RESEARCH ARTICLE

A Critical Analysis of Livelihood Security of Livestock Farmers in Tamil Nadu

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Abstract

The study was conducted in the north eastern zone of Tamil Nadu state in Tiruvallur, Kancheepuram, and Villupuram districts. A total of 200 respondents (40 each raising cattle, buffalo, sheep, goat, and pigs) and 40 non-livestock farmers, were selected. A Livelihood Security Index was developed, comprising eight dimensions: food, economic, livestock farming, health, education, socio-psychological, infrastructure, and environmental security. The food security index was found to be medium among most livestock farmers but high for pig farmers, while non-livestock farmers ranged from medium to high. The economic security index was high for cattle, buffalo, goat, and non-livestock farmers, medium for pig farmers, and medium to high for sheep farmers. The farming security index varied from medium to high for cattle, sheep, and non-livestock farmers but was medium for buffalo, goat, and pig farmers. The health security index was high for buffalo, pig, and non-livestock farmers, medium for cattle, and medium to high for sheep and goat farmers. In respect of educational security index, all the livestock farmers were in high category and medium to high for non-livestock farmers. The socio-psychological and infrastructure security index ranged from medium to high across all groups. The environmental security index was highest for cattle farmers but lower for goat, pig, and non-livestock farmers. Overall, livelihood security was medium to high for cattle, buffalo, and non-livestock farmers but lower for sheep, goat, and pig farmers. These findings can aid policymakers in designing targeted interventions which will boost the livelihood security of livestock farmers.

Key words: Livelihood analysis, Livelihood Indicators, Livelihood Security Index (LSI), Livestock Farmers.

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Introduction

Livestock makes a multifaceted contribution to the socio-economic status of rural people. Livestock contribute 5.50 % of total Gross Value Added (GVA) to national GVA and 30.23 % to agricultural GVA (DAHD, 2023). Over the past three decades, the growth rate in the livestock sector has improved, going from 3.5 % per year between 2000 and 2004 up to 7.5 % per year from 2012 to 2020. This growth has been significantly higher than the overall growth in the agricultural sector, which was between 1 % per year from 2000 to 2004 and 3.5 % per year from 2005 to 2011 (NAAS, 2023).

As of 2019, landless agricultural labourers, marginal farmers, and small farmers own 69 % of total livestock, implying a more equitable distribution of livestock holdings than land capital and livestock contributed 15 % to the average monthly income of rural households, which is an increase from 13 % in 2013 (NSSO, 2021). Thus, the growth in the livestock sector is more pro-poor; at a similar rate of growth, the livestock sector has a 1.4 times larger impact on poverty reduction than does the crop sector (Birthal, 2022).

Livestock is a substantial source of income for 22.90 % of landless people and 9.60 % of marginal and small farmers (Bhanwala, 2018). With the increasing share of livestock sector in agriculture, the role of livestock in the livelihood of the landless, marginal and small farmers become imperative and also with increasing per capita income, urbanization, and changing lifestyles associated with economic development, a shift in dietary patterns is seen and consumption of livestock products is increasing at a rapid rate. Against this backdrop, the present study was conducted to explore the livelihood security of livestock farmers in Tamil Nadu.

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Materials and Methods

"*Ex- post facto-effect to cause*" research design was adopted and the study was conducted in the North Eastern zone of Tamil Nadu state which consists of six districts, out of which three districts, *i.e.*, Tiruvallur, Kancheepuram and Viluppuram

were selected randomly. A total of 200 respondents, comprising of 40 each actively engaged in cattle, buffalo, sheep, goat and pig farming were selected from these three districts. The number of livestock farmers selected in each district was based on the livestock population of the selected district. A total of 40 non-livestock farmers, those who were involved in agriculture only were also chosen from the blocks from where the livestock farmers were selected as control group.

