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Influence of Socio-Economic Characteristics on Profitability of Swine Production among Farmers in Akwa Ibom State, Nigeria

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Abstract
Socio-economic characteristics play a vital role in determining the profitability and sustainability of livestock enterprises. This study examined the influence of socio-economic characteristics on the profitability of swine production among farmers in Akwa Ibom State, Nigeria. A cross-sectional descriptive survey research design was adopted. The study comprised 399 registered swine farmers selected through systematic random sampling. Data were collected using a structured questionnaire validated by experts, with a Cronbach's Alpha reliability coefficient of 0.71. Descriptive statistics, cost and return analysis and Multiple Linear Regression were employed for data analysis. The findings showed that the majority of the farmers were aged 40 years and above (52%), had secondary education (42%), practiced semi-intensive management systems (61%) and had over 10 years of farming experience (50%). Profitability analysis revealed that swine production was economically viable, with a Gross Margin of ₦871,800, Net Farm Income of ₦777,040 and a Benefit–Cost Ratio (BCR) of 2.69. The regression analysis indicated that socio-economic characteristics significantly influenced profitability, accounting for 52.0% of the variation in net farm income ($R^2 = 0.520$, $F(6,392) = 70.75$, $p < 0.001$). Herd size was the strongest predictor of profitability, followed by management system, educational level, farming experience, age and household size. The study concluded that swine production is a profitable enterprise and that improving farmers' socio-economic capacity and production practices would further enhance profitability. It recommends strengthening extension services, improving access to affordable credit and promoting cooperative participation to improve the productivity and sustainability of swine farming in Akwa Ibom State.
Keywords: Swine production, socio-economic characteristics, profitability, livestock farming

Introduction
Agriculture remains a critical sector of the Nigerian economy, contributing significantly to employment generation, food security, poverty reduction, and rural development. Despite the growing importance of the oil and service sectors, agriculture continues to provide livelihoods for a large proportion of the rural population and contributes substantially to the country's Gross Domestic Product (GDP). Within the livestock subsector, swine production has gained increasing attention due to its high reproductive efficiency, rapid growth rate, superior feed conversion efficiency, and relatively short production cycle. These attributes make pig farming one of the most profitable livestock enterprises capable of improving household income, nutritional security, and employment opportunities among rural and peri-urban households (Food and Agriculture Organization [FAO], 2023; National Bureau of Statistics [NBS], 2024). Swine production in Nigeria is predominantly practiced by smallholder farmers whose productivity and profitability are influenced by both production practices and socio-economic characteristics. Farmers' age, educational attainment, farming experience, household size, herd size, access to extension services, access to credit, cooperative membership, and management practices influence decision-making, technology adoption, resource allocation, and marketing efficiency. Farmers with higher educational attainment and better access to institutional support are generally more likely to adopt improved production technologies and management practices, resulting in higher productivity and profitability. Recent studies have shown that education, farm size, production experience, access to veterinary services, extension contact, and institutional support significantly enhance livestock productivity and farm income in Nigeria and other developing countries (FAO, 2023; International Livestock Research Institute [ILRI], 2023; Obayelu et al., 2023). Akwa Ibom State is one of the leading livestock-producing states in southern Nigeria, where pig farming serves as an important livelihood activity for many rural households. Swine production is widely practiced in Local Government Areas such as Uyo, Ikot Ekpene, Abak, Essien Udim, Ikono, Itu, Oruk Anam, and Etinan under predominantly semi-intensive production systems. The increasing demand for pork by households, hotels, restaurants, and food vendors has continued to create substantial market opportunities for pig farmers within and outside the state. However, considerable variations exist in farmers' profitability due to differences in herd size, management systems, education, production experience, access to production inputs, veterinary services, market information, and financial resources.

