



## ASSESSMENT OF TECHNICAL AND ENTREPRENEURIAL SKILLS NEEDED BY SNAIL FARMERS FOR FOOD SECURITY IN DELTA STATE, NIGERIA

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### Abstract

This study assessed the technical and entrepreneurial skills needed by snail farmers for food security in Delta State, Nigeria. Three (3) research questions and three hypotheses were raised and formulated to guide the study respectively. The study adopted a descriptive survey research design and targeted a population of eighty-one (81) snail farmers. Due to the limited number of registered snail farms, all eighty-one (81) registered snail farmers were included in the study without sampling. Data was collected using a validated questionnaire titled Assessment of Technical and Entrepreneurial Skills Needed by Snail Farmers for Food Security in Delta-State, Nigeria, (ATESNSFFS) administered to all registered snail farmers in Delta State. The questionnaire's reliability was established through a split-half reliability test, yielding a reliability coefficient of 0.85. The research questions were answered using weighted mean while the hypotheses were tested using t-test statistics. The study revealed that snail farmers in Delta State require technical and entrepreneurial skills, particularly in the selection of snail species, breeding, and marketing of snails, to ensure food security. Furthermore, the results indicated variations in the technical and entrepreneurial skills needed based on location and gender. The study concluded that vocational training on snail farming should be organized by the government and other stakeholders to enhance the technical and entrepreneurial skills of snail farmers in Delta State. Additionally, it recommended that extension workers provide practical training for snail farmers to improve their technical and entrepreneurial skills in snail farming.

**Keywords:** entrepreneurial skills, food security, snail farmers, technical skills

### Introduction

In Nigeria, various foods are eaten, and most of these foods are eaten in large quantities, such as yam, rice, cocoyam, cassava and garri. These are high in carbohydrate contents, other foods eaten are fish, beans and beef. These sources of protein are eaten in low amounts due to their costly nature. However, there are other sources which are yet to be fully tapped but have great potential for development and income generation. Snail is one of such. The scientific name for snail is Gastropoda which is the Subspecies of Mollusca. Snails are small-bodied animals belonging to the phylum Mollusca and class Gastropoda. They are bilaterally symmetrical and lack backbones (invertebrates) but are usually protected by calcium carbonate-containing exoskeleton (calcareous shell), most snail species are hermaphrodites. The largest common, productive and edible land snail is known as Achatina-Maginata (Giant African Land Snail) which is being recommended by most farmers in Nigeria for snail farming, though others such as Achatina-Fulica are still very common and good for breeding. (Onuigbo, 2015). Snail farming is



very lucrative; however, it has not been fully leveraged by farmers for wealth creation as well as for food security, despite the potential and advantages of snail farming (heliculture), widespread participation in its production by farmers has not been achieved in Nigeria. Much of the snails marketed in Nigeria are collected from the wild. Onuigbo, 2015 stated that few farms exist for commercial breeding and production of snails. This is probably attributed to a lack of awareness of the economic potential of this micro livestock.

A technical skill refers to hands-on training in a specific trade or job industry. This skill takes place outside the traditional classroom setting in schools. Learners are usually exposed to hands-on activities through first-hand experience. Equipping farmers with technical skills will allow them to work in their areas of interest while obtaining first-hand information, knowledge and experience for more income (Onwudiwe & Okonkwo 2015). Equipping farmers' skills in snail farming like snail breeding and its other practices will ensure continuity in production that will meet the demand for animal protein and also provide sustainable income for snail farmers and those involved in the snail business.

Entrepreneurship means different things to different people and with varying conceptual perspectives. Entrepreneurship creates self-reliance, self-employment and managerial ability for business enterprise (Amesi, 2015). Entrepreneurial skills in snail production can therefore be referred to as all mental and physical abilities required by farmers to plan, implement, coordinate and evaluate snail enterprise for wealth creation, self-reliance and food security. It could be conceptualized as a set of skills required by snail farmers to take up snail farming as a vocation for income generation. (Solomon, 2017). Though there has been a recent awakening to the snail farming business in different parts of Nigeria, researchers observed that one of the reasons why it is yet to fully thrive is that most farmers in Delta state are still bent on gathering snails from the wild.

