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## **Capacity Building Needs of Farmers on Snail Production for Food Security in Omuma Local Government Area, of Rivers State, Nigeria.**

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### **Abstract:**

The study examined the capacity building needs of farmers on snail production for food security in Omuma Local Government Area of Rivers State. The study adopted descriptive survey design. Four research questions guided the study. The population of the study was 120 male and female snail farmers in Omuma Local Government Area of Rivers State. The entire population was used as census sampling technique. The instrument used for data collection was the researcher structured questionnaire, titled 'Capacity Building Needs of Farmers on Snail Production for Food Security Questionnaire (CBNFSPFSQ) format modified in four-point Likert rating scale, which was validated by two experts in agricultural extension from Omuma Local Government Area, agricultural division. The questionnaire also passed the test of reliability, through test-retest method and its result computed using Pearson's Product Moment Correlation Technique which yielded a coefficient of 0.82. The data collected analysed using mean ( $\bar{x}$ ) and standard deviation (SD) to answer the research questions. The criterion mean was used in scoring the instrument. 2.50 And above was used to accept an item, while item below 2.50 were rejected. The result of findings include, snail farmers need capacity building skills on planning and management. They also need capacity building skills on snail pen construction among others. The study recommended that, government at the Local and state levels should train the snail farmers on planning and management skills to improve their efficiency. They should also encourage them to construct their snail pens according to recommended specification

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**Keywords:** Capacity, Building needs, Farmers, Snail farming, Food security

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### **Introduction**

Snail ancestors are among the world's oldest known animal species and that is where the history of snail started as asserted by (Okafor 2011). Fossil evidence of primordial gastropods dates back to the late Cambrian era, implying that they existed approximately 500 million years ago. The first land snail fossils were discovered between 350 and 250 million years ago in Mississippian. *Dendropupa vestusta*, the giant species was cylindrical about 8mm in size and had whorls. Land snails are more likely to have evolved from fresh water species than salt water species because minor adaption is required to counteract asthmatic needs snail species nowadays may exist in a variety of settings, from the desert to the deep sea. Nwosu (2013) noted that snails have a life expectancy of 3 to 7 years in the wild, but in captivity, they can survive for 10-15 years or even longer.

A snail's fundamental distinction is whether or not they are aquatic or terrestrial. Snail (Castropoda) evolved to dwell in the sea or fresh water bodies while others lived entirely on land, even in human environment. Nwosu (2013) went further to say that all land snails are gastropod molluscs, which mean they are related to octopuses and hence belong to the phylum mollusc. Snails and slugs, in general are included in the gastropod class. Being a mollusk implies that it lacks an internal skeleton and bones however, snails are not defenceless. Snails most distinguishing physical characteristics is their spiral shell, which they carry on their back, it is a calcium carbonate-based rigid structure that protects their fragile body and interior organs. Land snails lungs are one of the organs they rely on it for air from the atmosphere for their survival, which then flows into a lung to obtain oxygen; one of the critical distinctions between land snails and aquatic snails is that only a few species of water snails breathe air.

Nwosu (2013) observed that snail may be found almost wherever on the planet and this has been from history gastropods are next to insects in terms of the number of species that have been officially recognized, snails inhabit a wide range of habitats and even having distinct eating patterns. Nwosu (2013) also noted that approximately 85,000 to 150,000 molluscs are found, gastropods will account for 80-85 percent of the total. As a result there are over 60,000 species of them in the world. The size of land snails, varies widely, with some land snails are only a few inches tall and weigh only a few ounces, others like the Giant Africa are about 12 inches tall and weigh 10 gram Snails do not have legs yet they can walk owing to a muscular foot that allows the snails to move from one location to another through wave motions.

Snails are most active at night; they may also appear in the early morning hours they employ their sense of smell to help them discover food. Most of them are hermaphrodites, which implies that a single snail contain both male and female reproductive organs. The snail hatching a few weeks after laying, and faeces a number of predators.

