Analysis of Consumers' Preference for Snails to other Meats in Kabba/Bunu Local Government Area of Kogi State, Nigeria

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Abstract

Driven by increasing consumer demand for nutritious, healthier, safer, and more environmentally friendly food products, the consumption of snails has increasingly assumed significant position in recent years in Nigeria. It is against this backdrop that this study examined consumers' preference for snail consumption in Kogi State Nigeria. The specific objectives were to examine the socio-economic characteristics of snail consumers, analyze the level of preference for snail meat to meats from other animal origin; find out the dietary forms of snail meat preferred by consumers; and determine the effects of socio-economic characteristics on consumers' preference for snails. A total of 128 respondents were selected and administered questionnaire using a combination of both purposive and random sampling techniques. Data collected were subjected to descriptive statistics and binary Logit regression. Result shows that most (70.2%) of the respondents were in their youthful ages, majority (70.30%) were male who have attained one form of formal education or the other. It was indicated that majority (ξ=2.3) highly preferred to consume snails and bush meat in their parboiled forms (38.3%). Results of the binary Logit regression shows that age and household size had negative effects, while marital status, sex, and income of the respondents had positive effects on preference for the consumption of snails to other animals. It is recommended that both public and private extension should create awareness and encourage domestication of snails by training farmers on how to rear snailsas low cost of snail meat and its high protein contents are of great dietetic/nutritional values to the people.

1. Introduction

Over the past decades, Food and Agriculture Organization (FAO) has reported that the average animal protein intake in Nigeria is low, "calling for concerted efforts towards alleviating this crisis of protein shortage" [19, 6, 4]. Also, [33] reported that "the consumption of animal protein in Nigeria is 5.5kg per head per day" which is absolutely below the Food and Agriculture Organization recommendation of 35kg per head per day. Unfortunately, the conventional and regular sources of animal protein in the country like beef, pork, goat meat, fish, poultry etc. are getting out of the reach of the common populace due to their high price as a result of the economic down-turn in recent years [7]. Emphasis thus falls on the micro-livestock in which Nigeria is richly endowed with to complement the conventional sources of animal protein supply and as a major alternative which comes handy. There is therefore the need to look inward and integrate into our farming system some non-conventional animal protein sources [18].

In the light of the above, successive government in

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Nigeriahad embarked on policies and programmes aimed at boosting sustainable macro and micro livestock production in Nigeria. Micro livestock production refers to species of animals that are associated with small body size, moderate nutrition and management [5]. Snail is one of such micro livestock that has recently attracted attention among farmers in Nigeria as an aftermath of the alarm raised by Food and Agriculture Organization [33].

Snails are bilaterally symmetrical invertebrates with soft-segmented exoskeleton in the form of calcareous shells. They belong to the *phylum Mollusca* and*class gastropoda* that have coiled shells in the adult stage, and when the word snail is used in a general sense, it includes; sea snail, land snail and fresh water snail which belong to the group of invertebrates. Snail is one of the earliest known types of animals in the world. There is evidence that snail evolved more than 600 million years ago [10]. Snail is a small soft creature with a hard shell on its back that moves very slowly and often eats garden plants. Snails are the largest groups of mollusks constituting the largest animal groups after arthropods [15]. Snail is the second largest animal kingdom comprising about one hundred thousand living species. The genera *Archachatinaachatina* and *Archachatinamarginata* are the edible land snails which can grow to be 15 inches (38cm) from snout to tail, and weigh 1 kilogram. The largest living species of sea snail is *Syrinx aruanus* which has a shell that can measure up to 35 inches (90cm) in length, and the whole animal with the shells can weigh up to 18 kilogram [13].

Land snails habitat ranges from the dense tropical high forest in southern Nigeria to the fringing riparian forests of the derived guinea savanna, [28, 4]. In West Africa, snails dwell mostly in humid forest areas from where there are gathered by villagers for consumption and other uses [3]. It is a popular meat of many Nigerian in the rural areas, in the rainforest belt where it is collected from the wild. The potential for it domestication and commercialization in the country has not been fully exploited, although many studies have shown that snail farming could highly be profitable and productive business [9]. The availability of some edible types of snail in Nigeria, their population and acceptability nationwide, consumer preference for snails over meat from other animal sources, the potential for export, including the emerging technology for their production have largely contributed towards the present renewed interest in snail farming [7].

[25] and [22] reported that, snail meat is high in protein (12-16%) and contains almost all the amino acid needed by man also rich in vitamins. In addition to the nutritional value, snail is known to have medicinal properties and usage. Eating of snail meat has a medicinal value in treating some diseases such as whooping cough, ulcer, asthma, hypertension, kidney related diseases and also used as suppressant in stroke treatment [23].

