



A Perception-based Study of Tribal Farmers Regarding Semi-intensive Mithun Rearing Systems in Nagaland, India

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ABSTRACT

The study was conducted between August and November, 2024 in four prominent Mithun-rearing districts of Nagaland- Phek, Peren, Kohima, and Kiphire. The objective of the study was to understand farmers' perceptions of the semi-intensive Mithun rearing system and to analyze the relationship between their profile characteristics and perceptions. A total of 240 farmers from 16 villages were selected using a multi-stage sampling method. Data were collected through a structured questionnaire, and farmers' perceptions were assessed on a five-point Likert scale. Findings revealed that the majority of farmers held a positive view of the semi-intensive system, acknowledging its benefits such as minimizing damage caused by Mithun to agricultural crops, providing better income, reducing calf mortality, enabling easier vaccination, offering better protection against predators, and improving herd management. Nevertheless, concerns were expressed about increased labour requirements and high initial infrastructure costs. Socio-economic and personal characteristics such as education, training, landholding size, innovativeness, extension contact, and livestock ownership significantly influenced perception levels. Among these, landholding, innovativeness, training, and extension contact together explained 81.4% of the variation in perception. The study concluded that the semi-intensive Mithun farming system had strong potential to enhance sustainable livestock production and improve the livelihoods of tribal farmers in Nagaland. With suitable policy interventions, capacity-building programs, and financial support, adoption of this system could be further strengthened to ensure both economic and ecological sustainability.

KEYWORDS: Mithun, semi-intensive rearing, tribal farmers, perception, relationship

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1. INTRODUCTION

Mithun (*Bos frontalis*), often regarded as the “pride of the hills,” is an indigenous bovine species that holds deep cultural, social, and economic significance for the tribal communities of Northeast India. Adapted to the hilly forest ecosystems, Mithun is predominantly found in Arunachal Pradesh, Nagaland, Manipur, and Mizoram, where it has traditionally been maintained under free-range systems (Mondal et al., 2014; Dorji et al., 2021). According to the 20th Livestock Census, the Mithun population in India was recorded at 3.86 lakhs in 2019, reflecting a 30 percent increase over the previous census (Anonymous, 2020). This trend indicates its continuing relevance in sustaining rural livelihoods. Beyond India, Mithun is also distributed in Bhutan, Myanmar, and Bangladesh, though the highest population remains in Arunachal Pradesh (Dorji et al., 2021).

The importance of Mithun goes far beyond its role as livestock. It is considered a store of wealth, a symbol of prestige, and a vital element in rituals and customary exchanges (Mepfhuo and Saharia, 2016; Haokip et al., 2024). For many tribes, Mithun serves as a vital form of social insurance, providing security during financial or agricultural crises. Its value extends beyond economics, embodying prestige and cultural identity. In Nagaland, this significance is vividly expressed in the celebrated ‘Feast of Merit’, where the sacrifice of Mithun symbolizes generosity, prosperity, and communal harmony. Hosting such a feast not only strengthens social bonds but also elevates the host’s social standing, marking them as a respected leader within the community. (Chamuah et al., 2025). Similarly, studies among the Kuki and Zo communities highlight the intricate human-Mithun relationships, which encompass ritual, kinship, and identity (Haokip et al., 2024; Naulak et al., 2025). In Arunachal Pradesh, Mithun is also closely linked with shifting cultivation systems, where it is regarded as both an agricultural and cultural asset (Tayo et al., 2014). Despite its revered position, traditional husbandry practices expose Mithun to challenges such as predation, diseases, and limited access to veterinary care (Rashamol and Sejian, 2018). This has prompted efforts to combine traditional wisdom with modern management practices. Semi-intensive rearing systems, which emphasize controlled grazing, supplementary feeding, and regular health monitoring, are increasingly being promoted to improve productivity and reduce risks (Chamuah et al., 2024). Research has also advanced in reproductive technologies, semen preservation, and nutrition, highlighting scientific avenues to strengthen Mithun farming (Perumal et al., 2013; 2014; 2018; 2022; Vikram et al., 2023). For instance, innovations in semen cryopreservation and assisted reproductive techniques offer solutions to genetic conservation, while studies on

Mithun meat and milk composition under semi-intensive conditions provide evidence of their nutritional richness (Lalchamlani et al., 2024; Devi et al., 2023). Nevertheless, the adoption of semi-intensive practices has been met with mixed perceptions. While some farmers acknowledge the benefits of improved productivity and disease management, others worry about the erosion of traditional values and community practices associated with Mithun (Mepfhuo and Saharia, 2016; Haokip et al., 2024). These perceptions are often shaped by socio-economic status, education, and livestock-rearing experience (Chamuah et al., 2024).

