BENEFITS AND CONSTRAINTS OF SNAIL AND CATFISH FARMING IN ONDO WEST LOCAL GOVERNMENT AREA OF ONDO STATE

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Abstract

This study investigated the various aspects of snail and catfish farming as well as the benefits and challenges faced by entrepreneurs in Ondo West Local Government Area of Ondo State. The study involved thirty-six catfish and two snail farmers who were selected for this study. Validated questionnaires were used to collect data from selected farmers in the local government area. The data collected were analyzed using frequency counts, simple percentages, mean and standard deviation. The major findings revealed that there were different aspects of snail and catfish farming for farmers and entrepreneurs. These aspects included sorting (50%), transportation (100%), production of feed (63.9%), sales of smoked fish (50%), sales of table-size fish (41.7%) and fingerlings (58.3%), and acting as an intermediary between farmer and consumer (69.4%). Findings also revealed that snail and catfish farming brought significant benefits to the farmers. They were good sources of income and employment, and highly nutritious. The high reproductive ability of snails and catfish also makes the business viable. The challenges of snail and catfish farming were related to capital (69.4%), availability of infrastructure (47.2%) and amenities (50%), pests and diseases (100%), sitting (66.7%) and scarcity of feeds (55.6%). The study concluded that snail farming and catfish farming are profitable businesses with various aspects, viable benefits as well as constraints. It was recommended that extension agencies maintain good relationships with the farmers to intensify their awareness about the adoption of improved technology, and formal fund sourcing. Additionally, they should encourage fish farmers to join various fish and snail farmers' groups to make the required information and best practices readily accessible.

Keywords: catfish farming, entrepreneurship, snail farming

Introduction

The world's growing population and widespread malnutrition create a pressing need to increase food production. Meat consumption is rising globally. Pork remains the most popular meat, followed by poultry, beef, and goat/sheep (United States Department of Agriculture, 2023). However, growing health concerns, particularly among older adults, are leading people to explore alternative protein sources like fish (Lin & Kuo, 2020; Xia, et al., 2024). Snails are a potential alternative protein source due to their rapid reproduction and high nutritional value. The giant African land snail (*Achatina marginata*) is particularly suitable for farming due to its prolificacy (Agbaji, 2018). They are rich in protein, iron, and calcium, and low in fat and cholesterol (Okon et al., 2016). Snail farming offers several benefits for Nigerian entrepreneurs and farmers. It requires minimal startup costs, making it accessible to many.

The high market demand for snails can compensate for their longer gestation period (Agronews, 2016). Aquaculture, the farming of fish and other aquatic organisms, is crucial as wild fish stocks become depleted due to overfishing. Fish is a vital source of income and protein for many Nigerians. However, domestic fish production falls far short of demand, making Nigeria a major importer. Aquaculture offers a solution to bridge this gap and reduce reliance on imports (Liverpool-Tasie, et al., 2020). Snail and catfish farming holds promise for improving Nigeria's food security by reducing reliance on imported food sources. Both require relatively low investment and resources, making them suitable for small-scale farmers.

Entering the world of snail and catfish farming presents entrepreneurs with intriguing options or aspects. Within snail farming, one can focus on breeding, and raising snails specifically to sell as breeding stock to other farmers for meat production (Touchstone Snail, 2014). Alternatively, the entrepreneur can raise snails for their meat, selling them directly to consumers. Lastly, the unique properties of snail slime, touted for its anti-ageing benefits, have opened a niche market for those interested in harvesting and selling this mucus (Lawler, 2023). Catfish farming offers similar avenues. Hatchery operations specialize in producing young catfish fingerlings, which are then sold to other catfish farmers for grow-out (Agricdemy, 2020; Adetiloye, 2018). Alternatively, one can focus on raising catfish from fingerlings to marketable size for human consumption. In a bid to maximize profits, catfish farmers can consider processing their harvest into value-added products like smoked catfish fillets, which often command higher prices (Adhikari, et al., 2020).

The benefits of snail and catfish farming lie in their affordability. Compared to other livestock ventures, startup costs are relatively low, making them accessible to a wider range of potential farmers (Oritse, 2023). Additionally, both snail meat and catfish are popular protein sources, creating a high market demand that translates to potentially profitable opportunities (Agricdemy, 2020). Another advantage is their space efficiency. Both can be farmed intensively, requiring less land than traditional livestock grazing. Finally, snails and catfish boast fast growth rates, with snails reproducing multiple times a year and catfish reaching marketable size within a few months (Catfish Farm Enterprise, 2023). This allows for frequent harvests and potentially increased profitability.

