International Journal of Academic and Applied Research (IJAAR)
ISSN: 2643-9603
Vol. 8 Issue 7 July - 2024, Pages: 17-25

Sources of Supply and Constraints to Snail Production in Patani Local Government Area of Delta State, Nigeria.

[1]Amafade Ughwe Goodluck, [1]Ovwigho Bishop Ochuko, [2]Akporise Oruese Miracle

1Department of Agricultural Extension, Delta State University, Abraka.
2Department of Agricultural Economics, Delta State University, Abraka.
amafade-ughwe@delsu.edu.ng
https://orcid.org/0009-0004-2762-9308

Abstract: *The study analyzed the factors affecting the supply of snail meat to the market in Patani Local Government Area of Delta State. The sample consisted of 75 snail farmers and marketers, with a majority being married (74.1%) and having secondary education (66.7%). The average household size was seven persons, and their annual income was N207,612 per annum. The majority (66.6%) of the farmers obtained their snails from the extensive system (snail gathering). The constraints faced by the farmers included poor transport system, pest and disease attacks, technical know-how, low return on investment, difficulty in moving, high temperature, cultural factors, and poor support from government authorities and donor agencies. The study recommended increasing government and donor agency support for snail production, increasing extension contact, and providing regular trainings, seminars, and workshops for snail farmers.*

Keywords: Snail farming, nutritional value, constraints, biodiversity, hibernate, aestivate, constraints

Introduction

Snail belongs to the class mullusca with numerous edible species but the most popular species of economic value is the giant African land snails (*Archatina archatina* and *Archatina marginata*). This species of snails belong to the family Archatinidae, a group of large land snails that originated from western, eastern and southern Africa and are very prolific (Ume, Onuh, Onunka and Ucha, 2016). Snail farming (heliciculture) is not very popular in Africa and Nigeria in particular. Though, snail farming in recent years has started to gain momentum probably due to the awareness of it's nutritional, therapeutic, cosmetic and industrial properties created by extension agencies (Ezeano, 2016).

In Nigeria, snails are called several local names; Yoruba (*Ilako or Igbun*), Hausa (*Katantawa*), Igbo (*Ejune*), Boki (*Ekor*), Rivers (*Anubeku*), Igala (*Kokori*), Benin (*Egile*), Akoko- Edo (*Ulele* or *Ureh*), Urhobo (*Isekpe*), Isoko (*Uro*), Kwale (*Enorkpor*), AniomaOshimili (*Ejune*).

Snail is a very good and cheaper source of protein (12%-16%) and contain high level of iron (45:50mg/kg) and calcium. It also contains almost all the amino acids needed by humans. Snails are known to be low in fat, sodium and cholesterol. They are known to have been used t treat hypertension, anaemia and other fat-related ailments (Owolede, 2008). Bayode (2009) noted that the snail meat is a good substitute source of protein compared to poultry, pig and cow meat which have become too expensive and unaffordable daily to the average Nigerians..

Edible snail has been of great importance in traditional medicine. According to Cobbinah *et al* (2008), the high iron content of snail is used in treating ulcer, asthma and anaemia and the bluish liquid from the shell is good for infant development. According to a recent study, the glandular components found in edible snail meat induce some bacteria to agglutinate, which may help treat a number of illnesses, including whooping cough.

The place of snail in livestock production

Snail is an important live-stock. Research has indicated that the protein content of snail meat ranges from 37 to 51%, which is higher than that of guinea pigs (20.3%), poultry (18.3%), fish (18%), cattle (17.5%), sheep (16.4%), and swine (14.5%). Its iron content is about (45.59mg/kg) low in fat (0.05-0.08%) and contains almost all the amino acids needed for human nutrition (Orodabi 2006, Bayafe 2009).

Snail meat has also been found to have higher medicinal value compared to other livestock. Bayode' (2009) investigated that snail meet is used for different curative purposes from ancient time till today using several formations. For instance, it can be a remedy to treat wound, bums, small pox and other skin diseases. Snail meat is considered to be low in sodium, lipids, and cholesterol and high in key amino acids including tryptophan, arginine, leucine, and lysine. The blue-colored liquid extracted from snails is used to treat anemia, asthma, hypertension, and visual impairments due to its high iron level (Imevbore and Ademosun, 1998).

