

# Entrepreneurial Skills Required By Secondary School Students in Snail Farming For Food Security in Benin City, Edo State, Nigeria.

<sup>1</sup>OjomuAdeniyi Andrew, <sup>1</sup>Okwo Chinyere R., <sup>2</sup>IbekweNnamdi Franklyn, <sup>3</sup>Okoruwa Jane Idiaghe <sup>4</sup>Enabulele OsarumwenseFestus & <sup>5</sup>Durotimi, Moses Folorunsho

<sup>1</sup>Department of Agricultural Education, University of Nigeria, Nsukka.

<sup>2</sup>Department of Agricultural Education, Enugu State College of Education, Enugu. <sup>3</sup>Department of Vocational and Technical Education, University of Benin, Benin City.

<sup>4&5</sup>Department of Animal and Environmental Biology, University of Benin, Benin City.

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## ABSTRACT

The study was conducted to identify entrepreneurial skills required by secondary school students in snail farming for food security in Benin City, Edo State, Nigeria. Six research questions were formulated to guide the study. A descriptive research design was adopted for the study which was carried out in Benin City, Edo State, Nigeria. The researchers used a simple random sampling technique to obtain a sample size of 210 respondents consisting of 180 Agricultural Secondary School Students and 30 Agricultural Science Teachers in Benin City. Data were obtained from the respondents with the use of structured questionnaire titled: Snail Farming Entrepreneurial Skills Questionnaire (SFESQ). The instrument was validated by three experts, one from University of Nigeria Nsukka and two from the University of Benin, Benin City. Cronbach Alpha reliability coefficient was used to determine the internal consistency of the instrument which yielded a reliability coefficient of 0.84. Two hundred and ten copies of the questionnaire were administered to the respondents by the researchers and retrieved immediately. Data obtained were analyzed with the use of mean and standard deviation using SPSS. The study identified 8 entrepreneurial skills in planning operations for snail farming, 18 entrepreneurial skills in housing operations for snail farming, 10 entrepreneurial

skills for stocking and feeding operations for snail farming, 14 entrepreneurial skills for routine management operations for snail farming, 9 entrepreneurial skills for pest and disease operations for snail farming and 17 entrepreneurial skills for harvesting, processing and marketing operations required by secondary school students for snail farming in Benin City. It was recommended among others that the identified entrepreneurial skills be included in the curriculum of secondary schools to enable Agricultural Students acquire the skills before graduating from secondary school. Agricultural Science teachers are also to engage students in seminars and practical work on the entrepreneurial skills for snail farming identified by the study for food security.

## Keywords:

Entrepreneurial Skills, Secondary School Students, Snail Farming, Food Security.

## I. INTRODUCTION

The practice of hand picking of snails from the forest and bush which started with the early men is no more so as a result of some human activities such as bush burning and deforestation which destroy the natural habitat of snails and other animals. Cobbinah in Ojomu, Okwo, Okoruwa, Adigwai and Ojo (2021) described snails as invertebrate animal with shells covering the body. Ifedibal (2010) identified some of the species of

snails which include *Helix aspersa*, *Helix incorum*, *Archachatinamarginata* among others. Snails are usually found in dark and damp areas and they usually stay away from harsh weather condition. They feed on many leaves and some household wastes.

Snail farming helps to complement animal protein supply in human diets. Apart from being a source of animal protein in diets, it has some other usefulness. Ajayi in Okonta (2012) reported the amount of lipid and saturated fatty acids contained in snails which according to Ajayi in Okonta is low; a condition that makes it suitable for patients with hypertension and even other patients with poor health conditions. Ayodele and Ashimolowo in Okereke-Ejiogu (2016) also reported how snail mucus has been used by nursing mothers in Yoruba Land in western part of Nigeria to cure umbilical cord wounds. The mucus is also useful in treating heart related problems, stroke and high blood pressure. Snail shells are also very useful in making some ornaments and in feed formulation for livestock. The importance of snail and its usefulness has led to cultivation in some areas.