However, venturing into these fields is not without its challenges. Success hinges on acquiring the technical knowledge required for proper breeding, feeding, and disease management practices specific to snails or catfish (Catfish Farm Enterprise, 2023). Market fluctuations, inherent to any agricultural product, can also impact profitability as snail and catfish prices can vary depending on supply and demand. Lastly, climate dependence presents an obstacle. Snails thrive in humid environments, while catfish prefer warmer water temperatures. This may necessitate climate control measures or choosing species well-adapted to the local climate (Chigbogu, 2017). While these are some of the key considerations, thorough research on a specific region's market, regulations, and climate is paramount before embarking on a snail or catfish farming venture. Snail and catfish farming are two livestock practices that are gradually gaining the interest of young entrepreneurs and farmers, and they

can be the panacea to food insecurity. Nigeria is yet to become food secure and the increase in the importation of food items has further plagued the realization of this goal. Catfish farming and snail farming have the potential to reduce the country's reliance on importation of food. This study is an attempt to appreciate these potentials by examining the aspects of snail and catfish farming as well as the benefits and challenges among entrepreneurs in Ondo West Local Government Area of Ondo State.

Research Questions

The following research questions were raised and answered in this study:

1. What are the aspects of snail and catfish farming open to entrepreneurs in the study area?
2. What are the benefits of snail and catfish farming among entrepreneurs in the study area?
3. What are the constraints of snail and catfish farming among entrepreneurs in the study area?

Methodology

A descriptive survey design was employed for this study. The population of the study comprised all snail and catfish farmers in Ondo West Local Government Area of Ondo State. The study population consisted of all snail and catfish farmers in Ondo West Local Government Area. According to the Author's Field Survey (2019), there were 105 registered catfish farmers and 5 registered snail farmers. The breakdown of the catfish farmers included 20 small-scale farmers, 50 medium-scale farmers, and 35 large-scale farmers.

Purposive sampling was employed to select the catfish farmers across the three scales (small, medium, and large), ensuring that only those who had sustained their businesses for at least five consecutive years were included. A proportionate sampling technique was used to determine the sample size, representing one-third (33.3%) of the total population, while simple random sampling was used to select 38 livestock farmers, including 36 catfish farmers and 2 snail farmers for the study. Two separate questionnaires for the snail farmers and the catfish farmers with a four-point Likert scale were developed for data collection. The reliability was tested using the Pearson Product Moment Correlation (PPMC), yielding correlation coefficients of 0.856 for the catfish farmers' questionnaire and 0.843 for the snail farmers' questionnaire, indicating high reliability. The researchers visited the farms to administer the questionnaires. Thirty-six copies were given to the catfish farmers and two copies to the snail farmers, with all completed questionnaires collected immediately to prevent any loss in transit. The questionnaires were administered in English, with the researcher providing translations for non-literate farmers. The responses were analyzed using frequency counts, percentages, standard deviation, and mean.

Results and Discussion

Research Question 1: What are the aspects of snail and catfish farming open to entrepreneurs in the study area?

Table 1: *Frequency, Percentage and Ranking of the Aspects of Snail and Catfish Farming Open to Entrepreneurs*

S/N	Aspects	Frequency	Percentage	Rank
Snail Farming				
1.	Transportation of snail to the final consumer	2	100.0	1st
2.	Sales of table-size snail	1	50.0	3rd
3.	Intermediary between farmer and final consumer	2	100.0	1st
4.	Sorting	1	50.0	3rd
Catfish Farming				
1.	Production of feed	23	63.9	2nd
2.	Sales of fingerlings	21	58.3	3rd
3.	Sales of smoked fish	18	50.0	4th
4.	Sales of table-size fish	15	41.7	5th
5.	Intermediary between farmer and final consumer	25	69.4	1st

Table 1 revealed that all the snail farmers sampled (100%) can transport snails to the final consumer and act in the capacity of an intermediary between another farmer and the final consumer. Only half of them (50%) sort snails and sell table-size snails. This study found that snail farmers and entrepreneurs have several roles they can play in the supply chain, including transporting snails to final consumers, selling table-sized snails, and acting as intermediaries between other farmers and consumers. Transporting snails involves carefully moving them from the farm to the market or final producer, a task that requires special attention to maintain the snails' health and quality (Touchstone Snail, 2014). Additionally, snails are sorted by size, an economic activity known as sorting, which can be commercially significant for farmers (Agronews, 2016). Sorting not only helps in meeting consumer preferences but also allows farmers to sell snails at different price points based on size, maximizing their revenue potential. Table 1 also shows that the aspects of fish farming open to entrepreneurs were intermediary between farmer and final consumer (69.4%), production of feed (63.9%), sales of fingerlings (58.3%), sales of smoked fish (50%) and sales of table size fish (41.7%). Catfish farmers have various avenues for generating income, such as acting as intermediaries between other farmers and consumers, producing fish feed, brooding catfish to sell as fingerlings, and selling both smoked and table-sized fish. Adetiloye (2018) identified five profitable ventures within fish farming: hatching, rearing table-sized fish, selling fish feeds, smoking or drying fish, and providing consulting services. These opportunities highlight the versatility and potential profitability of catfish farming. By engaging in multiple aspects of the catfish supply chain, farmers can diversify their income sources and reduce financial risk (Agricdemy, 2020).

