

# PROFITABILITY AND CONSTRAINTS TO MINI-LIVESTOCK PRODUCTION IN URBAN NIGERIA: EVIDENCE FROM SNAIL FARMING IN IBADAN METROPOLIS

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**Abstract.** Mini-livestock can undoubtedly be raised and managed in small areas. They therefore become an important venture for meeting the increasing protein need of the urban populace like Ibadan. Hence, we analyzed the constraints to and profitability of Snail farming in Ibadan Metropolis. 120 snail farmers were randomly selected and interviewed. Specifically, we analyzed the profitability of snail production; identified the determinants of snail profitability and examined the constraints to snail farming in the study area. Snail farming is profitable in the study area with a return of ₦2.5 on every ₦1 invested. The farm size and income from other occupation were found to positively affect the profitability of snail farming. On the other hand, cost of breeding stock and labour cost were found to negatively affect the profitability of snail farming. The major constraints to snail farming in the study area in order of severity are: pest and disease attack, low patronage and inadequate access to credit for business expansion. The study was constrained by the limited number of registered snail farmers living and farming within Ibadan metropolis. The result provides the much-needed information on the factors that affect profitability of snail farming.

**Key Words:** Snails, Veterinary Service, Urban, Credit, Nigeria

## INTRODUCTION

Nigeria's urban population was 51.2 percent in 2019 (World Bank, 2019), with a total population of 195,874,740 people (World Bank, 2018). This rate of urbanization has been linked to natural urbanization and rural-urban migration (Farell, 2018). Urbanization is a major driver of unsustainable urban-rural linkages and food systems transformation (Seto & Ramankutty, 2016). Land availability, food security, and nutrition have all suffered as a result (Szabo, 2016).

The relatively uneven distribution of the urban population among cities and towns of various population sizes is a fundamental element of Nigeria's urbanization trend. The urban population has always tended to congregate in national and state capitals, as well as a few other rapidly rising metropolitan centers (Onokerhoraye, 1976). The demand for urban land has been the most visible effect of rapid urban population expansion in a few significant urban centers across the country. In metropolitan places, the rivalry for space between man and animals grows increasingly fierce. To cope with the burden of operating in cities, farmers in urban areas turn to space and noise-reducing businesses like mini-livestock production. Grass-cutters, snails, rabbits, and quail are examples of domesticated mini-livestock frequently grown in Africa (Ogunniyi et al., 2015)

Snail farming is one of Nigeria's most widely adopted mini-livestock producing methods. Snail farming, also known as heliciculture, is based on the fact that snails' native home is Nigeria's rainforest and swamp forest zones. When it rains, women and children in rural communities with good forest foliage suited for snail habitation go into the forest to gather, hunt, and hand pick snails for food, which they then sell in the rural markets to help pay for family expenditures (Agbogidi et al, 2008). The natural stock of snails has been depleted as a result of this. Commercial farms raise snails for their meat, shell, and other byproducts. However, understanding the profitability, factors of profitability, and ownership constraints of snail farms in urban Nigeria is still challenging. These are essential areas for ensuring that heliciculture is effectively mainstreamed into future biodiversity conservation, natural resource management, and food production programs. Specifically, we:

- a) analyzed the profitability of snail farming in Ibadan Metropolis of Oyo State, Nigeria
- b) analyzed the determinants of the profitability of snail farming in Ibadan Metropolis of Oyo State, Nigeria and
- c) examined the constraints to snail farming in Ibadan Metropolis of Oyo State, Nigeria

## **MATERIALS AND METHOD**

The research was carried out in Ibadan Metropolis, the capital of Nigeria's Oyo State. It lies between the equator and 7°22'39.2"N and 3°54'21.3"E. Ibadan is the capital of Oyo State and Nigeria's third most populous metropolis. It is West Africa's largest indigenous city by area. Ibadan's population has grown dramatically, from a population of 100,000 in 1851 to 175,000 in 1911 and 745,448 in 1952. In 1963, the population was 1,141,677. According to studies based on aerial photography at a scale of 1:25,000, the entire land area had increased to almost 112 square kilometers by 1973. (Adediran, 1984; Onibokun, 1988). All of the city's agriculture, fallow fields, and river flood plains had been developed. By 1981, a total of 136 square kilometers of land had been developed. In 1984, it grew to 176 square kilometers, and in 1988, it grew to 214 square kilometers (Ema, 1986; Mabogunje, 1992; Mschlia, 1986; Onibokun, 1987; Stren, 1985). In 2019, the population of Ibadan was 3,464,000, up 2.39 percent from 2018. (UN, 2019).

