Research Note
DoI: https://doi.org/10.58537/jorangrau.2025.53.1.15
J. Res. ANGRAU 53 (1) 141-147, 2025

LIVESTOCK INVESTMENT AND ITS IMPACT ON FARM INCOME AMONG MIXED FARMERS IN NAGALAND

SUNGJEMINLA LONGKUMER* and B. KILANGLA JAMIR

Department of Economics, Nagaland University Lumami - 798627, Nagaland

Date of Receipt : 18-12-2024 Date of Acceptance : 28-02-2025

ABSTRACT

The study estimates the pattern of livestock investment and its impact on farm income among mixed farmers of Nagaland. Additionally, the study also incorporates other livelihood assets owned by livestock farmers to identify the extent of their influence on farm income. The primary data pertains to the year 2020-21, collected through a multi-stage sampling technique conducted in Peren district of Nagaland, known as the "Green District of Nagaland" because of high diversity of flora and fauna offering significant potential abundant grazing areas. Information from 197 mixed farmers were collected to generate and interpret results. On average, farm households invest ₹ 38,293.75 annually in livestock, which constitutes about 27.75 per cent of total agricultural investment, with livestock contributing 40.33 per cent to total farm income. By farm size, the proportion of livestock investment in total farm investment was lower for marginal (29.27 per cent) and small farmers (21.79 per cent) than for medium farmers (33.64 per cent). Consequently, medium farmers earn a more significant proportion of income from livestock (46.03 per cent). Regression analysis results revealed that livestock investment, farm size, level of farmers participation in livestock management, and number of animals have positive impact on farm business income.The study suggests that there is catalyst for appropriate and higher government investment in agriculture and livestock operations by incorporating traditional knowledge and experience with the latest technologies.

Keywords: Farm income, Investment, Livelihood assets, Mixed farming, Multiple linear regression model

INTRODUCTION

India is an agrarian-based economy, where farmers are the backbone of the economy. For farming households, animal husbandry is crucial in generating additional income. Livestock has thus become a key component of the growing and changing agricultural sector in India. According to the Central Statistical Organization (CSO, 2019), within the agriculture sector, animal husbandry has emerged in recent years as the fastest-growing subsector. Agricultural growth has been significantly driven by the expansion of this subsector. Animal husbandry is significantly contributing to the agricultural sector and overall GDP. As of 2021-22, the livestock sector accounts for 30.19 per cent of Gross Value Added (GVA) in agriculture and

* Corresponding author: aien99lkr@gmail.com; Part of Ph.D. thesis submitted to Nagaland University Lumami, Nagaland

allied sectors, increased from 24.38 per cent in 2014-15. The sector's overall contribution to national GVA stood at 5.73 per cent (Press Information Bureau, 2023).

Both the agriculture and livestock sectors are highly coordinated and work well together. This underscores the importance of integrated or mixed farming, where livestock rearing is combined with crop cultivation to boost farm income. This practice is especially prevalent among marginal and small farmers in India, with over 62 per cent of these households directly engaged in livestock sector (Das *et al.*, 2020). Integrated crop-livestock systems can improve resource use efficiency and sustainability.

Livestock forms an integral part of farming community in Nagaland, serving not only as source of meat protein but also a major source for sustaining livelihoods by supplementing income, employment, and food security. Since time immemorial, livestock have been symbolic of health and wealth of a Naga family (Singh *et al.*, 2019). However, despite having significant potential for developing animal husbandry and its importance for enhancing farmers' livelihood sustainability, yet the State struggles to fulfill the growing demand for animal products. GoN (2022-23) reveal that, the State produced about 45 per cent of its total requirement of animal products, resulting in 55 per centshortfall that necessitates importing products worth ₹ 211.94 crores. This situation highlights an urgent need for an increase in livestock investment.

In 2022-23, the total revenue expenditure on animal husbandry and dairy development in Nagaland was ₹ 10,995.5 lakhs, that accounts for 13.62 per cent of expenditure in agriculture and allied sectors. However, its share in overall development expenditure was only 1.49 per cent. For capital expenditure, animal husbandry received ₹ 300 lakhs, which constituted 2.56 per cent of expenditure in agriculture and allied sectors and 0.11 per cent of total development expenditure (RBI, 2023).

Considering the critical role of livestock sector investment in mixed farming and its substantial contribution to the income of rural farmers, it is essential to conduct in-depth farm-level research, aiming to increase income from farm-related activities and improve the living conditions of rural communities.