"Livelihood Security" was operationalized as adequate access to income and other resources to meet basic needs including food and nutrition, health facilities, habitat facilities, educational opportunities and community participation and social integration. Based on the available literature and through discussion with experts in relevant field, dimensions of livelihood security were identified and grouped into eight categories, *viz.,* Food security, Economic security, Livestock farming security, Health security, Education security, Socio- psychological security, Infrastructure security and Environmental security.

Based on their perceived significance, specific weightage (scale values) were given to each dimension of the Livelihood Security Index (LSI). The Normalized Rank Order Method suggested by Guilford (1954) was used for determining the scale values. The eight different dimensions of LSI were ranked by the group of judges according to their perceived significance in determining the status of livelihood security of livestock farmers. Judges response was taken through questionnaires. Indicators under each dimension of LSI were selected through expert consultation and literature review. The various set of items/statements was prepared under each indicator for final data collection from the respondents. The total score of each dimension was converted into unit score by using simple range and variance as given below.

$$Uij = \frac{Yij - Min\ Yij}{Max\ Yj - Min\ Yj}$$

Where, Uij = Unit score of the i^{th} respondent on j^{th} component, Max Yj and Min Yj = Maximum and Minimum score on the j^{th} dimension

Then, the unit scores of each respondent was multiplied by respective scale value of the each dimension and summed up. Thus, the score obtained was divided by the sum of scale values in order to get the LSI for each respondent.

$$LSIi = \frac{\sum Uij * Sj}{Sum\ of\ scale\ values}$$

Where, LSIi = Livelihood Security Index of i^{th} respondent, Sj = Scale value of the j^{th} component; Σ= Sum

The respondents were classified into low, medium and high livelihood security status based on the range of total livelihood security index scores by cumulative square root frequency method.

Results and Discussion

Food Security

Table 1 indicated that more than one-half (52.50 %) cattle farmers, one-half (50.00 %) buffalo farmers, three-fourth (75.00%) sheep farmers had medium food security index. More than one-half (57.50 % each) of goat and pig farmers were found in medium and high categories of food security index, respectively, while among non-livestock owners, slightly more than two-fifths (42.50 %) had high food security index. The results were in disagreement with that of Eqbal (2015), Barela (2017), Kumar *et al*. (2018) and Girish *et al*. (2020). Cattle, buffalo and non-livestock farmers obtain food regularly from the farm produce for their family needs. The reason for majority of pig farmers found in high category of food security might be that they concentrate more on affordability and availability than quality.

Economic Security

As per Table 1, one-half (50.00%) cattle farmers, more than one-half (52.50 %) buffalo farmers had high economic security index. Sheep farmers were evenly split between high and medium (40.00% each) categories, more than one-half (52.50 %) goat farmers were found in high category, whereas more than one-half (57.50 %) pig farmers belonged to medium category. One-half (50.00 %) of the non-livestock farmers among them had high economic security index. The results were in agreement with the findings of Kumar *et al*. (2018) and contradictory to that of Eqbal (2015), Barela (2017) and Girish *et al*. (2020).

Highest mean of economic security index was found among sheep farmers as sheep were maintained in huge numbers in comparison to other livestock which provided them to have better savings which in turn helped to manage their expenses as well as any debt. Cattle and buffalo farmers also had high economic security, benefiting from regular income generation through sale of milk on daily basis. Thus, livestock farming ensured year-round employment, secured additional income, and provided greater economic security than agricultural activity alone. The results showed more economic security in all livestock farming categories as livestock serves as both a regular income source and a readily disposable asset.

Farming Security

Almost three-fourth (72.50 % when taken together) cattle farmers were found in medium (37.50 %) to high (35.00 %) category, more than one-half (57.50 %) buffalo farmers had medium farming security index. Among sheep farmers, more than three-fourths (77.50 % when combined together) belonged to medium (40.00 %) to high (37.50 %) category while equal percentage (55.00 %) of goat as well as pig farmers were found in medium category. Almost one-half (45.00 %) of non-livestock farmers belonged to high category of farming security index (Table 1).

