolar district of Karnataka state where a diverse group of households engaged under different farming systems. A total of 120 respondents were selected by using simple random sampling method. Primary information was collected for the reference period 2010-2011 by using pre-tested schedule. The primary data required for the study was collected from the randomly selected farm households on the socio- economic characteristics, land holdings, inventory of implements and machinery, cost and returns of principal crops, benefits derived from developmental programmes through personal interview.

Analytical framework

Index analysis

A. Educational index

Education index shows the educational status in the sample household and it is calculated as,

$$\text{Education index} = \frac{\sum w_i f_i}{\sum f_i} \quad (i=0,1,2,3,\dots,6)$$

Education attained, i.e. Illiterate=0, Primary=1, Middle=2, Metric= 3, Twelfth =4, Graduate=5, and Postgraduate=6, w_i = weights (0 to 6) and f_i = No. of family members.



B. Social network status index

Social network status index shows the level of participation and access to various sources of information and it is calculated as,

$$\text{Social network status index} = \frac{\sum w_i f_i}{\sum f_i} \quad (i= 0, 1, 2, 3, \dots, 6)$$

Social network status attained, i.e. No access to any source =0, Access to TV=1, Access to phone=2, Membership in SHG'S= 3, Member of Milk producers cooperative society =4, Member of Gram panchayat=5, and Member of Taluk panchayat =6, wi= weights (0 to 6) and fi= No. of family members

Garret ranking technique: To capture comprehensively the household livelihood security Garret ranking technique is used. The order of the merit given in ascending order was converted into ranks by using the formula. Accordingly these ranks were converted to scores by referring to Garrets table. Garrett's formula for converting ranks into per cent was given by

$$\text{Per cent position} = \frac{100*(R_{ij}-0.50)}{N_j}$$

Where Rij = Rank given for ith item in jth farming system and Nj = Number of items ranked in jth farming system

The per cent position of each rank was converted to scores by referring to tables given by Garret and Woodworth (1969). Then for each factor, the scores of individual respondents were summed up and divided by the total number of respondents for whom scores were gathered.

The mean scores for all the factors were ranked, following the decision criterion that higher the value the more important in order of livelihood.

The order of merit was assigned in ascending order considering the magnitude of the respective components as detailed below.

Economic security: Merit was assigned based on annual net income of the household as rank one for highest income and four for lowest income among different farming systems.

Food security: Merit was assigned based on the per capita monthly consumption of food grains as rank one for highest consumption and four for lowest consumption among different farming systems.

Health security: Merit was assigned based on the possession of yashasvini health card as rank one for highest number of farm households having card and four for lowest number of farm households having card among different farming systems.

Habitat security: Merit was assigned based on the value of household assets including dwelling house as rank one for highest value of household assets and four for lowest value of household assets among different farming systems.

Educational security: Merit was assigned based on the value of indices as rank one for highest value and four for lowest value among different farming systems.

Social network security: Merit was assigned based on the value of indices as rank one for highest value and four for lowest value among different farming systems.

Results and discussion

Land holding pattern of farm households

The distribution of operational holdings was highly skewed, with irrigated (Crop+Dairy, Crop+Sericulture and Crop+Dairy+Sericulture) and rainfed (Crop+Sheep) farmers. The irrigated farmers operated on an average 1.98 hectares as against 1.08 hectares by rainfed farmers (Table 1). The farm holdings consisted of number of small fragments with mixture of enterprises such as crop (annual, perennial), dairy, sericulture and sheep. The area under study comes under the Eastern dry zone of Karnataka where most of the crops grown are dependent on rainfall so the dry and garden land share was more in total land.

Table 1: Land holding pattern of sample farmers (in hectares per farm)

Type of operational holdings	C+D	C+S	C+D+S	C+Sh	Pooled
Dry Land	0.75 (39.06)	0.59 (30.89)	0.67 (31.60)	0.82 (75.92)	0.70 (40.23)
Irrigated Land	0.53 (27.60)	0.62 (32.46)	0.73 (34.43)	0.00 (0.00)	0.47 (27.02)
Garden Land	0.64 (33.33)	0.70 (36.64)	0.71 (33.49)	0.26 (24.07)	0.57 (32.75)
Total	1.92 (100)	1.91 (100)	2.12 (100)	1.08 (100)	1.74 (100)

Note: Figures in parentheses represent percentage to total



From the Table 2 it is seen that investment on non-land (sheds, carts, farm implements, pump set, drip pipelines and machinery) fixed assets per hectare (Table 2) was higher in case of Crop+Dairy+Sericulture farmers than other three farming systems. The higher investment by

Crop+Dairy+Sericulture farmers was due to heavy investment on implements and machinery. The investment on total fixed assets was less in case of Crop+Sheep farmers mainly because of very low investment on implements and machinery.