Given these realities, assessing farmers’ perceptions of semi-intensive Mithun husbandry is critical. Such an assessment can guide policy interventions that not only enhance livelihood security but also safeguard the cultural identity embedded in Mithun rearing. The present study was aimed to understand farmers’ perceptions of the semi-intensive Mithun rearing system and to analyze the relationship between their profile characteristics and perceptions about semi-Intensive rearing system.

2. MATERIALS AND METHODS

The study was conducted during August, 2024 to November, 2024 in four districts of Nagaland -Phek, Peren, Kohima, and Kiphire-selected purposively due to their active involvement in Mithun rearing. From each district, four villages were selected, namely Polami, Thevopisu, Porba, and Testunmi in Phek; Punglwa, Tening, Nzau, and Poilwa in Peren; Khonoma, Mezoma, Jotsoma, and Dzudza in Kohima; and Salomi, Pungro, Fakim, and Thenamir in Kiphire, totaling 16 villages. A sample of 240 Mithun-rearing farmers (15 farmers from each village) was selected using a multi-stage purposive sampling technique. Perception, as described by Morgan et al. (1993), referred to the awareness of objects, qualities, or events that activated the sense organs. Perception in this study was defined as the individuals’ understanding of the usefulness and their interpretations regarding different aspects of the semi-intensive Mithun rearing system based on their experiences. Based on the pilot study, literature available and discussion with experts, 16 statements were made, and responses were collected on a five-point scale (Fully Agree=5, Agree=4, Neither Agree nor Disagree=3, Disagree=2, Fully Disagree=1). The responses were scored, quantified, categorized and tabulated using mean, standard deviation, frequencies and percentages. After calculating the perception score, the respondents were classified into three categories-poor, average, and high perception-using the mean and standard deviation for validation. The correlation coefficient was calculated to assess the relationship between the profile characteristics of Mithun farmers and the dependent variable. The stepwise regression analysis, a

form of multiple regression, was utilized to evaluate how much independent variables affect perceptions of the semi-intensive Mithun rearing system.

3. RESULTS AND DISCUSSION

3.1. Overall perception of farmers towards semi-intensive Mithun rearing system

The farmers' views on the semi-intensive Mithun rearing system were examined by looking at both their overall perception and specific opinions on various aspects of the system. The findings are summarized in Tables 1 and 2. According to Table 1, a significant portion of farmers (67.92%) held a neutral or average perception of the system, while 20.83% had a high perception and 11.25% had a low perception.

Table 1: Overall perception of farmers towards semi-intensive mithun rearing system (N=240)

Sl. No.	Overall perception	Frequency (N=240)	Percentage
1.	Good perception (41-54)	27	11.25%
2.	Very good perception (55-67)	163	67.92%
3.	Excellent perception (68-82)	50	20.83%

Mean=61.67, S.D=8.44095

This pattern likely reflects a moderate understanding and acceptance of the system's benefits and practices. The farmers with an average perception are possibly in the process of transitioning, learning, and adapting to the semi-intensive approach. Factors like limited exposure to its advantages, insufficient training, or challenges related to resources may contribute to this moderate perception. Bhabhor et al., 2021 and Aiswarya et al., 2025 observed that farmers generally had a medium to high perception of animal husbandry practices.

3.2. Statement-wise perception of tribal farmers about semi-intensive mithun rearing system

The findings in Table 2 showed that the majority of farmers strongly agreed that the semi-intensive Mithun rearing system helped reduce the damage Mithun caused to crops. This aspect ranked the highest in terms of perceived benefit, with a mean score of 4.2458. It indicates that crop protection was a major concern for farmers, and the semi-intensive system effectively addressed this by limiting the free movement of Mithun. The second most recognized advantage was the system's ability to generate higher income for Mithun farmers, with a mean score of 4.175. This was mainly because the semi-intensive method is more cost-effective than fully intensive systems.