Snail farming business also known as heliciculture or snail farming is the process of raising edible land snails, primarily for human consumption or cosmetic use. The meat and eggs can be consumed. Snail rearing can either be reared as subsistence or commercial snail farming business. Snail farming for beginners is very easy as snail farming does not require much knowledge and a little capital (money) is needed. The archachating *margnata* (AM)

species for short) are herbivores; they feed majorly on plants. Snails may become cannibals if left unfed for some days and they can start to eat one another. Snail diet ranges from carbohydrates, proteins, vitamins and even to water.

Snail meat has been consumed by humans throughout the world since prehistoric times (Cobbinah, 2001). The interest in snail farming around the world stems from snails high quality protein and medicinal value. For instance, protein from snail meat is said to be very rich in all essential amino acids such as lysine, leucine, arginine and tryptophan. Snail meat has been found to be higher in protein content (37-51%) compared to that of guinea pig (20.3%), poultry (18.3%), cattle (17.5%), sheep (16.4%) and swine (14.5%). Iron content (45.59mg/kg), low in fat (0.05-0.08%), sodium and cholesterol level (Bayode, 2009). The bluish liquid obtained from snail has high iron content and is used for treatment of anaemia, hypertension and poor sight.

The formulations from this liquid can be used to treat burns, abscesses and other wounds, measles, small pox and some skin diseases (Bayode, 2009). In Ghana, the bluish liquid is believed to be good for infant's development (Ashaye, Omele, Adetoro and Kehinde, (2001). According to Amao, Adesiyan and Salako (2007), snail meat is recommended in the past for treatment of ulcer, asthma and even at the imperial court, in Rome it was thought to contain aphrodisiac 3 properties (arousing or increasing sexual desire) and was often served to visiting dignitaries in the late evenings. Snail meat being rich in calcium, potassium, magnesium and iron is recommended for hypertensive and pregnant women. It is important source of human diet, additional source of income to farmers. To avert danger of malnutrition, especially among children the giant African land snail is a good substitute of source of protein (Bayode, 2009). Ashey, et al (2001) reported that snail could be used to reduce the problem of malnutrition.

Amao, Adesiyan and Salako (2007) reported that snail breeding can start at any time of the year under domestication, but the best time to start breeding snail is at the beginning of the rainy season when feeds of snail are available. The foundation stock may be from the following sources: snail farmers, research institutes that produce snails or direct collection from the forest or bush. Edible land snails, though hermaphrodite, reproduce by fertilization of two ova when two snails mate for and exchange their sperms reciprocally. The eggs, about two weeks after fertilization are laid at night in holes dug 5-15cm deep in the soil. The hatchlings remain in the soil for 3-5 days after hatching. Snails feed on a wide variety of food mostly in the night at dusk, i.e. snails are nocturnal and crepuscular. They may feed during the day when it rains or there is very dark cloud.

**Snail Pen Construction:** Cobbinah, (2010) asserted that snail pen construction requires getting a good site as very crucial. He went further to say that for economic purpose extensive system of snail farming is the best. Owolabi, (2010) is of the opinion that snail does well in cool environment devoid of soldier ants and other harmful insects and reptiles. The temperature of the site should be between 20-35 degree centigrade, planted with trees around the pen. For the snails to do well according to Murphy, (2011), the site should have low wind movement and fresh air in circulation. The soil should be free from toxic fertilization and moderate sunlight around the pen this is so because snail is a boneless animal and moves very slowly. Good fencing, reinforced with chicken wire are needed to prevent intruders (human and animals) and also the snails from escaping.

General management routine, procedures for commercial snail production:

1. Discourage visitors from entering the snailery too frequently.
2. Do a proper inspection of materials carried to snailery such that they are safe.
3. Do not use chemicals i.e. insecticide or herbicides inside the snailery.
4. Adequate shade must be provided.
5. Snail must be handled carefully.
6. Fresh poultry dropping should not be added. Mouldy, stale or fermented feed should not be given to snails because it contains uric acid harmful to snails.
7. The hatching or young ones require more humid environment and more attention than the matured ones.
8. The inside and outside of the snailery should be cleaned regularly.
9. Feed and water should be served in shallow container for easy accessibility and also to avoid snail drowning.
10. The feeding must be served in shallow container preferably flat trays for easy accessibility.
11. Snail should be well protected against soldier ants, millipedes, snares and rodents etc.

