Original Research

Estimation of the Cost and Revenue of Rabbit Production in Some Selected LGAs In Kwara State, Nigeria

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Abstract

The livestock industry is essential to the rural economy and way of life, the impoverished actually contribute to this sector's success. In Nigeria, rabbit farming is thought to be one of the most promising ways to close animal protein deficit. Thus, this research looks at the costs and revenues associated with producing rabbits in Kwara State. Techniques for multistage sampling were used to gather 240 primary data points that were helpful for further examination. Descriptive statistics, gross margin analysis, and the stochastic frontier model were used to examine the data. Respondents who were male and female, young and elderly raised rabbits. The mean age of the respondents was 45.49 years, which is within an active range that can lead to competence and effectiveness. Since rabbit production is a modest occupation for the majority of farmers (70.4%), it has not been completely accepted as a substantial source of income in the research area. A strong skill set for implementing innovation in the rabbit production industry is correlated with farming experience. According to the study, selling pregnant and mature female rabbits (doe) is more profitable than selling other types of rabbits. According to a cross-tabulation analysis, university education increased the profitability of rabbit enterprises, as evidenced by the fact that 28.49% of respondents with earnings of over ₦ 250,000 on rabbit enterprises had completed their education. The study comes to the conclusion that the income, economic standing, way of life, and general well-being of rural households were significantly impacted by the production of rabbits.

Keywords: Livelihood; Livestock; Net Farm Income; Rabbit Production; Revenue

1. Introduction

Nigeria's agricultural industry continues to be the biggest contributor to the GDP of the country's economy. It has employed about 60% of the labor force and contributed an average of 39% of the GDP of the nation over the previous 20 years. In fact, more than 80% of the nation's rural residents depend on agriculture for their livelihood, either directly or indirectly (National Bureau of Statistics, 2005). In light of this, the cattle industry is essential to the rural economy and way of life. In this industry, the impoverished directly contribute to growth rather than reaping the benefits of growth produced elsewhere. (*Ayeni et al*., 2023). For the majority of farmers, the industry is a vital source of income,

providing essential inputs to agriculture, enhancing household health and nutrition, boosting earnings, creating job possibilities, and acting as a savings account during hard times. It serves as an additional and supportive endeavor. Additionally crucial to the diversification of agriculture and the augmentation of income is livestock. The nation's entire economic development, as well as that of agricultural households, depends heavily on livestock. The Food and Agriculture Organization (FAO) projects that the growth rate of animal consumption will increase by 5% to 7%. Large animals find it difficult to keep up with this increase due to their slow production cycles. They may however be met by short life cycle animals like poultry, rabbits, pigs. Poultry and pigs require food sources which are serious competition with man (Akinsola *et, al*., 2021).

It has been found that the drop in animal protein consumption in many developing countries worldwide is caused by an inadequate supply of animal protein from traditional livestock, such as cattle, sheep, goats, pigs, and chicken. (Agbede, 2019, Ogunwande, 2023). FAO (2022) estimates that 854 million people, or 12.6% of the world's population, suffer from severe malnutrition. In order to address this, Biobaku and Ekpeyong (2001) suggested that it is necessary to investigate non-conventional meat sources that are appropriate for small-scale farmers. A rabbit is classified as a mini-livestock with strong reproductive capacity by Iheukwumere and Okoli (2002). It possesses a certain quality that makes it a flexible financial reserve. It can Reproduce rapidly after giving birth, mature swiftly, have a brief gestation period, and are extremely prolific. Short generation intervals are caused by these characteristics (Lebas et al., 1997; Effiong and Wogar, 2007). The current Agricultural Transformation Agenda (ATA) includes value chain development for rabbit production as a micro-livestock (Ogunwande, 2023). This is due to the enormous potential for rabbit production to meet the demand for animal protein intake. Low capital expenditure and a good feed converter are two more of these potentials (Biobaku *et al*., 2002, Mukaila *et al*., 2022).

Furthermore, rabbit farming has become profitable due to the animal's distinctive compact body, size, quick growth, and capacity to survive on forage. This is particularly true in certain parts of Nigeria where the meat is becoming increasingly popular. Trypanosomiasis has threatened the production of cattle and other animals in this alternative livestock. Due to its monogastric nature, rabbit meat has a different protein content than that of other animals (Aduku and Olukosi, 2000). In comparison to beef, pork, poultry, or lambs, the meat also has lower cholesterol, fewer calories, and a lower percentage of fat (Aduku and Olukosi, 1990). Thanks to its low cholesterol value, Daodu et al. (2021) claimed in his findings that it can be a life-saver for those with high blood pressure. Additionally, the meat is moist and tender, making it appropriate for all age groups, young and old. Given that it is a multiplier, pressure on the demand for chicken and mutton is anticipated to lessen (Houessou *et al*., 2022).

