World Academy of Science, Engineering and Technology
International Journal of Agricultural and Biosystems Engineering
Vol:4, No:12, 2010

Poverty Alleviation Potential of Snail Farming in Ondo State, Southwest Nigeria

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Abstract**—**The recurring decimal of rural and urban poverty in Nigeria, resulting from lack of sustainable livelihood activities by the people due to non-diversification of the economy, necessitated this study. One hundred snail farmers were randomly selected in Akure North and Akure South Local Government areas of Ondo State, Southwest Nigeria where snail farming is widely practised. Data collection was through questionnaires administration and on-site observation of farms. Data obtained were subjected to descriptive statistics, Student's t-test and regression analysis. Cost benefit ratio (CBR) and rate of return on investment (RORI) were calculated in order to determine the poverty alleviation potentials of snail farming in the study areas. Although snail farming was profitable and viable, it was below poverty line. With time and more knowledge in its farming activities, and with more people taking to snail production, its poverty alleviation and reduction potentials will increase.

Keywords**—**Alleviation, farming, Nigeria, potential, poverty, snail.

I. Introduction

POVERTY is a fundamental global problem [1]. The number of poor people in Nigeria and many developing economies across the globe has continued to be on the increase within the past two or three decades. In addition, the changing socio-economic, political, environmental, and climatic atmosphere in Nigeria and other developing countries across the globe has continued to aggravate the living conditions of most households especially those living in the rural areas [2]. Past studies indicate that the rate of poverty in the rural areas is higher than in the urban areas [3],[4],[5]. The situation in the sub-Saharan Africa is that rural poverty accounts for 65-90% of overall poverty [6]. Research has also shown that over 70% of the Nigeria population lives in rural areas where poverty is as high as 63% [7]. Furthermore, available data indicate that majority of the poor in Nigeria are located in the rural areas [8]. In 1980, 1985, 1992, and 1996, the share of the poor in the rural areas in Nigeria was 28.3%, 51.4%, 46.0%, and 69.8% respectively, making poverty in Nigeria largely a rural phenomenon [8].

Concerned by the problems of poverty, various governments in Nigeria instituted various programmes aimed at alleviating and reducing poverty level among the citizenry particularly in the rural areas. Most of the poverty alleviation strategies adopted were well focused on rural areas and on the agricultural sector because poverty in Nigeria is largely a rural phenomenon [9]. However, in many part of the developing world, the numbers of poor people in rural areas exceed the capacity of agriculture to provide sustainable livelihood opportunities [10]. Thus one of the poverty alleviation strategies in Nigeria-NEEDS recognises that poverty has many strands and must therefore from several different directions at once [11].

Attention is currently on the potential of wildlife farming as a means of poverty alleviation. One of the wild animals often touted as farm animals, and which has gained widespread popularity for domestication is snail. Snail farming constitutes a major part of income of rural farmers who are predominantly women and have limited alternative sources of livelihood [12]. Snail meat has been consumed by humans worldwide since prehistoric times [13]. Despite the flourishing of international trade in snails in Europe and North America, and considerable foreign and local demand, commercial snail farms hardly exist in Africa [13]. For instance, United States imports of snails were worth more than US$4.5million in 1995 and came from 24 countries [14].

Traditionally, rural folk scout freely in the forest and farmlands to collect snails during the rainy season for sales and domestic consumption [12]. Because of this, the production of snail has not kept pace with demand [15], with different environmental and technical factors implicated [12]. Studies have also indicated that many products from snails farming are useful in other agricultural applications thereby enhancing its economic value. For example, study showed the feasibility of using snail meal of giant African snail *Archachatina marginata* as a partial fishmeal substitute in raising fish (*Claris gariepinus*) [13]. Thus, apart from sales from direct consumption, the production of snail meal could further boost marketing and income from its farming activities. This can further empower the rural people economically and reduce the poverty level. Also, crushed snail shells may be applied in chicken feed or liming to improve the quality of acidic (fish pond) soils [13]. Snails also fit in well with other farming activities, helping to fertilize the soil prior to cultivation of other crops [16]. Apart

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from the values derivable from snail farming, Capital, technical, labour and financial inputs in snail farming are relatively low compared to those in other types of livestock farming (poultry, pigs, goats, sheep, cattle, and cane rat) [13], and this should facilitate and enhance interest or involvement in snail farming by urban and rural people.