Nutritional and economic value of snail production

Snail have been recognised to be a reliable source of protein to human beings and also very useful in research. Some conventional animal protein sources such as beef, goat meat, pork and muflon have become too expensive for the average citizens in developing nations (Omole, 2000).

Table 1. Nutritional composition of snail meat

Nutritional Composition	**Per 100gm**
Water (g)	80
Protein (g)	15
Carbohydrate(g)	2.4
Fibers (g)	0.2
Fat (g)	0
Magnesium (mg)	0.4
Calcium (mg)	0.6
Iron (mg)	1.1
Vitamins (mg)	0.9

Source: *Nutritional Data of France (ENADEP, 2009)*

Table 2. Calories Constituent of Snail Meat

Total Calories	90
Calories from Carbohydrate	13
Calories from Fat	12.6
Calories from Protein	64.4

Source: *http/revivesnailextractinternational.blogspot.in*

Table 3. Constituents of fat and fatty Acids in Snail Meat

Total fat	1.4g
Saturated fat	0.4g
Mon saturated fat	0.3g
Polyunsaturated fat	0.3gm
Omega-3 Fatty Acids	218mg
Omega-6 Fatty Acids	17mg

Source: http//revivesnailextractinternational.blogspot.in

Table 4.1: Mineral Constituents of Snail Meat

Calcium	10mg
Iron	3.5mg
Magnesium	250mg
Phosphorus	272mg
Sodium	70mg
Zinc	1mg
Copper	0.4mg
Selenium	274mg

Source: http//revivesnailextractinternational.blogspot.in

Social cultural factors affecting snail production in Nigeria

Culture is the sum of material and non-material values that people living in an area within a defined time period. Such values developed overtime and passed from one generation to another does not exist in isolation of the ecological dictates of their surrounding. The culture and tradition of the people has been investigated to affect the rearing and consumption of the snail species. For different cultures, there are different perception of benefits and attributes of snails. In folktales, different stories abound about the animal in relation to the people and their way of life. Some traditions are of the opinion that crawling animals such as reptiles and snakes with snail inclusive are not fit for consumption while many are in the contrary (Cobinah, 1993).

In Nigeria for instance, the Hausa speaking northern majority does not eat snails and considers it to have originated from ghostly existence (Ayodele and Asimalowo, 1990). This people view snail consumption as abominable. The Muslims also believe that the eating of snails is contrary ti Islamic tradition because eating of snails was not recorded anywhere in the several centuries of Islamic history.

In Southern Nigeria, a particular lineage of the Yorubas, the Ibadan, are believed to be the descendants of snail and snail shell consumers; put as "Omo a je 'gbin je 'keraun; Omo a ft 'karaunf'ori mu". During masquerading, especially of various Yoruba festivals, different parties upon encountering each other greets thus "esaogbinaraagbojo". Various folkiores and proverbs with snails as the major player or as participants is numerous among Yoruba, Efila, Igbo and other Southern Nigeria tribe groups. (Cabinah, 1993).

Ogunjinmi, Jayeola, and Osinsing, 2008) stated that there are taboos associated with consumption of snails. They also looked at the fact that different ethnic groups used snails for cultural consumption, medical, and spiritual purposes, among other uses (for consumption).

For instance, the Isoko in Delta State (North and South) view eating of snails as a taboo. Also, some tradition such as those of the Ogume community in Delta State worship snail s their deity therefore, they forbid snail eating.

Also, snail shells flesh, mucus, antennae and whole body are applied for different uses including for love, cough, curing stroke, location of distant objects and sexual boosting.

Constraints to snail farming

Snail gathering and rearing is an important source of livelihood for rural dwellers in the humid forest and derived savanna zones of West and Central Africa. Recently, declining populations of *Achatina achatina* and *Achatina marginata* species is being affected with climatic conditions and changes in land use (Ngenwi, Mafeni, Etchu and Oben, 2010). According to Ekwu (2016), the influence of illnesses, climatic conditions, predators, and human activity has resulted in a gradual fall in the population and biodiversity of wild snails in the West African region.

These constraints will be discussed under production constraints, socio-economic constraints and marketing constraints.

Production constraints:

Production constraints affecting snail farming include climatic factors, predators, pest, diseases and parasites of African land snails.

