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Full Length Research Paper

Economic recovery of backyard rabbitory for self sufficiency in Oyo State, Nigeria

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Nigerians are finding it difficult to adequately feed and provide basic necessities of life to their families. This is in spite of the country's numerous and diverse natural resources. For rural Nigerians to be provided with much needed animal protein, efforts have to be doubled towards producing meat at a reasonably affordable price and at the shortest possible time. The study investigated how backyard rabbitory can bring about economic recovery and self-sufficiency in Oyo State, Nigeria. Two hundred and twenty (220) farmers were randomly drawn from thirty-two villages in the study area. Structured questionnaires were used to collect information from the respondents. Statistical analysis was accomplished by means of frequency distribution, means, percentages, budgetary analysis, profitability ratio and multiple regression technique. The results of the analysis showed that average total cost per head of rabbit was ₦190.33 and the average total revenue per head of rabbit was ₦465.62k. This gives a gross margin of ₦357.20k and net return of ₦ 275.29k per head rabbit. The multiple regression results showed that there is a significant relationship between total revenue and the educational level, farms size, labour and cost of feed. The study further revealed that the sum total of elasticities of variables was less than unity (0.977) which indicates that rabbit production in the study area fell in the rational stage of production (stage II). It is concluded that the backyard rabbitory can be used as a source of protein and cash income thereby enabling the farmers to attain both nutritional, self sufficiency and economic recovery.

Key words: Rabbit, Cobb-Douglas production function, elasticities, return to scale, profitability ratio.

INTRODUCTION

In Africa particularly Nigeria, the small holder agriculture is the main source of employment for the majority of the rural population, thus, success of food security hinges largely on the productive activities of small holders farmers. In fact, there is a considerable agreement with the notion that an effective economic development strategy depends critically on promoting productivity and output growth in the agricultural sector, particularly among small-scale producers (Dorothee and Kabore, 2004). Nigeria, as the most populous African country with over 99 m people is yet to achieve self sufficiency in food and raw materials production. This is inspite of the country's numerous and diverse natural resources.

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Provision of adequate food, especially animal protein, to Nigeria's teeming population should be the concern of policy makers and nutritionist in recent years; there have been expression of concern at rather low levels of animal protein intake by Nigerians, particularly among the rural communities which constitute the overwhelming majority of the population (Oluyemi and Roberts, 2000). The problem of protein deficiency in Nigeria is obvious and severe in children and infants than others. This has been a major source of concern to Nutritionists, Medical professionals, Government and third World Citizens, Also, the amount of animal protein per day an adult of 60 kg is 36 g but as earlier said, the consumption level is about 28 g which is less than minimum requirement recommended by FAO expert (FAO, 1985; Olomu, 1995).

The major constraint in achieving the country's goal of self-sufficiency in animal production is the non-availability

of year-round feedstuffs especially for the traditional livestock (cattle, sheep and goat). In most parts of the country, poultry production is also not easy to go by due to very expensive cost of production and management. The larger animals such as cattle take a considerable length of time to reach slaughter weight. For rural Nigerians to be provided with the much needed animal protein, efforts have to be doubled toward producing meat at a reasonably affordable price and at the shortest possible time. Rabbit, which are mainly kept by people in the tropics as a source of food and/or as a source of cash income could bridge the supply-demand protein gap and it is by far the most appropriate system for a nation to attain self-sufficiency in meat and also get easy cash. Being herbivores, rabbit do not compete with humans for their food and are easily adapted to different environments. It can be kept where tsetse fly is a problem. Rabbit is a good scavenger on home roughage or kitchen by-products and capital requirement for the animal and equipment is reasonably low and affordable (Adaku et al., 2000). However, because of the prolificacy of rabbit and ability to utilize forage efficiency, the protein needs of people living predominantly in rural environments where forages are plentiful can be easily met when raised with appropriate techniques (Oladunjoye et al., 2006). Despite the benefits derived from the rabbit sources both in terms of protein intake and economic returns, its production is still grossly inadequate. This study is therefore carried out to recover the economic status of background rabbitory for self-sufficiency and thereby improve the welfare of the farmers. Specifically, the study to:

(i) Determined the cost and returns to rabbit production
(ii) Analyzed the factors affecting rabbit production and
(iii) Identified the major constraints associated with rabbit production in the study area.

