



## Research Article

# COMPARATIVE ANALYSIS OF LIVELIHOOD SECURITY OF THE FARMERS PRACTICING DIFFERENT FARMING SYSTEMS IN CHICKABALLAPURA DISTRICT OF KARNATAKA

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**Abstract:** The present study was conducted during 2018-19 in Chickaballapura district of Karnataka to analyse the livelihood security of the farmers practicing different farming systems. From Chickaballapura district two taluks were considered *i.e.*, Gowribidanur and Sidlaghatta. Major farming systems in each taluk were identified after thorough discussion with extension professionals of line departments and interaction with farmers and two predominant farming systems were selected from each taluk *i.e.*, 'maize+dairy' and 'maize+dairy+horticulture' farming systems from Gowribidanur taluk and 'sericulture+dairy' and 'sericulture+dairy+horticulture' farming systems from Sidlaghatta taluk. For each farming system 30 respondents were selected, hence the total sample size was 120. A comprehensive scale was developed to measure livelihood security of the farmers practicing different farming systems. The study revealed that, in 'maize+dairy' farming system, nearly half (66.66 %) of the farmers belonged to poor level of livelihood security. In 'maize+dairy+horticulture' farming system, two-fifth (40.00 %) of the farmers belonged to average level of livelihood security. In 'sericulture+dairy' farming system, two-fifth (40.00 %) of the farmers belonged to better level of livelihood security. In case of 'sericulture+dairy+horticulture' farming system, more than half (53.33 %) of the farmers belonged to average level of livelihood security. Furthermore, the results also showed that, there is a significant difference between livelihood security of farmers practicing 'maize+dairy' and 'maize+dairy+horticulture' farming systems at 1 per cent level of significance. The U (1.02) value indicated that, there is a significant difference between livelihood security of farmers practicing 'sericulture+dairy' and 'sericulture+dairy+horticulture' at 1 per cent level of significance. The Chi-square value (29.60) value indicates there is a significant difference between livelihood security of the farmers practicing 'maize+dairy', 'maize+dairy+horticulture', 'sericulture+dairy' and 'sericulture+dairy+horticulture'. It was observed that 'sericulture+dairy' practicing farmers have better livelihood security than other farmers.

**Keywords:** Livelihood security, farming system, Mann-Whitney U test, Kruskal Wallis test

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## Introduction

Agriculture plays a vital role in Indian economy. India ranks second worldwide in farm outputs. As per 2018, Agriculture employed 50% of the Indian work force and contributed 17 to 18% to country's Gross Domestic Product (GDP) [1] small and marginal farmers, the scope to increase the farm income, family food security and employment through crop production alone is not viable. Therefore, one has to look for alternatives in order to get assured increase in income and employment in the long run. In this regard, combination of enterprises is the only answer in which livestock, Horticulture, Sericulture and other allied activities are regarded as the important components. Under such circumstances, to ensure regular employment and income, farmers have to undertake land based enterprise which would complement and supplement existing farming activity to get more income leading to social and economic upliftment [2]. Farming is a dynamic biological and open system with human or social involvement, being primarily biological with a high degree of dependence on weather variables and changing socio-political environments. A system consists of several components which depend on each other. A system is defined as a set of elements or components that are inter-related and interacting among themselves. Therefore, system approach is applied to agriculture for efficient utilization of all resources to maintain sustainability in production and obtaining higher net returns. Livelihood is the means for people use to support themselves, to survive and to prosper. It is an outcome of how and why people organize to transform the environment to meet their needs through technology, labour, power, knowledge, and social relations.

