



## Strategies to Promote Snail Production among Rural Women in Osun State, Nigeria

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**Abstract:** *Poverty among rural women in Nigeria is high and wide spread. However, the production of snails is perceived to have a high potential in reducing poverty among rural women in Nigeria. This paper therefore takes a look at the socio-economic impact of snails on the livelihood of rural women in Osun state, Nigeria and most importantly on the problems faced by rural women in the exploitation of snails. This is with a view to fashioning out strategies that can help to promote snail production among rural women so as to reduce poverty among them. Eight LGAs out of 30 LGAs in Osun State, Nigeria were randomly selected. Two villages were randomly selected in each of the selected LGAs. Structured questionnaires were administered on 13 purposively selected women that traded in snails in each sampled villages. The study showed that rural women are faced with the problems of attack from animals or insects, too much stress in collecting snails and high temperature. The exploitation of snails can be improved by promoting snail farming among rural women, encouraging more research into snail farming and encouraging rural women to form cooperative society.*

**Keywords:** *Strategies, Snail Production, Poverty, Rural women, Livelihood.*

### 1. INTRODUCTION

Poverty is a state of lack or deprivation of basic necessities of life especially food, shelter and clothing. Poverty in Nigeria is very high with about 65% of the population categorized as poor [1]. In the same vein [2] noted that poverty in Nigeria is severe and wide spread, with the highest prevalence in the rural areas. They noted that the number of the rural poor is roughly twice that of the urban poor in Nigeria. According to [3] a vast majority of rural inhabitants in Nigeria suffer from adverse environment, unemployment, poverty and disease.

Women constitute the majority of the poor in the rural areas of Nigeria. As a matter of fact there has been an increasing incidence of poverty among rural women in Nigeria. For instance, in 1980 the percentage rate of women that are poor in Nigeria was 26.9% and by 1996 it has increased to 58.5% [4]. Majority of these poor women reside in the rural areas of the country and lack access to productive resources. [5] also stated that about 80% of the rural women in Nigeria can be classified as poor with the average household income from all sources being less than US\$ 1 per person per day. Evidences from different parts of the country have shown that rural women suffer from poverty and have long duration of poverty. Many of them have been unjustifiably maligned, neglected and frustrated. This has a devastating effect on their lives and wellbeing as well as the welfare of their households. For millions of Nigeria's rural women, life is neither satisfying nor decent. Interlocking problems of poor income, illiteracy and poor health compounded by unfriendly social customs and tenurial rights, make it difficult for rural women to break free from a life of poverty [6].

Women constitute a vital social group in all known human societies. Apart from playing a significant role in the society through reproduction and socialization, their economic, social and political roles cannot be overemphasized. Yet, this vital group has been maligned with very harrowing effect on the society. Forest and its resources possess great potential in reducing poverty among rural women in Nigeria. Especially, Non-timber forest products (NTFPs). This is because rural women have easy access to NTFPs unlike timber products. They are capable of converting some of these NTFPs into simple utilitarian products which they can sell for cash even in urban markets [6]. Among the diverse NTFPs provided by the forests, snails represent a significant part.

Snails (*Acharchatina maginata*) are known to be the largest group of molluscs constituting the largest animal group next to arthropods. Snail meat is tasty, tender and highly nutritional; and it is majorly rich in protein (12- 16%) and all the essential amino acids [7]. The protein in snails is of good quality with high levels of lysine, leucine, isoleucine and phenylalacine [8]. It is rich in iron (45-50mg/kg) and calcium, but low in fat (0.5-0.8%) and cholesterol. It also has all the amino acids needed for human nutrition compared to other protein sources like poultry and pigs [7]. The high iron content is considered important in the treatment of anemia. In addition, it is believed that the glandular substances from edible snails cause agglutination of certain bacteria; thus snails could be of value against a variety of ailments. It serves as a ready source of meat to the rural communities where majority cannot afford the high cost of cow meat. Snails are said to be medically valuable and so for this reason the demand for snail meat has increased over the years in both domestic and foreign markets. In recent years, however, wild snail populations have declined considerably primarily because of the impact of human activities such as deforestation, pesticide use, slash-and-burn agriculture, spontaneous bush fires and massive collection of snails before they have reached maturity [9].