Table 1: Distribution of the farmers according to Food Security Index, Economic Security Index and Farming Security Index

Index	Category	Cattle farmers (n=40)	Buffalo farmers (n=40)	Sheep farmers (n=40)	Goat farmers (n=40)	Pig farmers (n=40)	Non-livestock farmers (n=40
Food Security Index	Low	06 (15.00)	08 (20.00)	08 (20.00)	07 (17.50)	05 (12.50)	07 (17.50)
		[< 0. 78]	[< 0.74]	[< 0.68]	[< 0. 63]	[< 0.66]	[< 0.72]
	Medium	21 (52.50)	20 (50.00)	30 (75.00)	23 (57.50)	12 (30.00)	16 (40.00)
		[0.78 – 0.83]	[0.74 – 0.82]	[0. 68– 0.74]	[0. 63 – 0. 72]	[0.66 – 0.72]	[0.72 – 0.77]
	High	13 (32.50)	12 (30.00)	02 (5.00)	10 (25.00)	23 (57.50)	17 (42.50)
		[> 0. 83]	[> 0.82]	[> 0.74]	[> 0. 71]	[> 0.72]	[> 0.77]
	Mean	0.79	0.78	0.71	0.67	0.70	0.75
Economic Security Index	Low	09 (22.50)	07 (17.50)	08 (20.00)	05 (12.50)	05 (12.50)	12 (30.00)
		[< 0.71]	[< 0.61]	[< 0. 85]	[< 0.73]	[< 0.48]	[< 0.61]
	Medium	11 (27.50)	12 (30.00)	16 (40.00)	14 (35.00)	23 (57.50)	08 (20.00)
		[0.72 – 0.85]	[0.61 – 0.96]	[0.85 – 0.96]	[0.73 – 0.84]	[0.48 – 0.60]	[0.61 – 0.64]
	High	20 (50.00)	21 (52.50)	16 (40.00)	21 (52.50)	12 (30.00)	20 (50.00)
		[> 0. 85]	[> 0. 96]	[> 0. 96]	[> 0.84]	[> 0.60]	[> 0.64]
	Mean	0.80	0.78	0.90	0.82	0.57	0.64
Farming Security Index	Low	11 (27.50)	03 (7.50)	09 (22.50)	06 (15.00)	08 (20.00)	09 (22.50)
		[< 0.64]	[< 0. 54]	[< 0.47]	[< 0.57]	[< 0.28]	[< 0.58]
	Medium	15 (37.50)	23 (57.50)	16 (40.00)	22 (55.00)	22 (55.00)	13 (32.50)
		[0.64-0.85]	[0.54-0. 77]	[0.47-0.70]	[0.57-0.77]	[0.28-0.49]	[0.58-0.71]
	High	14 (35.00)	14 (35.00)	15 (37.50)	12 (30.00)	10 (25.00)	18 (45.00)
		[> 0.85]	[> 0. 77]	[> 0.70]	[> 0.77]	[> 0.49]	[> 0.71]
	Mean	0.72	0.68	0.62	0.67	0.42	0.66

Figures in parentheses indicate percentage; figures in square brackets indicate cumulative square root frequency ranges

Sheep farmers were found to have lower farming security than cattle, buffalo and goat farmers as sheep were reared in large flock sizes, limited grazing land, insufficient inputs, and distant markets from their respective villages. Pig farmers had lowest farming security, facing restrictions on open grazing, inadequate vaccine supply, and limited access to technology and services. Poor veterinary facilities, low technology use, and inefficient marketing contributed to lower farming security among sheep, goat, and pig farmers. Non-livestock farmers had better farming security, likely due to optimal resource use in agriculture.