Livelihoods are also shaped by the broader economic and political systems within which they operate. In general, almost half of the world's population does not have the socio-economic and political means to realize their economic and social rights. One of the major causes of the poverty is the lack of viable livelihoods in the developing world. In this scenario, an attempt was made to analyse the livelihood security of farmers under different farming systems and to assess under which farming system the livelihood security was better in selected area. The present study was undertaken with following objectives:

1. To analyse the livelihood security of the farmers practicing different farming systems.
2. To compare the livelihood security of the farmers practicing different farming systems

## Materials and Methods

The study was conducted with ex-post facto research design in Chickaballapura District of Karnataka. The Chickaballapura district was selected because of existence of diversified farming systems. From Chickaballapura two taluks having different agro ecological situation was considered. From each taluk, six villages were selected. From each village, 10 respondents were selected. Hence, the total sample size was 120 respondents. 'Maize based farming system' and 'Sericulture based farming systems' were purposefully selected from Gowribidanur and Sidlaghatta taluks of Chickaballapura district respectively. By considering available secondary data and in discussion with line department officials and other local leaders major farming systems in each taluk were identified and two-

Table-1 Classification of the farmers based on livelihood security level under Maize based farming system in Gowribidanur taluk

SN	Farming system	Livelihood security level	Frequency	Percentage
1	Maize+Dairy Mean=113.16 SD=13.55 (n <sub>1</sub> =30)	Poor (<106.38 score)	14	46.66
		Average (106.38-119.94 score)	9	30
		Better (>119.94 score)	7	23.34
	Maize+Dairy +Horticulture Mean=155.63 SD=16.13 (n <sub>2</sub> =30)	Poor (<147.56 score)	8	26.66
		Average (147.56-163.70 score)	12	40
		Better (>163.70 score)	10	33.34

Table-2 Classification of the farmers based on livelihood security level under Sericulture based farming system in Sidlaghatta taluk

SN	Farming system	Livelihood security level	Frequency	Percentage
1	Sericulture+Dairy Mean=171.66 SD=10.23 (n <sub>3</sub> =30)	Poor (<166.55 score)	8	26.66
		Average (166.55-176.78 score)	10	33.34
		Better (>176.78)	12	40
2	Sericulture +Dairy +Horticulture Mean=161.36 SD=11.57 (n <sub>4</sub> =30)	Poor (<155.58 score)	4	13.33
		Average (155.58-167.15 score)	16	53.33
		Better (>167.15 score)	10	33.34

predominant farming systems were selected from each taluk i.e., 'maize+dairy', 'maize+dairy+horticulture' farming systems from Gowribidanuru taluk and 'sericulture+dairy', 'sericulture+dairy+horticulture' farming systems from Sidlaghatta taluk. These are the predominant farming systems in selected taluks. The present study was undertaken in order to know which combination of farming system is viable and which farming system contributing more towards farmers' livelihood security. The following independent variables like age, education, family size, farming experience, land holding, irrigation potential, cropping intensity, innovative proneness, risk orientation, achievement motivation, management orientation, scientific orientation, deferred gratification, decision making ability, mass media exposure, extension participation, economic motivation and information seeking behaviour were selected for the study to know their relationship and their contribution to livelihood security. In order to measure the livelihood security of the farmers practicing different farming systems, a comprehensive scale was developed based on the interaction with experts. The livelihood security scale consists of 39 statements and the responses on extent of livelihood security were obtained on a five point continuum representing 'very greater extent', 'greater extent', 'moderate extent', 'least extent' and 'very least extent' assigning a weightage of 5,4,3,2, and 1 respectively for positive statements and scoring was reversed for negative statements. The livelihood security score was calculated by adding up the scores obtained by the respondents on all 39 statements. The livelihood security score of this scale is ranging from a minimum of 39 and maximum of 195. The respondents were given their level of livelihood security for the 39 statements included in the scale. Based on their scores, livelihood security level was categorized i.e., poor, average and better. The collected data were scored, tabulated and analysed using frequency, percentage, mean, standard deviation, Mann-Whitney U test, Kruskal wallies (one way ANNOVA) test.

## Results and Discussion

The results from the [Table-1] indicates the livelihood security of farmers practicing maize based farming system in Gowribidanur taluk. In case of 'maize+dairy' farming system, nearly half (46.66 %) of the farmers belonged to poor level of livelihood security, which is followed by 30.00 percent and 23.34 percent of the farmers belonged to average and better level of livelihood security, respectively. The possible reason for this could be that maize crop mainly grown under rain-fed situation and uncertainty of rainfall or uneven or erratic distribution of rainfall results in low yield in maize and for rest of the year they might be depending on dairy farming for family maintenance which led to low income as well as poor level of livelihood security.