It therefore follows that the production of snails is vital to the nutrition and economy of rural dwellers in Nigeria. It is especially vital to the rural women who are majorly involved in the collection and sales of snails as well as in their preparation as food. [10] noted that women dominated the utilization of snails in Kwara State, Nigeria which is just a neighboring state to Osun state, Nigeria. However due to high exploitation of snails and many other NTFPs and the uncoordinated approach to their exploitation, availability of snails for the use of the people has dwindled considerably in the past few years. Quite often rural women over-exploit these resources thereby reducing their availability and sustainability potentials.

In addition forest policy makers and development planners have not taken too much interest in the exploitation of snails. They see snails as minor forest products. As such, there is little or no information on the contributions of snails to the livelihood of rural women in the country. It is in view of this that this study seek to assess the socio-economic impact of snails on the livelihood of rural women in Osun state, Nigeria and to identify problems faced by rural women involved in the exploitation of snails in the study area. This is with a view to fashioning out strategies that can help to promote exploitation of snails either in the open field or that can promote snail production (snailry) among rural women in Osun State, Nigeria. This is because if the production of snails among rural women is promoted it will go a long way in promoting rural economy. [6] noted that rural women through the exploitation of forest resources (especially Non timber forest products) make significant contributions to the welfare of their households and that of rural economy. The reason for this might not be unconnected with the fact that rural women are known to be hard working. [11] noted that women are naturally predisposed to serve their families or communities either because of their caring nature or because their gender roles embed them more than men in family or neighborhood ties. From the foregoing it therefore follows that if the production of snails among rural women is promoted through appropriate strategies, it will go a long way in helping to boost the welfare of rural households in particular and improve rural economy in general.

## 2. METHODOLOGY

### 2.1. Study Area

The study area is Osun state, Nigeria. The state was carved out of the old Oyo state on the 27th August 1991. It is located between longitudes 04<sup>0</sup>30<sup>1</sup> E and 4<sup>0</sup>5<sup>1</sup> E and latitude 70301 N and 70501 N, South-western Nigeria (figure 1). It covers an area of approximately 14,875 square kilometers. The area is mainly agrarian, and it is also divided into three federal senatorial districts, each of which is composed of two administrative zones. The 1991 census puts the population of the state at 2.2million. The State is made up of 30 local government areas with over 200 towns, villages and other settlements. The state has a considerable number of highly urbanized settlements some of which are Osogbo, Ile-Ife, Ipetumodu, Ilesa, Ikirun, Iwo, Ede, Ila-Orangun and Ikire. Others include, Ejigbo, Ilobu, Gbongan, Okuku, Inisa, Ijebu-Ijesa, Ipetu-Ijesha etc. The people of the state are mainly traders, artisans and farmers. Their other occupations include hand-woven textiles, tie and dye, leather work, calabash carving and mat-weaving. Osun State is bounded in the West by Oyo State, Ondo and Ekiti States in the East, Kwara State in the North and Ogun in the South. The State runs an agrarian economy with a vast majority of the populace taking to farming.