[28] and [23] further reported that snails meat are also used in traditional medicine in the preparation of concoctions for various cases like reduction of pains and blood loss in pregnant women during delivery in Nigeria. Snails have become an important source of income to some farmers who dwell in the forest areas; they collect the snails in the wild and selling them at premium prices along the road side and at some rural and urban markets. Snails are also important in many food chains and they are freely used by fish and wildlife as food. The importance of thin-shelled snails in animal diets is often underestimated. Snails serve as pollution and acid rain indicator [10]. [10] also reported that, the shell and offal of snails have also gained considerable recognition as a valued resource in the manufacture of food for animals of different types.

It is a known fact that human wants are unlimited but the resources to satisfy them are limited in supply, hence, choice must be made among competing alternatives, but it is inevitable to make choice without preference. In spite of the importance of meat as a source of protein, its palatability and edibility with high biological social and economic values, preferential consumption also exists. Earlier reports [12] classified factors that affect the consumption of meat as economic, social and cultural. [33] specifically highlighted religion, age, sex, socio-economic factors, individual variation and income as major factors in Nigeria. For instance, pork is unpopular in the Muslim dominated Northern part of the country [30]. Chevon is popular among the Igbos in the South-East [27], while beef and chicken appear to predominate all over Nigeria. Studies on consumers' preference are better appreciated by the food industry since they can explain consumers' decisions [36], and should be considered when commercial policies are designed [17]. Studies carried out in Czech Republic indicated that chicken and pork were the most consumed [17]. [35] reported that chicken, beef and chevon were the most preferred livestock meat in Ethiopia; studies on the consumers' perception and preference for the different types of meat in Nigeria have not been adequately documented. [31] earlier reported that broiler meats was most preferred among chicken meats by employees of University of Ibadan, Ibadan while [8] indicated that beef was the most preferred meat in Ogbomoso, Nigeria [31].

While most empirical studies on snails had concentrated on its production and farming, for example, [23], [30], [34], [26], and others concentrated on proximate and mineral analysis. [2] and some others dwell on consumption generally. [4] as well as a few others who worked on preference for snail consumption dwell largely on African

community living outside Africa. For example, 30 worked on Consumers'Preferences for Snail Meat in the African Community of Pittsburgh, Pennsylvania, Tennessee, USA. In respect of the above, we could confidently say that empirical studies on consumers' preference for snail consumption, has remain scanty and largely boycotted Nigeria in general and Kogi State in particular. It is against this backdrop of consumer preference which without choice making among competing alternatives remain voided and the problem of numerous human want amidst scarce resources will persists and in the light of bridging the literature lacuna and the significance of snail consumption to human existence and wellbeing that this study examined consumers' preference for snail consumption in Kogi state with particular attention to:

i. describe the socio-economic characteristics of snail consumers in the area;

ii. analyze the level of preference for snail meat to meats of other animal origin;

iii. find out the dietetic forms of snail meat preferred by consumers; and

iv. determine the effects of socio-economic characteristics on consumers' preference for snails.

2. Methodology

This study was carried out in Kabba/Bunu Local Government Area of KogiState, Nigeria. Kabba/Bunu Local Government Areawas created in 1991 and is located in the western senatorial district of Kogi state with its headquarters at Kabba. With 14 wards, the local government has common boundry with Ijumu, Lokoja, Adavi, Okehi and Mopa/Amuro local government areas. Kabba/Bunu has land mass of 2,748km^2 and the population of 145,446 (National Population Commission, 2006). It is located within latitudes 8°7'N and 8.117°N and longitude 6°9'E and 6.150°E. The area has a tropical savannah climate with distinct wet and dry seasons, the rainy season ranges between April to October with optimum around August and September. This Area has a mean annual rainfall of 120-140mm and a mean annual temperature that varies between 27°C and 37°C. The relative humidity is similarly variable with average of between 70-80% in July/August. The soil is predominantly sandy loamy that is very rich in organic matter. The major crops grown in this area includes Maize, Yam, Cassava, Cashew, Mango and the major livestock reared are Cattle, Swine, Poultry, Sheep and Goat, while snail farming is largely a recent development. The people of this area are involved in economic activities like trading and food processing. Small-scale industries such as Garri processing, cloth weaving and soap making are on the increase in the area.

The population for this study comprised of all snail consumers in Kabba/Bunu Local Government Area of Kogi state, Nigeria. Both purposive and random sampling techniques were adopted for this study. Three villages each were selected from Kabba and Bunu districts. Kakun, Gbeleko, and Out were purposively selected from Kabba, while, Oke-bukun, Odo-Ape and Oke-Offin werepurposively selected fromBunu, this is because ofthe concentration of snail consumers in these areas. Twenty-two snail consumer respondents were randomly selected from each of these villages, constituting a total of one hundred and thirty two (132) respondents with the aid of a well-structured questionnaire supported withpersonalinterview and observations.

