

Investment patterns of small-scale livestock farmers in Edo State, Nigeria

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Received 29th September 2024; Accepted 19th October 2024

ABSTRACT: This study investigated the investment patterns of small-scale livestock farmers in Edo State, Nigeria. A sample of 240 small-scale livestock farmers was drawn from six Local Government Areas (LGAs) and surveyed using a structured questionnaire. Descriptive statistics and inferential statistics (such as Tobit Regression Analysis) were used to analyze the data. The result of the analysis revealed that the majority (77.5%) of livestock farmers invested below the mean credit volumes of ₦383,366.7. This explains the reason why the livestock business was dominated by small-scale livestock farmers in the study area. The result of Tobit Regression revealed that income generation ($z = 3.09$; $p \leq 0.01$), population/urbanization ($z = 3.33$; $p \leq 0.01$), farm expansion ($z = 2.90$; $p \leq 0.01$), purchase of farm equipment ($z = 2.94$; $p \leq 0.01$), rising income among citizens ($z = -2.75$; $P \leq 0.01$) and home remittance ($z = -2.84$; $P \leq 0.01$) were significant factors influencing investment patterns of respondents. The study, also revealed that high breeding stock (Mean = 2.59), poor transportation (Mean = 2.58), inefficient government policy (Mean = 2.53), lack of vaccine/veterinary services (Mean = 2.30), lack of extension services (Mean = 2.30), low income (Mean = 2.23) and non-availability of farmland (Mean = 2.11) were rated very serious in order of magnitude as factors militating against investments in the study area. The study, therefore, recommends special government intervention programmes that would give incentives to small-scale livestock farmers to enable them to scale up their livestock business and implement policies that would encourage a high level of investments among respondents.

Keywords: Factors influencing investment, investment patterns, livestock business, small-scale farmers.

INTRODUCTION

According to FAO (2017), there is no standard definition of small-scale farmers, while, Nagayets (2005), concluded that the lack of a standard definition of small-scale farmers results from a wide variety of farm sizes characterised by small structures across different geographical areas. However, in crop production, small-scale farmers can be defined as farmers with low asset-based operating in less than 2 hectares of farmland. In terms of poultry production, small-scale poultry farmers are farmers who rear a small number of birds between 250-1900 on a small plot of farmland (Uchendu *et al.*, 2015). Generally, small-scale livestock farmers are farmers with small numbers of animals like poultry, goat, sheep, pig and among others.

These small-scale livestock farmers struggle to be competitive because of their low endowment of assets and investments.

Investment refers to any activity that results from the accumulation of capital, which yields a stream of returns over time (Harrod, 1939; Domar, 1946). According to Saifullah and Masahiro (2013), investment means an addition to capital which occurs, when a new animal house is built or a new breeding stock is purchased. Investment means, making an addition to the stock of goods in existence and it is a part of production not merely replacing past sales but directed to increase the rate of output in the future. On a more serious note, Saifullah and Masahiro

(2013), referred to investment as a process of forgoing consumption in the present to pursue a higher level of income in the future. Over time, small-scale livestock farmers invest in order to build capital so as to become more productive in the future.

Investment is an unavoidable part of any individual. This is because it plays an important role in measuring the growth of the economy and its contributing factors, leading to the development and building of modern society. The development of the livestock subsector heavily depends on the stock of capital (including retained earnings) built over time in livestock farming and the plunging back of such stock in order to further invest and expand the livestock business (Odoh *et al.*, 2020).

Across the globe, investment in the livestock sub-sector led to economic growth and development, however, livestock output has been slow in Africa due to the low investment rate in the system. Upton (2004), noted that in Nigeria, government policies have not been successfully implemented to encourage investment by small-scale livestock farmers. Snehal and Avadhoo (2021) and Ogbonna (2018), stressed that lack of proper policy instruments like high costs of breeding stocks, high interest rate charges on borrowed funds, low deposit interest rates, access to credit and infrastructural deficit are major factors affecting investment that will bring development to the livestock industry.

However, when Odoemenem *et al.* (2013) and David (2008), in their separate studies, considered small-scale farmers in terms of investment, it appears that small-scale livestock farmers are more constrained from making adequate investments as a result of sudden outbreak of diseases, poor pastures development, continuous conflict existing between crop farmers and pastoralists, loss of livestock to thefts, lack of agricultural information and credit, access to market, as well as low income and cultural values.