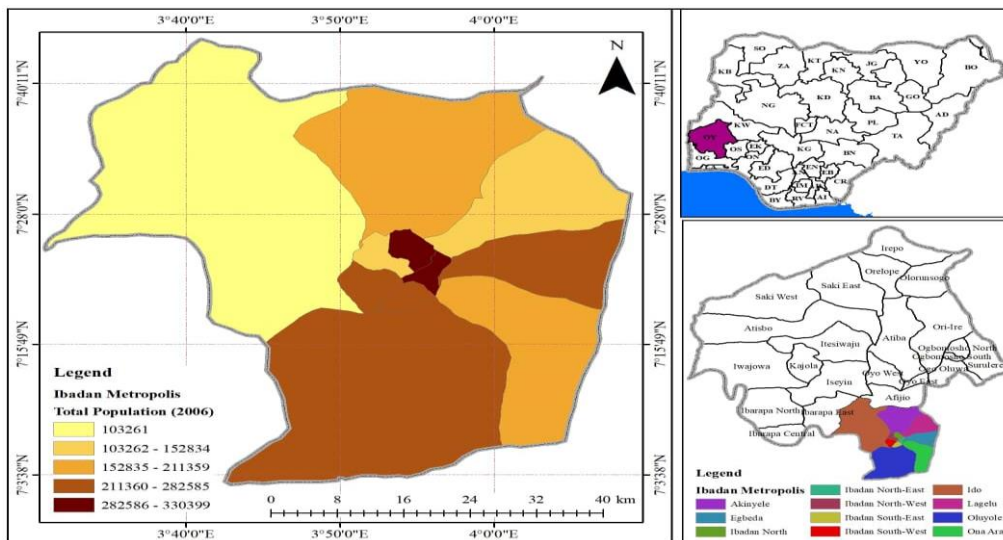


Figure 1: Map of Ibadan metropolis showing the population density of its various local government areas

120 snail farmers were selected using a simple random sample technique from the list of snail farmer's associations obtained from the Institute of Agricultural Research and Training (IAR&T), Ibadan. Semi-structured interview was conducted with the selected respondents. It was totally optional for the farmers to be interviewed for the study

*Net income analysis and profitability ratios:* Net income analysis was used to ascertain the profitability of snail farming in the study area. The equation is as follows;

$$NFI = TR - (TFC + TVC) \dots\dots\dots \text{Equation (i)}$$

The profitability ratios are as follows:

$$\text{Return on sales (ROS)} = \frac{NFI}{TR} \dots\dots\dots \text{Equation (ii)}$$

$$\text{Rate of return on investment (RRI)} = \frac{NFI}{TC} \times 100 \dots\dots\dots \text{Equation (iii)}$$

- Where NFI = Net farm income
- TR = Total revenue
- TVC = Total variable cost
- TFC = Total fixed cost
- TC = Total cost

*Ordinary least square regression:* The ordinary least square regression was used to analyze the determinants of snail farming profitability in Ibadan metropolis.  $Y = f(X_1 + X_2 + \dots + X_{11} + e)$

Where:

- Y = Profit
- X<sub>1</sub> = Age (years), X<sub>2</sub> = Snail farming experience (years), X<sub>3</sub> = level of education (adult education=5, tertiary=4, secondary=3, primary=2, no education=1) , X<sub>4</sub> = Farm size (hectare), X<sub>5</sub>= Stock / number of snail, X<sub>6</sub>= Primary occupation, X<sub>7</sub>= labour (person

days),  $X_8$ = Cost of feed (₦),  $X_9$ = Cost of breeding stock (₦),  $X_{10}$ = Cost of labour (₦),  $X_{11}$ = Average monthly income from primary occupation (₦),  $U$  =Error term.

*Likert-type Scale*: A 4-point Likert scale technique was used to analyze the constraints to snail farming in Ibadan Metropolis. The 4-point Likert scale was graded as Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, Strongly Disagree (SD) = 1.

## RESULTS AND DISCUSSION

The cost of labor accounts for 28.0 percent of the total cost of snail production in the study area, breeding stock accounts for 39.8 percent of the total cost, feeding accounts for 13.9 percent of the total cost, medication (such as wood ash) accounts for 3.7 percent of the total cost, and transportation accounts for 2.4 percent of the total cost, according to Table 1. Fixed asset depreciation accounts for 12.2 percent of total cost (pen, watering can, feeder, rake, and shovel). It was discovered that the average farmer spent ₦6,475.17 on overall costs but generated ₦226,570 in total revenue every production cycle. Snail farming yielded roughly 2.5 naira for every naira spent. This equates to a net income of 161,810.83 for the average farmer, indicating that snail farming is a viable enterprise. This result is consistent with Munonye and Moses (2019), who found that the return on investment in snail production in Nigeria's Owerri agricultural zone was 3.04.