- Climatic factors: Unfavorable climatic factors and climatic change poses a serious problem to snail population in West Africa regions. Climatic effect and it's influence have an associative effect on temperature, humidity, wind/air movement and light intensity. Ebenso and Ologhobo, (2009) noted that snails are vulnerable to illnesses and infections brought on by chemicals and environmental contaminants.
- Temperature: It has a significant impact on how snails behave. For proper physiological processes and nutrition, snails need a temperature that is lower and more moderate. A temperature range of 23–28°C is ideal for the growth and development of snails. According to Okafor (2001), snails usually hibernate and aestivate, particularly during arid, hot, and unfavorable seasons. Additionally, Ebenso and Ologhobo (2009) claimed that snails are impacted by noise, air, and environmental pollutants.
- Humidity: Snails like damp, colder habitats, which are typically created by rain, which also makes the air in the atmosphere moist and highly relative humid. Between 70 and 90 percent relative humidity is ideal for snail activity. Snails are negatively impacted by acidic rain in certain areas due to elevated air pollution levels. Snails may dry up, perish, or hibernate if the air is hot and dry for a prolonged period of time (Ojiako, 2006).
- Excessive wind and air movement: This is an additional climatic condition that could induce severe dehydration in snails and make them withdraw inside their shells instead of eating in order to eat and reproduce (Ngenwi, 2010). According to Okafor (2001), extended lengths of time may cause snails to enter aestivation, a state of dormancy or inactivity.
- Light intensity: Light is necessary for snails to perform tasks like feeding and reproducing. Despite being nocturnal creatures, snails nevertheless need light for a few photo-biological functions, such as photosynthesis and cellular digestion, which are vital to the energy level and food chain (Ikechukwu, 2012). Typically, daylight comes from the sun. Under ideal circumstances, a longer duration of light encourages snail reproduction.
- Soil type: Snails rely heavily on the soil for their food, water, and reproductive processes. Without an appropriate soil type, they have little chance of surviving or functioning as intended. According to Ekwu (2016), they require soils that are moist, aerated, easily drained, non-waterlogged, and non-acidic soils. According to Ikechukwu (2012), soil that has been sterilized to remove pathogens is suitable for snail farming1 and is rich in organic matter and minerals.
- Predators of African land snails: Giant African land snails are faced with the challenge of predators in their natural wild habitat. These predators pose great danger to their normal growth and reproduction, if not check mated might lead to the decline in population of snail biodiversity or extinction of various snail species in nature. Akwu (2016), investigated that predators mostly depend on their pray as source of food for their survival in the ecosystem. Snail predators feed on the snail species at their various stages of growth and maturity. According to Akinnusi (2014), snails predators include; Arthropods - insects (termites, beetles, mites, moths, driver ant, carabid beetles, cockroaches and soldier ants), Crusteceans; millipedes, centipedes, crickets, crabs and forest spider, Reptiles; lizards, and snakes, Amphibians; frogs, turtles and toads; Rodents; mice and rats, Ayes; birds, craws, ducks and turkeys, Mammals; man as well as nematodes.
- Diseases: Snails are prone to disease attack as in other livestock production. The common diseases affecting snails either in the wild or in their cultured environments include:

Bacteria disease caused by *Pseudomonas spp* especially *Pseudomonas aeruginosacauses* intestinal infections in snails. The disease affects snails normal growth and development process (Ekwu, 2016).
A Fungal diseases mainly Furasium spp affect indegenouse snail species native to West African
region. They are susceptible to this disease causing agent. Akinnusi (2014), noted that this disease is commonly referred to as rosy eggs disease and the affected eggs turns reddish brown and die off.

- Deficiency disease occurs mostly in domesticated snails with poor feeding. As a result of mineral nutrients especially calcium and phosporus. The affected snail shell turn white as a result of deficiency of calcium in their feeds over a long period of time (Akinnusi, 2014).

