

# Profitability and Constraints to Rabbit Production under Tropical Conditions in Nigeria

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## Abstract

The present research investigated the profitability and constraints to rabbit production in Osun State, Nigeria. Multi- stage sampling procedure was used to select 60 rabbit producers and subjected to descriptive and budgetary analyses. The mean age of the rabbit producers was 43 years, and 15% of the respondents were female. About half of the farmers had post-secondary education. Total revenue and net returns from the sales of rabbits were \*~~N~~50, 000 and ~~N~~20, 530 respectively. The major constraints faced by the farmers in the area (in descending order) were soldier ants' attack, premature death of fryers, marketing problem and predators. Rabbit farmers should have access to credit through micro and macro finance from formal and informal sources. Viable and well-established markets are required to enhance marketing opportunities for rabbit meat.

**Keywords:** Rabbit; Production; Economics; Tropics; Nigeria

## Introduction

In recent years there has been increased awareness of the advantages of rabbit meat production in Nigeria as a means to alleviate food shortages. This is largely due to the rabbit's high rate of reproduction; early maturity; small body sized; rapid growth rate comparable to that of broiler chicken (Rao, et al., 1977) high genetic selection potential; efficient feed and land space utilization, limited competition with humans for similar food; and high quality nutritious meat (Cheeke, 1980; Arijeniwa, et al., 2000). Rabbit has the ability of turning forage into high protein and yet remains within the investment ranges of the poorest families (Smith, 1991).

Rabbit has been identified as an economy livestock that could bridge the wide gap in dietary protein intake in Nigeria (Cheeke, 1980). It is a micro-livestock producing about 47 kg of meat per doe per year, which is enough to solely meet the animal protein requirements of a medium sized family under small scale rural farming systems. (Adedeji, et al., 2012; Hassan and Owolabi, 1996). Besides, rabbit meat is rich in vitamin B and extremely low in cholesterol and sodium levels (Jithendran, 2000; Omole, et al., 2005). As a result of a number of characteristics that are advantageous to smallholder subsistence rabbit farmers coupled with a greater recognition that rabbit farming has significant potential to improve food security and nutrition in Nigeria which can reduce, to some extent the country's malnutrition problems, and the diminishing bush meat supply which has been a strong impetus to small-scale rabbit farming, complete economic analysis is needed in order to know the full production potential and how to increase profit. Therefore, the objective of the study was to determine the profitability of rabbit production enterprise and also identify constraints associated with its production in the study area.

## Materials and methods

The study was carried out in Ife Area of Osun State, Nigeria. A multi-stage sampling procedure was employed in selecting the sample. First stage involved a purposively sampling of four Local Government Areas (LGAs) out of 36 LGAs in the State noted for rabbit production. The list of farmers involved in rabbit production and management in the selected LGAs was provided by the Agricultural Development Programme (ADP) officials in the study area and this constituted the target and sampled population. The second stage involves selection of four villages from each of the LGAs, a total of 16 villages. At the final stage, an average of four respondents was selected from each chosen village using simple random selection method at each sampling stage, thus, totaling 64 respondents. Out of the 64 copies of the questionnaire administered only 60 were found analyzable. Primary data were collected based on production activities for 2013 season with a structured questionnaire using interview schedule to obtain information on major socio-economic characteristics of the farmers and the enterprise, prices and quantities of inputs and output and constraints to production in the study area.

Descriptive statistics (mean, tables, and percentages) and gross margin analysis were used to analyze the data obtained. The socio-economic variables such as age of the farmers (years), sex, experience of farmers in rabbit production (years), years of schooling, family size and problems associated with rabbit production were analyzed using descriptive statistics. Gross margin analysis was used to determine the profitability and returns per naira. Gross margin is the difference between the Total Revenue (TR) and the Total Variable Cost (TVC) per unit of fixed input required to produce the crop or a particular livestock products (Alimi and Manyong, 2000). Return per naira (RPN) was calculated using the formula,  $RPN = NR / TC$ . Where NR = Net returns and TC = Total Cost (Utomakili and Aganmwonyi, 1995) and (Ogbonna and Ezedinma, 2005).