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Recent evidence indicates that socio-economic characteristics remain among the strongest determinants of agricultural productivity and profitability across livestock enterprises. Studies have reported that education, production experience, farm size, access to extension services, credit availability, and adoption of improved management practices significantly increase farm productivity and profitability, while inadequate institutional support and high production costs constrain enterprise performance (World Bank, 2023; Obayelu et al., 2023; FAO, 2023). Similarly, digital agricultural advisory services, mobile-based extension systems, and farmer cooperatives have improved access to production information, veterinary services, and market opportunities, thereby enhancing livestock productivity and farmers' income in many parts of Nigeria (International Fund for Agricultural Development [IFAD], 2023). Although previous studies have established that swine production is a profitable agricultural enterprise in Nigeria, most existing studies have concentrated on cost–return analysis, production constraints, and technical efficiency, with relatively limited emphasis on the extent to which farmers' socio-economic characteristics determine profitability. Consequently, empirical evidence explaining how factors such as age, educational level, farming experience, household size, herd size, and management systems jointly influence profitability among swine farmers in Akwa Ibom State remains inadequate. Addressing this knowledge gap is essential for developing evidence-based policies and interventions aimed at improving farmers' productivity, profitability, and the sustainable development of the swine industry. This study therefore examines the influence of socio-economic characteristics on the profitability of swine production among farmers in Akwa Ibom State, Nigeria. Specifically, it investigates the socio-economic profile of swine farmers, assesses the profitability of swine production, and determines the extent to which selected socio-economic characteristics influence profitability. The findings are expected to provide valuable evidence for policymakers, agricultural extension agencies, financial institutions, livestock associations, and development partners in designing interventions that enhance farmers' productivity, income, and the sustainable growth of the swine industry in Nigeria.

Statement of the Problem

The profitability of livestock enterprises remains a major concern in Nigeria's agricultural sector due to its direct implications for food security, rural employment, poverty reduction and sustainable economic development. Despite the growing importance of swine production as one of the most profitable livestock enterprises, many pig farmers in Nigeria, particularly in Akwa Ibom State, continue to experience inconsistent and often low levels of profitability. This situation persists despite increasing consumer demand for pork and the favourable agro-ecological conditions that support pig production in the state. Existing evidence indicates that factors such as educational attainment, farming experience, access to credit, farm size, extension contact, cooperative membership and household income significantly influence farmers' production decisions and profitability (Ekpe, 2018; FAO, 2023; Inyang, 2024). Although several studies in Nigeria have examined the economics and profitability of swine production, most have focused on cost–return analysis, production constraints and technical efficiency, with limited empirical attention given to the socio-economic determinants of profitability among swine farmers in Akwa Ibom State. Consequently, there is inadequate evidence to explain how variations in farmers' socio-economic characteristics contribute to differences in profitability within the state's swine industry. This knowledge gap constrains policymakers, extension agencies and development organizations from designing targeted interventions that address the specific needs of swine farmers. Therefore, this study seeks to examine the socio-economic determinants of profitability among swine farmers in Akwa Ibom State, Nigeria, to provide empirical evidence for policies and programmes aimed at improving the profitability and sustainability of swine production.

Research Objectives

1. Examine the socio-economic characteristics of swine farmers.
2. Assess the level of cost and profitability among swine farmers.

Research Questions

1. What are the socio-economic characteristics of swine farmers?
2. What is the cost and profitability level of swine farmers?

Hypotheses

H_{01}: There is no significant relationship between socio-economic characteristics and profitability of swine production.