Snail farming which is referred to as Heliculture has become an enterprise in Benin City. It is the practice of rearing snails in an enclosure. Snail farming requires little capital, little space for its establishment, except for the technical know-how. For students in secondary schools to successfully carry out snail farming as an enterprise, they must be well knowledgeable about the entrepreneurial skills required for successful snail farming. Some environmental factors have been reported by Ebenso (2002) to have hindered the success of snail farming by some snail farmers. These factors include climatic factors which include unfavourable weather condition for snails. Apart from harsh weather condition that that greatly affect snail farming, disease and pests attack is also a serious challenge as reported by Effiong (2005). Effiong also mentioned that cannibalism is also a serious problem in snail farming, a situation where older snails feed on the eggs laid by other snails as well as feeding on newly hatchlings in order to obtain nutrients. The challenges surrounding the establishment of snail farm and its smooth running make it important for anyone going into snail farming to acquire the necessary entrepreneurial skills for successful snail farming. Ekezie (2019) in a study identified vocational and technical skills needed by graduates of River State in snail farming which include siting snail farm in a conducive environment, regular feed and water supply to snails, prevention of predators and insects from gaining access into the pen as well

as pest and disease control. Ogba and Ndem (2016) in another study identified some entrepreneurial skills needed by graduates of secondary school to include skills in construction of snail pen, feed and water supply to snails in the pen, routine management operations and disease control for snail farming. In another study, Umeh (2017) identified skills required by NCE graduates of Agricultural Education in South Eastern Part of Nigeria for processing and marketing of snails as an employment after graduation from the secondary school.

Secondary school education in Nigeria is the education given to children in their first three and last three years at the post-primary level which follows the six years of primary education and before the tertiary education (Ohia and Obasi, 2014). This level of education is so important in the sense that it plays a significant role in the life of every student such as absorbing the products of secondary education as well as preparing students for tertiary levels of education (Ohia, 2010). According to Federal Republic of Nigeria (FRN) (2004), one out of the numerous specific objectives of secondary education in Nigeria is to provide technical knowledge and pre-vocational skills needed for agricultural, industrial, commercial and economic development.

In the National Policy on Education (FRN, 2013), senior secondary school subjects were classified into various groups as follows: Group A with eight (8) compulsory subjects, Group B with Seven (7) pre-vocational elective subjects and Group C with Three (3) non-prevocational elective subjects. The students are to choose a minimum of one or maximum of two subjects from both groups B and C. These lists of subjects and their various groups put more emphasis on students' acquisition of theoretical knowledge rather than practical skills which can bring about food security as a result of students' involvement in both crops and livestock production (Ohia and Obasi, 2014). So efforts should be directed towards making the secondary school students self-reliance by training them on skills development. If this must be achieved, the students must be given a formal education that will inculcate them with practical entrepreneurial skills that can make them create jobs.

### Statement of Problem

Snail farming requires small space and a little capital to start up and these make it an appropriate and profitable enterprise for secondary school students. Snail meat being consumed in Benin City is usually from the ones hand-picked from the forest, which is usually scarce and also

seasonal. This situation has made snail meat to be very expensive to buy, a situation that has led to snail farming in order to solve the problem of scarcity and high cost of snail meat. Snail farming is also very important to the secondary school students in Benin City as it can serve as source of income for them both while still in school and after graduation from school. But then, a major problem in snail farming is the technical know-how which means the entrepreneurial skills needed for successful snail farming. Addressing these skills problems through research would provide secondary school students, entrepreneurial, farmers, educationists and the government with the basic information needed about the required skills for snail farming in Benin City. Also, the information provided by the study would encourage the secondary school students to go into snail farming. Also, the findings of this study would constitute an entrepreneurial skills scheme and syllabus for educationists, schools and government at all levels in Benin City. Hence, the study is conducted to identify entrepreneurial skills in snail farming required by secondary school students for food security in Benin City.

#### **Purpose of the Study**

This study is conducted to identify entrepreneurial skills in snail farming required by secondary school students for food security in Benin City. Specifically, the study sought to identify entrepreneurial skills in snail farming required by secondary school students in:

1. Planning operations for snail farming for food security in Benin City.
2. Housing Operations for Snail Farming for food security in Benin City.
3. Stocking and Feeding Operations for Snail Farming for food security in Benin City.
4. Routine Management Operations for Snail Farming for food security in Benin City.
5. Pest and Disease Control Operations for Snail Farming for food security in Benin City.
6. Harvesting, Processing and Marketing Operations of Snails for food security in Benin City.

#### **Research Questions**

1. What are the entrepreneurial skills required by secondary school students in planning operations for snail farming for food security in Benin City?
2. What are the entrepreneurial skills required by secondary school students in housing operations for snail farming for food security in Benin City?