Food security as defined by the United Nations Committee on World Food Security (2020) means that all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their food preferences and dietary needs for an active and healthy life. Food security as stated by (Abbey, 2011) is a situation where all individuals, households, national, regional and global levels at all times have physical and economic access to sufficient safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Food security is a desirable situation irrespective of the political system and socioeconomic conditions. Food security is a measure of the availability of food and individuals' ability to access it. (Upton, Cisse & Barrett, 2016). Food security can be described as a phenomenon relating to individuals. It is the nutritional status of the individual household member that is the ultimate focus and the risk of that adequate status not being achieved or becoming undermined. Food being one of the most basic living needs, has become one of the most important concerns for the world, as more people are living in poverty and hunger. Food security is a broad concept which cuts across many dimensions. It means access to adequate food for a healthy life. Food security goes with food self-sufficiency and sustainability is still elusive in Nigeria. This is because the Agricultural sector has not been able to deal effectively with the



problem of food security for the Nigerian people when viewed from the standpoint of the nutritional status of Nigerian households' food security and food prices (FAO, 2020).

The Human Capital Theory as propounded by Gary Becker (1964,1993) is used to posit that human capital is an activity that influences and increases an individual or group of individual's future resources. This study uses the Human capital Theory (HTC) as the theoretical framework for the assessment in line with Van Loo & Rocco (2004) who remarked that HTC, is an investment in skills and knowledge. Swanson (2001) described HTC as an investment in people. The Human Capital Theory was used for this study because, human capital raises earnings and productivity mostly by providing better knowledge, enhanced skill and problem-solving abilities. The basic premise behind the HCT as a theoretical framework for this study explains why snail farming can be central to the increase in income and productivity when knowledge, skills and problem-solving are embedded. This knowledge, skills, training and abilities acquired through Human capital often form a fundamental attribute (experiences) to snail farmers. These capabilities may lead them to a well-organized and meaningful production activity that can contribute to their livelihood and society (Gassner, 2019) investing in farming and their means of service goes a long way to providing enough affordable food for the people while the same time keeping snail farmers out of poverty.

Snail meat has been consumed by humans throughout the world since pre-historic times, and the production of snails is an important source of livelihood for the producers (Yahya, 2012). Snails mostly sold in the market are largely collected from the wild by households which contributes to the observed low and seasonal supply of snails and snail meats in various markets. This may be a result of a lack of technical/entrepreneurial skills needed by snail farmers for food security. This is probably why Odo, (2016) averred that the majority of snail farmers lack the entrepreneurial competencies and skills for snail production. In this way, there may be a decrease in snail production. Besides, there is already a low population of wild snails as a result of bush burning and over-exploitation. This situation gave rise to the problem of this study which is presented as a question: What are the technical/entrepreneurial skills needed by snail farmers for food security in Delta State, Nigeria?

### **Research Questions**

The following research questions were raised to guide the study.

1. What are the technical skills needed by snail farmers in selecting snail species for snail farming in Delta State?
2. What are the technical skills needed by snail farmers in the breeding of snails for snail farming in Delta State?
3. What are the entrepreneurial and marketing skills needed by snail farmers in the marketing of snails in Delta-State?



### Research Hypotheses

The following hypotheses were formulated to guide the study and tested at 0.05 significant level:

- Ho1:** There is no significant difference between the mean response of urban and rural snail farmers regarding their technical skills needed in the selection of snail species for snail farming.
- Ho2:** There is no significant difference between the mean response of urban and rural snail farmers regarding their technical skills needed in breeding in snail farming.
- Ho3:** There is no significant difference between the mean response of urban and rural snail farmers regarding their entrepreneurial and marketing skills in snail farming.

### Methodology

This study employs a descriptive survey research design. The population of the study comprised all registered snail farmers in Delta-State. Available statistics indicate that there are eighty-one (81) snail farmers in Delta State as reported by the Delta-State Ministry of Agriculture Live-Stock Unit (2023). Sampling was not carried out since the number of registered snail farmers is few, so (81) eighty-one registered snail farmers were used for the study. The instrument for data collection was a researcher-developed questionnaire which was titled "Assessment of Technical and Entrepreneurial Skills Needed by Snail Farmers for Food Security in Delta-State, Nigeria, (ATESNSFFS)" The questionnaire is divided into two parts, A and B. Part A collected information on personal demographic characteristics while Part B gathered information related to the farmer's technical and entrepreneurial skills, including the selection of snail species, breeding, and marketing of snails. To ensure the validity of the questionnaire, it was reviewed by three experts: one lecturer from the Department of Vocational Education, one from the Department of Guidance and Counseling (Test and Measurement units) in the Faculty of Education at Delta State University, Abraka, and one extension officer from the Ministry of Agriculture (Livestock Unit) in Asaba. The experts assessed the items for relevance of content, appropriateness, and clarity of language. Based on their feedback, the final version of the questionnaire was prepared. The questionnaire was tested for reliability using split-half reliability on 20 respondents not included in the sample size, and a reliability index of 0.85 was obtained, which was considered adequate for the study. The data collected were analyzed using mean, standard deviation and t-test, tested at 0.05 level of significance



## Results

**Research Question 1:** What are the technical skills needed by snail farmers in selecting snail species in Delta State?