The various ratios were computed to explain the extent to which a rabbit farmer employs the production factors at his disposal to the fullest in order to achieve some desired goals.

- i) Operating expense ratio = Total Variable Cost / Gross Revenue
- ii) Net farm income (NFI, Profit) = Gross margin (GM) – Total fixed cost (TFC)
- iii) Benefit Cost Ratio (BCR) = Total Revenue (TR) / Total Cost (TC)

## Results and Discussion

### Socio-economic characteristics of farmers

The socio-economic characteristics of people are known to affect their standard of living (Eremie, 1983). The mean age of the rabbit farmers was 43 years, indicating that farmers were in their active and productive years who can easily adopt innovations that could enhance rabbit production (Table 1). The age of the farmers has important bearing on the effectiveness in performing management function on the farm and therefore affects his productivity. The production of rabbit in Osun State is gender biased; male (85 per cent) while female (15 per cent), the enterprise is male dominated. Similar observations were made by (Adedeji, et al., 2012). The reason

for low female participation in rabbit rearing may be due to other activities such as caring for the home, rearing of the children, fending for the home as well as other household chores which the women were involved and which may take more of their time.

Majority of the farmers were married with mean household size of 7 (Table 1). The enterprise used mainly family labor (85 per cent). This implies that the rabbit farmers have adequate family members that can provide cheap labor. Family labor serves as cheap and readily available source of labor if well-coordinated. Family labor is a critical input in the study area and was a major characteristic of farmers in the study area. Less than 20 per cent of the farmers did not have formal education. About half of the respondents have higher level of education, an attribute that can enhance their ability to obtain relevant information unguided since they could read and write in at least English Language and Yoruba (Local Language). Upton (1987) reported that education has an important influence in managerial ability and decision making; therefore, it may be concluded that producers will be able to adopt new technologies. Most of the respondents were not new in the business. Farmers who had stayed longest in the business started 24 years ago while the youngest entrant into the industry entered 5 years ago. The mean year of experience in rabbit farming was 14.4 years. The interview revealed that relatively new entrants ventured into the rabbit production due to down turn in economy in the last 10 to 15 years. The reason stated for going into rabbit farming was that rabbit are prolific in terms of offspring (kg/year/doe) and will breed all year round if well-managed. It requires little space than large livestock due to its small body size. This is important, especially in areas where there is shortage of agricultural land. Limited cost of the animals and of the housing structures. Rabbits are easy to transport and market and the recurrent costs for maintaining animals beyond the optimum are low.

### Farm Characteristics

The two most popular breeds reared are New Zealand and the Californian. These breeds are most popular because they combine white fur (preferred by processors) and good growth characteristics. Most of the farmers reared exotic breeds (78.3 per cent). All the farmers were engaged in other livestock production such as poultry (73.5 per cent), goats (10.3 per cent). Only very few farmers raised pigs and ducks as a result of their religious believes.

The purpose of rabbit production ranges from consumption (40 per cent) to sale (60 per cent) (Table 1). Both weaners and market weight rabbits were produced. Only 7 per cent of the respondents sell dressed animals (which command higher prices) directly in response to the demand of their customers. However, majority (90 per cent) of the respondents sold through individual contacts.

