



Relative Economics of Farmers Practicing Different Farming Systems and their Impact on Livelihood Security in Mandya District of Karnataka, India

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

A study conducted in Mandya district of Karnataka to examine the livelihood security of farmers practising important farming systems and their relative economic viability. Pandavapura and K.R.Pete talukas were selected from Mandya region. The vital farming systems in each taluk had been recognized after a radical discussion with line department specialists and after discussion with farmers and the major farming systems were decided on from each taluk: that is "paddy+dairy" and "paddy+dairy+horticulture" in K.R. Pete taluk, and "sugarcane+dairy" and "sugarcane+dairy+horticulture" in Pandavapura taluk. For each farming system, 30 respondents were randomly decided, giving an aggregate sample size of 120. A comprehensive measuring scale was developed to measure the livelihood security. Six components of livelihood security specifically food and nutrition security, economic, ecological, social, psychological and physical

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security have been recognized to assess the livelihood security of farmers. In the case of the farming system "paddy + dairy" social security (63.33%), in the case of the farming system "paddy+ dairy + horticulture" ecological security (70.00%), in the matter of "sugarcane + dairy" economic security (73.33%) and with regards to "sugarcane + dairy + horticulture" social security (76.66%) become labelled as I rank. The highest benefit-cost ratio was found in the case of "sugarcane + dairy + horticulture" (1:2.62) followed by "sugarcane+dairy" (1:2.47), "sugarcane+dairy+horticulture" (1:2.3) and "paddy+dairy" (1:1.43). Therefore, the sugarcane+dairy+horticulture farming system needs to be popularized via ensuring an assured market for horticulture products and offering a minimum support rate price for sugarcane.

Keywords: Farming system; livelihood security; correlation; path analysis; benefit cost ratio.

1. INTRODUCTION

"Indian agriculture is known for its multifaceted role in providing employment, food, environment, and nutrition securities. Indian agriculture employs 58% of the total workforce and is a major source of poverty alleviation and empowerment of rural people and the core of India's development. As a result of continuous efforts, food grain production increased from 50.8 million tons in 1950-1951 to 241.56 million tons in 2010-2011" [1].

The traditional agricultural system of Indian farmers is based on centuries of experience and is characterized by mixed farming involving one or more crops such as dairy, poultry, sheep, pigs, sheep and goats, fisheries and beekeeping. Its main goal is to achieve stability in production, secure good family life and protect themselves from extreme weather changes and other environmental challenges.

"Recently, the ecological, biological and socio-economic aspects of agricultural systems include not only crop production, but also animal production, horticulture, vegetable production, etc. The future strategy requires a shift in priorities through diversification to include horticulture, agroforestry, animal production, fisheries in farm-level agriculture. In order to conserve natural resources and farm income and meet the diverse food, animal and fuel needs of the growing population, it is critical to use agricultural practices in harmony with farmers' resources" [1].

"In India, where the majority (78%) of farmers are small and marginal farmers occupying only 32.5% of the total agricultural land, specialized agriculture is not viable and sustainable in the long run" [2]. "The average farm size in India is declining and more than 80 million of the 105 million holdings are having less than 1.0 hectare.

Small and marginal farmers in particular cannot survive on crop yields alone. As the farm gradually shrinks, it becomes difficult to produce enough food and other agricultural products for the family. On the one hand, frequent monsoon failures, the ever-increasing population, and declining per capita land ownership have worsened the situation. Moreover, there is not possibility for horizontal expansion of land and only vertical expansion is possible by combining different farms" [3].

"Livelihood is a tool that people use to connect, survive, and thrive. It is the result of how and why people organise their environment to meet their needs through technology and labour, power, education, and social relationships" [4].

"Livelihoods are shaped by general economic and political systems. In general, fifty percent of the world's population lacks the socioeconomic and political means to achieve their economic and social rights. One of the main causes of poverty in developing countries is the lack of livelihoods" [4].

In this framework, an effort was made to examine the livelihood security of farmers adopting different farming systems and to examine under which farming system the livelihood security was good in the selected area and the farming system which is economically viable in the selected area. The present investigation was done with the below mentioned objectives:

1. To estimate the relative economics of the farmers adopting major farming systems.
2. To analyse dimension wise livelihood security of farmers adopting different farming systems.

