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Farm diversification a key livelihood strategy for employment generation and socio-economic improvement for the farmers in west Jaintia hills, Meghalaya

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Abstract

Agriculture is the primary livelihood source for rural households in India, particularly in the North Eastern Region, where small and fragmented landholdings limit income opportunities. Farm diversification has emerged as an important strategy to enhance income, improve livelihood security, and reduce vulnerability to risks. The present study was conducted in Laskein and Thadlaskein blocks of West Jaintia Hills district of Meghalaya to analyze the socio-economic profile of livestock farmers, identify factors affecting farm diversification, and assess its impact on livelihood systems and socio-economic status. A total of 120 respondents were selected, and data were collected using a structured interview schedule. The findings revealed that most farmers had moderate levels of resources, income, and diversification. Institutional and economic factors such as access to credit, market facilities, and farming experience were the key drivers of diversification, while demographic factors had less influence. Farm diversification was found to positively impact livelihood systems by increasing income, improving food security, and enhancing resilience to economic and climatic risks. It also contributed to employment generation and socio-economic improvement. However, the overall level of impact was moderate, indicating the need for strengthened extension services, improved market access, and policy support to enhance diversification outcomes.

Keywords: Farm diversification, Laskein, Thadlaskein, livelihood system, socio-economic status, Meghalaya

1. Introduction

Agriculture is the primary source of livelihood for about 58% of India's population (M. Satheesh, 2025) [7]. Farming systems in India are strategically utilized, according to the locations where they are most suitable. Most Indian farmers practice subsistence farming, producing mainly for household consumption with little or no surplus for the market. In Meghalaya, approximately 83% of the tribal population is engaged in agriculture, predominantly practicing shifting cultivation and terrace (bun) farming (Solomon *et al.*, 2005). However, these traditional practices often result in soil erosion, land degradation, loss of biodiversity, deforestation, and increased carbon emissions, thereby contributing to ecological imbalance and climate change (Manikant Kumar, 2023) [9]. In addition, the increasing population pressure, fragmented landholdings, and climatic uncertainties have made traditional farming systems less sustainable. Farm diversification has emerged as a key strategy to enhance income, reduce risks, and improve livelihood security. Meraner, Heijman, Kuhlman, and Fingre (2015) [10] define "diversification" as reallocating farm resources from traditional activities to generate alternative income sources. Agricultural diversification indicates the changes in crop-mix, enterprises-mix and activity-mix at household level (Chand, 1999) [11]. It not only enhances income but also contributes to food security, employment generation, and

resilience against economic and environmental shocks. The NE offers a conducive environment for diverse farming systems, including upland paddy, vegetables, and livestock. In Meghalaya, the state's favorable climate and natural resources offer significant potential for producing a variety of fruits, flowers, and medicinal plants, while also supporting agriculture and livestock rearing to ensure food security. Backyard piggery and poultry farming are widely practiced in the state and serve as crucial supplementary income sources, particularly for economically vulnerable households. These practices are especially significant in drought-prone, hilly, and remote areas where conventional agriculture alone may not be sufficient to sustain livelihoods. Leveraging these resources for sustainable practices is essential for their economic stability. In this context, the present study was undertaken to analyze the socio-economic characteristics of livestock farmers and examine the role of farm diversification in improving their livelihood systems and socio-economic status in West Jaintia Hills district of Meghalaya.

Materials and Methods

The study was conducted in Laskein and Thadlaskein blocks of West Jaintia Hills district of Meghalaya. A total of 120 respondents (60 from each block), having 2–3 livestock units along with backyard poultry and agricultural land, were selected using purposive sampling. Data were collected through personal interviews with the help of a structured schedule. Both independent and dependent variables were included in the study. Independent variables comprised socio-economic characteristics such as age, gender, family size, education, landholding, herd size, farming experience, social participation, mass media exposure, extension contact, and income. The dependent variables included factors affecting farm diversification, its effect on livelihood, and its impact on socio-economic status. To assess factors affecting farm diversification, a total of 20 potential factors were considered. These included age, number of working household members, education level, gender, family size, farming experience, skill development, herd strength, marital status, access to extension services, availability of market information, resource ownership, communication effectiveness, relationship with rural institutions, reliability of electricity supply, environmental changes, participation in training programmes, access to institutional credit, improved marketing facilities, and overall agricultural experience. For evaluating the effect of farm diversification on livelihood, 15 indicators were