Ogbonna (2018), maintained that inadequate investment by small-scale farmers in Nigeria is one of the basic problems limiting the development of livestock subsector. According to Ajayi (1998), over the years, many farmers in Nigeria have been increasingly unable to invest adequately in their livestock business. Odoemenem *et al.* (2013) and Sunday *et al.* (2011) in their separate studies, noted that the problems confronting livestock business in Nigeria could be attributed to inadequate investment by small-scale livestock farmers. According to Shitu (2012) and Oluwakemi (2012), capital accumulation is a major prerequisite for improving livestock development in Nigeria and if the volume of investment is not enough, major bottlenecks would significantly impede and compound more problems for small-scale livestock farmers. Veveris *et al.* (2019), Guiomar *et al.* (2018) and Gavrilova (2020) on their parts, noted that looking at the current economic situation in the agricultural sector, which is dominated by global markets with exotic livestock breeds, farm speciali-

zation, modern technology, continuous clashes between crop farmers and pastoralists, loss of livestock to thefts and decoupling between rural communities and agricultural enterprises, small scale livestock farmers may seem inefficient and irrelevant to modern agriculture if not tackled. This will pose serious a threat to Nigeria's agricultural system because 80% of foodstuff consumed in Nigeria is provided by small-scale farmers in which small-scale livestock farmers are inclusive (Mgbenka and Mbah, 2016).

Basically, Osondu *et al.* (2015) noted that there is a lack of incentives for small-scale livestock farmer and as such they find it almost difficult to invest productively in their farm enterprise. Despite these problems, policymakers have not drawn up adequate and comprehensive rural investment schemes that will motivate small-scale livestock farmers to invest their capital productively. Ogbonna (2018) study on informal savings strategies among farm-headed households only considered factors influencing the amount saved in informal forms without considering how farmers invested these savings. Understanding not only the savings patterns of small-scale livestock farmers but also how these farmers invest their savings is important for the conduct of this study. Although, several researches have been undertaken by various scholars (Soyibo and Adekenye, 1992; Rottger, 2002; Osundare, 2013; Nwodo *et al.*, 2017; Mamman *et al.*, 2019; Snehal and Avadhoo, 2021) on savings and investment patterns or behaviours and socioeconomic characteristic of small scale farmers but despite the quantum of these studies, there seems to exist a dearth of conceptual knowledge in livestock subsector. There is little or no empirical literature to examine investment patterns of small-scale livestock farmers in Edo State; most studies focused only on the socioeconomic characteristics of small-scale farmers. This research endeavour was carried out in Edo State to cover this research gap and contribute meaningfully to the development of livestock production in the state. This research therefore is to investigate investment patterns of small-scale livestock farmers in Edo State, Nigeria.

METHODOLOGY

Study area

This study was carried out in 2023 to examine investment patterns of small-scale livestock farmers in Edo State, Nigeria. Edo State is divided into 3 Agricultural zones which include Edo South, Edo North and Edo Central. These agricultural zones possess diverse vegetation ranging from derived savannah in the north to rainforest in the south and mangrove swamp vegetation found also in the East among the riverside communities to fertile clayey soil in the northwest which supports the growth of pastures for livestock production.

Sampling technique

To successfully draw a sample from the study, a multi-stage sampling technique was adopted. The first stage was a purposive selection of six LGAs from the 3 agricultural zones of the state with 2 LGAs selected from each of the zone. In stage 2, both convenience and snowballing, non-probability sampling techniques were used to select 40 small-scale livestock farmers from each LGA. Due to the uneven spread of livestock farmers in different geographical locations, the researcher stationed in the central area where these livestock farmers were found purchasing animal feeds, drugs/vaccines and equipment in each of the LGAs selected for the study to administer the structural questionnaire. To avoid being biased and ensure other livestock farmers such as goats, sheep, pigs and cattle reared on a free-range system were well represented in the data gathering process. In stage 4, the snowballing sampling technique was adopted, where one farmer helped to suggest another livestock farmer until 40 respondents were achieved in that LGA. This method was repeated in each of the 6 selected LGA, bringing it to a total number of 240 respondents selected for the survey in the study (see Table 1 for selection of respondents by Local Government). Thereafter, primary data was used for this study. The primary data was collected by means of a well-structured questionnaire/oral interview scheduled. To analyze the data descriptive statistics like mean, frequency and percentage were used to achieve the investment quantum of respondents, while inferential statistics such as Tobit Regression was used to examine factors influencing the investment patterns of respondents. Eviews statistical package was used to run the Tobit Regression Model.