2. MATERIALS AND METHODS

The current investigation was conducted in Mandya district. Two taluks were picked out from

Mandya district namely Pandavapura and K.R. Pete. The predominant farming systems in each taluka were identified after thorough discussion with extension officers of line departments and interaction with farmers and two important farming systems were selected from each taluk namely 'Paddy+Dairy' and "Paddy+ Dairy+ Horticulture' farming systems from K.R.Pete taluk and "Sugarcane+Dairy" and "Sugarcane+ Dairy+ Horticulture' farming systems from Pandavapura taluk.

Ten respondents who adopted various farming systems were randomly picked out from each village. Hence, the total farmers from 12 villages were 120 ("Paddy+Dairy"- 30, "Paddy+ Dairy+ Horticulture"- 30, "Sugarcane+Dairy"- 30, and "Sugarcane+ Dairy+Horticulture"- 30).

"A developed and validated livelihood security scale was used to measure dependent variable (livelihood security). Total cost of production of each crop, yield obtained per crop, total gross income were considered to estimate the relative economics. Eighteen independent variables chosen for the investigation were quantified using structured schedules and standardized scales developed by various authors. Personal interview method was used to collect data. Data were examined using mean, standard deviation, correlation and path analysis" [5].

3. RESULTS AND DISCUSSION

The relative economics of the main farming systems adopted by farmers in Mandya district are presented in Table 1 and Table 2. The statistics in Table 1 indicates that ,in "paddy + dairy" farming system, the average cost of cultivation is Rs. 23,933.00, total income of Rs. 34,443.00 and a net income of 10,509.70. With regard to "paddy + dairy + horticulture" the net earnings is Rs. 49,250.00 where the average cost of cultivation is Rs. 71,150.00 and a total income is Rs. 1, 20,400.00. The total benefit cost ratio in 'paddy + dairy' farming system was 1.43, where the benefit cost ratio is 1.32 for paddy and 2.35 for dairy. The total benefit cost ratio in "paddy + dairy + horticulture" farming system was 1.69 where the benefit cost ratio for paddy, dairy and horticulture was 1.41, 2.36 and 1.78 respectively [6].

The facts in Table 2 shows that, in matter of 'sugarcane + dairy' farming system, the average cost of cultivation is Rs.29, 757.54, the total earnings was Rs. 73,500.00 and a net earnings

was Rs. 43,745.46. In terms of 'sugarcane+ dairy+horticulture' system the net income is Rs. 1,35,068.20, where the average cost of cultivation is Rs. 83,081.82 and a total income of was Rs. 2,18,150. The total benefit cost of 'sugarcane+dairy' farming system was 2.47 where the benefit cost ratio for sugarcane and dairy was 2.47 and 2.44 respectively. The total benefit cost ratio under "sugarcane + dairy + horticulture" farming system was 2.62 where the benefit cost ratio was 2.94 for sugarcane, 2.63 for dairy and 2.44 for horticulture.

The 'sugarcane+dairy+horticulture' (1:2.62) which is followed by 'sugarcane+dairy' (1:2.47) was found highest cost benefit ratio which is followed by 'paddy+dairy+horticulture' (1:1.69) and 'paddy+dairy' (1:1.43). A possible reason for the decline in the above results could be that due to the availability of irrigation for farmers at Pandavapura, they cultivate horticultural crops like banana, tomato, coconut etc. in addition to sugarcane. Therefore, these horticultural crops bring more profit to farmers at lower costs.

Six dimensions have been identified to examine the livelihood security of farmers adopting different farming systems, i.e. Food and nutrition security, economic security, ecological security, social security, psychological security and physical security. A quantitative analysis of the livelihood security of farmers under different farming systems in the Mandya region is presented in Table 3 and discussed in Table 3.

The facts in Table 3 show that in the matter of 'Paddy+Dairy' farming system, social security (63.33%, rank I), food and nutrition security (61.33%, rank II), environmental security (60.66%, rank III) and personality development (58.66%, rank IV) were the most important dimensions of livelihood security. Similarly, ecological security (70.00%, rank I), food and nutrition security (68.66%, rank II), economic security (67.33%, rank III) and social security (66.00% rank IV) in 'paddy+dairy+horticulture' farming system were predominant dimensions of livelihood security in the "paddy+dairy+gardening" farming system. "One possible reason for these results is that rice is the staple food of farmers. Therefore, food and nutrition security ranks first in the paddy farming system" [7].