3. What are the entrepreneurial skills required by secondary school students in stocking and feeding operations for snail farming for food security in Benin City?
4. What are the entrepreneurial skills required by secondary school students in routine management operations for snail farming for food security in Benin City?
5. What are the entrepreneurial skills required by secondary school students in pest and disease control operations for snail farming for food security in Benin City?
6. What are the entrepreneurial skills required by secondary school students in harvesting, processing and marketing operations for snail farming for food security in Benin City?

#### **II. METHODOLOGY**

The design of the study was a descriptive research design. The study was carried out in Benin City which comprises three Local Government councils which are Oredo Local Government Area, Egor Local Government Area and IkpobaOkhaLoal Government Area with their headquarters at Benin City, Uselu and Idogbo respectively. A simple random sampling technique was used to obtain a sample size of 210 respondents consisting of 180 Agricultural Secondary School Students and 30 Agricultural Science Teachers in Benin City. The respondents were randomly selected from five schools in each of the three local government areas in Benin City making a total of 15 schools in all; that is 12 students and 2 Agricultural Science Teachers from each school. The instrument for collection of data was a structured questionnaire titled "Snail Farming Entrepreneurial Skills Questionnaire (SFESQ)". The questionnaire had two sections – A and B with a four point scales of Strongly Required (SR), Moderately Required (MR), Required ®, and Not Required (NR) with corresponding values such as 4, 3, 2, and 1 respectively. The instrument was validated by three experts, one from the University of Nigeria Nsukka and two from the University of Benin, Benin City. The reliability index of 0.84 was obtained using Cronbach Alpha method to determine the internal consistency of the questionnaire. Two hundred and ten copies of the instrument were administered to the respondents by the researchers. The researchers retrieved the questionnaire immediately after the administration. Data collected were statistically analyzed using mean and standard deviation to answer the research questions. In taking decision, any item whose mean value was 2.50 or above an average on 4-point scale was considered as Required while any item whose mean value was

below 2.50 was considered as Not Required. The researchers made use of Statistical Package for the Social Science (SPSS).

### III. RESULTS

The results of the descriptive analyses were presented in Tables as follows:

#### Research Question 1

What are the entrepreneurial skills required by secondary school students in planning operations for snail farming for food security in Benin City?

**Table 1**

Mean Ratings of Secondary School Students and Agricultural Science Teachers Required in Planning Operations for Snail Farming in Benin City (n=210).

S/N	Planning Operations Items	X	SD	Decision
1	Set specific objectives for snail farming	3.02	.98	R
2	Review the objectives of snail farming based on changes in demand and supply of snails	3.10	.66	R
3	Prepare cost estimate or budget for snail farming	3.35	.45	R
4	Identify sources of labour and types labour needed for snail farming	2.59	.95	R
5	Identify sources of finance for snail farming	3.12	.82	R
6	Identify sources of breeding stock for snail farming	2.94	.86	R
7	Identify sources of feeds for snails such as formulated feeds, vegetables and peels	2.73	.71	R
8	Decides whether to buy snail feeds or to formulate the feeds	2.94	.98	R

**Key:** X= Mean, SD= Standard Deviation, R= Required, NR= Not Required and n= Number of Respondents.

Data in Table 1 revealed that all the 8 items have their mean values ranging from 2.59 to 3.35 which were above the benchmark of 2.50. This shows that the respondents agreed that all the 8-items are required in planning operations for snail farming for food security for secondary school students in

Benin City. The standard deviation of the responses on the 8-items ranged from 0.45 to 0.98, showing that respondents were not far from the mean in their responses.

#### Research Question 2

What are the entrepreneurial skills required by secondary school students in housing operations for snail farming for food security in Benin City?

**Table 2**

Mean Ratings of Secondary School Students and Agricultural Science Teachers Required in Housing Operations for Snail Farming in Benin City (n=210).