Model specification

Tobit regression analysis

The Tobit regression analysis was used to identify factors influencing investment patterns of small scale livestock farmers. Similarly, Oluwakemi (2013) adopted Tobit regression to study the factors that Determine Savings Rate in Rural Nigeria. The Tobit regression analysis is a nonlinear model and similar to the probit model. It was estimated using maximum likelihood estimation techniques. The dependent variable was normally distributed with mean μ and variance σ^2 . The likelihood function for the Tobit model was

$$\text{Log}l = \sum_{i=1}^n \left[-\frac{1}{2}(\log(2\pi)) + \log \sigma_2 + \frac{(Y_i - \beta X_i)^2}{\sigma^2} + \sum_{i=1}^n r_i \right] \quad (1)$$

The function has two components:

1. The probability density function for non-censored observations and

Table 1. Selection of respondents by Local Government.

S/N	Local Government	No of Respondents
1	Egor	40
2	Ore-Edo	49
3	Esan North East	40
4	Esan Central	40
5	Owan West	40
6	Estsako West	40
7.	Total	240

Source; Field Survey, 2023.

2. The cumulative density functions for censored observations.

Censoring takes place when data on the dependent variable (regressand) is lost or limited but when data on the independent variables is not. In this case, the censoring point is at the lower limit (zero). The marginal effect is the change in X_i on Y , the unobservable latent variable.

The implicit form of the Tobit model is presented as:

$$Y = f(X_i, U_i) \quad (i=1,2,3,\dots,n) \quad (2)$$

Where: Y = dependent variable (investment scores having upper limit "1" investment above the mean and lower limit "0" investment below the mean), U_i = error term, X_i - X_n independent variables stated as follows:

X_1 =To generate income (1= motivation factor to invest; Otherwise = 0), X_2 = population/urbanization (1= motivation factor to invest; Otherwise = 0), X_3 = rise in income (1= motivation factor to invest; Otherwise = 0), X_4 = high demand for quality livestock product (1= motivation factor to invest; Otherwise = 0), X_5 = expansion of grazing areas (1= motivation factor to invest; Otherwise = 0), X_6 = increase the number of livestock (1= motivation factor to invest; Otherwise = 0), X_7 = growing modern fast food outlets (1= motivation factor to invest; Otherwise = 0), X_8 = to purchase farm tools/equipment (1= motivation factor to invest; Otherwise = 0), X_6 = to diversify (1= motivation factor to invest; Otherwise = 0), X_6 = home remittances (1= motivation factor to invest; Otherwise = 0).

RESULTS AND DISCUSSION

The quantum of investment by the respondents

Table 2 presents the Quantum of investment by the respondents. From the table, the average weighted mean was ~~N~~383,366.67. Using ~~N~~383,366.67 as the mean benchmark, respondents who invested below the mean

Table 2. Investment quantum of the respondents.

Investment category	Investment quantum (₦)	Frequency	Percentage (%)
Low investment	100,000	69	28.75
Moderate investment	300,050	117	48.75
High investment	750,050	54	22.5
Total	1,150,100	249	100
Average weighted mean	383,367		

Source: Field survey, 2023.

amount were regarded as small-scale farmers with low investment, within the mean values were regarded as medium-scale farmers with moderate investment and above the mean values, were regarded as large-scale farmers with high investment. From the table, it was observed that 28.75% of respondents had a low investment of ₦100,000, 48.75% had a moderate investment of ₦300,050 and 22.5% had a high investment of ₦750,050 with a mean investment of ₦383,366.67 per production cycle. From the result, it was observed that the majority of respondents (77.5%) invested below the mean amount in their farm enterprise. This shows that respondents were mostly small-scale farmers with low capital bases. This study is similar to the finding of Marimuthu and Hemanat (2021), who noted that out of 200 sampled farms, 25.5% were in the category of low level of capital investment, 51.0% medium level of investment and 23.5% in high level of investment in agriculture.