Fig1. Map of Osun State, Nigeria

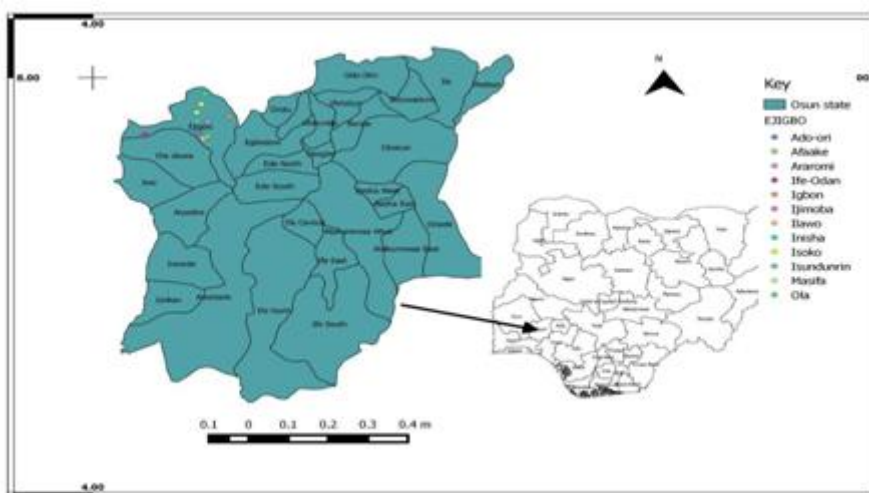


Fig2. Map showing the position of Osun state in Nigeria

Table1. List of sampled villages and their locations in the study area

Local Government Area	Village	Coordinates	
		Latitude	Longitude
Ife-north	Asabi	7.44955°	4.47624°
	Jatina	7.45433°	4.49991°
Ife-East	Alabameta	7.46353°	4.51123°
	Koola	7.45741°	4.50506°
Irewole	Opo-osun	7.45171°	4.26125°
	Dede	7.44351°	4.27552°
Atakumosa	Ayegbaju	7.56137°	4.56942°
	Akeredolu	7.57320°	4.56591°
Ife-central	Fasina	7.49514°	4.48247°
	Ogunwusi	7.49804°	4.47804°
Isokan	Oosa	7.33864°	4.27855°
	Papanla	7.340215°	4.19633°
Ayedire	Ijana	7.54223°	4.20147°
	Station	7.56523°	4.22836°
Ayedaade	Onimu	7.47176°	4.20349°
	Animu	7.45344°	4.31682°

## 2.2. Method of Data Collection

Eight LGAs out of 30 LGAs in the study area were randomly selected. Two villages were randomly selected in each of the selected LGA to make a total of 16 villages in the study area. A pre-tested and

validated structured questionnaire was administered on 13 purposively selected women that traded with snails in each of the sampled villages to make a total of 208 respondents in the study area.

**2.3. Method of Data Analysis**

The data obtained for this study was subjected to descriptive statistical analysis. This is in form of frequency and percentage distribution tables and bar charts. Chi-square was used to test stated hypotheses.

**2.4. Hypothesis Tested**

Ho - income earned by rural women from the sales of snails is independent of their educational qualification in the study area.

Ho – exploitation of snails does not have a significant association with the livelihood of rural women in the study area.

**3. RESULTS AND DISCUSSION**

**3.1. Socio-Economic Characteristics of Respondents in the Study Area**

Table 2 shows that the ages of the majority of the respondents in the study area varies between 31 years and 60 years of age. According to the Table 38% of the respondents in Atakumosa west local government area have their ages between 41-50 years.

At Ayedire local government area 19% have their ages between 31-40 years. At Ife-Central Local government area 4% of the respondents have their ages between 51-60 years while 12% have their age above 60 years.

At Ife-Central and Irewole local government areas 65% and 46% of the respondents have no formal education respectively, 35% of the respondents in Ayedaade LGA had primary school education, 27% of the respondents in Ife North had secondary education while 4% of the respondents in Ife east had tertiary education.

Table 2 also shows that 19% of the respondents in Atakumosa west LGA earn less than ₦20, 000.00 annually from the sales of snails in the study area. In Ayedaade and Ife central LGAs 15% and 38% of the respondents respectively earn between ₦20, 000.00 and ₦30, 000.00 annually from the sales of snails. At Ayedire LGA 46% of the respondents earn between ₦41, 000.00 - ₦50, 000.00 annually from the sales of snails. 4% and 8% of the respondents in Ife north and Irewole LGAs respectively earn greater than ₦50, 000.00 annually from the sales of snails. Chi-square test ( $p < 0.05$ ) shows that the income earned by respondents from the sale of snails has a significant association with the educational qualification of the respondents in the study area (Chi-square value 1 of Table 6).

This shows that educated respondents earn more money from the exploitation of snails than the uneducated ones. The implication of this is that education has an important role to play in the life of an individual and the society entirely. An educated person has the tendency to do things better than an uneducated fellow. [12] noted that education plays a very important role in the development of any society. He stated that there is a positive relationship between the average level of education and the degree of development.

**Table2.** Demographic characteristics of respondents in the study area

Age (years)	Atakumosa west		Ayedaade		Ayedire		Ife-central		Ife east		Ife north		Irewole		Isokan	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<30	0	0	0	0	1	4	7	27	1	4	1	4	1	4	0	0
30 -40	5	19	0	0	5	19	8	32	2	8	2	8	2	8	4	15
41-50	7	27	12	46	5	19	7	27	8	31	7	27	5	19	10	38
51-60	10	38	10	38	9	35	1	4	10	38	12	46	13	50	9	35
>60	4	15	4	15	6	23	3	12	5	20	4	15	5	19	3	12
<b>Education</b>																
No edu.	10	38	12	46	15	58	17	65	13	50	11	42	12	46	8	31
Primary	8	31	9	35	6	24	5	19	8	32	7	27	11	42	11	42
Secondary	6	24	3	12	4	15	3	12	4	15	7	27	3	12	4	15
Tertiary	2	8	2	8	1	4	1	4	1	4	1	4	0	0	3	12