Health Security

Table 2 shows that 52.50% of cattle farmers had medium health security index, while 57.50% buffalo farmers were found in high category. Majority (82.50 % when taken together) sheep farmers belonged to medium (45.00 %) to high (37.50 %) category, majority (80.00% when combined together) of goat farmers were found in medium (42.50%) to high (37.50%) category while more than two-third (67.50 %) pig farmers had high health security index. Among non-livestock farmers, 57.50 % were found in high category. The results were contradictory with that of Eqbal (2015), Barela (2017), Kumar *et al*. (2018) and Chandegara *et al.* (2024).

Health security ranged from medium to high across all groups, likely due to accessible health centers, affordability, and proper health status of farmers. More or less similar health security observed may reflect farmers satisfaction with the health services provided by the institutions in the villages.

Education Security

One-half (50.00 %) of cattle, sheep and goat farmers, more than one-half (55.00 %) of buffalo farmers, almost two-fifths (37.50 %) of pig as well as non-livestock farmers belonged to high category of education security index (Table 2). This was in contradiction with the results of Eqbal (2015), Barela (2017) and Chandegara *et al.* (2024). The implementation of various educational schemes and higher secondary schools at the taluk level likely contributed to similar education security across farmers, except pig farmers, who were evenly distributed across low, medium, and high categories.

Socio-Psychological Security

Table 2 shows that almost half (45.00 %) cattle farmers, slightly more than two-fifths (42.50 %) of buffalo as well as pig farmers had high socio-psychological index. Majority (87.50 % when combined together) of sheep farmers belonged to medium (47.50 %) to high (40.00 %) to high category while more than

Table 2: Distribution of the farmers according to Health Security Index, Education Security Index and Socio-Psychological Security Index

Index	Category	Cattle farmers (n=40)	Buffalo farmers (n=40)	Sheep farmers (n=40)	Goat farmers (n=40)	Pig farmers (n=40)	Non-livestock farmers (n=40
Health Security Index	Low	09 (22.50)	06 (15.00)	07 (17.50)	08 (20.00)	09 (22.50)	07 (17.50)
		[< 0. 81]	[< 0.64]	[< 0.70]	[< 0.78]	[< 0.78]	[< 0.71]
	Medium	21 (52.50)	11 (27.50)	18 (45.00)	17 (42.50)	04 (10.00)	10 (25.00)
		[0.81 – 0.91]	[0.64 – 0.84]	[0.70 – 0.84]	[0.78 – 0.85]	[0.78 – 0.85]	[0.71 – 0.77]
	High	10 (25.00)	23 (57.50)	15 (37.50)	15 (37.50)	27 (67.50)	23 (57.50)
		[> 0.91]	[> 0.84]	[> 0.84]	[> 0. 85]	[> 0.85]	[> 0.77]
	Mean	0.86	0.76	0.78	0.81	0.83	0.76
Education Security Index	Low	09 (22.50)	10 (25.00)	08 (20.00)	12 (30.00)	13 (32.50)	11 (27.50)
		[< 0.66]	[< 0.66]	[< 0.66]	[< 0.65]	[< 0.66]	[< 0.66]
	Medium	11 (27.50)	08 (20.00)	12 (30.00)	08 (20.00)	12 (30.00)	14 (35.00)
		[0.66 – 0. 82]	[0.66 – 0.82]	[0.66 – 0.82]	[0.65 – 0.81]	[0.66 – 0.82]	[0.66 – 0.82]
	High	20 (50.00)	22 (55.00)	20 (50.00)	20 (50.00)	15 (37.50)	15 (37.50)
		[> 0. 82]	[> 0.82]	[> 0.82]	[> 0.81]	[> 0.82]	[> 0.82]
	Mean	0.76	0.77	0.76	0.75	0.69	0.77
Socio-Psychological Security Index	Low	09 (22.50)	09 (22.50)	05 (12.50)	12 (30.00)	12 (30.00)	11 (27.50)
		[< 0.66]	[< 0.61]	[< 0.44]	[< 0. 49]	[< 0.38]	[< 0.53]
	Medium	13 (32.50)	14 (35.00)	19 (47.50)	13 (32.50)	11 (27.50)	14 (35.00)
		[0.67 – 0. 82]	[0.62 – 0.83]	[0.44 – 0.60]	[0.49 – 0.60]	[0.38 – 0.49]	[0.53 – 0.70]
	High	18 (45.00)	17 (42.50)	16 (40.00)	15 (37.50)	17 (42.50)	15 (37.50)
		[> 0.82]	[> 0.83]	[> 0.60]	[> 0.60]	[> 0.49]	[> 0.70]
	Mean	0.77	0.77	0.54	0.54	0.44	0.63