MATERIAL AND METHODS

Primary data was collected through a sample survey that pertains to the year 2020-21, purposively conducted in Peren district of Nagaland. Multi-stage random sampling technique was employed to select blocks, villages, and farm households. In first stage, two circles, Jalukie and Peren, were selected from four circles in the Peren district. In second stage, two villages from each circle were selected, totaling to four villages. In third stage, 50 farm households were selected from each village at random, resulting intotal of 200 farm households. Ultimately, data from 197 households that practice mixed farming (both crop and livestock farming) were processed and analyzed to generate the results. Households were further stratified into three farm size categories based on land holdings: marginal farmers (up to 2.5 acres), small farmers (2.51 to 5.0 acres), and medium farmers (5.0 to 25 acres).

Multiple linear regression model was used to examine impact of livestock investment and other livelihood assets on farm income. For this purpose, regression model was defined as,

$$Y_i = b_0 + \Sigma\, b_j X_{ij} + u_i \qquad (j = 1 \text{ to } 6)$$

Where,

Y= Farm income (₹ '000)

X_1= Farm holding (in acres)

X_2=Educational level of household head (in years)

X_3= Level of farmers' participation in livestock management (in numbers)

X_4=No of livestock population (in numbers)

X_5= Working age household members (in numbers)

X_6=Livestock investment ((¹ '000)

b_0 is the intercept and u_i is error term

RESULTS AND DISCUSSION

Table 1 indicates that most of mixed farmers (crop and livestock) were smaller farmers with land holdings of less than 5 acres, that accounts for 80.20 per cent of total household. While medium farmers accounts for 19.80 per cent only and there were no large farmers. For the sample average, the farm size was estimated at 3.12 acres. Breaking it down by farm size categories, the average land holding was 1.31 acres for marginal farmers, 2.99 acres (small farmers), and 7.22 acres (medium farmers).

Regarding the farmers' educational level, the average years of schooling was 8.19 years for the sample total households. By farm size categories, medium and small farmers have the highest average years of schooling at 8.13 years each, while marginal farmers have lowest (7.43 years). For livestock management activities, including breeding, purchasing, animal traction, sale of animal by-products, livestock business, vaccination, and access to veterinary hospitals, a livestock keeper was involved in an average of 3.07 activities in total households. By farm size categories, marginal farmers engaged in 2.83 activities on average, small farmers in 3.07 activities, and medium farmers in 3.56 activities. Larger farmers were engaged in more livestock management activities than the smaller farmers.

The average number of animals per household, including cows, buffaloes, mithun, poultry, pigs, and goats, was 17.84 in the sample total. While is was 7.61 for marginal farmers, 10.60 for small farmers, and 53.51 for medium farmers. The working-age population (14-64 years) per household was estimated at 4.16 individuals in the sample total. Small farmers had highest number of working-age members estimated at 4.53, followed by medium farmers at 4.28 and marginal farmers at 3.76 per household.

Farm income include income from crop production, plantation, livestock, and wages. A significant difference in average annual income from farm-related activities was observed among the farm size. Annual average

Table 1: Livelihood assets and farm income among livestock farmers

Livelihood assets	Marginal (n=83)	Small (n=75)	Medium (n=39)	All size (n=197)
Farm size (acre)	1.31	2.99	7.22	3.12
Education (years)	7.43	8.13	8.13	8.19
Livestock management activities(numbers)	2.83	3.07	3.59	3.07
Animals (numbers)	7.61	10.60	53.51	17.84
Working age population (numbers)	3.76	4.53	4.28	4.16
Farm income (rupees)	142545.18	241090.53	413199.74	233643.81

Source: Field survey 2020-21

income from farm was estimated at ¹ 233643.81 in the sample total. Medium farmers, by virtue of larger farm size, obtain higher farm income (¹ 413199.74) than the small (¹ 241090.53) and marginal farmers (¹ 142545.18).

Investment Pattern and Livestock Income

An analysis of investment patterns in livestock enterprises is depicted in Table 2. In the sample area, an average farm household invest ₹ 38,293.75 annually in livestock, which constitutes about 27.75 per cent of total investment in agriculture, with livestock contributing 40.33 per cent to total farm income. Among various livestock items, approximately 47.00 per cent of total livestock investment was in piggery, followed by buffalo/mithun at 34.95 per cent. Piggery is a mainstay of livestock farming due to the tribal people's high preference for pork (Singh and Mollier, 2016). Other items, such as cows and poultry, accounted for 12.20 and 5.66 per cent, respectively.

The share of contribution varied with farm sizes. For marginal and small farmers, piggery contributed the highest share of livestock investment at 58.16 and 52.07per cent, followed by buffalo/mithun at 20.39 and 23.21per cent, respectively. For medium farmers, buffalo/mithun constituted the highest share at 51.55per cent, followed by piggery at 37.21per cent. Average total investment in livestock was highest for medium farmers at ₹ 83,850, compared to ₹ 33,198.68 for small farmers and ₹ 21,351.18 for marginal farmers.