developed covering economic, social, environmental, and technological dimensions. These included income enhancement, food security, risk mitigation, resource-use efficiency, value addition, sustainable practices, community engagement, women empowerment, and technology adoption. Similarly, to assess the impact on socio-economic status, 15 indicators were identified, including employment generation, income diversification, consumption patterns, resilience to shocks, market participation, decision-making ability, poverty reduction, and rural development. Data were collected during April, July, and October 2024 and analyzed using descriptive statistics and correlation coefficients to examine relationships between variables.

Results

Socio-Economic Profile of Respondents

The majority of respondents belonged to the middle age group (56.66%) and were predominantly male (58.33%). Most respondents were married (91.66%) and lived in nuclear families (97.50%) with medium family size (70.00%). Educational attainment was generally at the middle school level (33.33%). Landholding and herd size were mostly of medium category, indicating moderate resource availability. A significant proportion of respondents had medium levels of farming experience, social participation, mass media exposure, and extension contact. Income levels were also predominantly moderate, reflecting the subsistence-oriented nature of farming systems in the region.

Factors Affecting Farm Diversification

The data in Fig.1 revealed that identified institutional and economic factors as the most influential determinants of farm diversification. Access to institutional credit emerged as the most critical factor, with nearly all respondents acknowledging its importance. Other major influencing factors included farming experience, availability of market information, improved marketing facilities, and resource ownership. In contrast, demographic variables such as marital status and education were perceived as less influential. The data in table 1 showed that the mean scores of factors affecting farm diversification were 50.63 (Laskein), 45.30 (Thadlaskein), and 47.97 (pooled), with standard deviations of 4.35, 12.56, and 9.74, respectively. Most respondents fall under the medium category in all cases and the difference between the two blocks was highly significant ($Z = 3.10^{**}$).

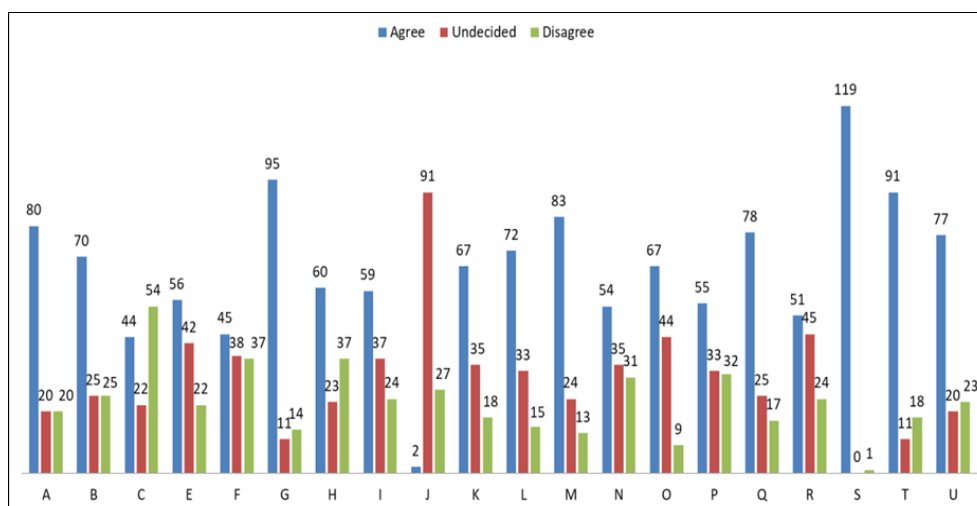


Fig 1: Factors affecting farm diversification

Factors affecting farm diversification

A= Age; B= Working household members; C= Education level; D= Gender; E= Family size F= Farming experience of the household head; G= Skill development H= Herd Strength; I= Marital Status; J= Extension Access; K= Market Information Access; L= Resource Ownership; M= Good

Ownership; N= Good Communication; O= Relationship with instruction; P= Supply of Electricity; Q= Environmental Changes; R= Participation in Training; S= Access to institution credit; T= Better Marketing Facilities; U= Agricultural experience.