Table 2: Pattern of distribution of fixed assets under major farming systems (in Rupees)

Sl. No.	Particulars	Farming Systems				
		C+D	C+S	C+D+S	C+Sh	Pooled
	Average size of the farm (Ha)	1.92	1.91	2.12	1.08	1.74
1	Value of land per farm	1014673 (90.09)	1002850 (85.98)	1105208 (82.27)	466900 (99.52)	897408 (87.44)
2	Value of land Per ha	528928	526283	522128	433549	502722
3	Value of non-land assets per farm	111584 (9.90)	163467 (14.01)	238108 (17.73)	2215 (0.48)	128844 (12.55)
4	Value of non-land assets Per ha	58166	85786	112489	2058	64625
5	Total assets per farm	1126257 (100)	1166317 (100)	1343316 (100)	469115 (100)	1026252 (100)
6	Total assets Per ha	587094	612069	634617	435607	567347

Note: Figures in parentheses represent percentage to total

Annual farm household income

Farming system is aimed at efficient use of resources to maximize the income. It also minimizes the production risk by spreading the risk to the various enterprises instead of one activity. The details of annual farm household income among major farming system derived from various sources indicated that (table 3), the Crop+Dairy+Sericulture farmers realized a maximum net annual income of ₹ 358880 of which 43.78 per cent was sourced back from sericulture and 28.43 per cent from crops.

Due to maximum area is under irrigation in this farming system the farmers could able to plant more land with mulberry cuttings and also able to

cultivate commercial crops like tomato, cabbage, onion and marigold. Due to availability of mulberry leaf throughout the year the farmers could able to rear more DFL's in a year. As a result the net annual income was more in Crop+Dairy+Sericulture farms. According to the study conducted in Bihar state Buffalo + crop Production system (BCPS) is the most sustainable production system for generating income and employment, followed by the Crossbred cow + Crop Production System (CCCPS). The farm profit analysis has revealed that the gross income and family labour income are highest in BCPS (₹ 1, 31,539 and ₹ 50322) and followed by CCCPS (₹ 56, 607 and ₹ 16,383) system in the Bihar state (Singh 2004).

Table 3: Annual farm household net income of farm households from various sources (in Rupees/annum)

Farming systems	Crops	Livestock	Sericulture	Non-farm income*	Total
C+D	75598 (38.58)	55619 (28.38)	0 (00.00)	64733 (33.03)	195950 (100)
C+S	55305 (19.31)	3476 (01.21)	196549 (68.63)	31033 (10.83)	286363 (100)
C+D+S	102062 (28.43)	42900 (11.95)	157148 (43.78)	56770 (15.81)	358880 (100)
C+Sh	8485 (18.33)	10046 (21.70)	0 (00.00)	27750 (59.95)	46281 (100)
All FS	60363 (27.20)	28010 (12.62)	88424 (39.85)	45072 (20.31)	221869 (100)

Note: Figures in parentheses represent percentages to total

*Non-farm income includes income earned by working in others field for wages, working in Governmental organizations, working in private organizations or through own enterprises like kirana shops etc...



The net annual income realized by the Crop+Sheep farm households was very low (₹ 46281) as their livelihood is mainly depended on rainfed farming, 59.95 per cent of their annual income was from non-farm activities like working in others field.

Food consumption pattern and per capita consumption of farm households

Dietary pattern of households in all groups was mainly cereal based (table 4). Ragi and rice were the major food grains consumed by the households. Average consumption of cereals (rice and wheat) and millets (ragi) was estimated to be highest in Crop+Dairy+Sericulture (100.22 kg/family/month) and lowest in Crop+Sheep (55.58 kg/family/month) farm households. This difference is mainly due to the average size of household and income levels of households. Consumption of pulses was low in all the farming systems. Average consumption of vegetables, fruits, milk, edible oil, sugar and egg that are rich in minerals and vitamins was higher in Crop+Dairy+Sericulture and lowest in Crop+Sheep farm households because of the most compelling reason of low level of income. The monthly consumption of non- vegetarian food like meat was higher in Crop+Dairy farm households. Meat being a high priced food item is generally out of reach of vast majority of the population so its consumption is low in Crop+Sheep farm households.