The advantages of snail farming (heliculture) over most other livestock includes low capital requirements, for its establishment and operation, less demand for professional knowledge very high fertility and low mortality, less labour requirements, and availability of ready domestic and international markets among other (Akindele, 2004). Some constraints that militate against good performance of snail includes genetic constituent, hormonal influence, environmental factors, rearing pattern and inefficient use of resources available to the farmers As was observed.

There is flourishing international trade of snails in Europe and North America. In France, the annual requirement is about 5 million kg, over 60% of which is imported; the estimated annual consumption in Italy is 306 million snails. In West Africa, snail meat has traditionally being a major ingredient in the diet of people living in the forest belt. In Cote D Ivoire for example; an estimated 7.9 million kg is consumed annually. In Nigeria, Enugu state in particular snail farmers are very few because of the taboos over snail production, consumption and marketing are done in few places in the state the few farmers farm in small scale (Owolabi, 2006).

In spite of the potentials and advantages of snail farming (heliculture), widespread participation in its production by farmers has not been achieved in Nigeria (Baba and Adeleke, 2006). Much of the snail marketed in Nigeria are collected from the wild. As was noted by Baba and Adeleke, (2006) few

farms exist for commercial breeding and production of snails. This probably attributed to lack of awareness of economic potentials of this micro-livestock (Azeez, 2009). Many agricultural strategies have been adopted in Nigeria, yet daily per capital animal protein make (estimated at less than 10g) remains a far cry from the Food and Agricultural Organisation recommended minimum requirement of 35g (Usman et al,2003). In order to bridge this gap, it has been suggested that there is the need to explore other sources of animal protein in addition to the conventional sources such as ruminants and poultry. Much of the snails marketed in Nigeria, and Rivers State in particular, are collected from the wild. Few farms exist for commercial breeding and production of snails.

This is probably attributed to lack of skills that can enable them to rear snails on their farms. This is because without skills to build your capacity in any occupation, it will be difficult to embark on such occupation and be successful, hence the need for the study to ascertain capacity building needs of farmers in Omuma Local Government Area in snail production for food security in Rivers State. This study will therefore serve as reference material for snail farmers and create awareness to prospective snail farmers. Over 80% of Nigerian populace are poor to whom protein products such as; Meat are a rare luxury.

## Purpose of the Study

The main purpose of the study was to examine the capacity building needs of farmers on snail production for food security in Omuma Local Government Area of Rivers State.

1. Identify the capacity building needs of farmers on planning skills for snail production in Omuma Local Government Area of Rivers State.
2. Identify the capacity building needs of farmers on pen construction for snail production in Omuma Local Government Area of Rivers State.
3. Identify the capacity building needs of farmers on management skills for snail production in Omuma Local Government Area of Rivers State.
4. Identify the capacity building needs of farmers on marketing skills for snail production in Omuma Local Government Area of Rivers State.

## Research Questions

The following research questions guided the study.

1. What are the capacity building needs of farmers on planning skills for snail production in Omuma Local Government Area of Rivers State?
2. What are the capacity building needs of farmers on pen construction for snail production in Omuma Local Government Area of Rivers State?
3. What are the capacity building needs of farmers on management skills for snail production in Omuma Local Government Area of Rivers State?
4. What are the capacity building needs of farmers on marketing skills for snail production in Omuma Local Government Area of Rivers State?