Theoretical consideration

The production function stipulates the technical relationships between inputs and output in any production schema or processes. The analysis of both technical and economic characteristics of method or techniques that can be used in the production of goods and services at the most economical cost and optional combination of factors-inputs is referred to as production theory. This theory deals with alternative methods by which resources can be combined in an optional manner to produce goods and services capable of satisfying the needs to the final consumer (Oyetunji et al., 1998).

A production function is a mathematical representation of relationship that exists between the inputs and the output in a process of production. This is specification of the minimum quantity of inputs required to produce a desired level of output. In mathematical terms, this function is assumed to be continuous and differentiable. Its differenttiability enables us to establish the rates of return.

Assume an implicit, continuous and differentiable function of the form $Q = f(X_i)$ where Q is the output (measured in kg/₦) and X_i are the input (labour (mandays), land (Ha)...). Then, the production parameters of interest are:

AP= $\frac{Q}{X} = \frac{f(X)}{X}$ -------- Average product

MP= $\frac{dQ}{dX} = f'$ -----Marginal product,

Rate of return can also be established in three main ways; the first of these returns is the case of constant returns. This states that each additional unit of input results in a constant rate of increase in output. The second of these rates of return is that of increasing returns. This states that each additional input of productive resources results in a larger increase in product than the preceding unit. Actual cases of increasing returns are not very common in agriculture. But when such cases are observed, they occur at relatively low levels of output, that are characteristics of small-scale peasant farming. The last of the three is the case of decreasing /diminishing returns. This is the case in which each add-itional unit of inputs results in a smaller increase in pro-duct than the preceding unit. This is the case that we would normally expect to find in the production of farm animals and crops. It is characteristics of the stages when optimum efficiency of production or resource use is being approached, as well as the situation where there exists a misallocation or over-utilization of inputs beyond the points of technical efficiency.

Since production function relates inputs and outputs, they are used to determine how much of an input to produce which also implies how much of the various inputs to use. It is conceivable that inputs such as land, labour and capital can be quantitatively measured without difficulty but environmental factors and management cannot be quantitatively determined particularly in small farmer production. This explains why production functions are usually defined for a particular area at a particular time for particular level of technology and management (Adegeye and Dittoh, 1985).

METHODOLOGY

The study was carried out in eight Local Government Area of Oyo State, Nigeria. They were purposively selected because of higher concentration of rabbit farmers in the area, four villages were randomly selected from each Local Government Area. Eight (8) respondents were selected by using simple random sampling technique from each village giving a total of two hundred and fifty six (256) rabbit farmers. Out of 256 questionnaire that were distributed among the rabbit farmers in the study areas, 36 of them were not found useful due to improper treatment given to them; hence, 220 questionnaires, were properly filled and were used for the purpose of this study. Gross margin analysis, net return analysis, and profitability ratio were used to examine the profitability

Table 1. Socio-economic characteristics of the respondents.

Mean	Percentage
Age	34 years
Educational level	12 years
Sex: Male	71.7
Female	28.3
Experience	3 years
Family size	5
Source of initial capital	
Personal savings	50
Friends/Relatives	10
Cooperative society	15
Multiple source	25
Labour	2
Breeds of rabbit	
California	3
Flemish giant	11.7
Campagne d'argent	11.7
New Zealand	5.0
Cross breed	6.6
Multiple breed	60

Source: Field survey, 2008.

of rabbit farming while production function analysis was employed to determine the productivity of the farm. Gross margin analysis is given by the equation as:

$$GM = TR\text{-}TVC$$

Where, GM = Gross Margin (#), TR = Total Revenue (#), TVC = Total Variable Costs (#), Net return analysis is given by

$$NR = TR\text{-}TC$$

Where NR = Net return, TC =Total Cost (#).

Profitability ratio analyses were employed so as to know the performance or Economic Net worth of the respondent. This is determined by the use of:

(i) Benefit - Cost Ratio BCR = Total Revenue / Total Cost,
(ii) Rate of Return ROR = Net Return / Total Cost,
(iii) Gross Ratio, GR = Total Cost / Total Revenue,
(iv) Expense Structure Ratio ESR = Fixed Cost / Total Cost

The production function postulated for rabbit farmers is implicitly presented by

$$Q = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, \varepsilon_i)$$

Where, Q = Total revenue, X_1 = Educational level of farmers (years), X_2 = Age of farmers (years), X_3 = Years of farming Experience (years), X4 = Family size (No), X_6 = Farm size (Number of rabbit owned), X_7= Cost of feed (#), ε_i = Error term which is assumed to have a zero mean and constant variance.