It was observed that livestock investment for medium farmers was 3.5 times higher than their smaller counterparts. And additionally, proportion of livestock investment to total farm investment is higher for medium farmers (33.64 per cent). This results a higher percentage of income for medium farmers(46.03 per cent) as compared to marginal and small farmers (40.52 and 35.13 per cent, respectively). This highlights the importance of livestock investment for generating higher income among mixed farmers.

Table 2: Investment in Livestock Enterprise by the Farm Sizes

Items	Marginal (n=83)		Small (n=75)		Medium (n=39)		All size (n=197)	
	Per farm (Rs)	Per cent	Per farm (Rs)	Per cent	Per farm (Rs)	Per cent	Per farm (Rs)	Per cent
Cow	3670.59	17.19	6506.67	19.60	3350	4.00	4670	12.20
Buffalo/Mithun	4352.94	20.39	7706.67	23.21	43225	51.55	13385	34.95
Poultry	910	4.26	1512	4.55	6077.5	7.25	2169.25	5.66
Piggery	12417.65	58.16	17286.67	52.07	31197.5	37.21	17999.5	47.00
Goat	0	0.00	186.67	0.56	0	0.00	70	0.18
Total livestock investment	21351.18 (29.27)	100.00	33198.68 (21.79)	100.00	83850 (33.64)	100.00	38293.75 (27.75)	100.00
Livestock Income	57762.05 (40.52)		84694.53 (35.13)		190207.44 (46.03)		94235.69 (40.33)	
Total farm investment	72956.48		152312.7		249286.3		137981	

Source: Field survey 2020-21

Note: Figures in brackets represent percentages of farm total investment and income.
Livestock investment includes cost on purchase of animals, fodder, and animal care
Livestock income includes gross value of output and income from dairy and others

Impact of Livestock Investment on Farm Income

The study considers livestock investment and livelihood assets that are likely to influence farm income, such as farm size, education level, participation in livestock management, number of animals, and the working-age population in the household.

The R^2 value for the district (overall) reveals that 85 per cent of variability in farm income was explained by the model, implying a strong correlation between farm income and investment in livestock and other factors. For marginal, small, and medium farmers, the values are 68 per cent, 73 per cent, and 85 per cent, respectively, indicating relatively strong relationships between the dependent and independent variables. The F-test indicates that independent variables had a significant effect on the dependent variables simultaneously. Table 3 shows that the F-test was significant at a 1 percent level among all sizes, marginal, small, and medium farmers.

The regression analysis result shows that the value of coefficient for livestock investment was 1.383 for the district (overall), which was positive at a 1 per cent significant level. This suggests that, keeping other things constant, investment in livestock had positive influence on farm income. A ₹1000 increase in livestock investment will increase farm income by ₹1383. Similarly, by the farm sizes, for the marginal,

Table 3: Factors affecting farm income by the size of holdings

Variables	Marginal (n=83)	Small (n=75)	Medium (n=39)	All size (n=197)
Constant	37.407**	-31.459	206.148**	59.994***
	(2.07)	(0.63)	(2.55)	(3.29)
Farm size (acre)	44.192***	54.641***	0.319	19.274***
	(6.47)	(4.14)	(0.04)	(8.76)
Education (years)	-0.080	2.757	2.121	1.209
	(0.07)	(1.22)	(0.48)	(0.90)
Livestock management activities (numbers)	9.140*	8.083	12.357	12.900***
	(1.68)	(1.19)	(0.82)	(2.66)
Animals (numbers)	-0.131	1.715**	0.403***	0.338***
	(0.22)	(2.19)	(3.12)	(4.46)
Family working members (numbers)	-5.126**	-4.743	-6.566	-3.244
	(2.17)	(1.33)	(0.90)	(1.37)
Livestock Investment (rupees in '000)	1.483***	1.397***	1.319***	1.383***
	(7.31)	(6.36)	(4.71)	(11.15)
R^2	0.676	0.730	0.852	0.847
Standard error	36.209	50.619	95.089	62.551
F value	26.372***	30.704***	30.629***	175.129***

***, ** and *: Significant at 1, 5 and 10 percent levels, respectively.
Figures in the brackets represent the t-value

small and medium farmers, livestock investment was found to be positive at 1 percent significant level, respectively, on which a ₹1000 increase in livestock investment will increase farm income by ₹1483, ₹1397 and ₹ 1319, respectively. This implies that a unit increase in livestock investment will enable farmers to produce and sell more animal products and thereby increase farm income, irrespective of farm size. The result was similar to Baidoo *et al.*(2016b).