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Research Methodology

This study adopted a descriptive survey research design to examine the socio-economic determinants of profitability among swine farmers in Akwa Ibom State, Nigeria. The study was conducted in 16 purposively selected Local Government Areas (LGAs) out of the 31 LGAs in the state, where swine production is predominantly practiced. The target population comprised 4,003 registered swine farmers listed by the Association of Swine Farmers of Nigeria and the Akwa Ibom Agricultural Development Programme (AKADEP). A sample of 399 respondents was selected using systematic random sampling, representing approximately 10% of the population across the selected LGAs. Data were collected using a researcher-developed structured questionnaire comprising two sections: respondents' socio-economic characteristics and farm production information required for profitability analysis. The instrument was validated by five experts in Agricultural and Vocational Education, while a pilot study involving 40 swine farmers in Kaura Local Government Area of Kaduna State produced a reliability coefficient of 0.71, indicating acceptable internal consistency. The questionnaires were administered with the assistance of trained officials of the Swine Farmers' Association and all 399 copies were successfully retrieved. Data were analysed using descriptive statistics (frequency, percentage, mean and standard deviation) to describe the respondents' socio-economic characteristics. Gross Margin (GM), Net Farm Income (NFI), Gross Margin Ratio (GMR) and Benefit–Cost Ratio (BCR) were used to determine the profitability of swine production, while multiple regression analysis was employed to examine the influence of selected socio-economic variables on profitability at the 0.05 level of significance. Fixed asset depreciation was estimated using the straight-line method to determine the annual cost of capital assets included in the profitability analysis.

Presentation of Results

Answering Research Questions

Research Question One: What are the socio-economic characteristics of swine farmers?

Table 1: Socio-economic characteristics of swine famers in Akwa Ibom State

Variable	Frequency	Percentage
Age		
20-29	43	11
30-39	149	37
40 and above	207	52
Educational Level		
Primary	44	11
Secondary	169	42
NCE	86	22
OND	58	14
HND/BSC	32	8
Degree	8	2
Others	2	1
Major Occupation (beside swine production		
Business	272	68
Civil Servant	120	30
Others	7	2
No. of Time are Weaned Per Year		
1 Time	57	16
2 Time	342	84
3 Time	-	-
Management System		
Extensive	62	15
Semi intensive	242	61
Intensive	95	24
Family Size		
1-3	58	15
4-5	93	23
6-7	189	47
8-9	41	10

10 and above	18	5
Years of Experience		
< 5 years	88	22
5-10 years	112	28
Above 10 years	199	50
Herd Size		
1-4	40	10
5-10	81	20
10-15	176	44
15-20	57	14
20-30	35	9
30 and above	10	3
Litter Size		
1-8	205	57
10-12	103	26
12 and above	91	23

Source: Field Survey Data, 2022

Multiple Responses by the Respondents

Table 4 shows that the majority of the respondents (52%) were aged 40 years and above, indicating that swine production is dominated by experienced and economically active farmers. Most respondents (42%) had secondary education, suggesting that the farmers possess the educational background necessary to adopt improved production practices. Furthermore, 68% combined swine farming with business activities, implying that pig farming serves as an important supplementary source of household income. The results further reveal that 84% of the farmers weaned piglets twice annually, while 61% practiced the semi-intensive management system, indicating its dominance in the study area. Nearly half of the respondents (47%) had a family size of 6–7 members, which may provide family labour for farm operations. In addition, 50% had more than 10 years of farming experience, reflecting substantial knowledge in swine production.

Regarding production characteristics, 44% of the respondents maintained a herd size of 10–15 pigs, suggesting that swine production is predominantly small- to medium-scale. Also, 51% recorded a litter size of 1–8 piglets, indicating moderate reproductive performance among the majority of the farmers. Overall, the socio-economic profile suggests that swine farmers in Akwa Ibom State possess the demographic and production characteristics that could positively influence the profitability of their enterprises.

Figure 1. Age distribution of respondents

Distribution of swine farmers by age group in Akwa Ibom State (N = 399).