Previous studies have shown that while some of the small scale enterprise including domestication of wildlife for bushmeat production, can be viewed as safety nets, some others could be poverty traps in which case it is perceived that the people are engaged in the activities because they are poor whereas in actual sense, they are poor because they rely solely on such enterprise for which economic dividend and remuneration are meagre. Such a situation often makes it very difficult if not impossible for those who depend on such enterprises to rise above poverty line [17]. In view of this, this study is highly justified.

II. METHODOLOGY

This study was carried out in Akure North and Akure South Local Government areas of Ondo State, Southwest Nigeria where snail farming is widely practised (Fig. 1). It was carried out in 2006. Data were obtained through face-to-face administration of questionnaire and on-site observation of the farms. One hundred snail farmers were randomly selected in the two Local Government areas. In all, 40 and 60 randomly selected snail farmers were interviewed in the two Local Government areas respectively. Data that were obtained were subjected to descriptive statistics (frequencies, percentages and means) and inferential statistics.

Analysis to investigate whether the profits made from small scale forest based enterprise (snail farming) are able to lift the entrepreneurs above the poverty lines was carried out using the Student's t Distribution. Student's t-test was calculated thus:

$$t = \frac{p - p^*}{\sigma} \quad (1)$$

Where p = mean annual profit of a particular enterprise

p* = Poverty Index (Poverty Line Value). Presently, the World Bank puts it at $1 per person per day for extreme poverty and $2 per person per day as general poverty line [18].

σ = Sample Standard Deviation

t = Calculated t value

In addition, in order to determine whether benefits exceed costs for snail farming, cost benefit analysis (CBA) was also calculated using:

$$B/C = \frac{\sum_{t=0}^{t=n} \frac{R_t}{(1+r)^t}}{\sum_{t=0}^{t=n} \frac{C_t}{(1+r)^t}} \quad (2)$$

Where B/C = benefit-cost ratio

R_t=revenue over time t

C_t= cost over time t

r=discount rate

l= constant

t= 3 years.

Furthermore, to measure the profitability of the enterprise (snail farming) at a point in time and shows how much could be realised on the money invested, rate of return on investment (RORI) was calculated thus:

$$\text{RORI} = \frac{TR - TC}{TC} X \frac{100}{1} \quad (3)$$

Where TR=Total Revenue

TC=Total Cost.

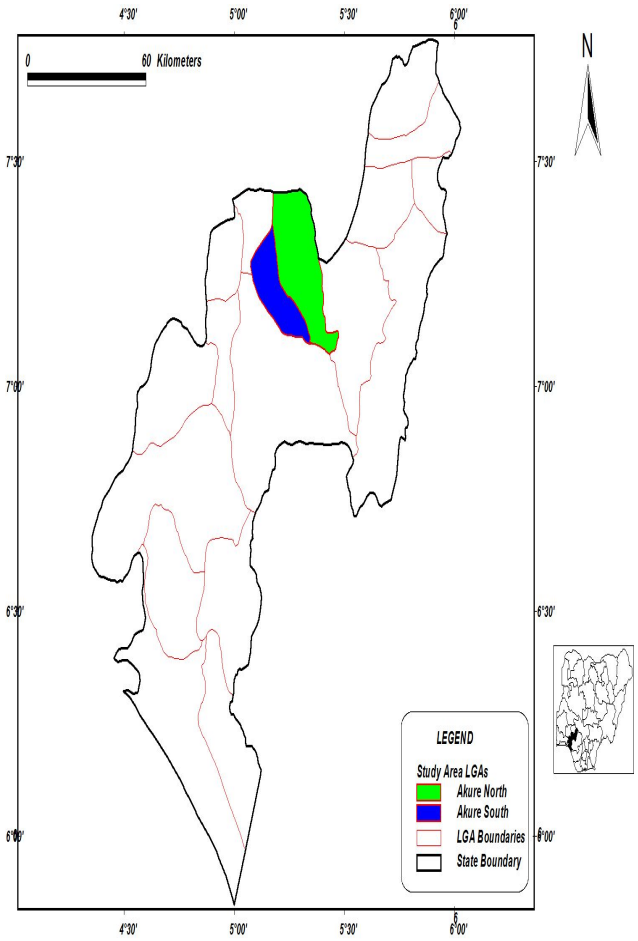

Fig. 1 Map of Ondo State showing the Local Governments of study

III. RESULTS AND DISCUSSION

In table I, 90% of the respondents (i.e. snail farmers) were male. This is an indication that snail farming is being dominated by men. This is in contrast with snail marketing which various studies reported that it is dominated by women [13]. This result however is in tandem with the findings of [19] and [20]. The highest percentage of the snail farmers

