



Technical and Developmental Strategies for Effective Production of African Giant Land Snails *Archachтина marginata* in Ika North-East and Ika South-East Local Government Areas of Delta State

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ABSTRACT

The study evaluated technical and developmental strategies for effective production of African giant land snails (*Archachтина marginata*) in Ika North-East and Ika South-East Local Government Areas of Delta State. One hundred and eighty (180) farmers spread across twenty (20) communities in the two local government areas were used for this study. It was gathered that the majority of the snail farmers were women between 36 – 50 years of age. Structured questionnaires of 38 items and an oral interview were used to collect pieces of information from the farmers. Data collected was analyzed using simple percentage, simple statistical mean with standard deviation. A decision rule was established where any item with a mean above 2.50 was accepted and items with a mean below 2.5 were rejected. The farmers stated that they are faced with some challenges such as financial constraints, they experience snail theft and the slow growth rate of snails discourages farmers from snail farming. Government at all levels and even Non-governmental organizations should support snail farming by organizing seminars, giving snail farmers soft loans, and improving extension services which will go a long way in improving and promoting snail farming.

Keywords: *Archachтина marginata*, growth, snail farming, technological measures

INTRODUCTION

It is an acknowledged fact that our country Nigeria is faced with a serious scarcity of animal protein for feeding its increasing population, the altitudinous rate of Nigeria's population increases with the rising standard of living which has a great effect on food production. Poultry, pigs, sheep, goat, and cattle occupy a unique position with regards to their supply of animal – protein, but their supply is insufficient to meet the livestock sector demand of the ever-increasing Nigeria population (Madubuike 2004). The meat obtained from these animals chicken, cattle, goat, etc are also expensive which could be due to a low level of technological efficiency, poor management, pest infestation, high cost of inputs, etc. Adegbola (1997) reported that Nigerians consume less than one-quarter (1/4) of the animal protein required for the metabolic body process. Ebenebe and Okpoko (2015) cited Food and Agriculture (FAO) (1991) which recommended consumption of 34g of animal protein per person for normal growth and development but in Nigeria, animal protein consumption level is at 7-10g/ person/day while her counterparts like Somalia and Mauretania were getting 32- 34 g respectively. Okoro (2000) indicated that to bridge the gap between animal protein deficit and human population growth, many alternative protein sources especially micro livestock has been integrated into the traditional farming system in compliance with FAO (1993)

recommendation, yet animal protein deficit in the country is still unresolved. This is as a result of human population growth at the rate of 3% per annum while animal production grows at the rate of 2% per annum (FAO 2013). Adebola (1997) also saw the need to exploit other fast-growing livestock species like a snail in Nigeria. Ebenebe (2000) also advocated the integration into our farming system such as non-conventional meat sources such as snails species which Nigeria is richly endowed with. Snail meat is highly nutritious and contains about 19.53g of protein /100g of fresh meat, it has a low-fat content of 2.44% and is rich in calcium 126.4mg/100g and iron 2.29mg / 100g (Babalola and Akinsoyinu 2009). Snails have many curative properties, an active ingredient referred to as thiocalcium phosphate is extracted from snails that are known to cure diseases like kidney diseases, tuberculosis, anemia, prevent influenza, restore fertility and perpetuate beauty by cleaning the skin (Akpa 2015). Okafor (2009) observed that snail farmers have systematically applied several techniques, methods, systems, and operations to combine the varied level of inputs and transform such input into the desired level of output. These inputs and different techniques, methods systems are applied by farmers in the snail production process which are referred to as technology. Chinwe (2000) sees technology as a systematic application of scientific knowledge, skill, devices, tools, and implements in the process of production of materials needed by society. Technology is also known to be scientific knowledge used in practical ways e.g. in farming, here in this context, technology is the systemic application of helixculture management practices and procedures in snail farming, as we know snail production requires the transformation of inputs into output. Production on a separate note involves the transformation of resources (input) into other goods and services called output (Alu and Osinem 2006). It is important to note that the price of animal protein has soared beyond the reach of low-income earners and there is a decline in the production of snails in Delta state which seems mainly because of the poor application of snail farming technology, and so there is a need to critically examine and improve the different strategies/technologies applied in snail rearing hence the call for this study.