Table 4: Food Consumption pattern of households under major farming systems (kg/month/family)

Food item	Farming System				
	C+D	C+S	C+D+S	C+Sh	Pooled
Average family size	5	5	6	4	5
Rice	54.16	55.27	62.44	29.67	50.38
Ragi	27.06	28.17	35.92	25.46	29.15
Wheat	1.86	1.15	1.86	0.44	1.32
Cereals and millets	83.08	84.59	100.22	55.58	80.86
Field bean	2.04	1.95	2.48	1.46	1.98
Red gram	0.71	1.11	1.46	0.22	0.87
Other pulses	1.54	1.32	2.16	1.83	1.71
Total Pulses	4.29	4.38	6.10	3.51	4.56
Tomato	3.1	6.2	8.59	4.07	5.49
Potato	4.07	2.97	4.25	2.21	3.37
Brinjal	2.26	1.99	2.66	1.99	2.22

Beans	2.44	1.77	2.92	0	1.78
Roots & tubers	3.32	3.19	4.61	3.63	3.68
Leafy vegetables	1.33	1.11	2.21	1.77	1.60
Cabbage & cauliflower	0.27	0.49	2.48	0.66	0.97
Onion	5.05	5.09	6.07	2.48	4.67
Vegetables	21.83	22.81	33.79	16.83	23.81
Mango	28.92	34.1	44.73	20.37	32.03
Banana	1.02	1.24	2.26	0	1.13
Papaya	0.58	0.27	1.46	0	0.57
Fruits	30.51	35.61	48.45	20.37	33.73
Edible oil (lit)	3.76	4.21	4.83	1.59	3.59
Milk (lit)	13.99	11.96	18.73	6.16	12.71
Sugar	4.92	4.69	5.98	2.21	4.45
Meat	2.92	2.48	2.52	0.97	2.22
Egg (No.)	13	9	18	5	11

The per capita consumption on monthly basis of Crop+Dairy+Sericulture is high in all food items except in case of meat (Table 5). Farm households of irrigation based farming system are on par with ICMR norms in cereal consumption but not rainfed based farming system. In case of pulses the consumption level of all farm households is below the ICMR norms. Irrigation based farm households exceeded the ICMR recommendations in cereal intake but rainfed based farm households are shortfall with recommendations. In the villages of Bihar on the whole cereal intake met the recommended allowances, while that of roots and tubers and other vegetables was three and two times higher than the recommended allowances respectively (Yadav *et al.* 1998).

Table 5: Per capita Consumption of Food under major farming systems (kg/month)

Food item	Farming System				
	C+D	C+S	C+D+S	C+Sh	Pooled
Rice	10.36	10.51	11.71	6.74	9.97
Ragi	5.17	5.36	6.74	5.79	5.77
Others	0.36	0.22	0.35	0.10	0.26
Total Cereals	15.89	16.08	18.80	12.63	16.00
Field bean	0.39	0.37	0.47	0.33	0.39
Red gram	0.14	0.21	0.27	0.05	0.17
Other pulses	0.29	0.25	0.41	0.42	0.34
Total Pulses	0.82	0.83	1.14	0.80	0.90
Tomato	0.59	1.18	1.61	0.93	1.09



Potato	0.78	0.56	0.80	0.50	0.67
Brinjal	0.43	0.38	0.50	0.45	0.44
Beans	0.47	0.34	0.55	0.00	0.35
Roots & tubers	0.63	0.61	0.86	0.83	0.73
Leafy vegetables	0.25	0.21	0.41	0.40	0.32
Cabbage & cauliflower	0.05	0.09	0.47	0.15	0.19
Onion	0.97	0.97	1.14	0.56	0.92
Total Vegetables	4.17	4.34	6.34	3.83	4.71
Mango	5.53	6.48	8.39	4.63	6.34
Banana	0.20	0.24	0.42	0.00	0.22
Other fruits	0.11	0.05	0.27	0.00	0.11
Total Fruits	5.83	6.77	9.09	4.63	6.67
Edible oil (lit)	0.72	0.80	0.91	0.36	0.71
Milk (lit)	2.67	2.27	3.51	1.40	2.51
Sugar	0.94	0.89	1.12	0.50	0.88
Meat	0.56	0.47	0.47	0.22	0.44
Egg (No.)	2	2	3	1	2