Table 3 explaining that under 'sugarcane+dairy' farming systems, ecological security (73.3%, rank I), social security (70.00%, rank II),

Table 1. Relative economics of main farming systems adopted by farmers in K.R.Pete taluk of Mandya district

					In rupees
Farming systems	Crops	Average cost of production/cultivation	Gross income	Net income	Benefit cost ratio
P+D (n=30)	Paddy (per acre)	21,333.30	28333.00	6999.7.00	1.32
	Dairy (per cross breed of cow per month)	2600.00	6110.00	3510.00	2.35
	Total	23933.30	34443.00	10509.70	1.43
	<hr/>				
P+D+H (n=30)	Paddy(per acre)	22400.00	31800.00	9400.00	1.41
	Dairy (per cross breed of cow per month)	2750.00	6500.00	3750.00	2.36
	Horticulture (per acre)	46000.00	82100.00	36100.00	1.78
	Total	71150.00	120400.00	49250.00	1.69
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<i>P+D= Paddy+ dairy, P+D+H=Paddy+dairy+horticulture</i>					

Table 2. Relative economics of main farming systems adopted by farmers in Pandavapura taluk of Mandya district

					In rupees
Farming systems	Crops	Average cost of production/ cultivation	Gross income	Net income	Benefit cost ratio
Sug+D,(n=30)	Sugarcane (per crop)	27090.91	67000.00	39909.09	2.47
	Dairy (per cross breed of cow per month)	2663.63	6500.00	3836.37	2.44
	Total	29754.54	73500.00	43745.46.00	2.47
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Sug+D+H (n=30)	Sugarcane (per crop)	29181.82	86000.00	56818.18.00	2.94
	Dairy (per cross breed of cow per month)	2900.00	7650.00	4750.00	2.63
	Horticulture (per acre)	51000.00	124500.00	73500.00	2.44
	Total	83081.82	218150.00	135068.20	2.62
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<i>Sug+D=Sugarcane + dairy, Sug+D+H= Sugarane+dairy+horticulture</i>					

Table 3. Dimension wise livelihood security of the farmers adopting various farming systems in Mandya district [12]

Sl. No.	Dimensions	Scores	% of scores	Rank
A. "Paddy + Dairy" (n₁=30)				
1	Food and nutritional security	92	61.33	II
2	Economic security	85	56.00	V
3	Ecological security	91	60.66	III
4	Social security	95	63.33	I
5	Psychological security	88	58.66	IV
6	Physical security	84	56.00	VI
B. "Paddy +Dairy+Horticulture" (n₂=30)				
1	Food and nutritional security	103	68.66	II
2	Economic security	101	67.33	III
3	Ecological security	105	70.00	I
4	Social security	99	66.00	IV
5	Psychological security	96	64.00	V
6	Physical security	88	58.66	VI
C. "Sugarcane +Dairy" (n₃=30)				
1	Food and nutritional security	92	61.33	VI
2	Economic security	101	67.33	III
3	Ecological security	110	73.33	I
4	Social security	105	70.00	II
5	Psychological security	98	65.33	IV
6	Physical security	95	63.33	V
D. "Sugarcane+Dairy" (n₄=30)				
1	Food and nutritional security	105	70.00	III
2	Economic security	112	74.66	II
3	Ecological security	98	65.33	IV
4	Social security	115	76.66	I
5	Psychological security	95	63.33	V
6	Physical security	92	61.33	VI

economic security (67.33%, rank III) and psychological security (65.33%, rank IV) are main dimensions of livelihood security. Similarly, with regard to 'sugarcane+dairy+horticulture' farming system social security (76.66%, rank I), economic security (74.66%, rank II), food and nutrition security (70.00%, rank III) and environmental security (65.33%), rank IV) were predominant dimensions [8-10].

A possible reason for the above results could be that agricultural diversification enhance water use efficiency, stimulates recycling of agricultural waste, decreases vulnerability to unfavourable climatic conditions, etc. In addition, farmers have adopted 'paddy+dairy' and 'paddy+dairy+horticulture' components, which provide food round the year, so their food and nutrition security is good. "In addition, combination of various farm components provides farmers recognition in society and ensures year-round employment for the members of the farm family; and also contributes to the construction of house, buying of equipment, etc., which leads to physical security. The combination of farm components helps to improve farmers' knowledge, gives confidence and leads to high satisfaction" [11-14,15].