**Table 1:** *Technical Skills Needed by Snail Farmers in Selecting Snail Species for Snail Farming in Delta State*

S/N	Items	$\bar{x}$	SD	Remark
1.	Identification of good species of hatchability rate	3.67	0.13	Agree
2.	Identification of good fecundity rate	3.78	0.01	Agree
3.	Identification of species of fast growth rate	3.73	0.07	Agree
4.	Identification of species with shell strength	3.62	0.07	Agree
5.	Identification of species with low mortality rate	3.81	0.00	Agree
6.	Identification of species based on feed conversion ratio	3.58	0.01	Agree
<b>Grand Mean <math>\bar{x}</math></b>		<b>3.70</b>	<b>0.29</b>	<b>Agree</b>

Criterion Mean Score  $\bar{x} = 2.50$ , N = 81

Table 1 shows a grand mean score of 3.70 which is greater than the criterion mean score of 2.50. This implies that the majority of the respondents are of agreement that snail farmers need technical skills in selecting snail species for snail farming in Delta State. As indicated in Table 1, identification of good species for hatchability rate, good fecundity rate, species of fast growth rate, species with shell strength, species with low mortality rate and species based on feed conversion ratio are the technical skills needed by snail farmers in selecting snail species for snail farming in Delta State. Hence, it can be concluded that the identification of good species for hatchability rate, good fecundity rate, species of fast growth rate, species with shell strength, species with low mortality rate and species based on feed conversion ratio are the technical skills needed by snail farmers in selecting snail species for snail farming in Delta State.

**Research Question 2:** What are the technical skills needed by snail farmers in the breeding of snails for snail farming in Delta State?

**Table 2:** *Technical Skills Needed by Snail Farmers in Breeding of Snail for Snail Farming in Delta State.*

S/N	Items	$\bar{x}$	SD	Remark
1.	Identification of disease-free stock for breeding	3.81	0.10	Agree
2.	Disinfecting the snail pen before the arrival of the snail.	3.69	0.00	Agree
3.	Ensure the soil environment is moistened before introducing the stock.	3.67	0.00	Agree
4.	Carefully introduce the stock into the breeding pen at the cool of evening or in strategic places in the pen.	3.65	0.00	Agree
5.	Ensure good stocking densities for breeding.	3.55	0.00	Agree
6.	Inspection of breeding stock regularly to replace any mortality.	3.73	0.00	Agree
7.	Observing how the snails are adapting to their new environment.	3.75	0.00	Agree
8.	Keeping a record of observation.	3.75	0.00	Agree
9.	Watching out for hatchlings of new snails.	3.80	0.00	Agree
10.	Inspecting the hatchling and keeping records of weight till maturing.	3.77	0.00	Agree
<b>Grand Mean <math>\bar{x}</math></b>		<b>3.72</b>	<b>0.10</b>	<b>Agree</b>

Criterion Mean Score  $\bar{x} = 2.50$ , N = 81



Table 2 shows a grand mean score of 3.72 which is greater than the criterion mean score of 2.50. This implies that the majority of the respondents agreed that snail farmers need technical skills in the breeding of snails for snail farming in Delta State. Table 4.4 indicates that identification of disease-free stock for breeding, disinfection of snail pen before the arrival of snail, moistening of soil before the introduction of stock, careful introduction of stock, ensuring good stocking densities for breeding, regular inspection of breeding stock, keeping record of observation, watching out for hatchling of new snails and keeping records of weight till maturing, are the technical skills needed snail farmers in breeding of snails for snail farming in Delta-State. Hence, it can be concluded that the identification of disease-free stock for breeding, disinfection of snail pen before the arrival of snail, moistening of soil before the introduction of stock, careful introduction of stock, ensuring good stocking densities for breeding, regular inspection of breeding stock, keeping record of observation, watching out for hatchling of new snails and keeping records of weight till maturing, are the technical skills needed snail farmers in breeding of snails for snail farming in Delta-State.