The study further revealed that though small-scale farmers dominated the livestock subsector, there is some level of investment among a high proportion (77.5%) of the respondents but was done only on a small lump sum amount, with the aim to generate income for the upkeep of their family. This finding is consistent with those obtained by Lahiri (1999), Obayelu (2014), Oluwakemi (2013) and Odoh *et al.* (2017) who noted that the inability of small-scale farmers to save over a long period, affected the rate of capital accumulation needed for investment in the livestock production, owing to the low income they find it almost difficult to save let alone to invest in their livestock business.

Tobit regression result of factors influencing investment patterns of respondents

The Tobit regression model was used to determine factors influencing the investment patterns of small-scale livestock farmers. The explanatory variables were used to determine investment patterns (investment quantum) in the livestock business by the respondents. Table 3 presents the result of Tobit's estimation of factors influencing the investment patterns of respondents in the study area. The z-statistics which is the ratio of estimated

coefficient to its standard error was used to interpret the result as it was used by Agwu *et al.* (2014) and Eviews Study Guide (2022).

However, 86% (pesudo $R^2 = 0.8621$) of the variation in the dependent variable was incorporated into the model; the explanatory variables were used to explain the variation of the dependent variable (investment quantum).

The overall significance and fitness of the model was checked with the value of chi-square ($\text{Prob} > \chi^2 = 0.000$) which showed that the result was significant at a 1% level of probability. Income generation, farm expansion, population/urbanization, purchase of farm equipment, rising income among citizens and home remittances were factors influencing the investment patterns of respondents for they were all significant at a 1% level of probability. The result is therefore presented accordingly.

At a probability level of 1% ($p < 0.01$), income generation ($z = 3.09$) was statistically significant and positively influenced investment by the respondents and accounted for about 33.33% variation of investment. This implies that a unit increase in income generated results in a greater probability increase in investment by 33.33%. The finding revealed that a higher income results in higher investment in the study area. To generate enough income and enhance economic livelihoods, the respondents reduced consumption and increased investment in their farm enterprise. This study is in agreement with the theory of investment on capital accumulation which states that capital accumulation occurs from investment when some proportion of income is saved and invested to argument future output and income. This finding is also consistent with the study of Saifullah and Masahiro (2013), who stated that investment, has a positive impact on livestock production and its productivity. For investment made by livestock farmers themselves is indispensable because it constitutes the foundation and engine for sustainable development as well as a reduction in poverty and hunger among small-scale livestock farmers.

At a probability level of 1% ($p \leq 0.01$), population/urbanization ($z = 3.33$) farm expansion ($z = 2.90$) and purchase of farm equipment ($z = 2.94$) were all statistically significant and positively influenced investment in the farm enterprise. As the population increased, the demand for

Table 3. Tobit regression estimates of factors influencing investment patterns of the respondents.

Variable	Coefficient	Std. Error	z-Statistic	Prob.
To generate income	0.33333	0.10791	3.08905	0.002*
Farm expansion	0.50023	0.17252	2.89957	0.0037*
To meet population/Urbanization increase	0.28718	0.08622	3.33082	0.0009*
Rising income of farmers	-0.2593	0.0942	-2.7531	0.0059*
Home remittances	-0.148	0.05221	-2.8351	0.0046*
Trend in customer service	0.08621	0.09327	0.92431	0.3553
Fast food growth	-0.1048	0.09638	-1.0874	0.2768
To purchase farms tools/equipment	0.20594	0.07005	2.93974	0.0033*
To diversify	-0.0854	0.06301	-1.3548	0.1755
Log likelihood	-304.94			
Av Log likelihood	-1.2706			
Pseudo R ²	0.8621			
Prob> ch ²	0.0001			

Dependent Variable: Investment Quantum; **Significant at 1% ($p < 0.01$), *Significant at 5% ($p < 0.05$) (Source: Field Survey, 2023).