4. CONCLUSION

Various farming systems practiced by farmers have provided productive recycling of the output of one component as an input for another. It also provides year-round cash flow through the sale of milk and vegetables. The 'sugarcane + dairy + horticulture' farming system has contributed more to total income with lower production costs. Therefore, the dimension of economic security of livelihood and environmental security have priority. Therefore, it is necessary to spread the cropping system of 'sugarcane+dairy+horticulture' farming system among the farmers wherever possible with sugarcane along with horticultural crops through appropriate extension interventions of the development department to strengthen the livelihood security of farmers in Mandya district.

5. RECOMMENDATIONS

The study showed that farmers in the 'paddy+dairy' and 'paddy+dairy+horticulture' farming systems have low levels of livelihood security due to lack of remunerative price for paddy. Therefore, it is obligatory to provide

minimum support price for paddy, provide technical advice, and conduct training programs to motivate farmers to diversify their agriculture so that they can secure their income and livelihood. The farmers who practiced 'sugarcane+dairy' farming system had worse livelihood security than the farmers who practiced 'sugarcane+dairy+horticulture' farming system, where the farmers had greater livelihood security. Therefore, the 'sugarcane+dairy+horticulture' farming system must be popularized by providing an assured market for horticultural products and minimum support price for sugarcane.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Harish Kumar HV. Livelihood security of farm households under different farming systems in Kolar District of Karnataka– An Economic Analysis. M.Sc. (Agri.) Thesis (Unpub.), Univ. Agric. Sci., Bangalore; 2012.
2. Anonymous. Indian Economic Survey, Government of India; 2018.
3. Behera UK, Jha KP, Mahapatra IC. Generation of income and employment – A success story, Intensive Agriculture. 2001;39(7,8):9-14.
4. Mamathalakshmi, N. An analysis of livelihood security among agricultural labourers in Karnataka. Ph.D. (Agri.) Thesis (Unpub.), Univ. Agric. Sci., Bangalore; 2013.
5. Shwetha NV, Shivalingaiah YN, Suresha SV. Relative economics of farmers practicing different farming systems and their impact on livelihood security in Chikkaballapur district of Karnataka. Journal of Pharmacognosy and Phytochemistry. 2020;9(1):1018-22.
6. Mahesh M. Livelihood security of farmers in Karnataka an Econometric analysis. Ph.D. (Economics), Univ. of Mysore, Mysore; 2014.
7. Yashodhara B. A Comparative analysis of livelihood status in irrigated and rainfed farming situations in central dry zone of Karnataka. Ph. D. (Agri.) Thesis (Unpub.), Univ. Agric. Sci. Bangalore; 2015.
8. Vinodkumar S Naik, Desai BK. Dairy based farming system models for livelihood security of small and marginal farmers of north eastern Karnataka. Int. J. Chemical Studies. 2017;5(3):805-808.
9. Lakshmi Narayani S. A study on livelihood security of farmers in Virudhnagar District of Tamil Nadu. M.Sc. (Agri) Thesis (Unpub.), Univ. Agric. Sci., Bangalore; 2009.
10. Smitha Baby. Livelihood security of rural community: A critical Analysis. Ph.D. (Agri.) Thesis (Unpub.), Division of Agricultural Extension, IARI, New Delhi; 2005.
11. Hari Ram Barela, Sujeet Kumar Jha, Chandan Kumar Rai and Raja Yadav. Assessment of livelihood security of tribal farmers: A case study from tribal area of Madhya Pradesh, India. Int. J. Curr. Microbiol. App. Sci. 2018;7(3):1135-114.
12. Swaminathan MS. From Stockholm to Riodijaneirio: The road to sustainable agriculture. Monograph No.4, M. S. Swaminathan Research Foundation, Chennai; 1990.
13. Mahapatra IC, Bapat SR. Farming systems research: challenges and opportunities. Proceedings of the XII national symposium held at Rajasthan agricultural university, Bikaner. 1992;382-390.
14. Singh M, Joshi AS. Economic analysis of crop production and dairy farming on marginal and small farms in Punjab. Agricultural Economics Research Review. 2008;21(2):251-258.
15. Shwetha NV, Sachan S, Shivalingaiah YN. Comparative analysis of livelihood security of the farmers practicing different farming systems in Mandya district of Karnataka. Plant Archives (09725210). 2021;21(1).

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