Annual Income from snail																
<N20,000	5	19	4	15	3	12	6	24	10	38	6	24	8	31	4	15
N20,000-N30,000	0	0	4	15	0	0	10	38	8	31	7	27	7	27	4	15
N31,000-N40,000	3	12	8	31	2	8	4	15	3	12	8	31	4	15	3	12
N41,000-N50,000	12	46	6	24	12	46	4	15	3	12	4	15	5	19	7	27
>N50,000	6	24	4	15	9	35	2	8	2	8	1	4	2	8	8	31

Source: Field Survey, 2017

Table 3 shows the impact of the benefits of snail exploitation on the livelihood of rural women in the study area. At Atakumosa west LGA 88% of the respondents consumes snail as source of food (as fish and meat substitute). 62% of the respondents in the same LGA said exploitation of snails serve as employment for them. 38% of the respondents in the same LGA said exploitation of snails provide money for them to pay school fees of their children.

96% and 92% of the respondents at Ayedaade and Ayedire LGAs respectively consumes snail as fish and meat substitute. This shows that exploitation of snails has great impact on the nutrition of rural dwellers in the study area. [13] noted that many NTFPs that serve as food (including snails) help to add flavor to the otherwise bland food eaten by the rural dwellers in Nigeria. He noted further that they help to improve the nutrition of rural dwellers by providing protein, energy, vitamins and essential minerals. [14] also noted that forests are the source of a variety of foods that supplement and complement what is obtained from agriculture. This shows that foods obtained from the forests play important role in ensuring that a lot of people are not malnourished in the rural areas of the country. It therefore follows that snails and some other NTFP foods ensure that rural households are food secured during emergencies and difficult periods. This include periods of drought, famine,, floods, wars or insurgency as well as during dry season and during periods of crop failure. Table 4 and 5 shows the proximate composition and mineral composition respectively of the albumen gland of three common species of snails; *Archachatina maginata*, *Achatina achatina* and *Achatina fulica*. The Tables show that rural households will derive high percentage of protein and calcium from snails. [15] noted that the analyses of the edible visceral part of the common species of snails (*Archachatina maginata*, *Achatina achatina* and *Achatina fulica*) showed that they have high nutritive value which makes them good for consumption by humans and livestock. [16] also noted that snail is a good source of iron.

At Irewole and Isokan LGAs 77% and 73% of the respondents respectively stated that exploitation of snails provided money they used to pay school fees of their children. This confirms the attestation of [6] that rural women in North Central Nigeria spent more than 50% of the income they earned from the exploitation of forest resources on the education of their children. [17] also noted that money realized by rural women from the sale of snails is used for many purposes including training their children. 38% and 54% of the respondents in Ife east and Ife north LGAs respectively uses snails for medicinal purpose. They stated that the fluid obtained from snails is used to treat hypertension and heart diseases. This confirms the findings of [17]. They noted that the therapeutic uses of snails in Ijebu North LGA of Ogun State, Nigeria include treatment of stroke, high temperature, heart diseases, ear infection and hypertension. [18] stated that the low cholesterol level of snails makes it useful in the treatment of heart related diseases. [19] also noted that snail mucous is used in the treatment of umbilical cord wounds in nursing mothers. [20] also reported that *Achantina fulica* slime can heal wound twice faster than normal saline solution. Chi-square test (p<0.05) shows that the benefits obtained by respondents from the exploitation of snails has a significant impact on their livelihoods in the study area (Chi-square value 2 of Table 6).

**Table3.** Impact of the benefits of exploitation of snails on the livelihood of rural women in the study area

	Atakunmosa west		Ayedaade		Ayedire		Ife-central		Ife-east		Ife-north		Irewole		Isokan	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Serve as source of food	23	88	25	96	24	92	23	88	24	92	22	85	23	88	26	100



Serve as employment	16	62	13	50	23	88	8	31	14	54	12	46	23	88	22	85
Provide money to pay school fees of children	10	38	10	38	20	77	3	12	12	46	10	38	20	77	19	73
For medicinal purpose	8	31	10	38	16	62	1	4	10	38	14	54	12	46	18	69
Provide money to meet other household needs	17	65	10	38	23	88	5	19	10	38	18	69	22	85	18	69

NB: There is multiple choice by respondents

Source: Field Survey, 2017

Table4. Proximate composition (%) of the albumen gland of three species of snails