Figures in parentheses indicate percentage; figures in square brackets indicate cumulative square root frequency ranges

one- third (37.50 %) of goat as well as non-livestock farmers were found in high category of socio-psychological index. The results were in concurrence with the reports of Kumar *et al*. (2018), Barela (2017), Girish *et al.* (2020) and contradictory with that of Eqbal (2015) and Chandegara *et al.* (2024).

Majority of cattle and buffalo farmers were in high category, likely due to their higher social status, leadership roles, and confidence in handling crises. Their involvement in farming fostered trust, responsibility, awareness of scientific techniques, and overall satisfaction beyond financial gains. This study confirmed high socio-psychological security means of 0.77 for cattle and buffalo farmers and 0.63 for non-livestock farmers. Sheep farmers, following traditional practices, may not prioritize recognition or membership in farming organizations, resulting in medium socio-psychological security.

Infrastructure Security

It is evident from Table 3 that almost one-half (45.00%) of cattle farmers belonged to high category while 42.5% of buffalo farmers as well as non-livestock had medium infrastructure index. Sheep farmers were evenly split between high and medium (40.00% each) categories, more than one-third (70.00 % when taken together) goat farmers belonged to medium (37.50 %) to high (32.50 %) category, while slightly less than two-fifths (37.50 %) of pig farmers were found in high category of infrastructure index. The results were in agreement with the findings of Eqbal (2015), Barela (2017), Kumar *et al*. (2018), Girish *et al.* (2020) and Chandegara *et al.* (2024).

As infrastructure is a community property, it improves with farmer satisfaction and frequent use of community services. The infrastructure security index was more or less similar in all categories, except pig farmers as they were not satisfied with the extent of services provided by the organizations and also support from Government agencies/ financial institutions/ Non-Governmental organizations.

Environment Security

One-half (50.00 % each) of cattle and pig farmers were found in high and medium categories of environment security index, respectively. Slightly less than one-half (47.50 %) buffalo farmers belonged to medium category, sheep farmers were evenly split between high and medium (35.00% each) categories. More than one-half (52.50 %) goat farmers and 55.00 % of non-livestock farmers had low and medium environment security index, respectively (Table 3).

Cattle and buffalo farmers had higher environmental security due to proper disposal of dead animals/animal

Table 3: Distribution of the farmers according to Infrastructure Security Index, Environment Security Index and Livelihood Security Index