The Linear, Semi log and Cob-Douglas production function were evaluated using ordinary least square method.

RESULTS AND DISCUSSION

Socio- economic characteristics

Table 1 summarizes the mean of the socio-economic characteristics of the respondents. The mean age of the respondents for the study area was 34 years. This implies that youth are mostly engaged and that there is a future for the industry as the ageing farmers have replacement by the middle age, matured, strong and productive ones. The average number of years spent in school by the respondents was 12 years indicating new and upward opportunity innovations and technology for the respondents. The average years of experience (3 years) showed that most of the farmers (75%) were just coming into the business, probably due to lack of awareness of how lucrative the rabbit productions were. Inadequate capital resources were observed in the respondent source of initial capital. The study revealed that 50% of the respondents got their capital through personal savings. The implication of this is that the respondent found it difficult to start on a large scale due to limitation of fund. The average number of hired labour used was 2. This implied that, labour requirement in rabbit production is very low and thus, definitely reduced cost of production consequently increasing the profit level of the respondents.

Gross margin and net return analysis

The average total cost per head of rabbit was N190.33 while the average total revenue per head of rabbit was #465.62k. This gives a gross margin of #357.02k and Net Return of #275.29k.

Gross Margin/head = Average Total Revenue –Average Variable Cost

= #465.62 – #108.60
= #357.02k

Net Return/head = Average Total Revenue – Average Total/Cost

= #465.62k- #190.33
= #275.29

The implication of these is that, rabbit production is profitable in the study area.

Table 2. Profitability ratio of rabbit production.

Item	(%)
Benefit cost ratio	2.45
Rate of return	1.45
Gross ratio	0.41
Expense structure ratio	0.43

Source: Field survey, 2008.

Profitability ratio

The summary of the profitability ratio is shown in Table 2. The detailed information is as follows:

(i) Benefit Cost Ratio (BCR): The high ratio of (2.45) shows an increase in returns. It thus indicates that, the enterprise is profitable even with the little capital invested into it. It is probable that with increased capitals (other sources apart from personal sources) and skilled labour with good management practices, this ratio will increase more than this,
(ii) Rate of Returns (ROR): High rate of 145% was obtained for the rate of return. This shows that for every #1 invested in rabbit production, #1.45k is gained by the respondents,
(iii) Gross Ratio (GR): The ratio obtained was 0.41 which implied that from every #1.00 return to the industry, #41.00k is being spent,
(iv) Expense Structure Ratio (ESR) - The value of ESR was 0.43 meaning that about 43% of the total cost of production is made up of fixed cost component. This makes the business worthwhile to invest.

Problems encountered in rabbit production

The main problems encountered with rabbit raising included their apparent helplessness and defense lessness. High mortality rate as a result of too much water and too much heat posed as lot of management problems to the farmers. Lack of awareness about rabbit production and marketing made quick disposal of the rabbits in the study area a problem. Other pertinent problems are inadequate fund to produce in large quantities and poor management practices.

Estimated production function

In order to isolate the critical factors affecting rabbit production in the study area, a structural relationship was specified. The total revenue (TR) was regressed on the educational level of farmers, age, years of farming, farming experience, family size labour, farm size and cost of feed. Four functional forms (linear, semi log, exponential and double log) were used, but the double log was chosen. The choice of the line as function is predicated on its confirmation to apriori expectation in terms of signs and magnitude of the coefficient, the number of significant variables and the coefficient of multiple determination (Olayemi and Olayide, 1981). The regression result is as shown below:

$$\underset{}{\text{Log } Q = 5.68} + \underset{(2.821)}{0.126\log X_1}^{*} + \underset{(0.043)}{0.009\log X_2} + \underset{(1.062)}{-0.072 \log X_3} + \underset{(-1.960)}{0.511\log X_6}^{*} + \underset{(0.432)}{0.516 \log X_7}^{*} - \underset{(-0.890)}{0.062 \log X_4} - \underset{(-0.014)}{0.051\log X_5}$$

$R^2 = 0.732$ $R^{-2} = 0.602$ $F = 15.324$

* Significant at 5%

The value in parenthesis under regression coefficients are standard error of the coefficients. The R^2 for the estimates regression showed that about 73% of variation in total revenue of rabbit's farmers in the study area was explained by the explanatory variables with the remaining 27% unexplained which was due to random variable. These may be due to:

(a) Mis-specification of the equation
(b) Non-randomness and
(c) Violation of certain assumption (Olayemi and Olayide, 1981).