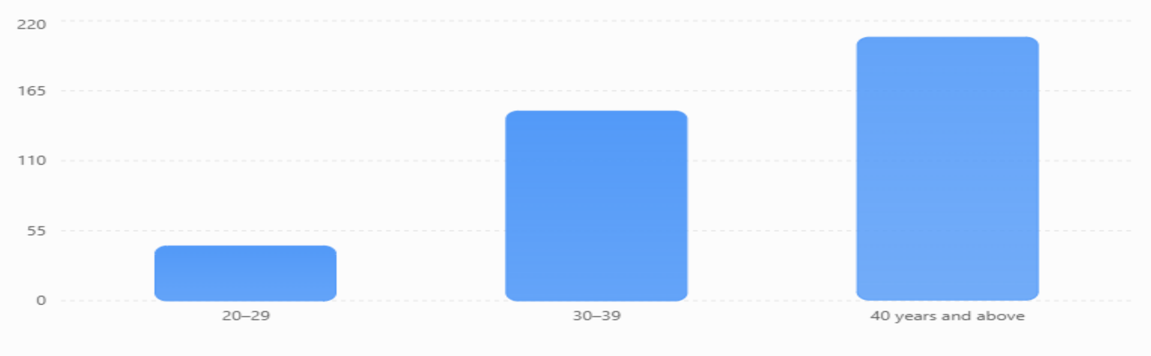

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Figure 2. Educational level of respondents

Educational attainment of swine farmers in Akwa Ibom State.

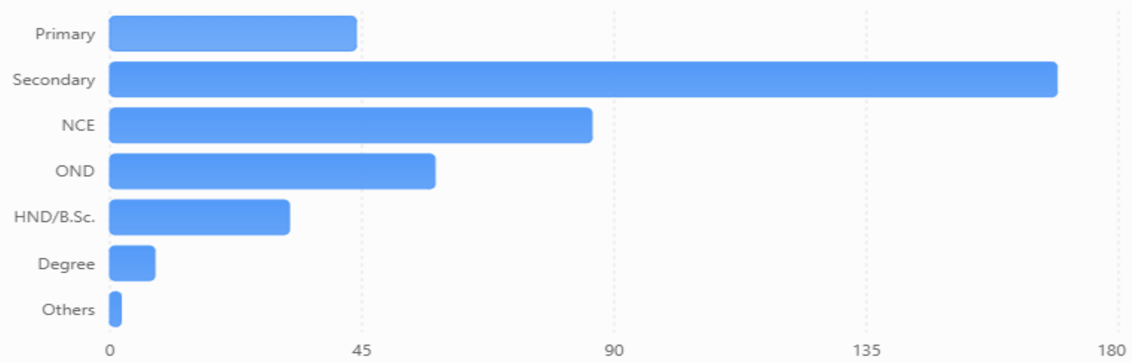


Figure 3. Management system adopted by swine farmers

Percentage distribution of management systems adopted by respondents.

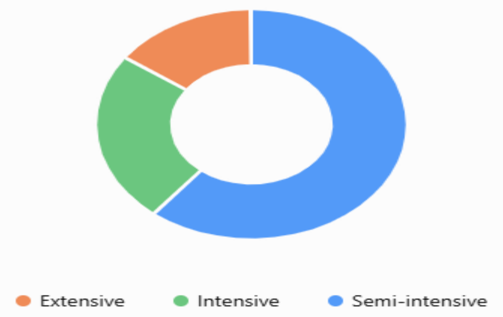
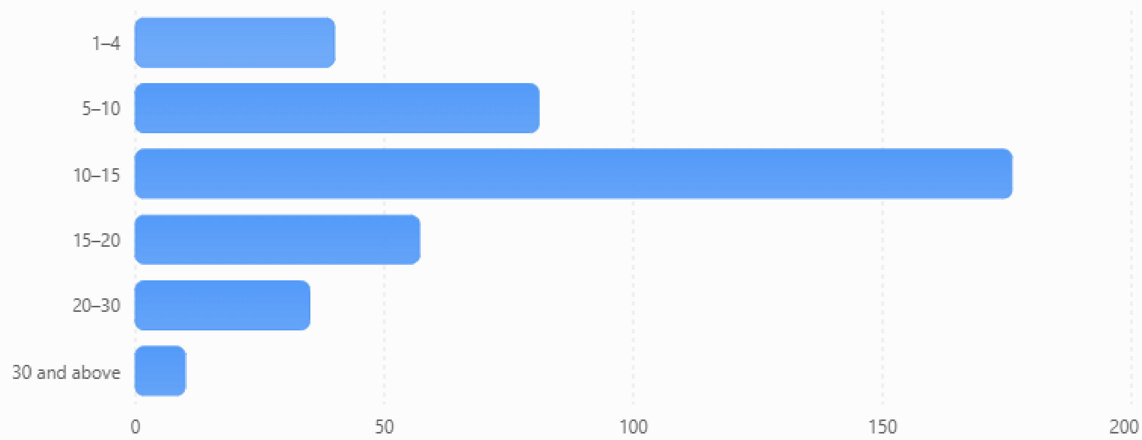