The size of farmland owned by livestock farmers positively impacts the farm income for the district (overall), marginal and small farmers at 1 percent significant level but for medium farmers, the relationship was insignificant. For the district (overall), by increasing agricultural land by an acre, livestock farmers can increase the farm income by ₹ 19000. Similarly, an acre increase will have a significant increase in farm income for the marginal and small farmers. These findings were in line with a study made by Akouegnonhou and Demirbas, (2021) that if farm size increases, the farm income source also tends to increase.

Level of farmers participation in different livestock management activities has positive influence on farm income at 1 percent significant level. Among farm size categories, this was found positive among the marginal farmers at 10 percent significant level. This finding could be associated with the fact that many Nagas, particularly those living in rural areas, depend on the ownership and management of livestock not just as source of income but also as a crucial aspect of their cultural and social identities (Khongsai, 2023). Hence, by self-employing and engaging in different livestock management activities, farmers depend heavily on income earned from livestock farming. In this way, maximum efforts are put in by the farmers, especially among the smaller farmers, to capitalize on availability of resources by increasing the level of farmers participation in livestock management.

Number of animals owned by a livestock farmer has positive impact on income of farmers at 1 percent significant level for the district. Moreover, by farm size categories for small and medium farmers, it was positive at 5 and 1 percent significant levels, respectively. As expected, number of animals positively affects livestock gross margins and thereby increases the share of income sources from farm-related activities. In study area, piggery was the first choice of the farming household as it has high market demand, and next was buffalo, which animal was used in plowing the farm.

CONCLUSIONS

The present analysis shows significant insights into the patterns of livestock investment and their impact on farm income among mixed farmers in the Peren district of Nagaland. Notably, higher investments in livestock were positively associated with increased farm income, particularly for medium farmers who invest substantially 3.5 times more than their smaller counterparts. The regression analysis indicates that each unit increase in livestock investment leads to a substantial increase in farm income i.e., a ₹ 1000 increase in livestock investment will increase farm income by ₹1383 and by farm sizes, it is[1] 1483, ₹ 1397 and ₹ 1319 for the marginal, small and medium farmers, respectively. Additionally, an acre increased in agricultural land positively influences income by ₹ 44,192 and ₹ 54,641for marginal and small farmers particularly, while an increased in level of farmers' participation in livestock management and number of animals owned also significantly contribute to income by ₹ 12,900 and ₹ 338, respectively. Overall, the findings highlight the importance of livestock investment for enhancing income

and livelihood opportunities in rural communities.

REFERENCES

Akouegnonhou, O. and Demirbas, N. 2021. Factors affecting the income of farmers participating in traditional and modern livestock markets: Case study from Benin Republic. Selcuk Journal of Agriculture and Food Sciences (SJAFS). 35(3): 210-217, e-ISSN: 2458-8377.

GON. 2022-23. Annual Administrative Report, Department of Animal Husbandry and Veterinary Services (AHVS), Government of Nagaland.

Baidoo, S.T., Yusif, H. and Anwar, U. 2016b. The effect of smallholder livestock production on income of farm households in Northern Ghana. Journal of Science and Technology(Ghana). 36(3): 8-19.

Central Statistical Organisation. 2019. National accounts statistics 2019. Central Statistical Organisation, Ministry of Statistics and Programme Implementation, Government of India.

Das, A., Raju, R. and Patnaik, N.M. 2020. Present scenario and role of livestock sector in rural economy of India: A review. International Journal of Livestock Research. 10(11): 22-30.

Khongsai, L.A. 2023. Animal Husbandry: A way of employment in Nagaland. International Journal of Academic Multidisciplinary Research (IJAMR). 7 (9):153-156.

Press Information Bureau on "Brief note on 9 years achievement of Department of Animal Husbandry & Dairying, Ministry of Fishery, Animal Husbandry & Dairying posted on 27th June 2023, 4:39 p.m. by PIB Delhi. Press Release: Press Information Bureau (pib.gov.in).

RBI, 2023. State Finance: A Study on Budgets, December 11,2023.

Singh, M. and Mollier, R.T. 2016. Pig production scenario in Nagaland: Current status and future prospective in souvenir meet on agriculture development and agromet advisory services in Nagaland organized by ICAR research complex for NEH Region, Nagaland Centre, 21st November 2016, 86-95.

Singh, M., Sharma, P.R., Mollier, R.T., Ngullie, E., Baisyha, S.K. and Rajkhowa, D.J. 2019. Tribal farmers traditional knowledge and practices of pig farming in Nagaland. Indian Journal of Animal Sciences. 89(3): 329-33.

SungjeminlaLongkumer and Kilangla Jamir, B. 2025. Livestock investment and its impact on farm income among mixed farmers in Nagaland.
The Journal of Research, ANGRAU. Vol. 53 (1): 141-147