Index	Category	Cattle farmers (n=40)	Buffalo farmers (n=40)	Sheep farmers (n=40)	Goat farmers (n=40)	Pig farmers (n=40)	Non-livestock farmers (n=40
Infrastructure Security Index	Low	08 (20.00)	09 (22.50)	08 (20.00)	12 (30.00)	11 (27.50)	11 (27.50)
		[< 0. 53]	[< 0.50]	[< 0.49]	[< 0.57]	[< 0.37]	[< 0.54]
	Medium	14 (35.00)	17 (42.50)	16 (40.00)	15 (37.50)	14 (35.00)	17 (42.50)
		[0. 53 – 0.61]	[0.50 – 0.61]	[0. 49 – 0.61]	[0.57 – 0.70]	[0.37 – 0.49]	[0.54 – 0.65]
	High	18 (45.00)	14 (35.00)	16 (40.00)	13 (32.50)	15 (37.50)	12 (30.00)
		[> 0. 61]	[> 0. 61]	[> 0. 61]	[> 0.70]	[> 0.49]	[> 0.65]
	Mean	0.59	0.57	0.58	0.63	0.43	0.59
Environment Security Index	Low	07 (17.50)	07 (17.50)	12 (30.00)	21 (52.50)	17 (42.50)	15 (37.50)
		[< 0.30]	[< 0.30]	[< 0. 11]	[< 0.03]	[< 0. 16]	[< 0.03]
	Medium	13 (32.50)	19 (47.50)	14 (35.00)	17 (42.50)	20 (50.00)	22 (55.00)
		[0.30 – 0.47]	[0.30 – 0.47]	[0.11 – 0.48]	[0.03 – 0.51]	[0.16 – 0.32]	[0.03 – 0.44]
	High	20 (50.00)	14 (35.00)	14 (35.00)	02 (5.00)	03 (7.50)	03 (7.50)
		[> 0.47]	[> 0.47]	[> 0.48]	[> 0.51]	[> 0.32]	[> 0.44]
	Mean	0.42	0.39	0.28	0.27	0.11	0.23
Livelihood Security Index	Low	11 (27.50)	11 (27.50)	12 (30.00)	12 (30.00)	12 (30.00)	11 (27.50)
		[< 0.70]	[< 0.65]	[< 0. 62]	[< 0.64]	[< 0.50]	[< 0.59]
	Medium	13 (32.50)	16 (40.00)	16 (40.00)	16 (40.00)	16 (40.00)	14 (35.00)
		[0.71 – 0.75]	[0.65 – 0.76]	[0.62 – 0.71]	[0.64 – 0.71]	[0.50 – 0.58]	[0.59 – 0.69]
	High	16 (40.00)	13 (32.50)	12 (30.00)	12 (30.00)	12 (30.00)	15 (37.50)
		[> 0.75]	[> 0.76]	[> 0.71]	[> 0. 71]	[> 0.58]	[>0.69]
	Mean	0.73	0.71	0.67	0.66	0.55	0.61

Figures in parentheses indicate percentage; figures in square brackets indicate cumulative square root frequency ranges

waste in prescribed manner and adoption of eco-friendly practices like manure application whereas, non-livestock farmers lacked knowledge of proper fertilizer and pesticide use, affecting soil and water management. Pig farmers had the lowest environmental security due to waste management issues.

Livelihood Security Index

It is noted from Table 3 that two-fifths (40.00 %) cattle farmers were found in high category, slightly less than three-fourths (72.50% when combined together) buffalo farmers had medium (40.00 %) to high (32.50 %) livelihood security index. Two-fifths (40.00 %) of the respondents among sheep, goat and pig farmers belonged to medium category. Among non-livestock farmers, more than one-third (37.50 %) were found in high category of livelihood security index. The results were in agreement with the findings of Kumar *et al*. (2018) Girish *et al*. (2020) and Chandegara *et al*. (2024) and in contradictory with that of Eqbal (2015) and Barela (2017). Based on the distribution of the respondents, all the livestock farmers and non-livestock farmers had medium to high livelihood security index as their security indices were similar.

Results from Table 4 revealed that there was no significant difference in the food, socio-psychological and environment security indices of cattle farmers and buffalo farmers as well as between sheep and pig farmers. Economic security index was similar among sheep and goat farmers, goat, cattle, and buffalo farmers, and between pig and non-livestock farmers. In case of farming security index, no significant difference was found among cattle, buffalo, goat and non-livestock farmers as well as among buffalo, goat, non-livestock and sheep farmers. There existed no significant difference in health security index among cattle, pig and goat farmers as well as among pig, goat and sheep farmers. Likewise, no significant difference was found among goat, sheep and buffalo farmers and also among sheep, buffalo and non-livestock farmers. Education and Infrastructure security indices showed no significant differences among cattle, buffalo, sheep, goat, pig and non-livestock farmers.