Table 1: Frequency distribution of respondents on the basis of degree of influence of factors affecting farm diversification.

Variable	Block Under Study	Mean	SD	Range	Degree of influence			Z' Value
					Low	Medium	High	
Factor affecting farm diversification	Laskein	50.63	04.35	44-58	15(25.00)	28(46.66)	17(28.33)	03.10**
	Thadlaskein	45.30	12.56	24-60	09(15.00)	30(50.00)	21(35.00)	
	Pooled	47.97	09.74	24-60	24(20.00)	58(48.33)	38(31.66)	

Effect of Farm Diversification on Livelihood System: The data in Fig.2 revealed that Farm diversification was found to have a positive effect on the livelihood systems of respondents. A large proportion reported increased household income and improved access to nutritious food. Diversification also created opportunities for supplementary income through agritourism and value-added enterprises. It helped farmers mitigate risks associated with price fluctuations and adverse climatic conditions, while promoting efficient resource utilization and sustainable agricultural practices. Social benefits were also evident, including increased awareness, improved communication, enhanced political participation, and greater community involvement. Importantly, diversification contributed to women empowerment by providing opportunities beyond traditional roles.

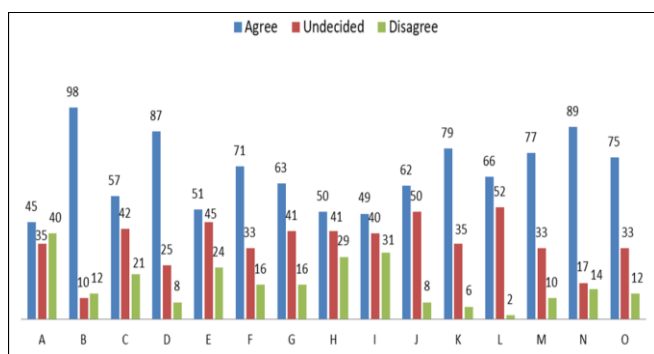


Fig 2: Effect of Farm Diversification on Livelihood system

Indicators of Farm diversification

A = Farm Diversification increases access to an adequate and nutritious diet.

B= Farm Diversification has raised the monthly income of the household.

C= Farm Diversification create opportunities for socialization

and community engagement

D= Farm Diversification can enables farmers to expand their income through agritourism

E= Farm diversification with Livestock integration boosts earnings

F= Farm Diversification Reduces risk from price fluctuations and weather

G= Farm diversification creates Resource Optimization (Efficient use of farm resources, Reduces waste & Promotes Sustainability)

H= Farm Diversification supports local employment and enterprises

I= Farm Diversification enhances ecosystem services and minimize environmental impact.

J= Farm Diversification promotes skill enhancement and empowerment

K= Farm Diversification Promotes agricultural education for sustainable agriculture

L= Technological integration enhances productivity, decision-making and overall farm management.

M= Farm diversity leads to modernity.

N= Farm Diversification promotes social development (Encourages community engagement, Increases market interaction & Builds political awareness)

O= Farm diversification enhance women empowerment by offering them opportunities beyond traditional agricultural roles.

The data in Table 2 showed that the mean effect of farm diversification on livelihood systems was 40.22 (Laskein), 37.97 (Thadlaskein), and 39.09 (pooled), with standard deviations of 2.75, 6.60, and 5.16, respectively. Most respondents fell in the medium category across all groups. The difference between the two blocks was statistically significant ($Z = 2.43^*$).