**Table1: Characteristics of rabbit farmers and enterprise**

Socio- economic characteristics of rabbit farmers		Characteristics of the enterprise	
	(%)		(%)
<b>Age (Yr); mean 42.8</b>		<b>Breeds Kept</b>	
20-29	13.3	Exotic breed	78.3
30-39	21.7	Local breed	8.0
40-49	40.0	Crosses	13.7
50-59	18.3	<b>Livestock reared with rabbit</b>	
60-69	6.7	Poultry	73.5
<b>Gender</b>		Goat	10.3
Male	85.0	Sheep	5.0
Female	15.0	Others	11.5
<b>Family size; mean 7.0</b>		<b>Enterprise objective</b>	
0-3	10.0	Household consumption	40.0
4-7	61.7	Sales	60.0
8-11	20.0	<b>Flock size</b>	
12-15	8.3	1-20	43.3
<b>Labor source</b>		21-40	18.3
Family labor	85.0	41-60	16.7
Hired labor	15.0	61-80	21.7
<b>Literacy level (Years)</b>		<b>Feed and feeding pattern</b>	
Primary	5.0	Pellet, forage & household waste	39.9
Secondary	26.7	Pellet only	10.0
Tertiary	53.3	Pellet and forage	35.0
No formal Education	15.0	Forage only	15.1
<b>Experience in Rabbit prodn (Yr); mean 14.4 yr</b>		<b>Housing used</b>	
5-9	14.3	Cages	79.0
10-14	34.7	Mud	21.0
15-19	40.8	<b>Marketing of rabbit</b>	
20-24	19.2	Open market	3.3
		Individual contact	90.0
		Both	6.7

Rabbits require a conducive environment for an optimal production. Most (79 per cent) of the respondents housed their rabbits in cages, out of which 46 per cent kept their cages in open space, 33 per cent under shed. The remaining farmers (21 per cent) used mud housing. The type of environment around most rabbit pen is residential building (75 per cent). This shows that most farmers live very close to where their pen is located. Complaint by farmers about the use of wood materials is that rabbits will eventually chew through the wood and escape or weaken the hutch structure, making rabbits more vulnerable to predation.

Livestock echo (1997) noted that special consideration must be given to the choice of hutch materials for rabbit keeping stressing on the attribute of rabbits to gnaw at any cage materials used to house them. The same argument is levied against the use of non-plant, natural materials, such as concrete, mud and stone, where rabbits can dig or burrow their way out from the hutch or pen enclosure. In some cases, welded wire is preferred, especially for farmers who are well established, but it should only be used without placing the farmer at high economic risk. Diet quality has been a major limiting factor of production in many rabbit programs. On farms it has been observed that a poor variety of feeds is provided (e.g., only grass). It was observed that less than 20 per cent of the respondents fed their rabbit solely with forage due to lack of capital to buy pellets while others fed with various combinations of pellets and other feeds sources. Almost 40 per cent of the farmers fed their rabbit with combination of pellet, forage and household feeds. There is significant difference on the flock size distribution. The category 1-20 rabbits have the highest percentage (43.3 per cent) followed by the 21-40 (18.3 per cent) and least in the category 41-60 was 16.7 per cent. The mean flock size of rabbit farmers was 34, which signify that farmers in the area of study were at commercial level of production.

### Profitability measures

The estimated costs and returns to rabbit production enterprise with 100 matured rabbits are shown in Table 2. The cost of variable inputs was ₦ 24,400 (Nigerian currency, 1\$ = ₦ 154) while fixed cost for the average enterprise size was ₦ 5,070 (with depreciation charge of 1,200 and cost of foundation of ₦ 3,870). The revenue from sale of matured rabbit was ₦ 50,000 (100 matured rabbits X ₦500) and total costs of ₦ 29,470. Gross margin was ₦25, 600, net farm income (profit) and the profit margin percentage was ₦ 20,530 and 41.06 per cent, respectively. The ratio of returns to total expenses (return per naira invested) was 1.7. This implies that for every ₦1 expended, there is a return of ₦1.7 to the enterprise.

