**RESEARCH ARTICLE**

## Cost Benefit of Snail Production in Umuagwo, Imo State, Nigeria

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**ABSTRACT**

This paper analysed the economics of snail production in Umuagwo, Imo State, Nigeria. A random sampling procedure was used to select sixty respondents from the study area. A well-structured questionnaire was used to collect data. The data were analyzed using frequency counts, percentages and budgetary technique. The findings showed that most of the snail farms are owned by individuals who were part-time snail farmers (84.9%) and financed their snail production (98.1%) through their personal savings. Management practice revealed that most of the respondents reared *Archachatina marginata* (98.1%). Budget analysis showed that snail production is profitable with the farmers making an average profit of N24, 089.03k while regression result revealed that years of education(t=2.835), years of experience (t=2.786) and farm size (t=2.197) are statistically significant and explain about 25% of the total variation in the profit made by the snail farmers. Due to its profitability and low capital investment nature, it is recommended for farmers without substantial capital, unemployed and those aspiring to augment their income.

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## INTRODUCTION

Micro livestock by rural household is becoming popular due to the fact that households have realized the need to diversify their source of income thereby reducing the risk involved in depending on crop production as the main source of income (Uwalaka and Ahaotu, 2013). Snail is one of the micro livestock that has attracted attention among Nigerian farmers due to its ability to step up protein intake among households. It has been reported by (Ajibefun, 2000) that the average animal protein intake in Nigeria is low, calling for conserted effort towards alleviating these crises of protein shortage. Unfortunately, the conventional and regular sources of animal protein supply in the country like beef, pork, goat meat and poultry are getting out of reach of the common populace due to the economic down-turn. There is therefore the need to look inward and integrate into our farming system some non-conventional meat sources (Ebenebe, 2000; Adesope, 2000; Akinnusi, 2000). These will complement the conventional animals as source of animals protein supply. The challenge thus falls on the micro livestock in which Nigeria is richly endowed. Snail meat is well accepted in many parts of Nigeria. Many species of edible land snails are recognized in Nigeria but the popular species of economic interest in the West Africa giant snails *Archatina achatina* and *Archachatina marginata.* Snail are small, noiseless and easy to handle, they can be reared in the urban areas without infringing on the peace of the neighbours (Odunnaiya, 1991; Uwalaka and Ahaotu, 2013). In Nigeria and Ghana, where snail meat is particularly popular, snails are gathered from the forest. However, wild snail population is declining rapidly due to indiscriminate hunting of snails before they reach maturity, bush burning, use of agro chemicals, deforestation and change in weather (Efarmspro, 2006).

## MATERIALS AND METHODS

### The Study Area

This experiment was carried out at Umuagwo, Ohaji Egbema Oguta Local Government Council, Imo State, Nigeria. The site is situated between longitudes $7^\circ$ $0^1$ $06^{11}$E and $7^\circ$ $03^1$ $00^{11}$ and latitudes $5^\circ$ $28^1$ $00^{11}$ N and $5^\circ$ $30^1$ $00^{11}$ N in the humid tropical West Africa (Ofomata, 1975).

### Population, Sampling Procedure and Sample Size

The population of the study is the snail farmers in the study area. A random sampling procedure was used to select the respondents. In the first stage, the town was stratified into four strata. In the second stage, a village

was randomly selected from each stratum. The last stage involves random selection of fifteen respondents from each village making a total of sixty snail farmers. The information collected was subjected to reliability test and due to outlier and inconsistency; the respondents were reduced to 53.

## Method of Data Collection

The data in this research work are mainly primary data that are obtained by conducting interviews through well-structured questionnaire that covered information on the socio-economic characteristics of snail farmers in the study area, the management practices employed in snail production, the cost incurred on and return accrued to snail production, factors affecting snail production, problems encountered in snail farming, possible solutions for the problem and likely areas of improvement in snail production activity in the study area.

## Method of Data Analysis

The analytical techniques employed include descriptive statistics and budgetary techniques. Descriptive Statistics such as frequency counts, percentage and mean was used to measure socio-economic characteristics of the respondents.

Budgetary techniques were used to determine the gross margin and net farm income obtained from snail production in the study.

GM = TR-TVC
NFI = GM-TFC
Profit = TR-TC
Where GM = Gross Margin
TR = Total revenue
TVC = Total Variable Cost
NFI = Net Farm Income
TFC = Total Fixed Cost
TC = Total Cost

Mean was used to compute the cost of the various inputs such as cost of land, feeds, equipment and labour employed, cost of water and cost of hatchlings used in the production process.

All equipment used was depreciated using straight line method of depreciation in order to guide against over valuation of the cost incurred in each production year.

Profitability ratio analysis such as Cost Benefit Ratio (CBR), Gross Revenue Ratio (GRR), Expense Structure Ratios (ESR) and rate of Returns (ROR) was used to measure the profitability of the snail farms and also to ascertain that snail production is a worthwhile venture.

## RESULTS AND DISCUSSION

## Socioeconomic Characteristics of the Respondents

The results of the socio-economic characteristics of the snail farmers such as gender, age, marital status, educational status, religion, social organization, years of experience, major occupation and source of capital is presented in Table 1.