Data collected for the study were analyzed using descriptive statistics and binarylogit regression analysis. Binary logit model was used to capture the probability of an individual respondent consuming snails = 1 or 0 otherwise. Implicitly, the model is:

$$I_i = \ln\frac{P}{1-P} = b_\circ + \sum_{j=1}^{n} bj\chi_i$$

The relative effect of each explanatory variable (Xji) on the probability of being a snail consumer or not is measured by differentiating with respect to Xji. Using the Quotient rule,

$$\frac{dPi}{dX_i} = [\frac{\varrho I_i}{_+\varrho I_i}] [\frac{I_i}{Xji}]$$

Explicitly, the model is stated as:

$$L_i = Ln\ (Pl_i - P) = \beta_0 + \beta_1 Age + \beta_2 Sex + \beta_3 Mts + \beta_4 Edu + \beta_5 Hss + \beta_5 Occ + \beta_6 Ainc + \beta_7 Rel + \mu$$

Where;

Li is the probability that an individual respondents consumes snail = 1 and 0 otherwise.

Age=Age was measured in years

Sex=sex as (male 1 or female 0)

Mts= marital status (married=1, otherwise=0)

Edu= educational level (years)

Hss= household size (number of persons)

Occ=Occupation (farming=1, otherwise=0)

Ainc=Annual income (in naira)

Rel=Religion (Christianity, 1 0 otherwise)

μ=Error term

3. Results and Discussion

Results in Table 1 shows that majority (28.1%) of the respondents were within the age of 16-25years, while a few 7.0% were in the age range of 46-55years. The average age of snail consumers in the area was 20years. This implies that younger people consumes snails more than their elderly counterpart. This could be due to the fact that snail can be scout and freely picked from the forest without spending a dime. Age is one of the important factors which can positively or negatively affect the acceptability and consumption of snails. This affirms the findings of [13] and [35] that the younger ones are more willing to accept and consume snails compared to their elderly folks.

Table 1. Distribution of respondents based on their socio-economic characteristics.

Variable	Frequency	Percentage (%)
Age		
16-25	36	28.1
26-35	35	27.3
36-45	19	14.8
46-55	9	7
56 and above	29	22.6
Total	128	100
Marital status		
Single	51	39.7
Married	61	48.4
Widowed	10	7.9
Divorced	6	4.6
Total	128	100
Educational level		
No formal education	32	25.4
Primary education	45	35.7
Secondary education	21	15.9
Tertiary education	30	23.0
Total	128	100
Occupation		
Trading	47	36.5
Farming	81	63.5
Total	128	100
Sex		
Male	90	70.3
Female	38	29.7
Total	128	100
Annual income		
30,000-70,000	40	31.2
80,000-110,000	40	31.2
120,000-150,000	30	23.4
160,000 and above	18	14.1
Total	128	100
Household size		
1-4	50	39.1
5-8	51	39.8
9-12	9	7
13 and above	18	14
Total	128	100

Source: Field survey, 2015

Also in table 1, majority of the respondents were male representing 70%, while 3.02% were females. This is in line with the words of [10] that men consume snails than the women folk. Because in some areas snail meat is forbidden for pregnant women and Kabba/Bunu local government area is not an exception. While, majority 48.4% of the respondents were married, 39.7% were single, a few 7.9% and 4.6% were widow and divorcees, respectively.

In terms of education, most of the respondents had one form of education or the other. 25.4% had no formal education while 35.7% had primary education, 15.9% had secondary education and 23% had tertiary education. Education plays a greater role in every facets of life including consumer preference as it helps the consumer to know the nutritional and health implication of what they eat. [7] believes that illiteracy and lack of information on, nutritional composition and health benefits could make acceptability and consumption of snails relatively difficult.

Result also shows that 39.7% of the respondents had the household size of between 5-8persons,those with household size were in the range of 1-4 accounted for 26.2%, those that falls within the range of 9-12 accounted for 25.4% and those that fell within the range of 13 and above accounted for 8.70%. This agrees with the findings of [10] that the size of households plays a vital role in snailsconsumption.

It was reflected that 63.5% of the respondents were farmers, while 36.5% were traders this means that majority of the respondents were farmers. Occupation plays a major role in consumer preference; farmers could be disposed to scouting and picking snails from the forest in their day to day farming activities. On the other hand, traders could also consume snail significantly as it can be bought by the road side handy at cheaper rates.