Snail species	Moisture (%)	Fat (%)	Ash (%)	Protein (%)	Carbohydrate (%)
A. <i>maginata</i>	60.32± 0.02	1.00±0.01	1.26±0.01	36.74±0.01	0.68±0.01
A. <i>achatina</i>	60.00± 0.01	1.26±0.02	1.31±0.01	36.81±0.02	0.62±0.01
A. <i>fulica</i>	53.85±0.02	1.32±0.02	1.42±0.02	42.69±0.02	0.72±0.02

Source: Ademolu et al (2017)

Table5. Mineral composition (mg/100g) of the albumen gland of three species of snails

Snail species	Ca <sup>2+</sup>	Na <sup>+</sup>	Fe <sup>2+</sup>	Cl <sup>-</sup>
A. <i>maginata</i>	1.91±0.01	0.62±0.02	0.1±0.0	0.09±0.01
A. <i>achatina</i>	1.87±0.01	0.54±0.01	0.1±0.01	0.09±0.01
A. <i>fulica</i>	1.92±0.01	0.52±0.01	0.08±0.02	0.08±0.01

Source: Ademolu et al (2017)

Table6. Chi square test results of hypotheses tested.

Hypothesis	Chi- square calculated	Chi- square tabulated	Degree of freedom	Remark
1. Education v/s income earned from snails	51.28	21.03	12	*
2. Impact of benefits of snail exploitation on livelihood of respondents.	251.59		28	*

NB- \* means significant

### 3.2. Problems Faced by Rural Women Involved in the Exploitation of Snails

At Atakumosa west, Ife-central and Irewole L.G.As, 73%, 81% and 85% of the respondents respectively stated that seasonal availability of snails is the problem they face in the exploitation of snails (Table 7). The reason for this is because snails are always scarce in the dry season. They are abundant and always available in the rainy season. As such scarcity of snails is therefore a problem during the dry season. [21] also noted that snails are scarce during the dry season. 62% and 69% of the respondents in Ayedaade and Ife-north LGAs respectively said the problem they face in the exploitation of snails is danger of attack from animals or insect. It should be noted that while rural women are on the field (forest) in search of snails they are wide open to the attack of dangerous animals like snakes and scorpions. They may also be attacked by insects such as bees and ants. This is a problem that tends to limit the exploitation of snails among rural women in the study area. 54% and 77% of the respondents in Ayedire and Irewole LGAs respectively said the problem they face in the exploitation of snails is too much of stress they pass through in the process of collection. It should be noted that collecting snails from the forest floor could be sometimes stressful especially during the period of scarcity i.e. during the dry season. Rural women spent longer hours and trekked longer distances in search of snails. This is no doubt is a problem.

Table7. Problems faced by respondents in the exploitation of snails in the study area

	Atakunmosa west		Ayedaade		Ayedire		Ife-central		Ife-east		Ife-north		Irewole		Isokan	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Seasonal availability	19	73	15	58	12	46	21	81	3	12	16	62	22	85	5	19

High temperature	21	81	15	58	22	85	16	62	8	31	19	73	21	81	15	58
Danger of attack from animals or insect	22	85	16	62	14	54	22	85	1	4	18	69	15	58	7	27
Stress of collection	20	77	18	69	14	54	23	88	11	42	17	65	20	77	7	27

Source: Field Survey, 2017

### 3.3. Strategies to Improve the Exploitation of Snails

In view of the findings of this research the following strategies can help to improve the exploitation of snails in the study area and in other rural areas of Nigeria.

#### 3.3.1. Promoting Snail Farming

It is important that efforts should be geared-up towards promoting snail farming among rural women in Nigeria. [22] noted that snail farming is one of the least recognized aspects of livestock production in Nigeria. Exploiting snails in the open field (bush and forest) in the 21<sup>st</sup> century is no longer sustainable with many problems bedeviling forest management in Nigeria. In addition, exploiting snails in the open field has been faced with many problems. This include increasing scarcity of snails due to increased deforestation and over-exploitation, exposure of snail collectors to danger of animal attack and high level of stress involved in the collection of snails. It is therefore pertinent that strategies that will help to promote snail farming among rural women should be put in place so as to promote snail farming and discourage reliance on exploitation in the open field. These include;

#### 3.3.2. Provision of Soft Loans to Rural Women

Majority of rural women in the study area and in Nigeria as a whole need financial assistance due to their high level of poverty. Providing soft loans to rural women will enable them to get money to start the business of snail farming. [23] noted that poor access to credit is one of the constraints to snail farming in Nigeria. State governments all over the country can help rural women to overcome this constraint by putting in place policies that will make it easy for rural women to access soft loans from financial institutions such as microfinance banks, commercial banks and other government lending agencies. It should be noted that the money needed to start snail farming is not much. As such many rural women can be empowered to start snail farming through provision of soft loans to them.