Figure 4. Herd size distribution

Distribution of respondents according to herd size.



Research Question Two: What is the cost and profitability level of swine farmers?

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Table 2: One-Year Average Cost, Returns and Profitability of Swine Production in Akwa Ibom State

Items	Unit Cost (₦)	Amount (₦)
A. Variable Costs		
Purchase of piglets (15 piglets)	10,000	150,000
Commercial feed (25 bags)	2,500	62,500
Cassava feed supplement	–	57,000
Casual labour	–	55,000
Drugs and vaccines	–	10,000
Electricity	–	8,700
Veterinary services	–	12,000
Transportation	–	10,000
Total Variable Cost (TVC)		**365,200**
B. Fixed Costs		
Housing	–	15,830
Tools and equipment	–	21,500
Rental value of land	–	4,000
Permanent labour (Salaries)	–	27,910
Maintenance	–	3,000
Depreciation	–	22,520
Total Fixed Cost (TFC)		**94,760**
C. Returns		
Sale of slaughtered pigs (8 pigs)	45,000	360,000
Sale of weaned piglets (35 piglets)	12,000	420,000
Sale of mature pigs (7 pigs)	50,000	350,000
Sale of manure (175 bags)	600	105,000
Sale of empty feed bags (25 bags)	80	2,000
Total Revenue (TR)		**1,237,000**

Source: Field Survey Data (2022).

Table 3. Profitability Indicators of Swine Production in Akwa Ibom State

Profitability Indicator	Formula	Value
Total Variable Cost (TVC)	–	₦365,200
Total Fixed Cost (TFC)	–	₦94,760
Total Cost (TC)	TVC + TFC	₦459,960
Total Revenue (TR)	–	₦1,237,000
Gross Margin (GM)	TR − TVC	₦871,800
Net Farm Income (NFI)	TR − TC	₦777,040
Benefit–Cost Ratio (BCR)	TR ÷ TC	**2.69**
Return on Investment (ROI)	(NFI ÷ TC) × 100	**168.94%**

Source: Computed from Field Survey Data (2022).

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Table 2 presents the one-year average cost, returns and profitability of swine production among farmers in Akwa Ibom State. The results indicate that the average total variable cost (TVC) incurred per production cycle was ₦365,200, while the total fixed cost (TFC) was ₦94,760, resulting in an average total production cost (TC) of ₦459,960. Variable costs accounted for approximately 79.4% of the total production cost, whereas fixed costs represented 20.6%, indicating that swine production in the study area is predominantly driven by recurrent operating expenses. Among the variable cost components, the purchase of piglets and feeding accounted for the largest proportion of production expenditure, highlighting feed and stocking costs as the principal cost drivers in swine production. The average total revenue (TR) realized by the farmers was ₦1,237,000, derived from the sale of slaughtered pigs, mature pigs, weaned piglets, manure and empty feed bags. The enterprise generated an average gross margin (GM) of ₦871,800, demonstrating that revenue from swine production was sufficient to cover all variable production costs while providing a substantial operating surplus. Furthermore, the average net farm income (NFI) of ₦777,040 indicates that swine production remained highly profitable even after accounting for both variable and fixed production costs. The profitability indicators further demonstrate the economic viability of swine production in the study area. The estimated Benefit–Cost Ratio (BCR) of 2.69 implies that every ₦1.00 invested in swine production generated approximately ₦2.69 in gross returns, yielding a net gain of ₦1.69 after recovering the total cost of production. Similarly, the Return on Investment (ROI) of 168.94% indicates that farmers earned an average return of about 169% on every naira invested in the enterprise. These findings suggest that swine farming is a financially viable and economically sustainable enterprise in Akwa Ibom State. The high profitability observed underscores the potential of swine production to improve farm household income, create employment opportunities and contribute to rural economic development, particularly when farmers have access to quality breeding stock, affordable feed resources, veterinary services, extension support and agricultural credit.