Socio-economic constraints
The main factor threatening the biodiversity and population of snails in a particular area is human activity. These consist of crop producers using pesticides, fertilizers, nematocides, and nematode control on their farms to suppress weeds. According to Ekwu (2016), the usage of agrochemicals like pesticides in agricultural production also affects the pH of the soil, the environment, and the biodiversity of snails.
Deforestation, also referred to as the felling of trees for a variety of reasons such as urbanization, road construction, construction of houses, schools, and factories, exposes the habitat of snails to unfavorable environmental circumstances, which causes the species of snails to diminish. During planting seasons, rural farmers' slash-and-burn farming methods displaces snails from their native habitat and expose their eggs to unfavourable weather, including sunlight and rain.
Other constraints include, indiscriminate snail hunting in the forest, bush burning occasioned by the hunters of wild life animals, unavailability of commercial snail feeds and concentrates, use of inorganic fertilizers for commercial farming destroys the natural snail ecosystem and habitate suitable for growth, development and reproduction in their wild (Ikoji, 2Ol4), and lack of technical know-how which is a major problem in snail production. Some farmers that venture into heliciculture do not have the required knowledge thereby endangering the snails that are confined.
Marketing constraints:
Market constraints that affect snail farmers range from lack of capital, poor market knowledge, poor sales, expensive and fluctuating prices, inadequate storage facilities, high transportation costs, and scarcity of snails due to seasonal nature of supply .
(Ugroumba, Obiekwe and Ozor, 2016)

Geographical description of study area
The study was conducted in Patani Local Government Area of Delta State, Nigeria. Patani Local Government whose administrative seat sits in the Patani town is one of the 25 local government areas of the. The towns are Agoloma, Kabowei, Kumboei, Bolou, Aven, Apelebiri, Bolou-Angiama, Odoruba, Toru-Angiama, Toru-Apelebiri, Uduophori, Abari, and Oporoza,. It form a federal constituency with Bomadi Local Government Area and fall within Delta South Senatorial District of Delta State. Patani Local Government Area has an estimated population of about 92,800. The indigenes share ancestral and traditional administrative systems, evident in their native attires, language, festivals, music and folklore. The people are hospitable, enlightened, resourceful and hardworking.

Instrument for data collection
Primary source of data was used in the survey. Data was collected by use of interview schedule. The interview schedule measured the socio-economic characteristics of the farmers, sources of snails in the snail market and constraints (production constraints, socio-economic constraints and marketing constraints) affecting snail production.
The study employed the services of agricultural extension agents and community leaders for data collection

Sampling procedure and sample size
A simple random sampling procedure was used to select respondents. The random sampling was in two stages.
First stage: Simple random sampling of 60% towns and villages in Patani local government area.
Second stage: Simple random sampling of 40% respondents from towns and village selected. Hence, the sample size is 75 respondents.

Measurement of variables
The socio-economic characteristics were measured as follows:
Age: The age of respondents was measured in years.
Marital status: This was measured by asking respondents to indicate their marital status; Married (1), Single (2), Divorced (3), and Widow (4)
Sex: Sex was measured by asking respondents to indicate their sex as: Male (1), Female (2) Level of Education: Level of education was measured by number years spent in formal education (Primary six = 6years, S.S.C E=2years, Tertiary = l6years).
Household size: The farm household size was measured.by the number of persons in living in a farming household.

Farming experience: Farming experience was measured in years.
Constraints: The various constraints were measured by 4-point likert type scale. The scale were be coded (Strongly Agree) 4, (Agree)= 3, (Disagreed) =2 and (Strongly Disagreed) = 1. Production system will be measured by nominal scale Extensive Production System Intensive Production System 2 and Semi-intensive Production System = 3

Method of data analysis
Objective was analysed by descriptive statistic involving frequency distribution and mean. Hypothesis was analysed by Analysis of Variance (ANOVA).

