International Journal of Livestock Research, Vol. 10 (6) June' 2020
http://www.ijlr.org
eISSN: 2277-1964
NAAS Rating 2020 – 5.36

Original Research

An Assessment of Livelihood Security of Farmers practicing Sericulture Based Dairy Farming in Karnataka State

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How to cite this paper: Girish, C., Kadian, K., Meena, B., & Mandi, K. (2020). An Assessment of Livelihood Security of Farmers Practicing Sericulture Based Dairy Farming in Karnataka State. *International Journal of Livestock Research*, 10(6), 43-50. doi: http://dx.doi.org/10.5455/ijlr.20200410020955

Received : Apr 10, 2020
Accepted : May 19, 2020
Published : Jun 30, 2020

Abstract

Sericulture and dairy farming play synergistic role in the livelihood of farmers particularly in Karnataka state. It provides assured income and employment to the farmers. Many studies revealed that when dairy enterprise was combined with other enterprises with scientific management offered greater opportunities for increasing farm income and employment, particularly to the weaker sections of the rural community. The study was therefore, conducted in the Karnataka state as it is the highest producer of silk in the country and was also ranked 11th among all milk producing state in India. Two districts were selected for the purpose of study (Kolar and Chikkaballapura). From each district two blocks was randomly selected. And, from each block three villages were randomly selected, wherein 15 respondents were randomly selected from each village. Therefore, a total of 180 respondents were selected for the study. The purpose of the study aims to access the livelihood security of the farmers practicing sericulture based dairy farming with the help of a composite livelihood security index consisting of 5 sub-indicators viz. Food and nutritional security, Economic and marketing security, Social security, Infrastructural security and Resource use efficiency. The salient findings revealed that, overall livelihood security index was found to be 0.76. Among which food and nutritional security had index value (0.86) while infrastructural security had low index value (0.65). According to overall livelihood security 46.11 per cent of the respondents fell under high level followed by 22.22 per cent with very high level. Hence, extension personnel working at grass root level should actively involve in providing opportunities to the sericulture based dairy farmers in Karnataka state.

Keywords: Dairy, Farmers, Livelihood, Security, Sericulture

Introduction

Livelihood is defined as adequate stock and flow of food and cash with an individual or a family to meet its basic needs. A livelihood encompasses the capabilities, assets (stores, resources, claims and access) and activities required for a means of living (Chambers and Conway, 1992). According to Chambers (1988) livelihoods are protected when households have secure ownership of or access to resources (both tangible and intangible) and income earning activities. Alinovi *et al.* (2010) stated that livelihood outcomes are the goals to which people aspire, the results of pursuing their livelihood strategies, such as increased income, reduced vulnerability, increased well-being, improved food security and more sustainable use of natural resources. The outcomes of livelihood security include economic security, food security, educational security, health security, habitat security and social network security. With rising population, declining land-man ratio and increasing mechanization in farm operations, agriculture alone is not able to provide adequate income and employment to households in India. Integration of farm enterprises provide better livelihood in terms of increased food production, higher net income, improved productivity and reduced income imbalance between agricultural labourer and urban factory worker. Introduction of appropriate farming systems has been proposed as one of the approaches to achieve better growth in agriculture and livelihood (NCF, 2005).