**Table 2 Enterprise budget for rabbit production in Osun State**

Item	Parameter	*₦	₦
1	Revenue		50,000
2	<b>Variable Cost</b>		
3	Labor cost	8,800	
4	Feeding cost	15,600	
5	Total variable cost (TVC)	24,400	(24,400)
6	<b>Gross Margin</b>		25,600
7	<b>Fixed cost</b>		
8	Depreciation of fixed asset	1,200	
9	Cost of foundation stock	3,870	
10	Total fixed cost (TFC)	5,070	
11	Total cost (TVC + TFC)	29,470	
12	Net farm income (Profit) (6 – 10)		20,530
13	Profit margin % (12 ÷ 1 X 100)		41.1%
14	Return per investment (₦) 1 ÷ 11		1.7
15	Operating Expense Ratio (%) 5 ÷ 1		48.8%

\*₦ (Nigerian currency) = 1\$ = ₦ 154

The operating cash expenses ratio was 48.8 per cent which connoted that 48.8 per cent of the gross revenue was used to cover the operating expenses. About 51 per cent of gross revenue went to farmer's equity and unpaid labor and management. This agrees with Akanni and Odubena (2003) in their study on costs and returns to rabbit production in Ijebu-Ode Local Government Area of Ogun State, Nigeria who found out that rabbit rearing was profitable with a profitability index of 0.43. The return per Naira outlay was 1.9. Using all these measures of performance, rabbit production in the area was profitable.

### Analysis of production constraints

The constraints, which hinder the production of rabbit in Osun State and reduced the level of profitability, are (a) poor housing, as rabbits are not yet commercialized; they are not accorded proper housing resulting in poor animal performance. (b) high cost of feeds and feeding especially during the dry season period. Ozor and Madukwe (2005) reported nutrition and housing as some of the constraining factors in the adoption of improved rabbit technologies by small-scale farmers. Similar observations were made by Oseni, et al (2008) in western Nigeria; (c) premature death of fryers, as rabbit farming is in its infancy, diseases and parasites of rabbits are

not known to the extension agents who are not adequately equipped to impart knowledge and skills to rabbit producers. Ozor and Madukwe (2005) reported health care challenges in small-scale rabbit production in Nigeria. The health care challenges included difficulty of rabbit producers to procure specific drugs for specific treatments of rabbit illnesses, inability to promptly isolate sick animals and difficulty of access to veterinary services; (d) marketing problem, there is no established, state-wide marketing system as we see for other livestock industries. In most cases producers must develop their own markets. However, there appears to be good domestic demand for meat rabbit in the study area. (e) poor quality foundation stock, there are no known rabbit breeders in the country and this contributes to the industry not growing. Oseni et al. (2008) found principal challenges facing the smallholder rabbit production to be difficulties in getting reliable and stable sources for foundation/replacement stock and theft. (f) lack of capital, few of the respondents mentioned inadequate capital as a production constraint. This could be an indication of relative low capital required in establishing the enterprise. Efforts in assisting farmers should be directed at these major constraints in the study area.

### Conclusions and recommendations

Based on the results obtained from the analysis of the data provided by this study, the following conclusions and recommendations were made with a view to encourage rabbit farming as a profitable enterprise among farmers:

- 1) Provisions should be made by government and other stakeholders in the agricultural sector to grant rabbit farmers access to credit through micro and macro finance from formal and informal sources. This will encourage farmers in embarking on large scale production, purchasing concentrates feeds which in turns have a positive effect on the quality of rabbit that will be sold either for consumption or breeding purposes.
- 2) The existence of viable and well-established markets is an important economic incentive for farmers. Many rabbit projects have failed because of inadequate marketing opportunities for rabbit meat. According to Omole, et al., (2005), rabbit meat could have been high in export promotion in sub-Saharan Africa, but lack of facilities for storage, lack of market organization and improper means of preservation has resulted in the reduction and in export potency. The problem of marketing can largely be prevented through prior marketing research and evaluation conducted in the feasibility and / or design stage of the rabbit project
- 3) Since inadequate information on rabbit management, inadequate veterinary services, poor markets for production are among the problems facing rabbit farmers in the area of study. Farmer should be given more orientation on the problems mentioned by the extension arms of government.

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