Research Question 2: What are the benefits of snail and catfish farming among entrepreneurs in the study area?

Table 2: *Benefits of Snail Farming Among Entrepreneurs*

S/N	Benefits	$\bar{x}$	Std. Dev.
1.	Both male and female reproductive organs are available in each snail. As a result, the snails can reproduce very fast.	4.00	0.000
2.	Snail meat is better than red meat and it is enriched with highly nutritious ingredients.	3.00	0.000
3.	Snail meat is low in iron, protein, calcium and phosphorus and very high in cholesterol, sodium and fat.	4.00	0.000
4.	Snail has a great market all over Nigeria and in the West African regions.	3.00	0.000
5.	The business tasks related to snail farming in Nigeria like financing, production, servicing, processing, sorting, transporting and marketing can create job opportunities for unemployed people.	4.00	0.000
6.	Domestic snail farming in Nigeria cannot meet the family's nutritional demands.	4.00	0.000
7	Commercial snail production can decrease the importation of frozen meat or fish from foreign countries.	3.00	0.000
8.	The risk of losses is more compared to other types of livestock farming systems.	4.00	0.000

Table 3: *Benefits of Catfish Farming Among Entrepreneurs*

S/N	Benefits	$\bar{x}$	Std. Dev.
1.	Commercial catfish farming business allows for a large supply of fish.	3.25	0.649
2.	Catfish can be easily reared in tanks until they are ready for sale or marketing and they don't need the wide capture of wild fish.	2.83	0.971
3.	Compared to the wild fishes, some of the farm-reared fish species are less healthy and delicious.	3.06	0.893
4.	The fish farming business is a great source of employment.	3.28	0.659
5.	Commercial catfish farming does not help in preserving natural ecosystems.	3.19	0.856
6.	Commercial catfish production can decrease the importation of frozen meat or fish from foreign countries.	3.42	0.554
7.	The risk of losses is more compared to other types of livestock farming systems.	2.78	0.929

Table 2 presents the responses of snail farmers on the benefits of snail farming to entrepreneurs. The Table revealed that the mean responses of snail farmers on all items ranged from 3.00 to 4.00 and were greater than the cut-off point (2.5). Hence, respondents agreed that both male and female reproductive organs are available in each snail, as a result, the snails can reproduce very fast; snail meat is better than red meat and it is enriched with highly nutritious ingredients; snail meat is low in iron, protein, calcium and phosphorus and very high in cholesterol, sodium and fat; and snail has a great market all over Nigeria and in the West African regions. In the same vein, respondents agreed that the business tasks related to snail farming in Nigeria like financing, production, servicing, processing, sorting, transporting and marketing can create job opportunities for unemployed people; domestic snail farming in Nigeria cannot meet the family nutritional demands; commercial snail

production can decrease the importation of frozen meat or fish from the foreign countries; and that risk of losses is more compared to other types of livestock farming system.

Snail farming offers numerous benefits, including rapid reproduction and the production of highly nutritious meat, which is richer in protein, iron, and calcium compared to red meat, while also being low in fat and cholesterol (Okon et al., 2016). Snails are easy to maintain and adaptable to various environments, making them suitable for farming in rural, urban, and peri-urban areas (Agbaji, 2018). They also hold significant medicinal value, such as their use in treating hypertension and anaemia, and their meat is a valuable protein source in West and Central Africa (Oritse, 2023). The large market demand for snails across Nigeria and the West African region further underscores their economic potential for farmers.

Table 3 also revealed that the mean responses of fish farmers on all items ranged from 2.78 to 3.28 and were greater than the cut-off point (2.50). Hence, respondents agreed that commercial catfish farming business allows for a large supply of fish, Catfish can be easily reared in tanks until they are ready for sale or marketing and they don't need the wide capture of wild fish and that compared to the wild fishes, some of the farm-reared fish species are less healthy and delicious. Also, respondents agreed that the fish farming business is a great source of employment, commercial catfish farming does not help in preserving natural ecosystems and that commercial catfish production can decrease the importation of frozen meat or fish from foreign countries.