Table 2: Frequency distribution of respondents on the basis of degree Effect of farm diversification on Livelihood system

Variable	Block Under Study	Mean	SD	Range	Degree of effect			Z' Value
					Low	Medium	High	
Effect of farm diversification on Livelihood system	Laskein	40.22	02.75	36-45	14(23.33)	27(45.00)	19(31.66)	2.43*
	Thadlaskein	37.97	06.60	22-45	10(16.66)	33(55.00)	17(28.33)	
	Pooled	39.09	05.16	22-45	24(20.00)	60(50.00)	36(30.00)	

Impact on Socio-Economic Status

The data in fig.3 revealed that Farm diversification significantly improved the socio-economic status of respondents. It contributed to employment generation, increased income, and improved consumption patterns, particularly of livestock products such as milk, meat, and

eggs. Diversification reduced dependence on single-crop systems and enhanced resilience to economic shocks. It also supported rural development by promoting local enterprises, improving infrastructure, and strengthening community resilience. Additionally, diversification enhanced farmers', decision-making capacity and increased market participation.

It played a vital role in poverty reduction and provided opportunities for low-income households.

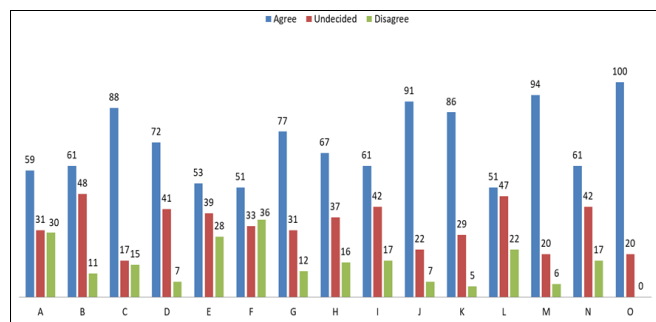


Fig 3: Impact of Socio-economic status

Indicators of the impact of Socio-economic status

A= Farm diversification created new employment opportunities.

B= Farm diversification broadens the spectrum of occupation within agriculture.

C= Farm diversification enhance livelihoods in irrigation-dependent areas by reducing dependency on a single crop rotation.

D= Farm diversification lead to a significant increase in household consumption of meat, eggs, and milk.

E= Access to market facilities encourages farmers to diversify

their products beyond traditional.

F= Diversified farms often improve community resilience by less dependent on single crops and large agricultural firms, helping sustain rural communities.

G= Diversifying farm activities increase income and provide additional sources of income.

H= Access to resources such as land, water, technology enable farmers to adopt more sustainable and profitable farming practices.

I= Diversification can make farm households more resilient to economic shocks.

J= Diversified farms can contribute to the development of rural communities by attracting tourists, supporting local business and providing infrastructure improvement.

K= Farm diversification has increase the decision making power in farm activities.

L= Diversification helped to achieve sustainable intensification by lowering mono cropping and boosting multiple cropping.

M= Farm Diversification increases market participation and income for poor.

The data in table 3 show that the mean impact of farm diversification was 40.28 (Laskein), 37.57 (Thadlaskein), and 38.93 (pooled). Most respondents fell under the medium category in all cases. The difference between the two blocks was highly significant ($Z = 2.77^{**}$).

Table 3: Frequency distribution of respondents on the basis of degree of affect of impact of farm diversification on socio-economic status

Variable	Block Under Study	Mean	SD	Range	Degree of affect			Z' Value
					Low	Medium	High	
Impact of farm diversification on socio-economic status	Laskein	40.28	02.31	36-43	11(18.33)	34(56.66)	15(25.00)	2.77**
	Thadlaskein	37.57	07.23	21-45	12(20.00)	31(51.66)	17(28.33)	
	Pooled	38.93	05.52	21-45	23(19.16)	65(54.16)	32(26.66)	