Table 1 show that 73.6% of the snail farmers are male while 26.4% were female. This shows that snail farming is a male dominated venture in the study area. This study agrees with the findings by Raheem (2001) that majority of the snail farmers are males (76%). The Table also

shows that about 38% of the respondents are in the age range 30-39 years with a mean age of 38 years. This implies that most of the snail farmers are in their active age group. The reason for this is that snail farming is a new business in the study area and as such older people are yet to be involved in the rearing of snail on commercial basis, rather they rear snail for family consumption and as a way of getting themselves busy. Majority of the snail farmers (75.5%) are married while 24.5% were single. This indicates that married people are more involved in snail farming in the study area probably to increase household income. This study is in line with findings by Yusuf (2002). Majority (58.5%) of the snail farmers had tertiary education while just 3.8% had primary education. Education is vital to snail rearing especially in the area of record keeping and proper management. Also commercial snail rearing being new in agricultural production activity is seen to be embraced by the educated people. More than half (62.5%) of the respondents are Christians, 35.8% were Muslims while 1.9% were traditional worshippers. This implies that there is no religious prohibition against snail rearing due to nutritional, medicinal and economic importance of snail. About 79% of the respondents belong to social organization such as cooperative society, farmers' development union, farmers' congress and community development associations. This implies that apart from snail rearing activities, they still have other activities they attend to and this is possible since snail rearing is not time consuming. Data in Table 1 also reveals that 41.6% of the respondents have years of experience of between three to four with a mean years of experience of 5 years. This implies that more people are now going into snail production due to increase in the awareness on the importance attached to snail production. About 84.9% of the respondents practice snail farming on part-time basis while the remaining 15.1% practiced snail farming on full-time basis. This implies that snail farming does not deprive the respondents of the time for other productive activities. Of the part time farmers, majority (60%) were civil servant, 26.7% were traders while 8.9% and 4.4% were students and contractors respectively. This implies that they are involved in snail rearing as a source of increasing household income and for household consumption. The data in Table 1 also shows that 98.1% of the initial source of capital used in setting up a snailery in the study area is from personal savings while the remaining 1.9% is from relatives and friends. This finding also agrees with the findings of Raheem (2001) that 96% of the snail farmers used their personal saving as a source of initial capital.

The data in Table 2 shows that 98.1% of the breed reared is *Archachatina marginata*. This is due to the fact that it has more meat than other species and thus command higher price there by giving more revenue to the snail farmer. This study agrees with findings by Hamzat (2000) that *Archachatina marginata* is common in Nigeria and it is an excellent source of animal protein, having large body size and easy to manage. Majority of the farmers reared their snail in fenced pen (43.4%), followed by Drums or pots (32.15) and the least is used tyres. This implies that fenced pens are the most preferred among the breeding location.

**Table 1:** Socioeconomic characteristics of the respondents

| Social-economic Characteristics | Frequency | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 39 | 73.6 |
| Female | 14 | 26.4 |
| **Age** | | |
| 20-29 | 12 | 22.6 |
| 30-39 | 20 | 37.7 |
| 40-49 | 17 | 32.1 |
| 50-59 | 2 | 3.8 |
| 60 and above | 2 | 3.8 |
| **Marital Status** | | |
| Single | 13 | 24.5 |
| Married | 40 | 75.5 |
| **Educational Status** | | |
| No-formal Education | 0 | 0 |
| Primary Education | 2 | 3.8 |
| Secondary Education | 20 | 37.7 |
| NCE/OND | 11 | 20.8 |
| HND/University | 20 | 37.7 |
| **Religion** | | |
| Christianity | 33 | 62.3 |
| Islam | 19 | 35.8 |
| Traditional | 1 | 1.9 |
| **Member of Social Organization** | | |
| Yes | 42 | 79.2 |
| No | 11 | 20.8 |
| **Years of experience** | | |
| 1-2 | 17 | 32.1 |
| 3-4 | 22 | 41.6 |
| 5-6 | 14 | 26.3 |
| **Mode of Practising** | | |
| Full-time | 8 | 15.1 |
| Part-time | 45 | 84.9 |
| **Major Occupation** | | |
| Civil service | 27 | 60.0 |
| Trading | 12 | 26.7 |
| Student | 4 | 8.9 |
| Contracting | 2 | 4.4 |
| **Source of Capital** | | |
| Personal saving | 52 | 98.1 |
| Relations and friends | 1 | 1.9 |