were in the age group of 41-50 years with the mean age of 38.5 years. Earlier study also reported this age range [20]. Majority of the respondents (70%) were married with 80% having family size of between 0-5 individuals. Previous study also indicated that married people are more involved in snail farming probably to increase household income [20],[21]. The study further shows that all the snail farmers (100%) had tertiary education. Literature indicated that snail farmers are highly educated, however, lower percentage (58.5%) was reported [20]. All the snail farmers have their primary occupation. However, 20% of them were lecturers and civil servant respectively. In terms of state of origin of the snail farmers, the study reveals that 90% of them are indigenes of other Southwest States of Ekiti, Oyo and Osun. This is an indication that indigenes of other states in Southwest Nigeria have adopted snail farming as an enterprise.

TABLE I
PERSONAL CHARACTERISTICS OF RESPONDENTS

Variable	Frequency	Percentage (%)	Mean
Gender			
Male	90	90	
Female	10	10	
Age			
20-30	30	30	
31-40	20	20	38.5
41-50	40	40	
greater than 50	10	10	
Marital status			
Single	30	30	
Married	70	70	
Family size			
1-5	80	80	
6-10	20	20	
Education			
Tertiary	100	100	
Primary occupation			
Lecturing	20	20	
Trading	10	10	
Civil servant	20	20	
Teaching	10	10	
Book keeping	10	10	
State of origin			
Ekiti	30	30	
Oyo	40	40	
Osun	20	20	
Ondo	10	10	

The snail farmers' production characteristics are presented in Table II. The study reveals that 50% and 40% of the snail farmers had between 1-5 years and 6-10 years of experience in snail farming. Earlier report indicated 5 years as the mean years of experience of snail farmers [20]. The further shows that 50% of the snail farmers have farms with only snails, and snails with other livestock respectively. This implies that snail farming is gaining popularity as a sole farming enterprise. The mean number of workers employed by the farmers is 3.7 comprising 190 full-time workers and 180 part time workers. This also indicates that snail farming is becoming a major source of employment in the study areas. Also, 40% of the land used in snail farming was acquired through inheritance, which is a common method of land holding in Nigeria. Fifty percent (50%) of the snail farmers invested between ₦1000 and ₦20000 with ₦41950 as the mean capital invested. Studies also showed that snail farming requires little capital investment [13],[22],[23]. The source of capital invested was personal savings according to the study. Previous studies also showed that snail farmers use their personal savings as initial capital [19,20].

TABLE II
PRODUCTION CHARACTERISTICS OF THE SNAIL FARMERS

Variable	Frequency	Percentage (%)	Mean
Experience in snail farming (in Years)			
1-5	50	50	
6-10	40	40	
11-15	0	0	
16-20	10	10	
Nature of farm			
Snails farms only	50	50	
Snail farms with other livestock	50	50	
No of employees			
Full-time	190	51.4	3.7
Part-time	180	48.6	
Land acquisition			
Inheritance	40	40	
Tenancy	30	30	
purchase	30	30	
Capital invested (₦)			
1000-20000	50	50	
21000-40000	10	10	
41000-60000	10	10	
61000-80000	0	0	
81000-100000	20	20	
Greater than 100000	10	10	
Source of capital			
Personal savings	90	90	
Loan	10	10	
Monthly income from sale of snails (₦)			
1000-20000	70	70	14490
21000-40000	30	30	

Table III shows the analysis of expenditure and income from snail farming from 2002, 2003 and 2004. The mean expenditure on snail farming was ₦27800, ₦46200 and ₦55450 in 2002, 2003 and 2004 respectively while the mean income was ₦178900, ₦186600 and ₦234300 respectively. An average monthly income of 54650 francs (US$ 121) was generated by small-scale snail farmers in Cameroon [12]. This implies that investment in snail farming is worthwhile. The study further indicated that the mean annual profitability for snail farming in Ondo State was ₦259666.70. With the

poverty line of $1/day for 6 people/year at ₦291270 and $2/day for 6 people /year at ₦582540, snail farming is below poverty line and thus implies that its poverty alleviation potential is low (Table IV).