The results from the [Table-1] with respect to 'maize + dairy + horticulture' farming system, two fifth (40.00 %) of the farmers belonged to average level of livelihood security, followed by 33.34 percent and 26.66 percent of the farmers belonged to better and poor level of livelihood security respectively. This may be due to the considerable extent of availability of assured irrigation facilities through bore well in their farm, farmers along with maize and dairy they are cultivating horticultural crops like tomato, brinjal, chilly, flower crops, banana etc. Hence, these things are

contributing towards considerable amount of income and employment generation and also, vegetables and fruits grown in their farm may be available for the family consumption which enhances the nutritional security that leads to average level of livelihood security. The availability of good marketing facilities for horticultural crops, since the farmers are very near to Bangalore, so that they can sell their produce in well established markets. Further, for marketing of milk there was a well-established MPSC (milk producers' co-operative societies) in villages and provides remunerative price and constant payment is one of the feature of MPSC. Hence, this combination of farming system contributing considerable extent towards farmers' livelihood security in the area. Further, 'maize + dairy' farming system practiced by farmers are having mean score of 113.16, whereas mean score of 'maize + dairy + horticulture' was 155.63. Better mean score of 'maize + dairy + horticulture' may be due to reduced due to continuous employment, constant price through well-established market and well established milk producers' co-operative societies.

An examination of [Table-2] in case of 'sericulture+dairy' farming system, two-fifth (40.00 %) of the farmers belonged to better level of livelihood security, followed by 33.34percent and 26.66percent of the respondents belonged to average and poor level of livelihood security respectively. This may be due to the farmers are rearing silkworms throughout the year with alternative silkworm rearing house, they were able to rear silkworm about 10 to 11 batches per year along with dairy farming by purchasing mulberry leaves from other farmers in case of shortage. Hence, there may be high employment and income generation around the year, which leads to better economic, ecological, social and physical security as well as psychological security. The economic results from sericulture and dairy might have acted as a strong motive for farmers that ensure livelihood security. As a result, majority of the farmers fall in better level of livelihood security category. Further, the silkworm rearing waste generated during rearing was more palatable to the animals, so this waste was given as a feed to the animals as a result the farmers are getting more milk yield and higher income. Apart from this, sericulture and dairy enterprises support one another in other words they act as complimentary and supplementary enterprises.

The results from the [Table-2] in case of 'sericulture + dairy + horticulture' farming system, more than half (53.33 %) of the farmers belonged to average level of livelihood security, which is followed by 33.34percent and 13.33percent of the respondents belonged to better and poor level of livelihood security respectively. This may be due to that practicing of sericulture, dairy and horticulture, farmers are getting continued employment opportunities and income throughout the year. Along with sericulture and dairy, farmers are cultivating horticulture crops like leafy vegetables, potato, grapes, flower crop etc., which provides employment and income for family. Hence, majority of the farmers comes under average to better level of livelihood security. Further, 'sericulture + dairy' farming system practiced by farmers are having mean score of 171.66, whereas mean score of 'sericulture + dairy + horticulture' was 161.36. Better mean score of 'sericulture + dairy' may be due to reduced cost of production, continuous employment and constant price through well-established market which leads to high income [3-6].

Table-3 Comparison between livelihood security of the farmers practicing 'maize+dairy' and 'maize+dairy+horticulture' farming systems in Gowribidanuru taluk (n=60)

SN	Farming systems	N	Livelihood security	
			Mean rank	Sum of ranks
1	Maize + Dairy	n <sub>1</sub> =30	15.5	465
2	Maize+Dairy+Horticulture	n <sub>2</sub> =30	45.5	1365
Mann-Whitney U			0.01**	