## Methodology

The study adopted a descriptive survey design; the study was carried out in Omuma Local Government Area of Rivers State. Omuma Local Government Area is one of the 23 Local Government Areas of Rivers State, with its headquarter at Ebori-Omuma. The Local Government is divided into ten (10) political wards and its inhabitants are predominantly farmers. The vegetation of Omuma Local Government favours agriculture. The population of the study consisted of 120 male and female snail farmers from the study area. The entire 120 population was used as census sampling technique. To guide the study, four research questions were provided. The list of the participants and house addresses were supplied from the agricultural extension division of the Local Government Area. The instrument for data collection was a researcher designed questionnaire titled: "Capacity Building Needs of Farmers on Snail Production for Food Security Questionnaire (CBNESPFSQ), the response format for the questionnaire was the four point modified Likert Scale Type of Strongly Agree (4) Agree (3) Disagree (2) and Strongly Disagree (1), respectively. The questionnaire before used was validated by two experts in the field of Agricultural Extension, drawn from Faculty of Agriculture, Rivers State University. The questionnaire also passed the test of reliability through test-retest method and its result computed using Pearson's Product Moment Correlation Techniques which yielded a coefficient of 0.82. Data collected were analyzed using mean and standard deviation measures. A criterion mean value of 2.50 and above as benchmark for agreement. 120 copies of the questionnaire were distributed to the respondents, and all were collected within two (2) weeks.

## Results and Discussion:

**Research Question 1:** What are the Capacity building needs of farmers on planning skills for snail production in Omuma Local Government Area of Rivers State.

**Table 1: Respondents Mean Responses on the Capacity Building Needs of Farmers on Planning Skills for Snail Production:**

S/N	Planning Skills	Male farmers (n=65)			Female farmers (n=55)		
		X	SD	REMK	X	SD	REMK
1.	Selection of suitable land is essential	2.73	0.38	Agree	3.03	0.68	Agree

2.	Most of the labour requirement were household	2.98	0.66	Agree	2.73	0.38	Agree
3.	Underground foundation with tick concrete plastering is used	2.82	0.88	Agree	2.74	0.79	Agree
4.	Sourcing of finance is major factor in snail production	2.77	0.71	Agree	3.03	0.48	Agree
5.	Snails feed on varieties of feed	2.70	0.73	Agree	2.82	0.88	Agree
6.	Termite attack is major set-back in snail production	2.55	0.71	Agree	2.73	0.38	Agree
7.	Market is available for snail	2.74	0.22	Agree	2.77	0.71	Agree
8.	Record keeping is essential in snail production	2.34	0.81	Agree	2.33	0.49	Agree
9.	Good foundation stock is key in snail production	3.23	0.67	Agree	3.15	0.43	Agree
10.	Regular skill training is needed	2.21	0.69	Disagree	2.33	0.49	Disagree
	<b>Grand Mean/SD</b>	<b>2.76</b>	<b>0.63</b>	<b>Agree</b>	<b>2.74</b>	<b>0.62</b>	<b>Agreed</b>

#### Researcher Field Work: 2022

Data in table 1 showed the 10 items related to the capacity building needs of farmers on planning skills for snails' production. Items by item analysis indicates that items 8 and 10 have means lower the criterion mean of 2.50, therefore there were rejected. While all the other items have mean above the criterion mean of 2.50. The result showed that with the grand mean of 2.76 and standard deviation of 0.63 for male snail farmers and 2.74 and standard deviation of 0.62 for female farmers, the participants agreed that snail producer's capacity building in planning skills for snail production. These planning skills are in items 1, 2, 3, 4, 5, 6, 7 and 9. The findings of the study are not contrary to the views expressed by some earlier studies, for instance, Chah and Inegbedion (2012) finds that snail producers/farmers should have planning skills if they should do well in the business. According to them, snail producers should have planning skills on selection of suitable table, material for pen construction, make fund available before going into the business and availability of market for the snails.

**Research Question 2:** What are the capacity building needs of farmers on pen construction for snail production in Omuma Local Government Area of Rivers State?