Table 1.  
Profitability of Snail farming in Ibadan Metropolis

Variable	Amount (₦)	% of total variable cost	% of total cost
<b>Output (no of snails)</b>	603	-	-
<b>Selling price</b>	₦376.00	-	-
<b>A. Total revenue (TR)</b>	₦226570.00		
<b>B. Expenses</b>			
<b>Variable cost</b>			
Labour	₦18133.33	31.9	28.0
Feeding	₦9026.17	15.9	13.9
Breeding stock	₦25768.75	45.3	39.8
Medication	₦2390.92	4.2	3.7
Transportation	₦1550.00	2.7	2.4
<b>Total variable cost</b>	₦56869.17	100	87.8
<b>C. Gross income</b>	₦169700.83		-
<b>Fixed cost (depreciation)</b>			
Snail pen	₦4000.00		6.2
Feeding trough	₦450.00		0.69
Bucket / watering can	₦420.00		0.65
Shovel	₦720.00		1.1
Rake	₦600.00		0.93
Water tank	₦1700.00		2.63

<b>D. Total fixed cost</b>	₦7890.00		12.2
<b>E. Total cost</b>	₦64759.17		100
<b>F. Net income (TR-TVC+TFC)</b>	₦161810.83		

$$*\text{Return on sales} = \frac{NFI}{TR} = \frac{161810.83}{226570.00} = \text{₦}0.714$$

$$*\text{Return on investment} = \frac{NFI}{TC} = \frac{161810.83}{64759.17} = \text{₦}2.5$$

The results of the predicted functions are shown in Table 2. At 5%, the farm size coefficient of 0.281 has a positive significant influence on profit. This means that increasing the size of the farm by one unit will improve profit by 2%. The cost of breed stock coefficient was -0.222, which has a negative substantial impact on profit at 5%. This means that a 2% rise in the cost of breed stock will result in a 2% decrease in profit. The household income coefficient of 0.219 has a positive significant influence on profit at 5%. This demonstrates a massive significant impact on profit, whereas the cost of labor coefficient was -0.323, indicating a negative substantial positive significant impact on profit at 1%. This means that a 3% increase in labor cost per unit will result in a 3% drop in profit.

Table 2.

## Determinants of snail farming profitability

Variables	Coefficient (β)	Standard error	P-value
Age	0.043	0.00941	0.703
Experience	0.068	0.001094	0.562
Education level	0.086	0.008938	0.347
Farm size	0.281**	0.037	0.012
Stock number	0.045	0.16	0.674
Primary occupation	0.063	0.007117	0.496
Labour	-0.028	0.007683	0.759
Cost of feed	-0.025	1.06	0.778
Cost of breeding stock	-0.222**	0.229	0.011
Cost of labour	-0.323***	0.347	0.000
Household Income	0.219**	0.167	0.023

**Note: \*\* Significant at 5%**

**\*\*\* Significant at 1%**

Table 3 demonstrates that predators and diseases, with a mean score of 2.73, snails' slow growth rate, with a mean score of 2.63, and a lack of a steady market were the biggest restraints militating against snail farmers. Because the bulk of them use all-in all-out stocking, the snail's slow growth rate was a constraint because it did not allow for

year-round supply of snail. And the off season usually falls during the dry season, when snail production is considered to be more profitable. Infestation with pests and diseases was also a major stumbling block since they increase mortality. Consumers prefer buying snails in the market from individuals who pick them from the bush at lower prices, resulting in a low or steady market. The lack of access to Extension programs was the fourth main barrier.

Table 3.

## Constraints to snail farming

Constraints	Strongly agree	Agree	Disagree	Strongly disagree	Mean	Ranking
Lack of financial capacity for business expansion	3	49	67	1	2.45	5 <sup>th</sup>
Inability to get good breeding stocks	0	9	84	27	1.85	14 <sup>th</sup>
Slow growth rate of snails	19	42	54	5	2.63	2 <sup>nd</sup>
Predator attack (e.g. insect) and diseases	25	38	56	1	2.73	1 <sup>st</sup>
Lack of access to Extension programmes	8	47	60	5	2.48	4 <sup>th</sup>
Lack of experience	0	10	84	26	1.87	13 <sup>th</sup>
Inadequate information on management practices	10	20	73	17	2.19	10 <sup>th</sup>
High mortality rate	13	25	76	6	2.37	7 <sup>th</sup>
Lack of stable market/low patronage	23	28	67	2	2.60	3 <sup>rd</sup>
Involvement in other off farm jobs	0	18	76	26	1.93	11 <sup>th</sup>
Effect of harsh weather condition	2	42	71	5	2.34	8 <sup>th</sup>
Theft	2	42	69	7	2.33	9 <sup>th</sup>
Inadequate land area for snail farming	4	20	85	11	2.14	11 <sup>th</sup>
Insufficient access to credit	5	42	69	4	2.40	6 <sup>th</sup>
Tedious nature of snail farming	0	10	68	42	1.73	15 <sup>th</sup>

## CONCLUSION

According to the findings of this study, sail farming is profitable in Nigeria's Ibadan city. However, problems like as insect and disease attacks, minimal patronage, and insufficient access to capital for business expansion limit its viability. As a result, we advocate focusing efforts on improving access to veterinary services, credit, and public awareness of the nutritional benefits of snails.

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