\*\* Significant at 1 level of significance

The Mann-Whitney U test was applied to compare the livelihood security of farmers under 'maize + dairy' and 'maize + dairy + horticulture' farming systems which is depicted in [Table-3]. The results of the test indicated that there is a positive significant difference between livelihood security of farmers practicing 'maize + dairy' and 'maize + dairy + horticulture' farming system at five percent level. The mean rank of farmers practicing 'maize + dairy + horticulture' is high (45.50) compare to 'maize + dairy' (15.50). The farmers who are practicing 'maize + dairy + horticulture' have better livelihood security than the farmers practicing 'maize + dairy'. The probable reason might be that cultivating horticultural crops along with maize and dairy that generate additional income and employment to the family members throughout the year which leads to better livelihood security [5]. The results of the Mann-Whitney U test from the [Table-4] shows that there is a positive and significant difference between livelihood security of farmers practicing 'sericulture+dairy' and 'sericulture+dairy+horticulture' farming systems at one percent level. The mean rank of farmers practicing 'sericulture+dairy' is high (39.23) compare to 'sericulture+dairy+horticulture' (21.77). The reason may be that, sericulture and dairy components act as a complementary and supplementary to each other, in other words silkworm rearing waste can be used as a feed for animals and found to sustain farm income by reducing cost of production. Further, dairy waste can be used or preparation of compost that can be used for crop production. Horticulture crop production is an intensive activity which require more investment in production and lack of assured market for the produce results in low mean score compared to 'sericulture+dairy' farming.

Table-4 Comparison between livelihood security of the farmers practicing 'sericulture+dairy' and 'sericulture+dairy+horticulture' farming systems in Sidlaghatta taluk (n=60)

SN	Farming systems	N	Livelihood security	
			Mean rank	Sum of ranks
1	Sericulture+Dairy	n <sub>3</sub> =30	39.23	1177
2	Sericulture+Dairy+Horticulture	n <sub>4</sub> =30	21.77	653
Mann-Whitney U			1.02**	

\*\*Significant at 1 percent level

The Kruskal-Wallis one-way ANOVA was applied to test the significant difference between livelihood securities of the farmers practicing different farming systems in Chickaballapura district which are depicted in the [Table-5]. The test was tuned out to a positive and significant difference among different farming systems viz. 'maize+dairy', 'maize+dairy+horticulture', 'sericulture+dairy' and 'sericulture+dairy+horticulture'. The data revealed that mean score of 'sericulture+dairy' farming system was more (171.66) followed by 'sericulture+dairy+horticulture' (161.36), 'maize+dairy+horticulture' (155.63) and 'maize+dairy' (113.56). The reason might be that, the 'sericulture+dairy' farming system fetches higher and assured income and employment generation to farmers throughout the year.

Table-5 Comparison between livelihood security of the farmers practicing different farming systems in Chickaballapura district (n=120)

S	Farming system	N	Mean score	Chi-square value
1	Maize+Dairy	n <sub>1</sub> =30	113.56	29.60**
2	Maize+Dairy+Horticulture	n <sub>2</sub> =30	155.63	
3	Sericulture+Dairy	n <sub>3</sub> =30	171.66	
4	Sericulture+Dairy+Horticulture	n <sub>4</sub> =30	161.36	

\*\* Significant at 5 percent level

Further, it leads to consumption of nutritious food items, establishing social linkages, recognition in the society, purchasing land, constructing own houses, sending children to higher education, leadership development and confidence building. These are the other reasons for better livelihood security among 'sericulture+dairy' and 'sericulture + dairy +horticulture'.

Lowest mean score was observed in 'maize+dairy' farming system because mainly farmers of this group are resource poor farmers, they depending on rain to cultivate crops. Hence low score was observed.

## Conclusion

The different farming systems practiced by farmers have provided effective recycling of produce of one component as input to the other component. It also provided flow of cash to the farmers round the year by way of disposal of milk, vegetables and cocoons. The 'sericulture+dairy' farming system has contributed higher proportion to the total income in the existing farming systems with reduced cost of production.

**Application of research:** Dairy and sericulture enterprise are complementary and supplementary to each other and found to sustain farm income and livelihood security of farmers. 'Sericulture+dairy' farming system needs to be popularized among farmers where sericulture can be taken up through appropriate extension strategies by the developmental departments to improve the livelihood security of the farmers.

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**Study area / Sample Collection:** Chickaballapura district

**Cultivar / Variety / Breed name:** Maize (*Zea mays*)

**Conflict of Interest:** None declared

**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.  
Ethical Committee Approval Number: Nil

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