Results and discussions
The socio-economic characteristics under the various management systems, the sources of snail in the market and the constraints facing snail production were presented and discussed.
Socioeconomic characteristics of snail marketers
The socio-economic characteristics studied were age, sex, marital status, level of education, household size, income level, farming experience and contact with extension agents.
Age: The highest percentage distribution of respondents according to age in Table 4.2 was 35-43 years (48.1%) and lowest was 17-25years (7.4%) and 26-34years (7.4%). The mean average of 42 years indicated that the snail marketers were relatively young. This finding s in line with Eze *et al*., (2006) who posited that majority of small scale snail marketers were aged between 40-45 years in southern Nigeria.
Sex: From the result in Table 4.2 it was shown that 14.8% of the marketers were male and 85.2% were female. This implies that the proportion of female marketers was higher than male marketers.
Marital status: Table 4.2 shows that most of the snail marketers were married (74.1%), while others were widow (14.8%) and divorced (11.1%). This result agreed with Obinaju, (2016) that a high population of snail marketers were married.
Level of education: The percentage distribution of snail marketers according to level of education as shown in Table 4.2 reveals that marketers who had no formal education was 0.0%, Primary education (25.9%), secondary education (66.7%) and tertiary education (7.4%).This result implies that a high 'proportion of the snail marketers had formal education. This is in accordance with Eze *et al*., (2006) who stated that majority of snail marketers are educated. These qualities of education can also influence their level of sales.
Household size: The household size distribution of respondents in Table 4.2 shows that most (48.1%) of the respondents had 5-8persons in their family while 25.9% and 11.1% of the respondents had 1-4 persons and 9-12 persons respectively. The Table further revealed that the average household size was 7 (seven) persons. Findings show that household size was important in providing labour required for agricultural marketing activities.
Income level: The annual farm income as shown in Table 4.2 reveals that majority (48.1%) of the marketers earned between ₦100,100 - ₦200,000 per annum. Result shows that 14.8% of marketers earned ₦200,100 - ₦300,000 while only 3.7% of the marketers earned ₦300,100-₦400,000. The Table also reveals an average annual income of ₦207,6124 per annum in the study area. This indicates that the snail marketers were mainly small scale marketers with attendant low income.
Marketing experience: In Table 4.1, majority (63.0%) of the marketers had marketing experience of 1-6 years while 14.8% and 7.4% had 7-12 years and 13-18 years experience. The average marketing experience in the study area was 8 years. This result implies that snail marketers in the study area were relatively old in the business.
Extension contact: Table 4.1 shows that majority (85.2%) of the snail marketers had no contact. with extension agents while about 11.1% had contact with extension agents twice in a month.

Table 4.2: Socioeconomic characteristics of marketers

Variables	Frequencies	Percentage	Mean/ Mode
Age (years)			
17 -25	6	7.4	42years
26 34	36	7.4	
35 43	36	48.2	
44 -52	19	25.9	
Above 52	8	11.1	
Sex			
Male	11	14.8	Female
Female	64	85.2	
Marital status			
Married	56	74.1	Married
Divorced	8	11.1	
Widows	11	14.8	

Level of education			
No formal education no	0	0.0	Secondary education
Primary education	19	25.9	
Secondary education			
Tertiary education			
Household size (persons)			
1 - 4	19	25.9	7 persons
5 - 8	36	48.1	
9 - 12	8	11.1	
Above 12	11	14.8	
Income			
100,000 - 200,000	25	33.33	#207,612.4
200,100 - 300,000	33	44.0	
300, 100 - 400,000	12	16.0	
400, 100 - 500,000	4	5.3	
Above 500	1	1.36	
Marketing experience			
1- 6	47	63.0	8 years
7 -12	11	14.8	
13 - 18	6	7.4	
19 - 24	8	11.1	
Above 24	3	3.7	
Extension contact			
No contact	64	85.2	No contact
Once	8	11.1	
Twice	3	3.7	
Three times	0	0.0	

Source of snail in the market and production systems

Table 4.3 showed that majority (66.6%) of the farmers got their snail from the extensive system (snail gathering) while 4.0% and 29.3% of the respondents got their snails from the intensive and semi-intensive system respectively. This could be because extensive system of production (snail gathering) was cheaper compared to the other two systems of production.

Table 4.3: Sources of snails in the market

Sources	**Frequency**	**Percentage**
Intensive System	3	4.0
Semi- Intensive system	22	29.3
Extensive system (snail gathering)	50	66.6

Constraints to snail production and marketing

Table 4.4 shows the constraints faced by snail producers in the study area. Out of the fifteen constraints examined in the study, only eight were agreed upon. These were; transport is a major problem (x=2.56); theft is rampant under my production system (x=2.50);high temperature and other weather conditions (x=3.25); hiding in places where they cannot be found (x=3.02); cultural factors militate against snail production in my area (x=2.87); poor support from government authorities and donor agencies to encourage snail production (x=3.66); poor knowledge about nutritional value of snail (x=2.66); and formulated feeds and concentrates are not readily available (x=3.62). Poor support from government authorities and donor agencies to encourage snail production (x=3.66) was recorded as the highest constraints in the study area.