Discussion

The study revealed that most farmers were middle-aged, reflecting a balance of experience and active involvement in agriculture. Similar findings were observed by O.T. Olukunle, 2021^[12] and Nanda *et al.*, 2022^[11]. Male dominance was evident due to their role as household heads, while most respondents were married and lived in medium-sized nuclear families, consistent with the finding of Gummagolmath *et al.*, 2020^[4]. Farmers generally had medium levels of education, landholding, herd size, and farming experience, indicating semi-subsistence systems influenced by land fragmentation and backyard livestock practices which is similar with the findings of Ume *et al.*, 2020^[14] and Kumar *et al.*, 2018^[9]. Moderate levels of social participation, mass media exposure, extension contact, and income suggest limited but improving access to information, infrastructure, and institutional support. Similar findings were reported by Nongtdu *et al.*, 2012^[3]. Farm diversification was influenced by socio-personal, economic, institutional, and environmental factors, including age, family size, resource ownership, credit access, extension services, and market facilities, consistent with Kassie *et al.*, 2017^[6]. Diversification positively affected livelihoods by enhancing income, food security, and resilience while promoting sustainable practices and skill development, consistent with Heumesser & Kray, 2019^[5]. It also improved socio-economic status through employment generation, better consumption patterns, and reduced vulnerability to shocks, contributing to rural development and poverty reduction, similar with the findings of Dev *et al.*, 2017^[2].

Correlation Analysis Between Independent and Dependent Variables

Laskein Block

Correlation analysis revealed that *family size* ($r = 0.257$), **landholding* ($r = 0.251$), and *years of experience* ($r = 0.254$) were positively and significantly associated with farm diversification, indicating that labour availability, resource base, and farming knowledge enhance diversification. Extension contact ($r = 0.334^{**}$) showed a strong positive influence on impact, highlighting the role of institutional support. In contrast, *total annual income* ($r = -0.250$)* and *income from livestock and poultry* ($r = -0.254$)* were negatively correlated with the effect of diversification, suggesting that households with higher or alternative income sources rely less on diversification. These findings are in line with Gummagolmath *et al.*, 2020^[4].

Thadlaskein Block

In Thadlaskein Block, *age* ($r = 0.268$)* was positively and significantly related to the impact of diversification, indicating that middle-aged farmers benefit more due to experience and stability. However, *landholding* ($r = -0.297$)* and *mass media exposure* ($r = -0.293$)* showed negative significant relationships, implying that smaller farmers diversify more intensively while media exposure may shift focus away from agriculture. Further, *total annual income* ($r = -0.428$), *livestock income* ($r = -0.429$, -0.460), and *monthly income* ($r = -0.415$) were negatively correlated, suggesting that higher-income households depend less on farm

diversification. Similar trends were reported by O.T. Olukunle, 2021^[12].

Pooled Data

The pooled analysis showed that **age* ($r = 0.239$), **family size* ($r = 0.250$), **landholding* ($r = 0.268$), **herd size* ($r = 0.299$), **experience* ($r = 0.251$), and **extension contact* ($r = 0.256$) were positively and significantly associated with farm diversification. Additionally, *total annual income* ($r = 0.264$), **livestock income* ($r = 0.264$), and *monthly income* ($r = 0.261$) also showed positive relationships, indicating that better economic status enhances the capacity to adopt and benefit from diversification. These findings agree with the findings of Mandavkar *et al.*, 2020 and Akriti *et al.*, 2023.

Conclusion

The study concludes that livestock-based farming systems in West Jaintia Hills district are undergoing a gradual transition towards diversification. While diversification has positively influenced livelihood systems and socio-economic status, its overall level remains moderate. Enhancing diversification requires targeted interventions such as improved access to credit, strengthened extension services, promotion of modern technologies, and capacity-building programs. Government initiatives and institutional support can play a crucial role in accelerating this process. Overall, farm diversification serves as a vital pathway for improving income stability, reducing vulnerability, and promoting sustainable rural development in the region.

Conflict of Interest

Not available

Financial Support

Not available

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