Objectives of the study

1. To ascertain the level of technical strategies applied by the farmers in snail farming.
2. To ascertain the constraints encountered by the snail farmers.
3. To ascertain the technological measures for enhancing snail farmers production

METHODOLOGY

Ika Northeast and Ika Southeast fall within the rain forest vegetative belt of Delta north senatorial zone. The occupation of the inhabitants is mainly farming and it has been discovered that snail meat is a delicacy in this part of Delta state. The population of the study comprises of one hundred and eighty (180) snail farmers spread across twenty (20) communities in the two local government areas, which includes Abavo, Agbor obi, Agbor nta, Aliagwa, Alisimie, Orogodo, Ewuru. Oki, Alisor, Alihame, Aliokpu, Igbodo, Umunede, Mbiri, Ekwuoma, Otolopko Owa-oyibu, Owa- nta, Owa- alero, Owa- ofie. Nine (9) farmers each were selected randomly from each community.

Research Instrument

A well-structured questionnaire was designed and used for the study. The questionnaire consists of two sections, section A dealt with the socio-economic characteristics of the snail farmers (Table 1) while section B addresses the objectives of the study. The data collected were analyzed using simple percentage and statistical mean obtained from a four-point Likert consisting of Strongly agreed (SA), Agree (A), Disagreed (D), Strongly disagreed (SD), a numerical weight score of 4,3,2 and 1 respectively was used to collect information from the farmers.

Method of Data Analysis

Data collected were analyzed using simple percentages, a simple statistical mean, and standard deviation obtained from a 4point scale rating. A decision rule was established where any item with a mean above 2.50 was accepted and items with a mean below 2.50 were rejected.

RESULT AND DISCUSSION

Table 1: Demographic information of the respondents

S/N	ITEM	VARIABLE	NO. OF RESPONDENT	PERCENTAGE %
1.	Sex	Male	11	6.11
		Female	169	93.89
		Total	180	100
2.	Age (year)	20-35	48	26.67
		36-50	75	41.67
		51-65	45	25.00
		66-75	12	6.66
		Total	180	100
3.	Educational of level farmer	Primary	46	25.56
		SSCE	125	69.44
		1 st Degree	05	02.78
		2 nd Degree (Master)	02	1.11
		PhD	02	1.11
		Total	180	100
4.	How long have been into snail farming (year)	2-5	125	69.44
		6-20	35	19.44
		21-35	10	5.56
		36-50	10	5.56
		Total	180	100

The result in Table 1 shows the demographic information of snail farmers in the study area. The majority of the farmers were women which represents 93.89% of the population while 6.11% of farmers are males. This is in line with the studies of Adedayo (2018) that women are mainly engaged in snail farming than males. This shows that women are more interested in snail farming. The result indicates that the majority of snail farmers are within the active age of 36-50 years of age which represent 41.67% of the farmers and most of the snail farmers have senior secondary school certificate while very few of the farmers have a first degree, second degree and Ph.D. with 2.78%, 1.11% & 1.11% respectively. The result also revealed that 69.44% of the farmers have been into snail farming for 2-5 years while 5.56% each have 21-35 years and 36-50 years of experience respectively in snail farming.

Table 2 Farmers level of snail farming

S/N	ITEMS	VARIABLES	NO OF RESPONDENTS	PERCENTAGES %
5.	Are you into full time or part-time snail farming	Part- time	155	86.11
		Full- time	25	13.89
		Total	180	100
6.	Are you into small scale or large scale snail farming	Small scale	155	86.11
		Large scale	25	13.89
		Total	180	100
7.	Do you rear other livestock apart from snails?	Yes	165	91.67
		No	15	8.33
		Total	180	100
8.	If yes, what type of other livestock do you rear?	Poultry	34	20.60
		Fish	55	33.33
		Goat	36	21.82
		Cattle	01	0.61
		grasscutter	04	2.42
		Poultry & fish	35	21.82
		Total	180	100
		Total	180	100
9.	Do you also have a crop farm?	Yes	175	97.22
		No	05	02.78
		Total	180	100
10.	Type of sponsorship	Personal	147	81.67
		government	33	18.33
		Total	180	100
11	Have you ever gone to a seminar on snail farming?	Yes	128	71.11
		No	52	28.89
		Total	180	100
12	If not, where did you get your snail experience?	On Radio	08	15.38
		Co- farmer	32	61.54
		Internet	08	15.38
		Books	04	07.69
		Total	52	100
13	Are you farming for sales or consumption?	Consumption	12	6.67
		Sales	168	93.33
		Total	180	100
14	Are you into snail breeding or fattening for consumption?	Snail breeding	—	—
		Fattening for consumption	—	—
		Both	180	100
		Total	180	100
		Total	180	100