The food security index of goat farmers had significantly lower mean ± SD value than other farmers. The pig farmers have significantly lower mean ± SD value than other farmers in terms of farming, socio-psychological, infrastructure and environment security indices. Table 4 indicated that a significant difference existed between overall livelihood security index of cattle and buffalo farmers with that of sheep, goat and non-livestock including pig farmers. The overall livelihood security index of pig farmers had significantly lower mean ± SD values than other farmers.

Table 4: Comparison of dimensions of Livelihood Security Index of farmers involved in different farming

S. No.	Dimension of Security Index	Cattle farmers (n=40)	Buffalo farmers (n=40)	Sheep farmers (n=40)	Goat farmers (n=40)	Pig farmers (n=40)	Non-livestock farmers (n=40	F-value
1.	Food Security	0.79 ± 0.04^{a}	0.78 ± 0.04^{a}	0.71 ± 0.03^{c}	0.67 ± 0.04^{d}	0.70 ± 0.05^{c}	0.74 ± 0.07^{b}	41.058**
2.	Economic Security	0.80 ± 0.17^{b}	0.78 ± 0.19^{b}	0.90 ± 0.07^{a}	0.82 ± 0.10^{ab}	0.57 ± 0.15^{c}	0.63 ± 0.05^{c}	34.840**
3.	Farming Security	0.72 ± 0.18^{a}	0.68 ± 0.14^{ab}	0.62 ± 0.19^{b}	0.67 ± 0.15^{ab}	0.42 ± 0.20^{c}	0.66 ± 0.16^{ab}	15.591**
4.	Health Security	0.86 ± 0.05^{a}	0.76 ± 0.16^{cd}	0.78 ± 0.12^{bcd}	0.81 ± 0.11^{abc}	0.83 ± 0.09^{ab}	0.76 ± 0.09^{d}	5.120**
5.	Education Security	0.77 ± 0.19^{NS}	0.77 ± 0.20^{NS}	0.76 ± 0.18^{NS}	0.75 ± 0.21^{NS}	0.69 ± 0.17^{NS}	0.77 ± 0.18^{NS}	1.039^{NS}
6.	Socio-Psychological Security	0.77 ± 0.14^{a}	0.77 ± 0.16^{a}	0.54 ± 0.11^{c}	0.54 ± 0.12^{c}	0.44 ± 0.15^{d}	0.63 ± 0.23^{b}	29.812**
7.	Infrastructure Security	0.59 ± 0.10^{a}	0.57 ± 0.11^{a}	0.58 ± 0.11^{a}	0.63 ± 0.11^{a}	0.43 ± 0.11^{b}	0.59 ± 0.11^{a}	15.913**
8.	Environment Security	0.42 ± 0.21^{a}	0.39 ± 0.22^{a}	0.28 ± 0.23^{b}	0.27 ± 0.24^{b}	0.11 ± 0.10^{c}	0.23 ± 0.20^{b}	12.191**
Overall LSI		**0.73 ± 0.07^{a}**	**0.70 ± 0.08^{a}**	**0.67 ± 0.07^{b}**	**0.66 ± 0.08^{b}**	**0.55 ± 0.08^{c}**	**0.64 ± 0.06^{b}**	**27.402****

Differences in superscripts across rows indicate significance; **p<0.01, NS- Non-significant

Conclusion

The study highlights notable disparities in livelihood security levels among farmers involved in different farming. To improve the overall livelihood security, it is imperative to address their shared challenges. This can be achieved through collaborative efforts aimed at enhancing institutional support, increasing educational access, and reinforcing social networks, as well as implementing targeted measures to ensure sustainable livelihoods. A comprehensive strategy is needed that not only acknowledges but also utilizes the distinct strengths of each sector while simultaneously addressing their particular vulnerabilities. Such an approach will facilitate the bridging of livelihood security gaps and support the well-being of these crucial communities.

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