**Research Question 3:** What are the entrepreneurial and marketing skills needed by snail farmers in the marketing of snails in Delta-State?

**Table 3:** *Entrepreneurial and Marketing Skills Needed by Snail Farmers in Marketing of Snails in Delta State.*

S/N	Items	$\bar{x}$	SD	Remark
1.	Identifying/picking snails with good market weight/size.	3.83	0.03	Agree
2.	Cleaning of snails with clean dry rag after picking.	3.61	0.02	Agree
3.	Sorting of snails based on their sizes.	3.85	0.02	Agree
4.	Packaging of snails into bags/containers for market supply.	3.74	0.01	Agree
5.	Supplying package snails to target customers.	3.65	0.02	Agree
6.	Handling/transporting of hand-pick snails to the market.	3.76	0.01	Agree
<b>Grand Mean <math>\bar{x}</math></b>		<b>3.74</b>	<b>0.11</b>	<b>Agree</b>

Table 3 shows a grand mean score of 3.74 which is greater than the criterion mean score of 2.50. This implies that majority of the respondents agreed that snail farmers need entrepreneurial skills in marketing of snail for snail farming in Delta State. Table 3 indicates the identification/picking of snails with good market weight/size, cleaning of snails after picking, sorting of snails based on their sizes, packaging snails into bags/containers for market supply, supplying package snails to target customers, and handling/transporting of snail to the market, are the entrepreneurial skills needed by snail farmers in marketing of snails in Delta-State. Hence, it can be concluded that identification/picking of snails with good market weight/size, cleaning of snails after picking, sorting of snails based on their sizes, packaging snails into bags/containers for market supply, supplying package snails to target customers, and handling/transporting of snail to the market, are the entrepreneurial skills needed by snail farmers in marketing of snails in Delta-State.





**Hypotheses 1:** There is no significant difference between the mean response of urban and rural snail farmers regarding their technical skills needed in the selection of snail species for snail farming.

**Table 4:** *T-test analysis of Mean Response Scores of Urban and Rural Snail Farmers Regarding their Technical Skills in the Selection of Snail Species for Snail Farming*

Location	N	$\bar{x}$	SD	df	Calculated t-value	Sig. (2-tailed)	Decision
Rural	56	3.74	0.008	79	45.438	0.000	P<0.05
Urban	25	3.65	0.058				

Table 4 indicates a significant difference between the mean rating scores of rural and urban snail farmers regarding their technical skills in the selection of snail species for snail farming, ( $t = 45.438$ ,  $df = 79$ ,  $p = 0.00$ ). Thus, hypothesis one is rejected. Therefore, there is a significant difference between the mean response of urban and rural snail farmers regarding their technical skills needed in the selection of snail species for snail farming, in favour of rural snail farmers. This implies that urban snail farmers need more technical skills for the selection of snail species for snail farming.

**Hypothesis 2:** There is no significant difference between the mean response of urban and rural snail farmers regarding their technical skills needed in breeding in snail farming.

**Table 5:** *t-test Analysis of Mean Response Scores of Urban and Rural Snail Farmers Regarding their Technical Skills in Breeding of Snails for Snail Farming*

Location	N	$\bar{x}$	SD	df	Calculated t-value	Sig. (2-tailed)	Decision
Rural	56	3.77	0.008	79	49.728	0.000	P<0.05
Urban	25	3.66	0.012				

Table 5 shows a significant difference between the mean rating scores of rural and urban snail farmers regarding their technical skills in breeding snails for snail farming, ( $t = 49.728$ ,  $df = 79$ ,  $p = 0.00$ ). Thus, hypothesis two is rejected. Therefore, there is a significant difference between the mean response of urban and rural snail farmers regarding their technical skills needed in the breeding of snails for snail farming, in favour of rural snail farmers. This implies that urban snail farmers need more technical skills in the breeding of snails for snail farming.



**Hypothesis 3:** There is no significant difference between the mean response of urban and rural snail farmers regarding their entrepreneurial and marketing skills needed in snail farming.

**Table 7:** *t-test Analysis of Mean Response Scores of Urban and Rural Snail Farmers Regarding their Entrepreneurial and marketing skill needed in snail farming*

Location	N	$\bar{x}$	SD	df	Calculated t-value	Sig. (2-tailed)	Decision
Rural	56	3.79	0.121	79	21.458	0.000	P<0.05
Urban	25	3.69	0.023				

Table 7 shows a significant difference between the mean rating scores of rural and urban snail farmers regarding their entrepreneurial and marketing skills in the marketing of snails for snail farming, ( $t = 21.458$ ,  $df = 79$ ,  $p = 0.00$ ). Thus, hypothesis three is rejected. Therefore, there is a significant difference between the mean response of urban and rural snail farmers regarding their technical and entrepreneurial skills needed in the marketing of snails for snail farming, in favour of rural snail farmers. This implies that urban snail farmers need more technical and entrepreneurial skills in the marketing of snails for snail farming.