Several studies have highlighted the importance of livelihood security among farmers in agriculture and allied sector. An assessment of livelihood security among tribal farmers of Madhya Pradesh indicated that majority of the respondents in case of food security (47.50%), economic security (52.50%), health security (43.33%), institutional security (40.83%) were falling under low category; in case of educational security (49.17%), infrastructural security (46.67%) respondents belonged to medium category, whereas 51.67 per cent of respondent in case of social security were under high category and therefore, overall Livelihood Security Index (48.33%) of the respondents indicated low category (Barela *et al.*,2018). Similarly, Akter (2016) measured livelihood security in sampled urban areas in Bangladesh using five livelihood security indices for measuring outcomes of food, economic, education, health and shelter indices. A livelihood analysis of smallholders in tribal areas of Maharashtra revealed that 35.84% of the smallholders had high (0.74-0.76) level of livelihood security followed by medium (0.70-0.73) level of livelihood security (40.41%). There was wide variation in livelihood dimensions especially in food security, economic security and health security of smallholders. The smallholder farmers who integrated livestock enterprises with crop had better economic security and their livelihood was found to be significantly improving (Argade *et al.,* 2018). Further, Bangladesh based study on livelihood security indicated that five areas such as economic, food, health, education and empowerment were chosen to measure the livelihood security indices wherein economic security played dominant role in overall livelihoods followed by food security (Akter and Rahman,2017). However, insufficient agricultural land, insufficient working manpower within a family, and lack of access to ecological agricultural services were prime factors of livelihood insecurity in agricultural watershed communities in Nepal (Bhandari and Grant, 2007).

Among livelihood security indices, food and nutritional security acted as vital force in sustainable development of rural life. Weingartner (2012) defined nutrition security as a condition when all people at all times consume food of sufficient quantity and quality in terms of variety, diversity, nutrient content and safety to meet their dietary needs and food preferences for an active and healthy life. A study on food security status in Vaishali district of Bihar revealed that75 per cent of the sampled households had low food security (Sajjad *et al.*,2014). It was also noteworthy to observe that women played important role in maintaining livelihood security of the rural households. Ali (2005) carried out a study on livelihood and food security in Saturia sub-district under Manikgani district of Bangladesh and found that the gender of the household members was crucial for attaining individual level of food security and women's social capital played a crucial role in achieving household food security and averting vulnerability. Similarly, Shyamalie and Saini (2010) in their comparative study of Kangra district in India and NuwaraEliya district in Sri Lanka with regard to livelihood security of women in hills opined that food security, habitat security, health security, education security, social network security were higher in NuwaraEliya district as compared to Kangra district. On the other hand, Kassie *et al.* (2012) found that female headed households were more food insecure as compared to male headed households since female heads are offered fewer opportunities to earn livelihood than the male counterparts. The evidences from several studies summarized that sericulture along with dairy farming had huge potential and played synergistic role in generation of income and employment to the farmers. Therefore, keeping the above reviews in due consideration, the study was conducted in Karnataka state to access the livelihood security of farmers practicing sericulture based dairy farming in the state.

Material and Methods

The study was undertaken in the Karnataka state during the year 2017-18. Karnataka state was purposively selected as it is the highest producer of silk in the country and was ranked 11th among milk producing states in India (NDDB, 2018-19). Two districts were selected for the purpose of study (Kolar and Chikkaballapura). From each districts two blocks were randomly selected. And, from each block three villages were randomly selected, wherein 15 respondents were randomly selected from each village. Therefore, a total 0f 180 respondents were selected for the study. Data were accumulated relevant to survey with the help of a well-structured interview-schedule with the farmer of study area. The interview schedule was pre-tested in the non-sampling area, among homogenous population having similar socio-economic status.

Based on the feedback obtained from non-sampling area, the necessary adjustments were made in the "Interview-schedule", which was, consequently, used for the purpose of data collection from the respondents. The collected data were scored, compiled, tabulated and subjected to various appropriate statistical tools in order to draw significant results and reasonable conclusions. "Livelihood security" was operationalized as an adequate access to income and other resources to meet the basic needs including food and nutrition, health facilities, habitat facilities, educational opportunities and community participation and social integration. The livelihood security of the respondents was calculated by developing one "Livelihood Security Index" as suggested by Guilford (1954). The index was developed on the basis of different indicators of livelihood security of farmers. A list of five components was prepared by referring to different literatures. The five indicators of livelihood security selected for this study were as Food and nutritional security, Economic and marketing security, Infrastructural security, Social security and resource use efficiency. The index of livelihood security was developed by following the further down-mentioned steps. Weightage was given to different indicators of livelihood security by taking the ranks from the judges (Scientist and Experts of Social Science). Judges response was taken by sending questionnaire to them. For transforming rank into weightage, the methodology given by Alfares and Duffuaa (2008) was followed. Further, the mean of these indicators was calculated and taken as a weightage of that specific indicator.