Commercial-scale catfish farming ensures a large and consistent supply of fish, which can be easily reared in tanks, reducing the need for capturing wild fish and helping to preserve natural fish stocks (Liverpool-Tasie et al., 2020). While farm-reared fish might be considered less healthy or delicious than wild-caught counterparts, catfish farming significantly contributes to employment and can reduce the need for imported frozen fish or meat. Small-scale fish farming also provides a viable income source for families and creates job opportunities, addressing unemployment and supporting local economies (Adhikari et al., 2020).

Research Question 3: What are the constraints of snail and catfish farming among entrepreneurs in the study area?

Table 4: *Constraints of Snail and Catfish Farming among Entrepreneurs*

S/N	Constraints	Frequency	Percentage	Rank
	Snail Farming			
1	Inadequate capital	00	0.0	6th
2	Unorganized marketing	02	100.0	1st
3	Pest and disease problems	02	100.0	1st
4	High cost of suitable snails for farming	02	100.0	1st
5	Scarcity of suitable snails for farming	02	100.0	1st
6	Inadequate extension service	00	0.0	6th
7	Inadequate training in new technology	00	0.0	6th
8	Inadequate infrastructure	00	0.0	6th
9	Inadequate water	02	100.0	1st
10	Siting problem	00	0.0	6th
	Catfish Farming			
1	Inadequate capital	25	69.4	1st
2	Unorganized marketing	15	41.7	11th
3	Pest and disease problems	13	36.1	12th
4	High cost of fingerlings	21	58.3	5th
5	High cost of feed	23	63.9	3rd
6	Scarcity of fingerlings	20	55.6	6th
7	Scarcity of feed	20	55.6	6th
8	Inadequate extension service	18	50.0	8th
9	Inadequate training in new technology	22	61.1	4th
10	Inadequate infrastructure	17	47.2	10th
11	Inadequate water	18	50.0	8th
12	Siting problem	24	66.7	2nd

Table 4 showed that all the respondents (100%) identified unorganized marketing, pest and disease problems, high cost of suitable snails for farming, scarcity of suitable snails for farming and inadequate water as the constraints of snail farming among entrepreneurs. Despite its benefits, snail farming faces several challenges, including pest and disease problems, the high cost and scarcity of suitable snails for farming, and inadequate water supply (Chigbogu, 2017). These constraints can hinder the growth and productivity of snail farms. Effective pest and disease management, along with ensuring a reliable water supply, are crucial for the success of snail farming ventures. Additionally, addressing the high costs and scarcity of farming snails can involve breeding programs and better resource management practices to improve accessibility for farmers (Okon et al., 2016). Table 3 also revealed that the constraints of fish farming among entrepreneurs include inadequate capital (69.4%), siting problems (66.7%), high cost of feed (63.9%), inadequate training on new technology (61.1%), high cost of fingerlings (58.3%), scarcity of fingerlings (55.6%) and scarcity of feed (55.6%). Other challenges of feed farming include inadequate extension service (50%), inadequate water (50%), inadequate infrastructure (47.2%), unorganized marketing (4.1%) and pest and disease problems (36.1%).

Catfish farmers encounter various challenges, such as inadequate capital, siting problems, high costs of feed and fingerlings, and insufficient training on new technologies (Adetiloye, 2018). These issues can limit the productivity and profitability of catfish farms. Other significant challenges include inadequate extension services, water scarcity, lack of infrastructure, unorganized marketing, and pest and disease problems (Catfish Farm Enterprise, 2023). Addressing these challenges requires comprehensive support for farmers, including access to financing, training programs, and improved infrastructure and marketing systems. Overcoming these hurdles can enhance the sustainability and success of catfish farming ventures (Liverpool-Tasie et al., 2020).

Conclusion

Snail farming and catfish farming are profitable business ventures with different aspects for commercial farmers and non-farmer entrepreneurs. These include the production and sales of table-size fish and snails, smoking of fish, sorting of snails, transportation of snails, and sales of fingerlings to mention a few. Farmers and entrepreneurs will benefit greatly from catfish and snails. The two animals have the potential to reduce the country's dependency on imported frozen foods as well as gainful employment and better nutrition of her citizens. Constraints associated with the farming of the two animals include capital for production, availability of infrastructure and amenities; pests and diseases, siting, scarcity of feeds and others.

Recommendations

The study recommends that small-scale fish farmers should come together to form cooperative unions to complement individual efforts, fingerlings and snails should be sourced from healthy farms. Also, inputs such as feeds and healthy fingerlings should be subsidized and made available to small-scale fish farmers through the fish farming associations.

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