This study supports that of Eze *et al*., (2006) who stated that snail farming was found to be marginally efficient and may be attributed to the problems of production such as poor storability and excessive price. Obinaju and Asa (2016) also reported that high temperature was a severe constraint to snail farming.

Table 4.4: Factoring affecting the production and supply of Snail meat

Constraints	SA (4)	A (3)	D (2)	SD (1)	Score	Mean	Remark
Transporta is a major problem	4(16.7)	17(35.4)	17(35.4)	6(12.5)	107	2.56	Agreed
Pest and disease	0(0.0)	12(25.0)	17(35.4)	19(39.6)	89	1.85	Disagreed
Technical know-how of scientific snail production	6(12.5)	14(29.2)	19(39.6)	9(18.8)	113	2.35	Disagreed
Return on investment is low	1(2.1)	19(39.6)	22(45.8)	6(12.5)	111	2.31	Disagreed
Theft is rampant under my production system	5(10.4)	20(41.7)	17(35.4)	6(12.5)	120	2.50	Agreed
Cost of establishment is high	5(10.4)	20(41.7)	21(43.8)	6(12.5)	120	2.31	Disagreed
Difficulty in moving from place to place	2(4.2)	18(37.5)	16(33.3)	7(14.6)	111	2.29	Disagreed
High temperature and other weather conditions	2(4.2)	20(41.7)	16(33.3)	10(20.8)	110	3.25	Agreed
Hiding in places where they cannot be found	19(39.6)	25(52.1)	1(2.1)	3(6.3)	156	3.02	Agreed
Cultural factors militate against snail production in my area	14(29.2)	22(45.8)	11(22.9)	1(2.1)	145	2.87	Agreed
Poor support from government authorities and donor agencies to encourage snail production	34(70.8)	12(25.0)	2(4.2)	0(0.0)	176	3.66	Agreed
Poor knowledge about nutritional value of snail	7(14.6)	21(48.3)	17(35.4)	3(6.3)	128	2.66	Agreed
Predation	2(4.2)	8(16.7)	16(33.3)	22(45.8)	86	1.79	Disagreed
Formulated feeds and concentrates are not readily available	33(68.8)	12(25.0)	3(6.3)	0(0.0)	174	3.62	Agreed
Poor storage facilities are major constraints	3(6.3)	1(2.1)	22(45.8)	22(45.8)	81	1.68	Disagreed

Differences in the constraints faced snail farmers under various management system.

The result in table 4.3 shows the results in differences in the constraints faced by snail farmers under the various management systems. There was no significant difference in the constraints faced by snail farmers under various management systems in the study area at 5% level of probability ($F=0.825$; $p> 0.05$). Therefore the null hypothesis which stated that there was no significant difference in the constraints faced by snail farmers under various management systems in the study area was upheld.

Table 4.5: Differences in the constraints faced by snail farmers under various management systems

Management systems	N	Mean	Std Deviation	Std Error	Minimum	Maximum
Intensive	3	**2.623**	**0.216**	**0.125**	**2.470**	**2.870**
Semi - Intensive	11	**2.485**	**0.276**	**0.083**	**2.070**	**2.870**
Extensive	**34**	**2.613**	**0.300**	**0.051**	**2.000**	**3.130**
Total	**48**	**2.585**	**0.291**	**0.042**	**2.000**	**3.130**

ANOVA

	Sum of Squares	df	Mean	F	Sig.
Between Groups	**0.141**	**2**	**0.070**		
Within Groups	**3.831**	**45**	**0.085**	**0.825**	**0.445**
Total	**3.971**	**47**			

Conclusion

A high proportion of the farmers and marketers had formal education in the study area. Labour supply was largely dependent on family household in rural communities. Poor support from government authorities and donor agencies to encourage snail production was recorded as the highest constraints in the study area. There was no significant difference in the constraints faced by snail farmers under various management systems in the study area.

Recommendations

The following recommendation were made;

i. Support from government authorities and donor agencies should be increased to encourage intensive snail production in the study area.
ii. The States Ministry of Agriculture and Rural Development, through its extension agents, should establish more contact with both farmers and marketers in order to enlighten/educate them more on the business.
iii. It is also recommended that timely and regular trainings, seminars, workshops on new findings about snail production should be conducted for snail farmers and other interested people.