The statements representing particular indicators of livelihood security were selected by sending the statements to the experts/judges, for taking their response. On the basis of the recommendations given by the experts, final selection of statements of each indicator was done.

$$\text{Z indj} = \frac{\text{Indicator j} - \text{Min j}}{\text{Max j} - \text{Min j}}$$

Where,

Zindj= Standard indicator j
Max j and Min j = Maximum and minimum value of indicator j

Then, 'Livelihood Security Index' for each indicator of the entire households was calculated by using the formula given as below:

$$\text{LSi} = \frac{\sum \text{Zindj}}{\text{N}}$$

Where,

LS_i= Livelihood Security for one indicator
Σ $Zind_j$= Summated standardized score of all respondents for one indicator
N= Number of households covered in the study

Once, Livelihood Security Index for one indicator was constructed, and then the composite overall "Livelihood Security (LS) Index" was calculated by using the formula given as below:

$$\text{LSi} = \frac{\sum \text{WiHLSi}}{\sum \text{Wi}}$$

Where,

LS_i= Livelihood Security
HLS_i = Household Livelihood Security
ΣW_i = Summated value of weightage of all indicators

Result and Discussion

For the present study, the livelihood security of the farmers were assessed at 5 levels of indicators viz. food and nutritional security, economic and marketing security, infrastructure security, social security and resource use efficiency.

1. Food and Nutritional Security

The results presented in Table 1 revealed that 35.00 per cent of respondents had very high level of food and nutritional security followed by high level of food and nutritional security (31.88%). It was substantial to note that near about 5.55 per cent of the respondents had very low level of food security. Hence, sericulture based dairy farming could be great option to provide food security and nutritional security for farmers. The systems having dairy and sericulture components had higher level of food and nutritional security. It was understood that a farmer while cultivating and practicing sericulture and rearing animals, indirectly helped to purchase items from the market needed for their consumption. The result showed that sericulture based dairy farming was food secured. The similar findings were also reported by Jayanthi *et al.* (2009) that Integrated Farming System of various situations enhanced productivity, profitability and nutrition security of the farmer and sustained soil productivity through reusing of organic source of nutrient from the enterprises involved.

Table 1: Distribution of respondents according to food and nutritional security (n=180)

Category	Frequency	Percentage
Very Low (<.57)	10	5.55
Low (0.58-0.69)	22	12.22
Medium (0.70-0.77)	28	15.55
High (0.78-0.86)	57	31.88
Very High (>0.86)	63	35

2. Economic and Marketing Security

The data in Table 2 showed that 31.11 per cent of the respondents had high level of economic security followed by very high level of economic security (27.22%). About 10 per cent of respondents had very low and low level of security. This might be due the outputs generated through sericulture and dairy enterprises throughout the year made them economically secured through good linkage with different market. Due to this farmer were getting remunerative price.

Table 2: Distribution of respondents according to economic and marketing security (n=180)

Category	Frequency	Percentage
Very Low (<0.56)	18	10
Low (0.57-0.62)	18	10
Medium (0.63-0.77)	39	21.66
High (0.78-0.86)	56	31.11
Very High (>0.86)	49	27.23

3. Infrastructure Security

The overall development of the farming communities can be realized through better infrastructure facilities at household and village level. Table 3 clearly indicated that about 38.33 per cent of respondents had medium level of infrastructural security followed by higher level of infrastructural security (29.44 %). The respondents had some good infrastructure facilities at household level i.e. house for leaving, animal and sericulture rearing etc.