S/N	Housing Operations Items	X	SD	Decision
1	Select site with shades for the construction of snail pen	3.41	.81	R
2	Select site that is well protected from wind to prevent snails from drying out	2.73	.48	R
3	Select site with adequate security	2.94	.92	R
4	Source for a well-drained loamy soil for snail pen	2.68	.64	R
5	select site that is easily accessible to snail farmers	2.74	.98	R
6	Select a particular type of snail pen and build it either with concrete or wooden pen	3.41	.62	R
7	Sourcing materials for snail pen's construction such as wood, wire mesh, concrete blocks, nails, cement, soil, etc.	3.38	.91	R
8	Site clearing for snail pen construction	3.30	.94	R
9	Erecting the snail pen at East-West direction to reduce the effects of sunlight from drying the snails	3.82	.69	R

10	Placing coarse sand at the base of the snail pen	3.24	.97	R
11	Adding a well-drained loamy soil on top of the coarse sand	2.69	.81	R
12	Constructing ant-proof gutter around the snail pen to be filled with water and engine oil to trap ant from gaining access into pen	2.75	.84	R
13	Provide appropriate feeding trough that is not so deep in the pen	3.20	.91	R
14	Provide appropriate watering trough that is not so deep in pen	3.40	.89	R
15	Cover the top of the pen with wire mesh and net to prevent flies and pests from gaining access into the pen	3.00	.91	R
16	Heat the loamy soil with fire before placing it in the snail pen to kill all forms of ants and pathogens in the soil	2.80	1.0	R
17	Construct the top of the pen in the form of door for easy access	2.79	.77	R
		2.69	.77	R

**Key:** X= Mean, SD= Standard Deviation, R= Required, NR= Not Required and n= Number of Respondents.

Data in Table 2 showed that all the 17 items have their mean values ranging from 2.68 to 3.82 which were above the benchmark of 2.50. This indicates that the respondents agreed that all the 17-items are required in housing operations for snail farming for food security for secondary school students in Benin City. The standard deviation of the responses

on the 17-items ranged from 0.48 to 1.0, depicting that respondents were not far from the mean in their opinions.

### Research Question 3

What are the entrepreneurial skills required by secondary school students in stocking and feeding operations for snail farming for food security in Benin City?

**Table 3**

Mean Ratings of Secondary School Students and Agricultural Science Teachers Required in Stocking and Feeding Operations for Snail Farming in Benin City (n=210).

S/N	Stocking and Feeding Operations Items	X	SD	Decision
1	Identify good species of giant land snails for rearing such as <i>Achachantinamarginata</i>	3.26	1.0	R
2	Ensuring good and appropriate stocking density for the snails	3.29	.91	R
3	Cleaning feeding trough and placing it in the pen	3.24	.92	R
4	Cleaning watering trough and placing it in the pen	3.26	.91	R
5	Placing feeds and water in the pen before the snails' arrival	3.10	.88	R
6	Feed snails with concentrate feeds to maintain balanced diet	2.80	.99	R
7	Feed snails with grasses and vegetables	2.73	1.1	R
8	Feed snails with fodders such as yam peels, cassava peels and peels from fruits	3.05	.86	R
9	Supply antibiotics for snails in the water	3.23	.87	R
10	Supply feed additives such as vitamins and minerals for snails in the water	2.99	.91	R

**Key:** X= Mean, SD= Standard Deviation, R= Required, NR= Not Required and n= Number of Respondents.

Data in Table 3 revealed that all the 10 items have their mean values ranging from 2.73 to 3.29 which were above the benchmark of 2.50. This shows that the respondents agreed that all the 10-items are required in stocking and feeding operations for snail farming for food security for secondary school students in Benin City. The standard

deviation of the responses on the 10-items ranged from 0.86 to 1.1, showing that respondents were not far from the mean in their responses.

### Research Question 4

What are the entrepreneurial skills required by secondary school students in routine management operations for snail farming for food security in Benin City?

**Table 4**

Mean Ratings of Secondary School Students and Agricultural Science Teachers Required in Routine Management Operations for Snail Farming in Benin City (n=210).

S/N	Routine Management Operations Items	X	SD	Decision
1	Wetting the snail pen with water especially during dry season to prevent snails from drying out	3.64	.97	R
2	Providing clean water and fresh feed for snails	3.70	.90	R
3	Inspecting the snail pen daily or regularly	3.71	.86	R
4	Isolating any snails perceived to be sick or infected	3.70	.89	R
5	Keeping the pen clean regularly	3.67	.95	R
6	Washing the feeding and watering troughs regularly	3.61	.99	R
7	Weighing the snails regularly to monitor their weight gain	3.55	1.0	R
8	Sorting out snails from time to time according to their size	3.68	.94	R
9	Identification of snails with good market weight and size	3.53	.98	R
10	Preparing and formulating snail feeds	3.71	.86	R
11	Keeping records of weight gain and feed intake of snails	3.68	.81	R
12	Keeping records of snail mortality and escape	3.59	.98	R
13	Keeping records of financial inputs	3.47	.96	R

**Key:** X= Mean, SD= Standard Deviation, R= Required, NR= Not Required and n= Number of Respondents.

Data in Table 4 showed that all the 13 items have their mean values ranging from 3.47 to 3.71 which were above the benchmark of 2.50. This indicates that the respondents agreed that all the 13-items are required in routine management operations for snail farming for food security for secondary school students in Benin City. The standard

deviation of the responses on the 13-items ranged from 0.81 to 1.0, depicting that respondents were not far from the mean in their opinions.