It reduced labor costs and lowered veterinary expenses through better disease management, leading to increased profits for farmers. The third key benefit, with a mean score of 4.0750, was the protection of Mithun from predators. Traditional grazing methods often left the animals vulnerable to attacks as they roamed freely through forests or isolated areas. In contrast, the semi-intensive system, which included fenced enclosures and controlled grazing areas, significantly reduced this risk by keeping predators away. Farmers widely appreciated how this system ensured the safety of their livestock, not just preventing direct losses from predators but also providing economic stability. The system also contributed to social harmony by reducing human-mithun conflicts (Mean=4.033, Rank IV). Another important advantage was its role in reducing the spread of diseases among Mithun (Mean=3.9334). By controlling Mithun movement and limiting exposure to contaminated water, parasites, and infected animals, disease risks were minimized. Regular monitoring, improved sanitation, and timely vaccinations contributed to better disease prevention, enhancing the overall productivity of Mithun farming (Mean=3.93, Rank VI). Farmers also valued the system for allowing better monitoring and supervision of their Mithun (Mean=3.9167), facilitating easier handling and vaccination (Mean=3.9042). The improved management capabilities provided by the semi-intensive system were recognized as significant operational advantages. Moreover, small farmers found the infrastructure requirements of the system to be manageable (Mean=3.9000). The semi-intensive system, with its basic structures like resting sheds and water stations, was affordable and practical for small-scale farmers, unlike fully intensive systems. The system's cost-effectiveness (Mean=3.8375) was another significant factor in its adoption, as it helped small farmers manage costs, apart from the initial establishment expenses. Despite these advantages, some challenges persisted, particularly with the quality and consistency of fodder. Inconsistent fodder availability could limit the effectiveness of the semi-intensive system, highlighting the importance of better fodder management and supply chains. Seasonal shortages underscored the need for alternative strategies, such as fodder banks and diversified crops, to maintain a steady supply year-round. These findings align with the research of Biam et al., 2021, Ghasura et al., 2023, and Sihag et al., 2022, who highlighted that such farming systems not only offer additional income and livelihood support with minimal space and labor requirements but also reduce damage caused by livestock to crops.

3.3. Relationship between profile characteristics of farmers and their perception about semi-intensive mithun rearing systems

A statistical approach using Karl Pearson's correlation coefficient (r) was employed to assess the relationship

Table 2: Statement-wise perception of tribal farmers about semi-intensive mithun rearing system

Sl. No.	Statements	Fully Agree	Agree	Neither agree or disagree	Disagree	Fully disagree	Mean	Perceived rank
1.	It minimizes damage caused by Mithun to agricultural crops.	87 (36.30%)	125 (52.10%)	28 (11.70%)	0 (0%)	0 (0%)	4.2458	I
2.	It increases the income of Mithun farmers	79 (32.90%)	124 (51.70%)	37 (15.40%)	0 (0%)	0 (0%)	4.1750	II
3.	It provides better protection against predators	106 (44.2%)	88 (36.70%)	4(1.7%)	42 (17.5%)	0 (0%)	4.0750	III
4.	It reduces human-Mithun conflicts in the community.	78 (32.50%)	92 (38.30%)	70 (29.20%)	0 (0%)	0 (0%)	4.0333	IV
5.	It reduces the risk of diseases spreading among Mithun	62 (25.80%)	126 (52.50%)	26 (10.80%)	26 (10.80%)	0(0%)	3.9334	V
6.	It can help improve the overall productivity of Mithun farming	68 (28.30%)	84 (35.00%)	88 (36.70%)	0 (0%)	0 (0%)	3.9333	VI
7.	It helps in better monitoring and supervision of the Mithun	64 (26.70%)	115 (47.90%)	35 (14.60%)	26 (10.80%)	0 (0%)	3.9167	VII
8.	It allows for easier handling and vaccination of Mithun	113 (47.10%)	62 (25.80%)	23 (9.60%)	12 (5%)	30 (12.50%)	3.9042	VIII
9.	The infrastructure requirements of the system are manageable for small farmers	66 (27.50%)	86 (35.80%)	84 (35.00%)	0 (0%)	4 (1.70%)	3.9000	IX
10.	The resting sheds with water and salt licks help farmers gather more Mithun in one place reducing the need to search for them in the forest	49 (20.40%)	135 (56.30%)	30 (12.50%)	26 (10.80%)	0 (0%)	3.8625	X
11.	The system is cost-effective compare to fully intensive method	43 (7.90%)	141 (58.80%)	30 (12.50%)	26 (10.80%)	0 (0%)	3.8375	XI
12.	It supports weight gain and overall growth in Mithun	55 (22.90%)	102 (42.50%)	71 (29.60%)	12 (5.00%)	0 (0%)	3.8333	XII
13.	It reduces the risk of disease spreading among the Mithun	66 (27.50%)	76 (31.70%)	84 (35.00%)	3 (1.30%)	11 (4.60%)	3.7625	XIII
14.	It allows Mithun to graze freely while still maintaining control over their movements	62 (25.80%)	117 (48.80%)	19 (7.90%)	12 (5%)	30 (12.50%)	3.7042	XIV
15.	It is more sustainable than traditional grazing practices	8 (3.30%)	122 (50.80%)	41 (17.10%)	69 (28.80%)		3.2875	XV
16.	The fodder availability is less enough in semi semi-intensive system	38 (15.80%)	41 (17.10%)	72 (30.00%)	89 (37.10%)	0 (0%)	3.1167	XVI