Note: ICMR Recommendation: Cereals=13.99 Kg/month/person and Pulses=1.21 Kg/month/person

C+D: Crop+Dairy, C+S: Crop+Sericulture, C+D+S: Crop+Sericulture+Dairy and C+Sh: Crop+Sheep.

Health security among households of different farming systems

Health is an important factor which influences the livelihood of household. Security of households in terms of health is defined by way of availability

and accessibility of health services like Primary health center, 24 Hours facility, Specialty hospital, Yashasvini facility and their monthly expenditure on health services (table 6). The results showed that, the Crop+Dairy farm households have more availability of primary health centers (63.33 %), 24 hour facility (26.66 %) and Yashasvini card facility (23.33 %) than the other farm households and they are also having good accessibility both in terms of time as well as distance. The average monthly expenditure on health was high in Crop+Dairy (Rs. 163) farm households.

Habitat security among households of different farming systems

Habitat of the household is another factor which influences the livelihood of household. Type of house, toilet facility, availability of cooking gas, drinking water and value of households are the parameters which influences habitat security (table 7 and 8). Due to higher net annual income, the value of household assets in Crop+Dairy+Sericulture (Rs. 237579) farm households was more. Although the number of households with pakka houses was less than Crop+Dairy farm households, households with toilet facility and cooking gas facility was more in Crop+Dairy+Sericulture households. Households having their own source (bore well) of drinking water was more in Crop+Dairy+Sericulture and remaining 66.67 % of households were dependent on public source and others bore well.

Table 6: Availability and accessibility to health services to farm households

Particulars		C+D (n=30)	C+S (n=30)	C+D+S (n=30)	C+Sh (n=30)	Overall (n=120)
Availability	Primary health center	63.33	50.00	53.33	60.00	56.66
(Per cent)	24 Hours facility	26.66	16.66	20.00	06.66	17.50
Accessibility	Primary health center	00.56	03.35	01.49	00.92	01.58
[Distance in km]	24 Hours facility	05.91	05.61	05.16	14.00	07.67
	Specialty hospital	19.63	17.86	15.13	19.50	18.03
Accessibility	Primary health center	08.00	15.00	10.00	11.00	11.00
[Time in min]	24 Hours facility	17.00	19.00	17.00	36.00	22.15
	Specialty hospital	55.00	52.00	45.00	57.00	52.15
No. of farm families possessing Yashasvini card		7 (23.33)	5 (16.66)	6 (20.00)	0 (00.00)	18 (15.00)
Monthly expenditure on health services (₹)		70.00	69.00	163.00	35.00	84.12

Note: Figures in parentheses represent percentages to total

Health services includes Primary health center, 24 Hours facility, Specialty hospital, Yashasvini Facility etc...



Table 7: Availability and accessibility to drinking water by the farm households

Particulars		C+D (n=30)	C+S (n=30)	C+D+S (n=30)	C+Sh (n=30)	Overall (n=30)
Availability (Per cent)	Public Source	66.67	50.00	53.33	80.00	62.50
	Own bore well	23.33	16.67	33.33	00.00	18.34
	Others bore well	10.00	33.33	13.34	20.00	19.16
Accessibility [Distance in km]	Public Source	00.02	00.01	00.02	00.02	00.02
	Own bore well	00.00	00.00	00.00	00.00	00.00
	Others bore well	00.06	00.04	00.08	00.07	00.06
Accessibility [Time in min]	Public Source	07.00	06.00	09.00	10.00	08.00
	Others bore well	13.00	12.00	15.00	15.00	13.45

Educational security of farm households

Education is the important facet of life. Level of education at the individual as well as household level, availability and accessibility of educational institutes and monthly expenditure on education are the major determinants of educational security of households (table 9). Minimum level of education in Crop+Dairy+Sericulture farming system is middle school, and most of the respondents are

having education at high school and colligate level. Educational index of households was also highest in Crop+Dairy+Sericulture. Although average monthly expenditure on education was less than Crop+Dairy and Crop+Sericulture farm households, Crop+Dairy+Sericulture is considered as most educationally secured by considering overall parameters which decides educational security.