#### 3.3.3. Organizing Seminars for Rural Women

State governments in the country should organize seminars for rural women to teach and enlighten them on how to adequately operate snail farming for profit making. Rural women in the study area and all over the country need to be taught on management techniques used in snail farming. [23] noted that one of the constraints to snail farming in Nigeria is inadequate management information. He noted that poor management of snail farming has led to serious loss to snail farmers in Nigeria.

#### 3.3.4. Improved Snail Feeds Should Be Made Available at Subsidized Rate

Improved snail feeds that can enhance the growth of snails should be provided to rural women at subsidized rate. This will help many rural women to venture into snail farming because improved snail feeds will speed up the growth and size of snails and this will lead to increased profit. It is important to note that getting high quality feeds for snails in the dry season is a problem. [24] noted that high cost of snail feeds is one of the problems faced by snail farmers in Imo state, Nigeria.

*Improved Extension Service:* It is necessary that extension service to snail famers be improved in the study area. Extension Officers will help to bring innovations on snail farming to rural women involved in snail farming. This will go a long way in increasing their profit margin and help in promoting snail farming among rural women in the study area. [25] noted that considering the gross margin and net profit of snail farming extension agents can help to boost snail farming by improving their visit to snail farmers.

*Encouraging the Use of Protective wares by rural women:* One of the problems that rural women faced in the study area is exposure to danger of attack from animals especially snakes and bees attack. The use of protective wares like boots, goggles, gloves and rain coats can help to solve this problem and encourage many rural women to exploit snails either in the forest reserves or in the open field. However going by the high level of poverty among rural women many of them might not be able to

afford to buy these protective wares. Local government authorities, NGOs and Community based organizations in the study area can come to the aid of rural women by supplying these protective wares to them.

*Encouraging More Research into Snail Farming:* It is important that more research into snail farming should be encouraged by research organizations and NGOs. Research will help to provide solutions to many of the problems faced by snail farmers in the study area and all over the country. For instance [26] noted that as a snail farmer he encountered two strange snail diseases that killed many of his snails. He believed that research by scientist in Nigeria can provide solution to them. It will therefore be good if research into snail farming is encouraged by research organizations so that solutions can be sought to many problems snail farmers are facing in Nigeria.

*Encouraging Rural Women to form Cooperative Society:* Rural women that are involved in snail farming should be encouraged to form cooperative society. The encouragement should come from the States Ministry of women affairs. Rural women need this encouragement because of their high level of illiteracy and poverty. With the help of officials from State Ministry of women Affairs snail farmers (rural women) can form cooperative society. This will help them tremendously. Innovations in snail farming can easily be made available to them and as a cooperative society they will have better access to credit facilities from financial institutions.

*Improve the Literacy level among Rural Women:* It is necessary to improve the literacy level among rural women not only in the study area but all over the country. It is generally known that the illiteracy level among rural women in Nigeria is high. [27] noted that the high level of illiteracy is responsible for lack of development and high level of poverty among the rural women in Nigeria. He noted further that the high illiteracy level among rural women in the country is responsible for their lack of access to information and new technology. It is therefore difficult for them to adopt innovations that can bring development to their livelihoods. Literacy level among rural women can be improved by establishing adult literacy centres in the rural areas where rural women can be taught how to read and write. This will go a long way in bringing development not only to snail farming but to other livelihoods of rural women as well as improve their marketing information awareness.

#### 4. CONCLUSION

This study has shown that the exploitation of snails by rural women has provided many benefits to them. These include provision of food, employment, provision of money and the use of snail for medicinal purpose. The study showed that rural women are faced with some problems in the exploitation of snails. These problems are seasonal availability of the snails (i.e. scarcity of snails during dry season), danger of attack from dangerous animals like snakes or insect such as bees and too much of stress during the process of collection especially during the dry season. Based on the identified problems the following strategies can help to improve the exploitation of snails in the study area and in other rural areas of the country. These include promoting snail farming among rural women through provision of soft loans, organizing seminars on snail farming for rural women, and provision of improved snail feeds to rural women. Other strategies include improved extension service on snail farming to rural women, encouraging the use of protective wares by rural women during exploitation of snails in the open field, encouraging more research into snail farming, encouraging rural women that are involved in snail farming to form cooperative society and improving the literacy level among rural women in the study area.

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