**Research Question 5**

What are the entrepreneurial skills required by secondary school students in pests and disease control operations for snail farming for food security in Benin City?

**Table 5**

Mean Ratings of Secondary School Students and Agricultural Science Teachers Required in Pests and Disease Control Operations for Snail Farming in Benin City (n=210).

S/N	Pests and Disease Control Operations Items	X	SD	Decision
1	Keeping the pen and its floor clean regularly by scooping snail waste	3.22	.65	R
2	Heat treating the soil in the pen before use	3.58	.67	R
3	Regular washing of feeding and watering troughs	3.24	.75	R
4	Netting the snail pen with window net to wall off insects	3.18	.76	R
5	Constructing gutters round the snail pen with water and engine oil in it to restrict ants from gaining access into the pen	3.45	.77	R
6	Using good trait of snails breeding snails	3.13	.74	R
7	Providing clean water and feed for snails	3.15	.64	R
8	Adequate feeding to enhance proper growth	3.26	.82	R
9	Ensuring good stocking density to avoid overcrowding	2.98	.91	R

**Key:** X= Mean, SD= Standard Deviation, R= Required, NR= Not Required and n= Number of Respondents.

Data in Table 5 revealed that all the 9 items have their mean values ranging from 2.98 to 3.58 which

were above the benchmark of 2.50. This shows that the respondents agreed that all the 9-items are required in pest and disease control operations for snail farming for food security for secondary school students in Benin City. The standard

deviation of the responses on the 9-items ranged from 0.64 to 0.91, showing that respondents were not far from the mean in their responses.

#### Research Question 6

What are the entrepreneurial skills required by secondary school students in harvesting, processing and marketing operations for snail farming for food security in Benin City?

**Table 6**

Mean Ratings of Secondary School Students and Agricultural Science Teachers Required in Harvesting, Processing and Marketing Operations for Snail Farming in Benin City (n=210).

S/N	Harvesting, Processing and Marketing Operations Items	X	SD	Decision
1	Look for potential markets for snails such as hotels, restaurants, catering service centres and old adults before, during and after production of snails	2.90	.71	R
2	Identify snails with good market weight and size	3.25	.84	R
3	Sorting snails with good market weight and size	3.11	.75	R
4	Handling and transporting handpicked snails using basket or any other suitable container to processing centres	3.22	.78	R
5	Cleaning the snail shells with dry and clean rags or foam to make the snails look attractive to potential buyers	3.18	.80	R
6	Sorting snails based on their sizes	3.51	.85	R
7	Breaking snail shells that will be sold without shells	3.22	.86	R
8	Separating the broken shells from the meat (flesh)	3.01	.72	R
9	Removal of snail intestine with hands	3.65	.87	R
10	Removal of slime using salt, lime or alum	3.31	.83	R
11	Rinsing off the slime-removal substances from the snail meat	3.15	.75	R
12	Storing of snail shells for supply to industries that use them for production of useful materials	2.91	.71	R
13	Packaging of snail meat and snails with shells into transparent containers/materials for sales	3.17	.78	R
14	Transporting packaged snail meat and snails with shells to buyers	2.67	.81	R
15	Distributing snail meat and snails with shells well packaged to customers for purchase and consumption	3.29	.76	R
16	Fix prices for snail meats and snails with shells according to their weight and size	2.80	.72	R
17	Keep records of sales of snails for cost and benefit analysis	3.15	.69	R

**Key:** X= Mean, SD= Standard Deviation, R= Required, NR= Not Required and n= Number of Respondents.

Data in Table 6 showed that all the 17 items have their mean values ranging from 2.67 to 3.65 which were above the benchmark of 2.50. This indicates that the respondents agreed that all the 17-items are required in harvesting, processing and marketing operations for snail farming for food security for secondary school students in Benin City. The standard deviation of the responses on the 17-items ranged from 0.69 to 0.87, depicting that respondents were not far from the mean in their opinions.