The results also shows that 31.7% of the respondents earns ₦30,000-70,000, while19.8%earns ₦80,000-110,000, 15.9% earns ₦120,000-150,000 and 32.4% earns ₦160,000 or above, annually. Consumers' disposable income is one of the major factors affecting his preference,the higher the consumer's income the greater his preference for good X or good Y, *ceteris paribus*.

Table 2. Level of Preference of Snails Compared to Meat from Other Animal Sources.

Meat type	Low	Medium	High	Sum of attitude	Mean
Chicken	35(27.3)	45(35.2)	48(38.0)	269	2.1
Goat	41(32.0)	60(47.0)	27(21.1)	283	2.2
Mutton	28(29,0)	45(35.2)	45(28.1)	273	2.1
Duck	62(48.4)	30(23.4)	36(28.1)	230	1.8
Turkey	65(51)	15(12.0)	48(38.0)	239	1.9
Bush meat	28(29).0	40(31.3)	60(47.0)	288	2.3
Pork meat	21(16.4)	77(60.2)	30(23.4)	265	2.1
Beef	12(9.4.0)	80(63.0)	36(28.1)	280	2.2
Snails	35(27.3)	20(16.0)	73(57.0)	294	2.3
Rabbit	28(29.0)	55(43.0)	45(35.2)	273	2.1

Source: Field surveys, 2015. Figures in parenthesis are percentages

Results in Table 2 shows thatrespondents in the area mostly preferred snails and bush meat (ξ = 2.3), followed by goat meat and beef (ξ=2.2), others preferred chicken, mutton, pork and rabbit (ξ=2.1), while a few others preferred Turkey and Duck (ξ=1.9 and 1.8 respectively). The implication of this result is that since rural people are poor with low income, they tend to prefer snails and bush meat which be easily gotten through scouting and hunting.

Table 3. Distribution of Respondents Based on dietetic forms of Snails Preferred.

Dietary forms	Frequency	Percentage (%)
Roasted	27	21.1
Dried	20	16.4
Fried	31	24.2
Parboiled	49	38.3
Total	128	100

Source: Field Survey, 2015

Table 3 shows that majority (38.3%) of the respondents prefer to consume snail meat in the parboiled form, while 21.1% preferred the roasted, 16.4% preferred it in the dried form and 24.2% preferred to consume snail meat in the fried form. The major reason for preference in this context is in respect of the ease of preparation. People preferred the parboiled form more because it involves less processing compared to others even though, the fried form is very palatable, it takes longer time in processing, and the dried form requires longer time for processing than the roasted ones.

Table 4. Logit Regression Estimates on the Effects of Socio-economic Characteristics on Preferencefor Snail Meat.

Variables	B	S.E	Ward	Sig
AGE	-0.008	0.012	0.379	0.538
MRT	0.45	0.251	0.032	0.858
HSS	-0.39	0.251	0.579	0.447
SEX	0.033	0.378	0.008	0.930
INC	0.002	0.003	0.325	0.568
Constant	0.656	0.356	0.356	0.551

Chi-square statistics =1.395, P< 0.925, Nagel Kerke R square =0.15

Results in Table 4 show that age has a negative effect on the preference of snail's meat to other animals which implies that as people get older the probability of consuming snail decreases. This is in line with the words of [13] that the younger ones are more willing to consume snails than their older counterparts. Marital status has a positive effect on the preference of snails' meat to other animals; this means that married people are likely to consume snails than the single and divorced folks. Household size has a negative effect, which means that an increase in the house hold size of the respondents reduces the likelihood of preference for snail meat to other animals. This is in accordance with the words of [13] who postulated that the level and size of house hold determines the consumption level of snails.

Results indicated that annual income has a positive effect, which means that increase in the annual income of the respondents increases the probability of the respondents to prefer snails' meat to other animals. Chi-square statistics was not statistically significant implying that the socio-economic characteristics of snail consumers haveno signifycantrelationships with consumers' the preference for snails consumption as against other animals. Nagerkerke R square =0.15, this means that only 15.0% of the variables accounted for the variation in the regression model for snail consumption. This implies that there are some other factors which affect the preference for snail consumption that were not captured in the regression model.

4. Conclusion and Recommendations

The low animal intake in Nigeria has remained a major nutritional problem especially for the low income and non-wage earners. The outcome of the research shows that this problem can only be properly addressed by value re-orientation for acceptance and consumption of Snail meat by the Nigeria populace. This is because snail meat is a cheap source of animal protein supply for consumption. Taking into cognizance the relative advantage of snail meat over other animals,there is need for effective extension educationto bring about positive changes in the behavior of people towards the acceptability and consumption of snails meat.

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