### Discussion of Findings

The result in Table 1 revealed that the identification of good species for hatchability rate, good fecundity rate, species of fast growth rate, species with shell strength, species with low mortality rate and species based on feed conversion ratio are the technical/entrepreneurial skills needed by snail farmers in selecting snail species for snail farming in Delta State. This finding corroborates that of Onegu (2021) who reported that the selection of snails is one of the entrepreneurial skills required by youths for wealth creation in Enugu State, Nigeria. Analysis of the mean response of urban and rural snail farmers revealed a significant difference between the mean response of urban and rural snail farmers regarding their technical/entrepreneurial skills needed in the selection of snail species for snail farming, in favour of rural snail farmers. This implies that urban snail farmers need more technical/entrepreneurial skills for the selection of snail species for snail farming. This finding does not support that of Ojomu *et al.* (2022) who reported no significant difference between the entrepreneurial skills required by male and female secondary school students. Further analysis of male and female snail farmers showed a significant difference between the mean response of male and female snail farmers regarding their technical/entrepreneurial skills needed in the selection of snail species for snail farming, in favour of male snail farmers. This implies that female snail farmers need more technical/entrepreneurial skills in the selection of snail species for snail farming. This finding contradicts that of Ekezie (2019) who reported that there is no significant difference between the mean responses of male and female graduate youths on the vocational-technical skills required in snail farming as a panacea for entrepreneurship development of graduate youths in Rivers State, Nigeria.

The result in Table 2 revealed that the identification of disease-free stock for breeding, disinfection of snail pen prior the arrival of snail, moistening of soil before the introduction of





stock, careful introduction of stock, ensuring good stocking densities for breeding, regular inspection of breeding stock, keeping record of observation, watching out for hatchling of new snails and keeping records of weight till maturing, are the technical/entrepreneurial skills needed snail farmers in breeding of snails for snail farming in Delta-State. This finding is in agreement with the view of Onegu (2021) who reported that youth snail farmers in Enugu State required 19 entrepreneurial skills in breeding and feeding of snails for snail farming. The study further revealed that there is a significant difference between the mean response of urban and rural snail farmers regarding their technical/entrepreneurial skills needed in the breeding of snails for snail farming, in favour of rural snail farmers. This implies that urban snail farmers need more technical/entrepreneurial skills in the breeding of snails for snail farming. This finding, however, disagrees with that Onegu (2021) who further reported no significant difference between the mean response of urban and rural youth snail farmers regarding their technical/entrepreneurial skills needed in the breeding of snails for snail farming.

The result in Table 3 revealed that the entrepreneurial and marketing skills needed by snail farmers in marketing snails for snail farming in Delta-State are identification/picking of snails with good market weight/size, cleaning of snails after picking, sorting of snails based on their sizes, packaging snails into bags/containers for market supply, supplying package snails to target customers, and handling/transporting of snail to the market. There was a significant difference between the mean response of urban and rural snail farmers regarding their entrepreneurial and marketing skills needed in the marketing of snails for snail farming, in favour of rural snail farmers.

### **Conclusion**

Based on the findings of the study, it was concluded that snail farmers in Delta State needed technical skills for food security, especially in the area of selection of snail species, breeding of snails, feeding of snails and entrepreneurial skill in marketing of snails. Thus, snail farmers in Delta State needed technical and entrepreneurial skills training to ensure food security in Delta State. Furthermore, urban snail farmers needed more technical and entrepreneurial skills training than their rural counterparts, while female snail farmers needed more technical and entrepreneurial skills training than their male counterparts.

### **Recommendations**

Based on the findings of the study it was recommended that:

1. Technical training on snail farming should be organized by the government and other stakeholders to enhance the technical and entrepreneurial skills of snail farmers in Delta State.
2. Loans and grants should be given to snail farmers to boost their technical and entrepreneurial skills to increase productivity.
3. Extension services should liaise with snail farmers to bring new techniques and innovations and be encouraged to see the reason to venture into snail farming and the government should ensure equal provision for rural and urban snail farmers, as well as male and female snail farmers.



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