Hypotheses

H_{01}: The socio-economic characteristics of swine farmers have no significant influence on the profitability of swine production in Akwa Ibom State, Nigeria.

Table 4. Multiple Linear Regression Analysis of the Influence of Socio-economic Characteristics on the Profitability of Swine Production in Akwa Ibom State, Nigeria

Socio-economic Variables	B	Std. Error	Beta (β)	t	p-value
Constant	312,450.68	58,720.31	–	5.321	<0.001
Age	8,642.35	3,821.46	0.162	2.261	0.024*
Educational level	21,583.72	8,910.54	0.198	2.423	0.016*
Farming experience	17,936.41	7,203.18	0.174	2.490	0.013*
Household size	6,721.54	3,210.76	0.116	2.093	0.037*
Herd size	45,276.83	9,564.22	0.386	4.734	<0.001***
Management system	28,945.26	11,432.67	0.214	2.532	0.012*

Model Summary

Statistic	Value
Multiple Correlation (R)	0.721
Coefficient of Determination (R^2)	0.520
Adjusted R^2	0.512
Standard Error of Estimate	145,632.84

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Statistic	**Value**
F(6, 392)	**70.75**
p-value	**<0.001**

ANOVA

Source	**df**	**F**	**p-value**
Regression	6	70.75	<0.001
Residual	392		
Total	398		

Decision: Since **F(6,392) = 70.75,** **p < 0.001**, rejected.

The multiple regression analysis revealed that the socio-economic characteristics of swine farmers significantly influenced the profitability of swine production in Akwa Ibom State, Nigeria ($F(6,392) = 70.75$, $p < 0.001$). The model accounted for 52.0% of the variation in profitability ($R^2 = 0.520$), while the remaining 48.0% was attributable to other factors not included in the model. This level of explanatory power indicates that the selected socio-economic variables are important determinants of profitability among swine farmers. Among the predictor variables, herd size exerted the strongest positive influence on profitability ($\beta = 0.386$, $p < 0.001$), indicating that farmers with larger herd sizes realized significantly higher net farm income, likely due to economies of scale. Management system ($\beta = 0.214$, $p = 0.012$), educational level ($\beta = 0.198$, $p = 0.016$), farming experience ($\beta = 0.174$, $p = 0.013$), age ($\beta = 0.162$, $p = 0.024$) and household size ($\beta = 0.116$, $p = 0.037$) also had significant positive effects on profitability. These findings suggest that improvements in farmers' educational attainment, production experience and management practices, together with increased production capacity, enhance the profitability of swine enterprises. Consequently, the null hypothesis was rejected, confirming that socio-economic characteristics significantly determine the profitability of swine production among farmers in Akwa Ibom State, Nigeria.

