

## Resource Use Efficiency in Small Production in Ibadan South West Local Government Area of Oyo State, Nigeria

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**Abstract:** Snail production apart from its importance as an edible meat, has medicinal uses which has been emphasized in literature. Snails are gathered from the forest during the wet season where they live in the wild. Recently, the population of snails in the wild have decreased as a result of human activities such as catching of hatchlings for domestication, deforestation, use of chemicals in their habitat and bush burning. This has led to the need to domesticate snail to avoid extinction. The foundation stock are collected from the bush, markets, snail farmers and through other sources. Resource use efficiency is an important issue in the economics of snail production as it gives an explanation on the resources that can be used in snail production. The study used multistage sampling technique to determine resource use efficiency in snail production (heliculture). The coefficients of land ( $X_1$ ), labour ( $X_2$ ) and fixed capital ( $X_3$ ) showed an inverse relationship with the output as their respective coefficients were negative. However, their marginal value productivities were N4,580.42 for land, N800 for labour and N1,894 for fixed capital respectively. This ran contrary to their respective acquisition costs.

**Key words:** Resource use, efficiency, snail, production, multistage, acquisition costs

### INTRODUCTION

Snail meat has been consumed by humans throughout the world since prehistoric times. It is high in protein (12-16%) and iron (45-50 mg kg<sup>-1</sup>), low in fat (0.05-0.8%) and contains almost all the amino-acids needed by humans. In addition to the nutritional value of snail meat, a recent study has shown that the glandular substances from edible snails cause agglutination of certain bacteria, this could be of value against a variety of ailments including whooping cough (Cobbinah, 2001).

Edible snails also play an important role in folk medicine Ashaye *et al.* (2001) revealed that snail could be used to reduce the problem of nutrition. In Ghana, the bluish liquid obtained from the shell when the meat has been returned is believed to be of good for infants' development. The high iron content is considered important in the treatment of anaemia. In the past, it was recommended as a means of combating ulcers and asthma, even at the imperial court, in Rome snail meat was thought to contain aphrodisiac properties and was often served to visiting dignitaries in the late evening.

In Nigeria, Ghana and Cote d'ivoire, where snail meat is particularly popular. Snails are gathered from the forest during the wet season. In recent years, wild snail populations have declined considerably primarily because of the impact of such human activities as deforestation, pesticide use slough and burn agriculture, spontaneous, bush fires and the collection of snails before they have reached maturity. It is therefore important to encourage snail farming (heliculture) as means of conserving this important resource.

Though the breeding of snail can start at any time of the year under domestication, but the best time to start breeding snails is at the beginning of the raining season, when feeds of snails are available.

The foundation stock may be from the following sources, snail farmers, research institutes that produce snails for farmers, rural and city markets, direct collection from the forest or bush.

Edible land snails though hermaphrodite reproduce by fertilization of the ova when two snails mate and exchange their sperms reciprocally. The eggs are laid at night in about two weeks after fertilization, the eggs are laid

at night in holes dug 5-15cm deep in the soil. The hatchling remain in the soil for 3-5 days after *in-situ* hatchling method (Amusan, 2002).

Snails feed on a wide variety of food mostly in the night and at dusk i.e. snails are nocturnal and crepuscular. They may feed during the day when rains or there is very dark cloud. However, (Akintomide, 1997) observed some constraints that militate against good performance of snails: genetic constituent, hormonal influence, environmental factors, rearing pattern and inefficient use of resources available to the farmers.

The measurement of efficiency has remained an area of important research both in the developed and developing countries. Especially in developing agricultural economics, where resources are merged and opportunities for developing and adopting better technologies are dwindling (Ali and Chandry, 1990). Measurement of efficiency is very important because it helps to determine productivity growth by improving the neglected resources (Tadesse and Knishnavmoorthy, 1997). This study sampled the resource use efficiency in snail production in Ibadan South West local government area of Oyo state Nigeria. It was hypothesised that, snail producers are resource use inefficient.

### MATERIALS AND METHODS

The study was carried out in Ibadan South West Local Government area of Oyo state, Nigeria. The respondents used were the snail producers in Ibadan South West Local Government Area. Primary data were collected through administration of structured interview schedule. Multi-stage sampling technique was employed in data collection. In this regard, Local Government area was stratified into four zones of North, West, East and South. From each of these zones, 10 farmers were randomly selected with the aid of Oyo State Agricultural Development Programme (OYSADEP).

In all 40 snail farmers were interviewed. The data were analysed using multiple regression analysis.

The analytical framework is briefly discussed below:

The implicit function for the regression analysis is presented in Eq. (iii) below:

$$Y = f(X_1, X_2, X_3, X_4, X_5, \dots, e) \dots \dots \dots (1)$$

Where

- Y = Quantity snail production in (kg)
- X<sub>1</sub> = Land (ha)
- X<sub>2</sub> = Labour in (man days)
- X<sub>3</sub> = Input cost/expenditure (₦)

- X<sub>4</sub> = Fixed capital (₦) cost of snailery construction
- X<sub>5</sub> = Years of experience (years)
- e = Error term

The relationship between the endogenous and each of the exogenous variable were examined. Using double logarithmic production function.

$$\text{Log } Y = b_0 + b_1 \log x_1 + b_2 \log x_2 + b_3 \log x_3 + b_4 \log x_4 + b_5 \log x_5 + \log e \dots \dots (ii)$$

The lead equation called the Best Linear Unbiased Estimate (BLUE) functional form was chosen based on statistical significance, the economic theory that support production function concept and *A priori* expectation of the variable. All the variables are expected to positively influence snail output.