Table 8: Household assets of farm households

Particulars		C+D (n=30)		C+S (n=30)		C+D+S (n=30)		C+Sh (n=30)	
No.		Value (₹)	No.	Value (₹)	No.	Value (₹)	No.	Value (₹)	
Type of house	Kacha	2 (06.67)	77500	4 (13.33)	80000	2 (06.67)	78850	15 (50.00)	39000
	Pakka	22 (73.33)	260000	18 (60.00)	300277	19 (63.33)	312105	3 (10.00)	175000
	Semipakka	6 (20.00)	109000	8 (26.67)	166250	9 (30.00)	176666	12 (40.00)	97500
	Overall	30 (100.00)	148833	30 (100.00)	182175	30 (100.00)	189207	30 (100.00)	103833
Toilet facility	22 (73.33)	12256	19 (63.33)	10682	22 (73.33)	11123	6 (20.00)	8942	
Cooking gas	19 (63.33)	4800	22 (73.33)	4623	22 (73.33)	4684	3 (10.00)	4436	
Value of other durables (₹)		16580		23480		32565		6690	
Total value (₹)		182469		220960		237579		123901	

Note: C+D: Crop+Dairy, C+S: Crop+Sericulture, C+D+S: Crop+Sericulture+Dairy and C+Sh: Crop+Sheep.

Other durables include Television, Phone, Fans, Almirahs and Motor cycle

Table 9: Education level of farm households

Level of education	C+D (n=30)	C+S (n=30)	C+D+S (n=30)	C+Sh (n=30)	Pooled (n=120)
Illiterate	4 (13.33)	1 (03.33)	0 (00.00)	12 (40.00)	17 (14.16)
Primary school	3 (10.00)	1 (03.33)	0 (00.00)	3 (10.00)	7 (05.83)
Middle school	6 (20.00)	1 (03.33)	6 (20.00)	12 (40.00)	25 (20.83)
High school	6 (20.00)	15 (50.00)	11 (36.66)	3 (10.00)	35 (29.16)
College	6 (20.00)	12 (40.00)	11 (36.66)	0 (00.00)	29 (24.16)
Graduation	5 (16.66)	0 (00.00)	2 (06.66)	0 (00.00)	7 (05.83)
Total	30 (100.00)	30 (100.00)	30 (100.00)	30 (100.00)	120 (100.00)
Educational index	2.26	2.24	2.80	1.40	2.18
Avg. monthly expenditure on education (₹)	467	414	378	93	338

Note: Figures in parentheses represent percentage to total

C+D: Crop+Dairy, C+S: Crop+Sericulture, C+D+S: Crop+Sericulture+Dairy and C+Sh: Crop+Sheep

Social network security of farm households

Social network is nothing but the level of participation by the households in organizations like Panchayat, Co-operatives, Self Help Organizations and other organizations. Access to social network elements like phone and television is another factor which determines social network status of households (table 10). The participation in organizations like panchayat (9), co-operatives (6) and SHG'S (11) was higher in Crop+Dairy+Sericulture farming system and also 66.67 per cent of households have access to television in Crop+Dairy+Sericulture farming system. The number of phone users and Index of Social network status was highest in

Crop+Dairy+Sericulture (1.34) farm households.

Benefit derived from developmental programmes by farm households, 2011

On an average a household in Crop+Dairy+Sericulture farming system derived a benefit of Rs. 22105/- by participating in nine developmental programmes of which lion share was from BPL programme (Table 11). Although most of the households under this farming system were not eligible for getting benefit under programmes like old age pension, BPL and Bhagyajyothi but they are availing benefits by shelling rents by producing false documents.