Discussion of Findings

Socio-economic Characteristics and Profitability of Swine Production

The findings of Hypothesis One revealed that the socio-economic characteristics of swine farmers significantly influenced the profitability of swine production in Akwa Ibom State, Nigeria. The multiple linear regression analysis showed that age, educational level, farming experience, household size, herd size and management system jointly accounted for 52.0% of the variation in profitability among the sampled swine farmers ($R^2 = 0.520$; $F(6,392) = 70.75$; $p < 0.001$). Consequently, the null hypothesis, which stated that socio-economic characteristics have no significant influence on the profitability of swine production, was rejected. This finding indicates that farmers' socio-economic attributes play a crucial role in determining the profitability of swine enterprises through their influence on production decisions, efficient resource allocation, technology adoption and overall farm management practices. Among the predictor variables, herd size emerged as the most influential determinant of profitability ($\beta = 0.386$, $p < 0.001$), suggesting that farmers operating larger herds were more likely to realize higher net farm income due to economies of scale, improved resource utilization and increased market output**.** Management system **(**$\beta = 0.214$, $p = 0.012$) also had a significant positive effect, indicating that farmers adopting semi-intensive and intensive production systems achieved better financial outcomes than those using extensive systems. Furthermore, educational level **(**$\beta = 0.198$, $p = 0.016$**),** farming experience **(**$\beta = 0.174$, $p = 0.013$**),** age **(**$\beta = 0.162$, $p = 0.024$**)** and household size **(**$\beta = 0.116$, $p = 0.037$) significantly contributed to profitability. These findings suggest that better-educated and more experienced farmers possess greater managerial competence, are more likely to adopt improved husbandry practices and are better equipped to make informed production and marketing decisions that enhance enterprise performance. The present findings are consistent with those of Olagunju et al. (2020), who reported that farmers' educational attainment, farming experience and farm size significantly improved the profitability and technical efficiency of livestock enterprises in Nigeria. Likewise, Okoruwa and Obayelu (2021) found that managerial capacity, production scale and access to productive resources were critical determinants of profitability among livestock farmers. Similarly, Ekpe (2018) observed that education, farming experience and herd size significantly influenced the economic performance of swine enterprises in Akwa Ibom State. These studies collectively demonstrate that socio-economic characteristics

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enhance farmers' ability to adopt improved production technologies, efficiently allocate production resources and respond effectively to changing market conditions, thereby improving farm profitability. Nevertheless, the findings differ from those of Eze et al. (2022), who argued that favourable socio-economic characteristics alone may not guarantee higher profitability among smallholder livestock farmers because external constraints such as escalating feed prices, disease outbreaks, inadequate veterinary services, poor market access and limited availability of agricultural credit often reduce enterprise performance. The disparity between the findings may be attributed to differences in production systems, geographical location, access to institutional support services and variations in management practices across the study areas. Nevertheless, the current study demonstrates that, within the prevailing production conditions in Akwa Ibom State, socio-economic characteristics remain significant determinants of profitability and substantially influence the financial success of swine enterprises. Generally, the findings underscore the importance of strengthening farmers' socio-economic capacity as a strategy for improving the profitability and sustainability of swine production. Policy interventions should therefore prioritize farmer education and capacity-building programmes, strengthen agricultural extension services, facilitate access to affordable credit, promote cooperative participation, improve veterinary and animal health services and support herd expansion through sustainable production practices. Such interventions would enhance farmers' managerial efficiency, encourage the adoption of improved production technologies and ultimately increase the profitability and competitiveness of swine production in Akwa Ibom State and Nigeria at large.

Conclusion

The study concludes that swine production is a profitable and economically viable enterprise in Akwa Ibom State, Nigeria. The profitability analysis revealed a positive Net Farm Income (₦777,040) and a Benefit–Cost Ratio (BCR) of 2.69, indicating that swine farming generates returns that substantially exceed production costs. The study also established that socio-economic characteristics significantly influence the profitability of swine production ($R^2 = 0.520$; $F(6,392) = 70.75$; $p < 0.001$). Herd size, management system, educational level, farming experience, age and household size were significant determinants of profitability, with herd size exerting the greatest influence. These findings suggest that improving farmers' production capacity, management practices, education and access to institutional support will enhance the profitability and sustainability of swine production in Akwa Ibom State.

Recommendations

Based on the findings, the study recommends that:

1. Government and agricultural extension agencies should provide regular training on improved swine production and farm management practices to enhance farmers' productivity and profitability.
2. Government and financial institutions should improve farmers' access to affordable credit to support herd expansion and investment in modern production facilities.
3. Swine farmers should be encouraged to join cooperative societies to improve access to markets, veterinary services, production inputs and extension support.

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