between farmers' characteristics and their views on the semi-intensive Mithun rearing system. The results, presented in Table 3, showed that out of nine variables, five had a positive influence on farmers' perceptions of the system. The independent variables-Extension Contact (0.608^{**}), Education (0.534^{**}), Training undergone (0.606^{**}), Innovativeness (0.561^{**}), and Livestock possession (0.373^{**})-were found to have a significant positive relationship with the perception of the semi-intensive Mithun rearing

system. This indicates that farmers with more exposure to extension services, higher levels of education, prior training, a more innovative mindset, and a larger number of livestock were more likely to have a positive view of the system. On the other hand, variables like Landholding (-0.473), Age (-0.533), Gender (-0.473), and Farming experience (-0.068) did not show a significant relationship with farmers' perceptions. Age, gender, and farming experience had a negative correlation with perceptions, suggesting that older

Table 3: Relationship between profile characteristics of Mithun farmers on perception of Semi-Intensive Mithun Rearing Systems

Sl. No.	Independent variables	(r' value)
1.	Extension contact	0.608**
2.	Education	0.459**
3.	Land holding	-0.473
4.	Age	-0.533
5.	Gender	-0.473
6.	Trainings undergone	0.606**
7.	Innovativeness	0.561**
8.	Farming experience	-.068
9.	Livestock possession	0.373**

** : Significant at 0.01 per cent level of probability

farmers, those with more years of experience, and those of certain genders may have less favourable views of the semi-intensive system. These findings were in line with the studies of Veni et al., 2022, and Verma et al., 2020, who also reported that extension contact, education, and innovativeness were positively related to farmers' perceptions, while age, gender, and farming experience had a negative correlation.

3.4. Significance of independent variables in shaping perceptions of the semi-intensive mithun rearing system

In behavioral sciences, it has been widely recognized that no single independent variable can solely influence a dependent

variable. Instead, the perception of the semi-intensive Mithun rearing system was shaped by a combination of multiple independent factors working together. These factors interacted with each other and collectively influenced the overall perception. To assess the specific impact of each independent variable, it was essential to isolate the effects of the others. One effective method for this analysis was stepwise regression, a technique often used in multiple regression analysis. This method allowed for the examination of each variable's contribution at every stage of the process. The findings from the stepwise regression analysis, presented in Table 4, showed that Extension Contact alone accounted for 36.7% of the variation in perceptions. When combined with Innovativeness, this figure rose to 49.9%. Furthermore, when Extension Contact, Innovativeness, and Training undergone were considered together, they explained 50.9% of the variation in farmers' perceptions of the semi-intensive Mithun rearing system. The R² values at each stage of the regression were found to be statistically significant, confirming the robustness of the model. These results were consistent with the study by Desai et al., 2024, which found that factors such as risk orientation, knowledge of organic farming, cropping intensity, annual income, and exposure to agricultural mass media had a significant impact on farmers' perceptions of organic farming. Together, these factors explained 28.7% of the variation in perceptions, further supporting the idea that multiple factors worked in tandem to shape perceptions.

Table 4: Relative importance of profile characteristics in explaining perception towards semi-intensive mithun rearing system

Model	Independent Variables	Multiple correlation coefficient (R)	Coefficient of multiple determination (R ²)	Adjusted R ²	Standardized coefficients	Total variation accounted (%)
1.	Extension contact	.608	.370	.367	.608	36.7%
2.	Extension contact +Innovativeness	.709	.503	.499	.466 .393	49.9%
3.	Extension contact +Innovativeness +Trainings undergone	.717	.515	.509	.338 .358 .179	50.9%

4. CONCLUSION

Tribal farmers in Nagaland understood the semi-intensive Mithun farming as a promising system, providing better income, improved herd management, and reduced crop damage, though challenges like labour and infrastructure costs persist. Perceptions were influenced by landholding, training, innovativeness, and extension contact.

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