Table 10 Social network status of farm households (in Numbers)

Particulars	Farming Systems				
	C+D (n=30)	C+S (n=30)	C+D+S (n=30)	C+Sh (n=30)	Pooled (n=120)
Member in Gram Panchyath	1 (5.5)	5 (22.72)	8 (30.76)	0 (00.00)	14 (18.66)
Member in Taluk Panchyath	0 (0.00)	0 (0.00)	1(3.84)	0(00.00)	1 (1.33)
Member in Milk Producers Co-operative Society	7 (38.88)	5 (22.72)	6 (23.07)	0 (00.00)	18 (24.00)
SHG's	10(55.55)	12(54.54)	11(42.30)	9(100.00)	42(56.00)
Total	18(100.00)	22(100.00)	26(100.00)	9(100.00)	75(100.00)
Television (No.)	19(63.33)	25 (83.33)	20 (66.67)	9 (30.00)	18 (60.00)
Phone (No.)	33	36	45	24	34
Social network status	0.97	1.16	1.34	0.57	1.01

Note: Figures in parentheses represent percentage to total

Table 11: Benefit derived by farm households from Developmental programmes

Sl no.	Name of the Program/ Scheme	Annual Benefit/household (₹)				
		C+D	C+S	C+D+S	C+Sh	Pooled
1	APL Ration Card	3204 (14.60)	3336 (17.55)	3393 (15.34)	0 (0.00)	2483 (11.75)
2	BPL Ration Card	5410 (24.66)	5136 (27.02)	5593 (25.30)	4467 (20.85)	5152 (24.39)
3	Mid Day Meal Scheme	720 (3.28)	720 (3.78)	720 (3.25)	720 (3.36)	720 (3.40)
4	Kaliyuva Makkalige Bicycle	2350 (1.18) [259]	2350 (1.36) [259]	2350 (1.71) [259]	2350 (1.20) [259]	2350 (1.22) [259]
5	Old Age Pension Scheme	5280 (24.07)	4000 (21.04)	4640 (20.99)	4800 (22.40)	4680 (22.16)
6	Bhagyajyothi	936 (4.26)	936 (4.92)	936 (4.23)	936 (4.36)	936 (4.43)
7	Indira Awas Yojana	0 (0.00) [0.00]	0 (0.00) [0.00]	0 (0.00) [0.00]	45000 (23.12) [4954]	11250 (5.86) [1239]
8	Micro Irrigation	15120 (18.1) [3972]	13360 (18.47) [3510]	16594 (19.72) [4360]	0 (0.00) [0.00]	11269 (14.01) [2961]
9	National Horticulture Mission	2155 (9.82)	1106 (5.82)	2204 (9.97)	0 (0.00)	1366 (6.46)
10	MGNREGA	0 (0.00)	0 (0.00)	0 (0.00)	5288 (24.68)	1322 (6.26)
	Total	21936 (100)	19003 (100)	22105 (100)	21424 (100)	21117 (100)

Note: Figures in parentheses () represent percentage to total. Figures in [] represent amortized annual benefit in rupees

Ranking of farm household livelihood security

The livelihoods of Crop+Dairy+Sericulture farm households were secured more due to their higher annual income boosted their economic security, and also other attributes like higher consumption of food articles, good health, household assets, good educational background and their social linkages made them to strive higher in terms of overall livelihood security (Table 12). The overall livelihood security index further reveals that one-fourth of the women in kangra district are under the low livelihood security trap which is a matter of great concern (Shyamalie et al. 2010). Integration of two or more enterprises in irrigated situations enhances productivity, profitability and nutritional security of the farmer and sustains soil productivity through recycling of organic sources of nutrients from the enterprises involved there by their livelihoods can be sustained (Desai et al. 2013).

Table 12: Ranking of farm household livelihood security under major farming systems

Sl No.	Farming system	Garret mean score	Rank
1	C+D	50.83	III
2	C+S	52.00	II
3	C+D+S	70.17	I
4	C+Sh	27.00	IV

Conclusion

The dairy and the sericulture components contributed higher proportion to the total income in the existing farming systems. Dairy and sericulture enterprise are complementary to each other and found to sustain farm income. Hence Crop+Dairy+Sericulture farming system needs to be popularized among farmers through extension programmes of the development departments to



strengthen the livelihood security and also it is suggested to promote dairy farming among all classes of the rural population especially among households of rainfed farming system.

Dietary pattern of households in all the groups was mainly cereal based. Ragi and rice are the major food grains consumed by the farm households. Thus the programmes like PDS are to be pursued further with more vigor to strengthen the household food security which is having greater implications on farm households especially among rainfed based farming systems.

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