References

Afolabi, l.A (2013). Snail farming as an environment friendly and viable enterprise in Ondo State, Nigeria. *Journal of Human Ecology*. Pp:289-293

Ahmadu, J. and Ojogho, 0. (2012), Economics of snail production in Edo State, Nigeria. *International Journal of Agricultural Sciences*, 4(1),122-128

Bayode O.T. (2009) Snail production techniques: An opportunity for self sustenance in the face of Economic Recession. Cedar Consult-Seminar Paper

Chika, O.A and Felix, A. (2012). Snail Marketing: a means to combat poverty and hunger in *Nigeria Journal of Applied Biosciences*. 27(2), 202-208

Cobbinah J.R (2015). Snail farming. Implication for industrialization. A Keynote address presented at the 3rd International conference on giant African land snail held an 2nd June, 2014 at Federal College of Education. Abeokuta, Ogun State.

Cobbinah. J.R, Vin K, A and Onwuka, B, (2008) Snail Farming Production, processing and marketing Agronisa Foundation, Wagningen. Pp 12-18

Eze, CC, Ohajianya, D.0, Oguoma N.N.0. (2016). Analysis of land snail marketing in Owerri Agricultural Zone of Imo State, Nigeria. Animal Production Research.

Ezeono Cd. (2015). Mini-livestock farming: Technology minogeo-graph. Department of . . . . . Agricultural Economics and Extension, Nnamdi Azikiwe University Awka, Nigeria. Pp23

Goreux L.M. (2013). Cotton Producers in Africa vis US and EU Subsidies. relude to the Cancun Negotiations. *European Parliament: Brussels*, Pp. 4-10.

Lameed, G. (2009). Socio-economic characteristics of Snail Farmers, Consumers and Sellers in Selected Zones of Oyo State Agricultural Development Programme (OYSADEP). *Journal of Agriculture, Forestry and the Social Sciences*. .4. 10.43 14/joafss.v4i.2.33773.

National Bureau of Statistics (2006): Population census of Delta State, Nigeria.

National Population Commission of Nigeria (web), National Bureau of Statistics (web).

Ngenwi, A.A, Mafeni, J.M, Etchu, K.A and Oben, F.T (2010) Characteristics of snail farmers and constraints to increase production in West and Central Africa. *Journal of Environmental Science and Technology*, 4(2),247-283.

Obianaju, L.C.; Asa, U.A. (2016). Economics of rural livelihoods: a case study of snail farming in Itu Local Government Area, Akwa-Ibom State, Nigeria. *American Journal of Research Communication*, 4(2),75-85 www.usa.joumals.com

Obinaju, L.C and Asa, A.U (2016) Economics of Rural Livelihoods: A case study of snail farming in Itu local government area, Akwa Ibom State, Nigeria. *American Journal of Research Communication*, 4(2)73-82

Oguniyi L.T (2009) Economic analysis of snail production in Ibadan, Oyo State. International *Journal of Agriculture Economics and Rural Development*, 7(3),33-38

Ogunjinmi, A.A, Jayeola, A.0 and Osunsina, 1.0 (2008) Socio-Cultural factors determining consumption and utilization of snails among ethnic groups in New Russa, Niger State, Nigeria, Obeche Journal, 27(4), 22-35

Onuigbo, C.C (2015). Economics of snail production in Enugu East Agricultural zone of Enugu State, Nigeria. Department of Agricultural Economics, University of Nigeria, Nsukka.

Owolade, E.O, (2012). Information-seeking behaviour and utilization among snail farmers in Oyo State, Nigeria: Implication for sustainable animal production Federal College of Animal Health and production Technology Ibadan. Pp 27-3 3

Ugwumba, C.O.A, Obikwe, J.N and Ozor, M.U (2016). Marketing of African Giant Snail (*Achatina Achatina*) in Anambra State, Nigeria. Journal of Dental and Medical Sciences, 15(3),156-158

Ume, S.I., Onuh, N.C, Onunka, B.N and Ucha, S.O (2015). Adoption of Snail production technologies by farmers in Onicha local government area of Ebonyi State, Nigeria, Asian *Journal of Agricultural Extension, Economic and Sociology*, 2(2),41-55