**Table 2: Respondents Mean Responses on the Capacity Building Needs of Farmers on Pen Construction for Snail Production.**

S/N	Pen Construction	Male farmers (n=65)			Female farmers (n=55)		
		X	SD	REMK	X	SD	REMK
1.	Getting good site is very important	3.23	0.41	Agree	3.03	0.68	Agree
2.	For economic purpose extensive system is best	2.98	0.46	Agree	2.73	0.38	Agree
3.	Snail does well in cool environment	2.77	0.71	Agree	2.82	0.88	Agree
4.	Temperature of the site should be between 20 – 35 <sup>o</sup> c	2.52	0.32	Agree	2.56	0.63	Agree
5.	Trees should be planted around the pens	2.74	0.79	Agree	2.82	0.88	Agree
6.	The site should have low wind movement	2.34	0.81	Disagree	2.21	0.69	Disagree
7.	Building snail pen in line with specification	2.78	0.72	Agree	2.80	0.68	Agree
8.	Site for the pen should have fresh air circulation	2.21	0.69	Disagree	2.33	0.49	Disagree
9.	The soil should be free from toxic fertilizers	2.56	0.63	Agree	2.74	0.79	Agree
10.	There should moderate sunlight around the area.	2.73	0.38	Disagree	2.98	0.49	Disagree
11.	Good fencing for security	2.55	0.71	Agree	2.73	0.38	Agreed
12.	Chicken were to cover the surface reforced with mosquito nets.	2.98	0.46	Agree	2.555	0.71	Agreed
13.	Lay sacks on the bottom of the pen to cover the soil and fill with humus soil to a depth of 10 – 15cm.	2.55	0.71	Agreed	2.56	0.63	Agreed
	<b>Grand Mean/SD</b>	<b>2.74</b>	<b>0.63</b>	<b>Agreed</b>	<b>2.71</b>	<b>0.62</b>	<b>Agreed</b>

#### Researcher's Field work: 2022

Data in table 2 showed the 12 items relates to the capacity building needs of snail farmers n pen construction skills for snail product ion. Items by item analysis indicated that items 6 and 7 have mean lower the criterion mean of 2.50. Therefore, these were rejected. While all the other items have mean above the criterion mean of 2.50. The result showed that with the grand mean of 2.74 and standard deviation of 0.63 for male farmers and 2.71 a and standard deviation of 0.64 for female farmers, the participants agreed that the snail producers/farmers need capacity building need in pen construction skills for snail production. These pen construction skills are in items: 1, 2, 3,4,5,8, 9, 10, 11, and 12. The findings are in agreement with the work of Afolab (2013), who stated that in snail pen construction getting or selecting a suitable site is very importance, snails does well in a cool environment, trees should be planted around the pen to reduce the wind movement, and the pen should be fenced toward off intruders.

**Research Question 3:** What are the capacity building needs of farmers in management skills for snail production in Omuma Local Government Area of Rivers State?

**Table 3: Respondents Mean Responses on the Capacity Building Needs of Farmers on Management skills for Snails Production.**

S/N	Management Skills	Male farmers (n=65)			Female farmers (n=55)		
		X	SD	REMK	X	SD	REMK
1.	The purchased foundation stock are received in the pen	3.23	0.41	Agree	3.20	0.44	Agree
2.	The snails are cleaned before stocking	3.03	0.68	Agree	3.10	0.58	Agree
3.	Formulation of specific objective for the enterprise	3.68	0.66	Agree	2.70	0.67	Agree
4.	Identification of equipment needed	2.56	0.70	Agree	2.70	0.80	Agree
5.	Making budget for the purchase of the equipment	2.75	0.64	Agree	2.80	0.76	Agree
6.	Registration of the snail farm	2.66	0.72	Agree	2.54	0.56	Agreed
7.	Coordination of the activities of the workers to achieve unity of purpose	2.86	0.67	Agree	2.80	0.74	Agree
8.	Labelling of the pens according to type of snail and date	2.65	0.67	Agreed	2.80	0.74	Agreed
9.	Identification of hazard in the farm	2.80	0.62	Agree	2.76	0.76	Agree
10.	Cleaning in and around the pens	2.78	0.64	Agreed	2.86	0.72	Agreed
11.	Installation of waste collection and disposal facilities	3.05	0.68	Agree	2.96	0.70	Agreed
12.	Provision of first aid	2.68	0.80	Agree	2.70	0.74	Agreed
	<b>Grand Mean/SD</b>	2.70	0.68	Agreed	2.68	0.67	Agreed