15	What types of feed do you give to the snails?	Vegetables alone	28	15.56
		Vegetables and kitchen waste	74	41.11
		Vegetable formulated feed & kitchen waste	45	25.00
		Formulated feed alone	33	18.33
		Total	180	100
16	How often do you feed your snails ?	Once/ day	102	56.67
		Twice/day	74	2.22
		Thrice/day	04	41.11
		Total	180	100

Data in Table 2 revealed that the majority of the respondents (86.11%) took snail farming as a part-time occupation and also it is done on a small-scale basis which could be as a result of lack of finance or lack of technical knowledge in the rearing of the snail. 91.67% of the population are involved in rearing other livestock species such as fish, goats, sheep, pigs, etc apart from snails, while 8.33% rear only snails. The respondents also engage in crop production which could be a way of broadening their sources of income as only one source of income is no longer enough in Nigeria. The farmers made me understand that majority of their activities are self-sponsored which could result in small-scale farming. 71.11% of the farmers have gone through snail farming seminars while 28.89% have not. Most of the farmers who have not gone to any snail farming program explained that the knowledge they have in snail farming was gotten from co-farmers, on the radio, the internet, and books. Adebayo (2018) agreed that one of the strategies to improve snail farming is to attend seminars/workshops and training. Most of the respondents are farming for commercial purposes and they are also into snail breeding and fattening for consumption. 41.11 of the respondents declared that they use vegetables and kitchen waste for feeding their snails and only feed them once a day at sunset because they are active at night. This is in line with the studies of Eze et al (2010) that snails have an irregular pattern of feeding and feeding mainly at night.

Table 3 Developmental strategies applied by the farmers in snail farming

S/N	ITEMS	VARIABLES	NO OF RESPONDENTS	PERCENTAGES %
17	What type of snail housing do you use?	-Concrete cage	16	8.89
		--wooden boxes	65	36.11
		--cages/hutches	73	40.11
		--drums	10	5.55
		-Rubber tires	16	8.89
		Total	180	100
18	Where do you get your foundation stock from?	Pick from the bush	127	70.56
		Buy from the market	41	22.78
		Purchase from reputable farmers	12	6.66
		Total	180	100
19	Which type of snail species do you rear?	<i>Archachatina marginata (AM)</i>	142	78.89
		<i>Achatina achatina (AA)</i>	20	11.11
		<i>Achatina fulica (AF)</i>	18	10.00
		Total	180	100
20	Do you carry out fertility tests for snail eggs?	Yes	25	13.89
		No	155	86.11
		Total	180	100
21	Do you incubate the fertile eggs in the incubator or are left with breeder snails until they are hatched?	Yes	42	23.33
		No	138	76.67
		Total	180	100
22	Do you have a special feed for the hatched snails (juvenile)?	Yes	165	91.67
		No	15	8.33
		Total	180	100
23	If yes what kind of feed do give the	--Tender leaves	113	68.48
		--formulated feed	15	9.00
		-- Tender leaves/ formulated feed	37	22.42
		Total	165	100
24	Do you rear the young snails (juvenile) alongside breeder snails or are they reared separately?	-reared separately	154	85.56
		-reared together with breeder snail	26	14.44
		Total	180	100
25	Do extension agents visit your farms?	Yes	164	91.11
		No	16	8.89
		Total	180	100
26	If yes, how often do they visit your farm?	-once in a month	21	11.67
		- once in three months	58	32.22
		-once in six months		
		-once in a year	85	47.22
		- once in a while	08	04.44
		Total	08	04.44
27	Do you do temperature or humidity checks of the soil on which the snail is reared?	Yes	159	88.33
		No	21	11.67
		Total	180	100