livestock products increased proportionately and farmers would perhaps respond to this increase by investing in their livestock business. It can therefore be concluded that a unit increase in population and growth in urbanization resulted in a higher probability increase in investment in the farm enterprise. The implication of this is that an increase in population and growth in urbanization would result in higher demand for livestock products. This will create a demand gap in the market. To close the demand gap and increase the supply of livestock products, farmers increased investment by purchasing modern farm tools and machinery to expand their livestock business and increase production per output. This study is consistent with those obtained by Devendra (2007), Fraser (2008), Alirol *et al.* (2011) and Lancet (2011), who in their separate study reported that rapid urbanization and population growth come with higher demand for livestock products, as mass rural-urban drift for a better standard of living. Since urbanization is usually associated with high income it increases demand for livestock products. This urbanization and population growth rate motivates livestock farmers to invest more in their farm enterprises to meet the demand for livestock products in the market. This in turn leads to expansion of farm size and increase in stocking rate.

However, at a probability level of 1% ($p \leq 0.01$), the rising income of farmers ($z = -2.75$) and home remittances ($z = -2.84$) though, statistically significant but negatively influenced investment of small-scale livestock farmers and accounted for 25.9% and 14.80% respectively of the variations. This implies that a unit increase in the rising income of the farmers and home remittances reduce the probability of investment in the farm enterprise. It was observed from the result that the rising income of the farmers and home remittance do not automatically

translate into investment in the livestock subsector because incomes coming from rising income and home remittance were diverted into non-farming business sumptuous lifestyle such as house construction, purchase of luxury cars, social ceremonies, family responsibilities and among others. This finding is contrary to the study of Saifullah and Masahiro (2013), who reported that migration and remittances have recently become the main source of rural household income in developing countries. They were found to be an important source of investment in agriculture for the development of families and particularly for making a shift from subsistence agriculture to market-oriented production.

Constraints militating against investment by the respondents

Constraints militating against investment in the study area are presented in Table 4. Using the 3-point Likert scale rating with 3.00 very serious, 2.00 serious and 1.00 not serious, the mean benchmark was 2.00. From the result, constraints with mean values above 2.00 were regarded as very serious factors affecting the respondents in descending order. Among these are high breeding stock (Mean = 2.59), poor transportation (Mean = 2.58), bad government policy (Mean = 2.53), lack of vaccine/veterinary services (Mean = 2.30), lack of extension services (Mean = 2.30), no enough income (Mean = 2.23) and non-availability of land (Mean = 2.11). It could therefore be concluded that the respondents under study were faced with some level of constraints that prevented them from investing in the farm enterprise. The finding revealed that the high cost of production, inflation, and poor road networks across the country which hindered

Table 4. Constraints that militating against investment by the respondents.

Variable	Mean
High breeding costs	2.59*
Poor transport/storage facilities	2.58*
Bad government policy	2.53*
Lack of vaccines/vet services	2.30*
Lack of extension services	2.30*
No enough income	2.23*
Non-availability of land	2.11*
Dispute between farmers and pastoralists	1.8
No market	1.51

*Mean > 2.00 Serious (Source: Field Survey, 2023).

the movement of goods and services contributed to the costs of breeding stocks and reduced the rate of investment in livestock production in the study area. Similar results have been reported by David (2008), Snehal and Avadhoo (2021), Bamaïyi (2013), Ogbonna (2018), Macrae *et al.* (2005), Bhat *et al.* (2012), Babalobi (2005), and Olugasa *et al.* (2013), who stressed that lack of proper policy instruments like high cost of breeding stock, poor transportation system, lack of extension services, access to market, lack of vaccine and veterinary services were major factors limiting investment in the farm enterprise.

Conclusion and Recommendations

The study revealed that income generation, farm expansion, increase in population, growth in urbanization, purchase of farm equipment, rising income among citizens and home remittances significantly influenced investment patterns of small-scale livestock farmers. However, the high cost of breeding stock, poor transportation system, ineffective government policies and programmes, lack of vaccine and veterinary services, weak extension agents, and low capital limited small-scale livestock farmers from investing in the livestock sub-sector. Though, the study recorded some level of investment but large proportion (77.5%) of the farmer's population, invested below the mean value of ₦383,366.67. The implication of this is that the livestock sub-sector would continue to be dominated by small-scale farmers in the study area due to low investment. This study therefore recommends special government intervention programmes that would give incentives to small-scale livestock farmers in order to scale up their livestock business and implementation of policies that would encourage a high level of investments among respondents.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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