Respondents also had well access to the ICT tools. The better infrastructure facilities at household and village level, increased production efficiency of farmers, Hence, infrastructure security played important role in livelihood security of farmers.

Table 3: Distribution of respondents according to infrastructure security (n=180)

Category	Frequency	Percentage
Very Low (<0.54)	34	18.89
Low (0.54-0.62)	14	7.78
Medium (0.63-0.67)	69	38.33
High (0.68-0.76)	53	29.44
Very High (>0.76)	10	5.56

4. Social Security

The results presented in Table 4 reported that about 32.77 per cent of respondents had high level of social security followed by very high level of social security (28.33 %). This might be due to the higher social status in the society. Sericulture based dairy farming indirectly provides education to the children in the family. It also reduces the gender discrimination as the women were involved in the most of the sericulture and dairy farming activities.

Table 4: Distribution of respondents according to social security (n =180)

Category	Frequency	Percentage
Very Low (<0.58)	21	11.67
Low (0.59-0.64)	25	13.89
Medium (0.65-0.72)	24	13.33
High (0.73-0.80)	59	32.78
Very High (>0.80)	51	28.33

5. Resource Use Efficiency

The data in Table 5 showed that 33.33 per cent of the respondents had high level of resource use efficiency followed by very medium level of resource use efficiency (29.44%). Sericulture and dairy enterprise were found to be complementary to each other. Hence, the utilization of resources between two were found to be very high. Left over materials from the dairy was used as manure in the mulberry garden. Use of drip irrigation to save water showed that resource use efficiency was secured.

Table 5: Distribution of respondents according to resource use efficiency (n=180)

Category	Frequency	Percentage
Very Low <0.54	19	10.56
Low (0.55-0.60)	14	7.78
Medium (0.61-0.68)	53	29.44
High (0.69-0.77)	60	33.33
Very High (>0.77)	34	18.89

An analysis of distribution of respondents according to overall Livelihood Security Index in Table 6 clearly exhibited that 46.11 per cent of the respondents had high level of livelihood security through sericulture based dairy farming followed by very high level of livelihood security (22.22%). The majority of respondents had high to very high level of livelihood security. This might be due to their assured high income from both dairy and sericulture. Integration of both enterprises provided optimum utilization of available resources through recycling and more income and employment throughout the year. This finding was in line with the findings of Smitha (2005) reiterating that majority of small farmers (58%) were placed at high level of livelihoods security index while most of the marginal farmers (87%) belonged to medium level category. Sivaji (2009) also reported that majority of small and marginal farmers (50.84%) had high to very high level of integrated livelihood security followed by medium level of livelihood security (40.41%).

Table 6: Distribution of respondents according to overall Livelihood Security Index (n=180)

Category	Frequency	Percentage
Very Low (<0.62)	12	6.67
Low (0.63- 0.66)	16	8.89
Medium (0.67-0.72)	29	16.11
High (0.73-0.77)	83	46.11
Very High (>0.77)	40	22.22

Table 7: Selected indicators of respective dimensions of livelihood security index with their relevancy weightage and mean relevancy score (n=180)