**Researchers Field work: 2022**

Data in table 3 showed that the 12 items related to the capacity building needs of snail farmer on management skills for snail production. Items by item analysis indicated that all the items tested have mean score above the criterion mean of 2.50. The result showed that with the grand mean of 2.70 and standard deviation of 0.68 for male farmers and 2.68 mean and standard deviation of 0.69 for female farmers. The participants agreed that the snail farmers need capacity building need in management skills for snail production. These management skills are in items 1,2,3, 4,5,6,7,8,9,10,11 and 12. The findings are in consonant with the findings of Adeyeye (2006) in his work titled: "Technology of Snail Farming. He highlighted the following as major management procedures such as purchasing of foundation stock, cleaning the purchased snails, before stocking, registration of the snail farming business, labelling the pens according to snail breeds among others.

**Research Question 4:** What are the capacity building needs of farmers on marketing skills for snail production in Omuma Local Government Area of Rivers State?

**Table 4: Respondents Mean Responses on the Capacity Building Needs of Farmers on Marketing Skills for Snail Production.**

S/N	Marketing Skills	Male farmers (n=65)			Female farmers (n=55)		
		X	SD	REMK	X	SD	REMK
1.	Carrying out market survey for the sales of snail	2.56	0.63	Agree	2.77	0.71	Agree
2.	Fixing of prices on the snails according to size	2.98	0.72	Agree	2.73	0.58	Agree
3.	Advertisement of sale to different buyers and supplying of snail to different buyers.	2.77	0.71	Agree	2.98	0.70	Agree
4.	Recording all sales/financial transactions in their appropriate column	2.48	0.91	Disagreed	2.30	0.94	Disagreed
5.	Filling bank tellers, receipts and other evidence of payment for account reconciliation.	2.30	0.94	Disagree	2.36	0.92	Disagree
6.	Reconciling sales and expenditure to determine profit or loss of the enterprise	2.87	0.42	Agree	2.80	0.43	Agreed
7.	Weighing snails to determine maturity and price	3.03	0.68	Agree	3.20	0.67	Agree
8.	Harvesting snails for sale with hand-gloves	2.68	0.60	Agreed	2.70	0.70	Agreed
9.	Treading adult snails with ropes for retail sale	2.91	0.70	Agree	2.88	0.54	Agree
10.	Storing live snails in perforated containers for sale	2.86	0.74	Agreed	2.068	0.68	Agreed
	<b>Grand Mean/SD</b>	2.72	0.70	Agreed	2.70	0.68	Agreed

**Researcher's Field work: 2022**

Data in table 4 showed the 10 items related to the capacity building needs of snail producers/farmers on marketing skills for snail production items and item analysis indicated that items 4 and 5 have mean lower than criterion mean of 2.50 therefore were rejected. While all the other items have means

above the criterion mean of 2.50. The result showed that with the grand mean of 2.72 and standard deviation of 0.70 for male farmers and 2.70 mean and standard deviation of 0.68 for female farmers. The participants agreed that snail farmers need capacity building need on marketing skills for snail production. These marketing skills are in items 1,2,3,6,7,8,9 and 10 respectively. The findings is in agreement with the works of Wosu (2013) in his work titled: Commercial Snail Farming in West Africa, he highlighted some of the marketing skills needed in snail production such as carrying out marketing survey for the sales of snails, fixing prices on the snails according to size and quality, advertising the sale to different buyers and supplying the snails to different buyers among other skills.

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### **Conclusion:**

In conclusion, the study examined the capacity building need of farmers on snail production for food security in Omuma Local Government Area of Rivers State, Nigeria. The findings indicated that respondents identified that snail producers/farmers needs skills in planning, pen construction, management and marketing in order to do well in commercial snail production.

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### **Recommendations**

Based on the findings of the study, the following recommendations were made:

1. Snail farmers/producers should be trained on planning skills needed for snail production such as the skills in record keeping and management of labour.
2. The snail farmers should be encouraged to construct their pens according to recommended specification.
3. Snail farmers should adapt to good management procedure such as registration of the snail farm, formulation of specific objective for the enterprise and making budget for the purchase of equipment among others.
4. Before going into production, the snail farmers should first source for market.

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