Three of the estimated coefficients of variables (experience, family size and labour) had negative signs which indicated that a decrease in any of these variables would increase the level of total revenue of the respondents "ceteris paribus." The coefficients of variables, education, age, farm size (Number of rabbit) and cost of feed showed positive signs which indicated that an increase in any of these variables would decrease the total revenue of the respondents ceteris paribus. The coefficient of variable cost of feed was positive and significant because as rightly stated by Oladunjoye et al. (2005) that rabbit like any other livestock needs adequate feeding in combination with good health maintenance in order to be a profitable venture. Although, domestic rabbit are herbivores and consumes most types of grains and hay, supplementation with concentrate is needed to improve the performance of the rabbit.

The coefficient of the variable labour was negative but significant in the study area. Rabbit production requires strict sanitation practices such as cleaning all cages and water containers every day and collecting forages from uncontaminated area. By this, the chances of any disease outbreak can be drastically minimized. Another significant coefficient is that of the farm size that is the number of rabbit kept. Rabbits are highly prolific, with gestation period of 30 - 31 days; a good rabbit can produce 10 times her own weight within a year. This ability to increase in size is a function of adequate feeding,

Table 3. Elasticity of production and returns to scale (RTS) of rabbit farmers in Oyo State, Nigeria.

Independent variables	Elasticity of production
X_1	0.126
X_2	0.009
X_3	-0.072
X_4	-0.062
X_5	0.051
X_6	0.511
X_7	0.516
Return to scale	0.977

Source: Field survey, 2008.

better management including housing and disease control. The significant coefficient of variable education indicated that educational level of the farmers had a positive influence on the manner with which they responded to new and upward opportunity innovation and technology which ultimately lead to increase total revenue. The coefficients of the variables that are significant at 5% level of significance are educational level, labour, farm size and cost of feed.

Elasticity of production and return to scale

The total sum of elasticities of production of the variables was shown in Table 3. The results thus suggest that rabbit production in the study area had a decreasing positive return to scale. At this point, each additional unit results in a smaller increase in product than the preceding unit. Rabbit production in the study area falls within the rational stage (stage II) of the production function. This implies that the more input used, the higher the profit even though, at a decreasing rate.

Conclusion

Stemming from above discussions rabbits are easy to raise as they do not require heavy initial capital investments and operating cost. Thus, it can be concluded unequivocally that rabbit production is a viable venture in Oyo State, Nigeria. They can be raised as a means of securing easy money. Thus, rabbits which can be raised in the backyard can be kept as source of protein and cash income, thereby enabling trouble - ridden countries like Nigeria attain in both nutritional self-sufficiency and economic recovery.

Policy Implication

(i) Public awareness should be made where enlightenment campaign on benefits of rearing rabbit should be encouraged to boost- consumption and expand market horizon,
(ii) More credit facility that will attract little interest should be produced by the government through agricultural banks to rabbit farmer in other to encourage large-scale farming,
(iii) Banning of importation of frozen meat should be put in place so as to encourage local rabbit production and other livestock,
(iv) Rabbit production could also be encouraged through periodic training and workshop in rabbit management practices, feeds, feeding and adequate disease management by the extension agents.

REFERENCES

Dorothee BK, Tambi S (2004). Micro economic Growth, Sectoral Quality of Growth and Poverty in Developing Countries: measures and Application to Burkina Faso" Forum Paper presented at African Development and Poverty Reduction: The macro-micro Linkage Workshop at Lord Charles Hotel, Somerset West, South Africa.

Food and Agricultural Organization (FAO) (1985). Expert Committee Report on agriculture, Food and Agriculture, Rome.

Olomu JM (1995). Monogastric Animal Nutrition: Principles and Practise. A Jachem Publication Nigeria.

Olayemi JK, Olayide SO (1981). "Element of Applied Econometrics" CARD, 195-199.

Oladunjoye IO, Ojedapo LO, Ojebiyi OO (2005). Essentials of Non-Ruminants Animal Production (A monography) Positive Press, Iwo Road, Ibadan, Oyo State.