TABLE III
ANALYSIS OF EXPENDITURE AND INCOME FROM SNAIL FARMING
(In Naira, ₦)

Year	Frequency	Percentage (%)	Mean
2002 Expenditure			
22000	90	90	27800
80000	10	10	
2002 Income			
108000	30	30	
225000	50	50	178900
170000	20	20	
2003 Expenditure			
18000	40	40	
25000	20	20	46200
80000	20	20	
90000	20	20	
2003 Income			
139000	40	40	
180000	20	20	186600
225000	20	20	
250000	20	20	
2004 Expenditure			
16000	35	35	
55000	15	15	
75000	25	25	55450
79000	15	15	
110000	10	10	
2004 Income			
170000	35	35	
250000	15	15	
295000	25	25	234300
287000	15	15	
205000	10	10	

In addition, the cost benefit ratio (CBR) for snail farming in the study areas was 2.34. Since the cost benefit ratio is not less than 1, snail farming is profitable. The rate of return on investment (RORI) was 127.42, 132.39 and 187.31 for the year 2003, 2004 and 2005, which implies that for every naira invested in snail farming in 2003, 2004 and 2005 by the farmers, 27 kobo, 32 kobo and 87 kobo was gained (Table V). The trend in the rate of return on investment (RORI) with regression coefficient (R^2) shows that the R^2 for snail farming was 0.6616. This reveals that snail farming is viable (Fig. 2).

IV. CONCLUSION

Snail farming is gaining a lot of popularity in Ondo State, Southwest Nigeria. This is borne out of the substantial number of people in its employment from this study. Although snail farming as an enterprise is below poverty line and its potential to alleviate poverty low, the enterprise is profitable and viable. With time and more knowledge in its farming activities, and with more people taking to snail production, its poverty alleviation and reduction potentials will increase. Extension services would do a lot in increasing interest and the number of people involved in snail farming particularly among the indigenes of the state.

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TABLE IV
PROFITABILITY OF SNAIL FARMING IN ONDO STATE

State	Standard Deviation	Mean Annual Profit (₦)	Poverty Line ($1/Day) 6 People/Yr (₦)	Poverty Line ($2/Day) 6 People/Yr (₦)	Student's t Distribution ($1/Day)	Student's t Distribution ($2/Day)
Ondo	25187.2	259666.7	291270	582540	-1.25	-12.82

TABLE V
ECONOMIC ANALYSIS OF SNAIL FARMING IN ONDO STATE

State	Cost/Benefit Ratio	RORI (%)		
		2003	2004	2005
Ondo	2.34	127.42	132.39	187.31

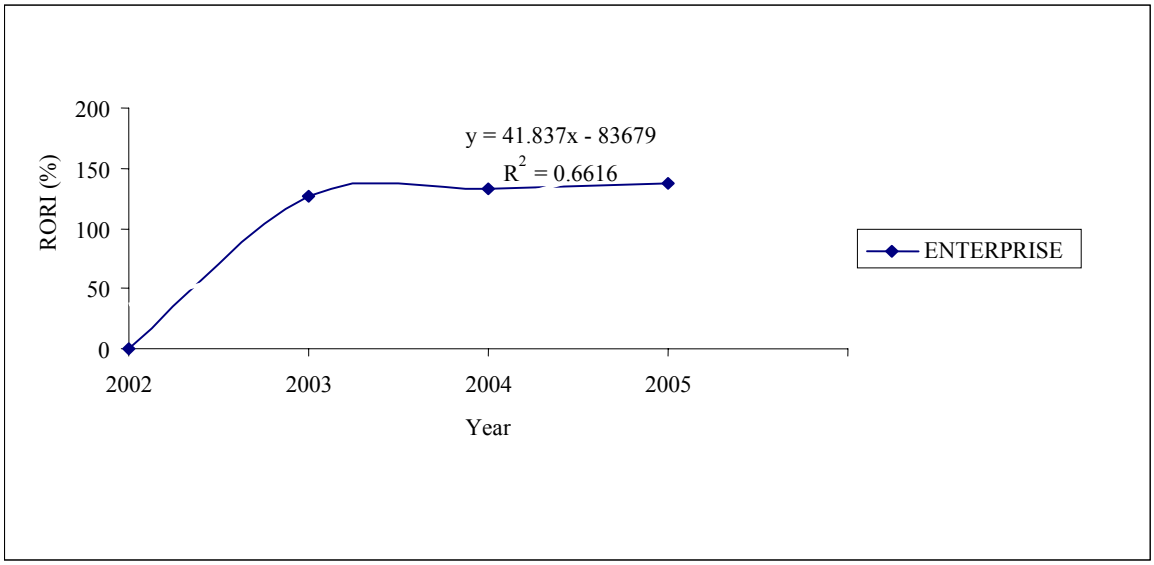

Fig. 2: Trend in rate of return on investment (RORI) in snail farming