S. No.	Statements	Relevancy Weightage	Mean Relevancy Score
A) Food and nutritional security			
1	Sericulture based dairy farming (SBDF) helps in securing daily requirements throughout the year to farmer	0.83	2.5
2	A nutritious food to family members is affordable if farmer practices dairy farming along with sericulture	0.83	2.48
3	Food items derived or purchased from the SBDF helps in achieving nutritional security to the family	0.83	2.5
4	SBDF reduces the cost of purchasing dairy food items from the market	0.75	2.25
B) Economic and Marketing Security			
1	Sericulture based dairy farming gives more net profit per unit area as compared to others	0.88	2.63
2	Through SBDF the dependency ratio on a single enterprise is low	0.88	2.63
3	SBDF generates continuous income throughout the year	0.83	2.5
4	SBDF helps during sudden loss of any one enterprises (sericulture or dairy)	0.69	2.08
5	Silk market for silk and milk federation unit for milk are providing more marketing security to the farmers	0.93	2.78
6	Silk market for silk and Karnataka milk union federation for milk helps in providing remunerative prices to the farmers	0.87	2.6
7	Marketing network will be more utilized in marketing of silk and milk	0.8	2.38
C) Infrastructural security			
1	SBDF improves the infrastructures of farm as well as house due to more income.	0.84	2.53
2	SBDF promotes utilization of private infrastructure such as credit facility, input sale facilities, Agri-Clinic etc.	0.78	2.33
3	SBDF improves access and utilization of modern ICT tools by the farmers.	0.78	2.33
4	SBDF facilitates in an access of farmers to dairy and sericulture farming technologies.	0.79	2.38
D) Social security			
1	SBDF improves the social status of the family by acquiring more income.	0.93	2.78
2	Social participation as an office bearer or member in either silk or milk cooperative societies or any SHGwill ensure the social security for the family.	0.82	2.45
3	SBDF helps indirectly in improving the education status of the family.	0.86	2.58
4	Gender discriminations can be reduced, through SBDF, because most of the sericulture and dairy enterprises are managed by female members.	0.84	2.53
E) Resource use efficiency			
1	SBDF facilitates in effective utilization of the resources, as output of one enterprise can be used as input of other.	0.9	2.7
2	Utilization of dung and left-over materials is done effectively via SBDF.	0.84	2.53
3	Mulberry leaves are utilized as fodder crops, especially during the lean season.	0.83	2.48
4	Drip irrigation System can be used effectively in SBDF, since it encourages water conservation.	0.84	2.53

RW= Relative Weightage. MRS= Mean Relevancy Score, SBDF= Sericulture Based Dairy Farming

6. Livelihood Security Index for Different Indicator

The perusal of Table 8 indicated that the overall average livelihood security index value was 0.76. The average livelihood security index value was very high (0.86) in food and nutritional security indicator. This might be due to their assured high income from both sericulture and dairy. The average livelihood security index for economic and marketing security was very high i.e. 0.78. Among all, infrastructural security lied in medium level category i.e. 0.65. Whereas average livelihood index of social security and resource use efficiency lied in high level i.e. 0.76 and 0.72 respectively. These findings were in agreement with the findings of Smitha (2005) indicating that majority of small farmers (58%) were placed at high level of livelihoods security index while most of the marginal farmers (87%) belonged to medium level category of livelihood security index. Sivaji (2009) also reported that majority of small& marginal farmers (50.84%) had high to very high level of integrated livelihood security followed by medium level of livelihood security (40.41%).

Table 8: Livelihood security index values for different indicators

Indicators	Index value
Food and nutritional security	0.86
Economic and marketing security	0.78
Infrastructural security	0.65
Social security	0.76
Resource use efficiency	0.72
Composite index value	0.76

Conclusion

It can be concluded from the study that, an overall analysis of livelihood security of farmers regarding sericulture based dairy farming revealed that overall livelihood security index was found to be 0.76. Among which food and nutritional security had index value (0.86) while infrastructural security had low index value (0.65). Further, according to overall livelihood security 46.11 per cent of the respondents were falling under high level followed by 22.22 per cent with very high level. This might be due to their assured high income from both dairy and sericulture. Integration of both enterprises provided optimum utilization of available resources through recycling and more income and employment throughout the year along with good market linkage. The study also suggests that the farmer and other stakeholders must be sensitized and trained in scientific sericulture-based milk production by means of adequate extension, policy and financial support to grow sericulture and dairy-based integrated agriculture broadly in the State of Karnataka.

Acknowledgement

Authors are thankful to all the faculty and staff members of the Division of Dairy Extension, ICAR-National Dairy Research Institute. Thanks, are also due to local informants and village headmen for their valuable support and cooperation throughout the field work.

Conflict of Interests

There is no conflict of interest.

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