$$MVPX_i = \frac{b_i Y}{X}$$

where

- Y is computed from the regression equation where all factors are fixed at the geometric mean
- b<sub>i</sub> represents the coefficient of X<sub>i</sub>
- X<sub>i</sub> indicates input at geometric mean levels
- MVPX<sub>i</sub> indicate marginal value productivity of inputs

### RESULTS AND DISCUSSION

The resource use efficiency of snail farming was examined in the study area. Olayemi and Olayide, 1981 indicated that, the choice of appropriate functional forms may be based on a priori expectation, which in turn is guided by economic theory. In this regard polynomials and logarithmic functions are most common for production studies. Based on the statistical significance of the coefficient and economic theory that support production function concept the double logarithmic was chosen.

$$\text{Log } Y = 2.50 - 0.007x_1 - 0.15 x_2 + 0.005x_3 - 0.250x_4 + 0.708x_5$$

(73.013) (-0.003) (-0.095) (2.033) (-0.195) (52.87)

Figures in parenthesis represent standard error.

The coefficients of multiple determination (R<sup>2</sup>) was found to be 60%. This implies that 60% of the total variation, in the value of quantity of snail produced is explained by the explanatory variable-land, labour, input cost, cost of snailery construction and years of

Table 1: Regression result of snail production in Ibadan South West Local Government Area of Oyo state

Predictor	Estimated parameter	Standard error	t-ratio
Constant	2.50	73.013	0.034
X <sub>1</sub>	-0.007	-0.003	2.333
X <sub>2</sub>	-0.150	-0.095	15790
X <sub>3</sub>	0.005*	2.033	0.008*
X <sub>4</sub>	-0.250*	-0.195	1.282
X <sub>5</sub>	0.708*	52.871	0.013

\*Source: Field Survey 2002. \*t-value significant at 10% level

experience. The remaining 40% not explained is attribute to other variables not variables not included in the model.

The coefficient of input cost (X<sub>3</sub>) and years of experience (X<sub>5</sub>). One be the positive and significant at 10%. This implies that these variables have direct relationship with quantity of snail. An indication that as these variables increased, there is need for the output to be increased.

The coefficient of land (X<sub>1</sub>), labour (X<sub>2</sub>) and fixed capital (X<sub>4</sub>) are negative. This is indication of having an inverse relationship with the output, which is a deviation from a priori expectation. This implies that as these variables increase, total output will be decreased. This shows that these variables should be used to their barest minimum in the production of snail in the study area (i.e. not capital intensive). The production elasticities generally represent the percentage increase in output of snail production (Y) for each percentage increase; in the inputs of respective resources (Ogunfowora *et al.*, 1974). However, the most critical variables are the input cost and years of experience in snail farming. These problems accounts for the focus of research institutes. In essence, output from snail production is inelastic in response to the input cost and years of experience.

Given the levels of technology and prices of both input and output, the marginal value productivity is the yardstick for judging the efficiency of resource use. A give resource is optimally allocated when this is no divergence between its MVP and its acquisition price .

Hence, the Marginal Value Productivities (MVP) of individual resources provide a framework for policy decision on resource adjustment and the differential between the MVP and acquisition cost indicate the scope of resource adjustment necessary to attain economic optimum. As shown in Table 1 with the input and output at their geometric mean, the marginal value productivity of land was ₦4580.42 and was found to be positive while its acquisition cost was found to be ₦1,500.

For this, it could be seen that MVP was higher than the acquisition cost land. The implication of this is that

Table 2: Marginal Value and Acquisition Cost of Snail Production in Ibadan South West Local Government Area of Oyo state

Explanting variable	Geometric mean	Log of geometric mean	Regression coefficient	MVP	Px <sub>i</sub> (N)
X <sub>1</sub>	2.05	0.31	-0.007	4580.92	1500
X <sub>2</sub>	2.08	0.32	-0.150	480.20	600
X <sub>3</sub>	2.04	0.31	0.005	7000000	2500
X <sub>4</sub>	1.89	0.28	-0.250	1894.00	5000
X <sub>5</sub>	2.06	0.31	0.708	693	-

Source: Field Survey 2002

the farmers are underutilizing the land and that an increase in the unit of land given to the farmer will contribute more to the total revenue than to the total cost. The marginal value productivity of year of experience was ₦19.74. The MVP of the year of experience (X<sub>5</sub>) obtained cannot be compared with its acquisition value. The positive coefficient for year of experience suggest that as the year of experience of the farmer improves. Their age and education, their efficiency improve the role it played in improving the efficiency and productivity was well recognized. Experience via education, their efficiency improves.

The positive coefficient for year of experience suggest that there is a positive correlation between the age and level of education of the farmers which was found to improve efficiency and productivity.

The role it played in improving the efficiency and production was well recognized in the study. Experience via education not only helps in better crop management decisions but also places the farmer in a better position to receive needful information based on past record of experience.

Marginal Value Productivity (MVP) of fixed capital is ₦1894.00 and was also found to be positive while its acquisition cost was found to be ₦5000 (Table 2). From the table it could be seen that MVP is lower than the acquisition cost of fertilizer. The implication of this is that the producers are over-utilizing the fixed capital available to them and that an increase in the level of fixed capita used by the farmer will contribute more to total cost than to total revenue.

The marginal value productivity (MVP) of labour was ₦800 and was found to be (labour, X<sub>2</sub>) positive while its acquisition cost was ₦600. From this it could be seen that MVP was higher than the acquisition cost of hired labour. This implies that labour was under-utilized and that an increase in the unit given to the farmer will contribute more to the total revenue that to the total cost.

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