#### IV. DISCUSSION OF RESULTS

The result of the study in Table 1 revealed that secondary schools students require 8 planning operations skills which are setting specific objectives for snail farming, reviewing the objectives of snail farming based on changes in demand and supply of snails, preparing cost estimate or budget for snail farming, identifying sources of labour and types labour needed for snail farming, identifying sources of finance for snail farming, identifying sources of breeding stock for snail farming, identifying sources of feeds for snails such as formulated feeds, vegetables and peels and deciding whether to buy snail feeds or to formulate the feeds. This result is in agreement with the result of Alaribe, Igwe and Olaitan (2013) in a study on management of resource inputs in

okra production for the creation of wealth capacity of women who are into agricultural production in Abia State where they needed improvement in 12 planning operations such as setting specific objectives for the production of okra, selecting site that is suitable for the production among others.

The result of this study in Table 2 showed that there are 18 housing operations skills which are selecting site with shades for the construction of snail pen, selecting site that is well protected from wind to prevent snails from drying out, selecting site with adequate security, sourcing for a well-drained loamy soil for snail pen, selecting site that is easily accessible to snail farmers and erecting the snail pen at East-West direction to reduce the effects of sunlight from drying the snails among others. This study is in consonance with the findings of Anjov, Muhammed and Aduku (2017) in a study on technical skills needed by graduates of Agricultural Education in sheep production for employment in animal husbandry for food security in Benue State where farmers needed housing operations skills such as identification of the type of pen for sheep production, and surveying the site to build pen for sheep among others.

The result of this study in Table 3 showed 10 stocking and feeding operations skills. These operations include identifying good species of giant land snails for rearing such as *Achachantinamarginata*, ensuring good and appropriate stocking density for the snails, cleaning feeding trough and placing it in the pen, placing feeds and water in the pen before the snails' arrival, cleaning watering trough and placing it in the pen among others. This result corroborated the report of Ogba and Ndem (2016) in a study on skills needed by secondary school graduates for breeding and rearing of Giant African Land Snail in Ebonyi State which include provision of adequate feed and clean water to the snails and cleaning of feeding and watering troughs among others.

The findings of this study in Table 4 indicated 14 routine management skills required by secondary school students for snail farming in Benin City. These operations include wetting the snail pen with water, regular inspection of snail pen, keeping the pen clean regularly, and provision of clean water and feed in the pen and preparation of snail feeds among others. These findings are in agreement with the findings of Ogba and Ndem (2016) that discovered observation of snails' pen regularly, regular cleaning of the pen, cleaning of feeding and watering troughs, provision of water and feed and regular cleaning of the pen among others are greatly required in snail productions.

Results of this study in Table 5 showed 9 pest and disease control skills required by secondary school students for snail farming in Benin City. These skills among others include keeping the floor of the snail pen clean at all times, heat-treating the soil in the pen before use, netting the pen to wall off insects, using disease free stock for breeding snails and provision of clean water and feed. These findings are in consonance with that of Ogba and Ndem (2016) in a report that selecting healthy stock for mating, regular cleaning of snail pen and provision of clean water and feeds are skills needed in controlling and preventing disease outbreak in snail farm.

The findings of this study revealed 17 harvesting, processing and marketing skills required by secondary school students for snail farming in Benin City. These skills among others include looking for potential markets for snails, identifying snails with market weight and size, picking snails with good market weight and size, sorting snails based on their size, breaking and separating snail shells from the meat and packaging/transporting snail meat to potential buyers. These findings agreed with the findings of Umeh (2017) that found out that sorting matured snails, breaking of snail shells and separating the flesh from the shells are skills needed for harvesting and processing snails. Also, Ogba and Ndem (2016) reported that sorting and grading of snails and packaging of snails in suitable materials are vital skills required for marketing of snails.

## V. CONCLUSION AND RECOMMENDATIONS

Based on the findings of this study, it is clear that all the items are required by secondary school students in snail farming for food security as the mean of all the items were above 2.50 which is the bench mark. This study therefore recommended that:

1. Secondary school students in Benin City should use these findings for snail farming in the fight against food insecurity.
2. Agricultural Science teachers should engage the students in seminars and workshops to educate them on the required skills in snail farming for food security as identified by this study.
3. Authorities in education should use the entrepreneurial skills identified by this study as a guide to formulate curriculum for training secondary school students in snail farming.



4. More researches on snail farming should be carried out to boost snail production and attain food security.

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