The result in Table 3 shows that many of the snail farmers use wooden boxes, cages, and hutches with 36.11% and 40.56% respectively in housing their snails. It was also gathered that the majority of the

farmers pick their foundation stock from the bush (70.56%) and the species they prefer rearing is *Archachatina marginata* (AM) which is the giant African land snail (GALS). This is the preferred spice in Nigeria because of the large size at maturity; 76.62% of the farmer also revealed that they do not use incubators for hatching the eggs, the eggs hatch on their own. All the farmers rear the juvenile separately when hatched and are fed with succulent vegetable leaves. Data collected also showed that extension agents visit the snail farmers but 32.22% and 47.22% of the farmers respectively agreed that they visit them once in three months and once in six months while only very few of the farmers indicated that they are visited once in a year and once in a long while with 4.44% each respectively. This is in line with Adesiji et al 2019 that extension agents are grossly inadequate to deliver services to the farmers. 88.33% of the snail farmers agreed that they do temperature and humidity checks on the soil in which the snail is reared.

Table 4 Constraints encountered by snail farmers

S/N	VARIABLES	MEAN	SD	DECISION
28.	Snail farmers encounter financial constraints in snail farming	3.72	0.29	Accepted
29.	Government at all levels supports farmers financially	1.43	0.56	Rejected
30.	Snail farmers experience theft in their farms	3.30	0.92	Accepted
31.	Pest, predators, and diseases reduce snail yield	3.96	1.25	Accepted
32.	Slow growth rate/long maturity period discourages farmers in snail farming	3.97	0.16	Accepted

The result in Table 4 reveals that snail farmers encounter some problems, items numbers 28, 30, 31 and 32 rated above 2.50 of the acceptable mean value. It is quite clear that snail farmers encounter financial constraints and they do not get financial support from the government, they experience snail theft in their farms; they also agreed that pests, predators, and diseases reduce snail yield while slow growth rate/ long maturity period discourages farmers from snail farming. This is in agreement with the studies of Eze et al (2013) and Erubetina (2012) that slow growth rate is one of the challenges in snail farming that it takes between 18-24 months for snails to get to maturity.

Table 5 Technical measures for enhancing snail farming

S/N	VARIABLES	MEAN	SD	DECISION
33	The use of formulated diet will improve the growth of Snails	3.80	0.50	Accepted
34	Proper fencing will reduce snail theft and community vigilante will also help to secure snail farms.	3.90	0.36	Accepted
35	Empowering snail farmers with new technologies/innovations and ideas will enhance snail production/performance	3.94	0.39	Accepted
36	The use of an incubator will increase snail eggs hatchability	3.72	0.41	Accepted
37	The use of an improved/formulated diet will improve the fertility of snail eggs.	3.82	0.51	Accepted
38	The use of improved technological measures will control pest and diseases infestation in snail production.	3.80	0.51	Accepted

Data in Table 5 showed that the farmers believed that a lot of technological measures will improve snail production, such as the use of formulated diets, the use of incubators will increase snail eggs' hatchability. They also agreed that technological measures will go a long way in controlling pest and diseases infestation on the farm. This aligns with the works of Pitkin et al (1996) in Organisation for Economic Co-operation and Development (OECD 1997) that technological innovations have a potential role to play in improving the sustainability of these farming systems through a range of innovations in engineering, information technology, pesticides, and biotechnology, reducing the load of known toxins, substituting

safer alternatives, protecting ground or surface water, protecting natural habitats, reducing nutrient loads in soils, reducing gaseous nitrogen loss.

CONCLUSION

The findings in this study revealed that the snail farmers in Ika North-East and Ika south are mostly into small-scale farming and that they farm for sales but they are faced with financial problems, snail theft, and the slow growth rate of snails is not left out. They strongly believed that improved technological measures will enhance snail production.

RECOMMENDATION

Based on the findings of this study, it is recommended that

1. Snail farmers should be given soft loans to assist them to boost their productions.
2. Local, State, and Federal governments, and even Non-governmental organizations should organize seminars to educate farmers on management techniques used in snail farming.
3. There should be improved extension services that will help the farmers to improve and promote snail farming
4. It is also necessary to encourage more research in snail biology to improve snail growth.
5. Snail farmers should form cooperative societies to enhance production.
6. Modern technologies in snail farming will technically and economically improve snail production enterprise.
7. Schools, Colleges, and other institutions of higher learning should be encouraged to establish snaileries as school demonstration farms.

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