**Table 2:** Management Practices

| Management Practices | Frequency | Percentage |
|---|---|---|
| **Breed of Snail** | | |
| *Archachatina marginata* | 52 | 98.1 |
| *Achatina achatina* | 1 | 1.9 |
| **Where Snail are Grown** | | |
| Fenced pens | 23 | 43.4 |
| Drums or pots | 17 | 32.1 |
| Trench pens | 8 | 15.1 |
| Tyres | 2 | 3.8 |
| Others | 3 | 5.7 |
| **Record Keeping** | | |
| Yes | 48 | 90.6 |
| No | 5 | 9.4 |
| **Feed consumed** | | |
| (1) Green feed | 12 | 22.6 |
| (2) Compound Ratio | 5 | 9.4 |
| (3) Industrial by-product | 0 | 0 |
| (4) Domestic waste | 14 | 26.4 |
| (5) 1-2 | 9 | 17.0 |
| (6) 1-4 | 9 | 17.0 |
| (7) 2-3 | 2 | 3.8 |
| (8) 2-4 | 2 | 3.8 |
| **Frequency of feeding** | | |
| 1 | 51 | 96.2 |
| 2 | 1 | 1.9 |
| 3 | 1 | 1.9 |
| **Source of Water** | | |
| (1) Well | 44 | 83.0 |
| (2) Stream | 1 | 1.9 |
| (3) Water supply | 6 | 11.3 |
| (4) 1-3 | 1 | 1.9 |
| (5) 2-3 | 1 | 1.9 |
| **Family Labour used (Man days)** | | |
| 1-20 | 26 | 49.1 |
| 21-40 | 18 | 33.9 |
| 41-60 | 7 | 13.2 |
| 61-80 | 1 | 1.9 |
| 81-100 | 1 | 1.9 |

Farm record is very important in agricultural business because it shows the overall performance of that particular enterprise at any point in time. As a result of the importance of record keeping, data in Table 2 shows that greater numbers of the respondents (90.6%) keep record of their snail production activity, 26.4% of the feed consumed by the snails in the study area came from domestic waste, 22.6% came from green feed while 17% each came from green feed and compound ration and green feed and domestic waste. This implies that the cost of feeding and sustaining snails are minimal and affordable since snail is able to convert low quality feed such as green feed and domestic waste into high quality animal protein thereby reducing the cost of feeding. The data in Table 2 also reveals that most of the farmers in the study area feed their snails once a day. This implies that snails do not require much feed since it is able to convert low quality feed to high quality animal protein and meat. More than three quarters (83%) of the respondents used well water in their snailery. The mean family labour used was found to be 24 man days which implies that majority of the snail farmers are still practicing on a small scale.

**Gross Margin and Net Farm Income Analysis**

Snail farmers made profits from their production with gross margin of N27, 432.78k and Net farm income of N 24, 089.03k per farming season. This shows that snail production in the study area is a profitable business.

The data in Table 4 shows that CBR is greater than one. Judging from investment decision criteria, this implies that snail farming is profitable. The gross revenue ratio was found to be 0.388, which implies that from every N1.00 returns to the snail industry, 38.8k is spent. The expense structure ratio was found to be 0.181, which also implies that 18.1% of the total cost of production is made up of fixed cost component, thus making the business worthwhile to invest in. Also, the rate of returns was found to be 1.574 which shows that for every one naira invested in snail production 157k is gained. From all these profitability ratios snail production is a profitability business in the study area.

**Problems Encountered in Snail Production**

The major problems faced by the snail farmers in the study area are Predators such as rats, lizard, snake, frog, bird, ants, termites and cockroaches (43.4%), theft (18.9%), lack of finance (13.2%), lack of space (9.4%) and inexperience (3.8%). This implies that the major problem faced by the snail farmers in the study area is that of predators (Table 5).

**Table 3:** Gross Margin and Net Farm Income Analysis for one farming season

| Items | Cost (N) |
|---|---|
| Total Revenue | 39, 628.13 |
| Variable cost | |
| Hatchling cost | 11,628.66 |
| Feed cost | 338.49 |
| Water cost | 92.45 |
| Transport | 144.75 |
| Total Variable cost | 12,204.35 |
| Gross margin | 27,423.78 |
| Fixed cost | |
| Land | 547.17 |
| Cost of equipment | 2787.58 |
| Total fixed cost | 3334.75 |
| Net farm Income | 24089.03 |

**Table 4:** Profitability Ratio of the Snail

| Ratios | Values |
|---|---|
| Cost Benefit Ratio *TR/TC* | 2.574 |
| *Gross Revenue Ratio TC/TC* | 0.388 |
| *Expense Structure Ratio* | 0.181 |
| *FC/TC* | 1.574 |
| Rate of Returns NR/TC | |

**Table 5:** Distribution of the respondents according to problems encountered in Snail production

| Problems | Frequency | Percentage |
|---|---|---|
| No Problem | 6 | 11.3 |
| Lack of Finance | 7 | 13.2 |
| Lack of Space | 5 | 9.4 |
| Theft | 10 | 18.9 |
| Predators | 23 | 43.4 |
| Inexperience | 2 | 3.8 |
| Total | 53 | 100 |

## Conclusion

Based on the major findings of this research, the following conclusions were drawn. Snail farming is a profitable venture if carried out with adequate management.

Snail farming can be handled as a part-time business because it is not time consuming. A large number of feed consumed by the snails come from domestic waste and green feed which made the cost of feeding to be low. Profit made in snail production is being influenced by years of education; years of experience and farm size, and the main problems of snail production is predators. This study therefore recommends that more people should go into snail production and the already involved farmers should enlarge their production. Farmers should also take great care by avoiding or removing of all materials that can cause harms to the snails.

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