It has been noted that rabbits outperform cattle, sheep, and goats; nevertheless, when it comes to growth rate, feed conversion efficiency (FCE), and meat quality, rabbits are comparable to chickens. The most effective livestock animal in terms of converting feed to flesh is the rabbit (Agunbiade et al., 2001). According to Lebas and Matheron (2002), one kilogram of rabbit meat only needs 25% of the fed energy needed to create the same amount of lamb or beef, and only 70% of the feed needed to generate the same amount of pork. Because it involves little initial expenditure for housing and equipment, rabbit breeding is a great business venture for young people. With a pair of rabbits, a breeder can generate between 60 and 80 bunnies year for consumption or sale (Mondin *et al*., 2021). Proper feeding will maximize rabbit prolificacy and performance (Iheukwumere *et al*., 2005), however inadequate nutrition can cause rabbits to take longer to reach sexual maturity and yield a lower financial return to the farmer (Asuquo, 1993).

Past studies deduced that rabbit (Oryctolaguscuniculus) appears to be the most sustainable means of producing high quality animal protein for the expanding populations of the LDC's like Nigeria (Ayeni, *et al*., 2023). These attributes of rabbit's meat preferred for consumption include: among others include: price affordability, low-cost in

management, small-bodied size, short-gestation period, fecundity, rapid growth rate, genetic diversity, ability to utilize forage and agricultural by products, and productiveness, adaptability to any ecological environments. Past studies indicated that in Nigeria, Up to 1.7 million rabbits are thought to be produced annually (RIM, 2012). Because eating meat is safe and widespread among the elderly, there has been a growth in rabbit production and knowledge of its consumption in recent times. Therefore, it is essential to investigate the variables affecting the production and use of rabbit meat.

2. Methodology

2.1 Study Area

Kwara state served as the study's location. One of Nigeria's six States in the country's north and center is Kwara state. There are sixteen Local Government Areas (LGAs) in the State, making up 74,256 square kilometers (8%) of Nigeria's total area of 923,768 square kilometers. With 254,242 hectares of agricultural land, there are 247,975 farming families in the State. Between latitudes 7°45N and 9°30N and longitudes 2°3039E and 6°35E, the State is located. Approximately 2.37 million people call this place home [National Population Census (NPC) 2006]. The State experiences high rainfall in May and June and September and October, with lowest rainfall of 1,500–1,600 mm occurring between April and October. November through February has almost no rainfall, with mean temperatures between 30°C and 35°C [Ministry of Agriculture and Natural Resources (MANR, 2004)] The state's boundaries with Kogi and Osun state are shared through the Ekiti Local Government. Additionally, the State's northern Baruten Local Government shares international borders with the Benin Republic. The State is known as the gateway between the Country's North and South because of its exceptional geographic location. Over 80% of the state's population lives in rural areas, where agriculture is their primary source of income (National Bureau of Statistics, 2005). The State's main crops are sweet potatoes, cassava, yam, cowpea, groundnut, maize, sorghum, soya beans, melon, okra, pepper, and some leafy vegetables. Poultry, goats, sheep, and cattle are among the livestock raised there. Bush fallow and mixed cropping are the main agricultural practices, with a focus on subsistence farming. Some farmers also work in woodwork, welding, blacksmithing, and weaving. The population of Kwara State is diverse, drawing people from the Yoruba, Nupe, Baruba, Fulani, and Hausa ethnic groups. The Yoruba people make up the majority ethnic group in the state, and they speak a language that is widely used there.

2.2 Sampling Techniques and Sample Size

The study adopted a multi-stage sampling technique for data collection. The first stage was to identify areas where rabbit is produced and processed in the State. Hence, four local government areas were identified as a rabbit production area. In the second stage, three towns/villages were randomly chosen from each of these selected four local governments areas listed, to give a total of twelve (12) communities. The selected towns/villages are regarded as the top rabbit-producing areas. In the 3rd stage, twenty (25) rabbit farmers respondents were randomly selected from each towns/village, totaling three hundred (300). However, only two hundred and forty (240). Respondents' data that were useful for data analysis, the remaining sixty (60) questionnaires contained missing information, questionnaire not properly filed among others.

2.3 Method of Data Collection

For the study, both primary and secondary data were employed. Structured questionnaires were used to collect primary data. Socioeconomic details of rabbit farmers, such as age, gender, marital status, and family size, are among the data gathered, educational levels and years of experience Also, data on technical efficiency of production, profitability of rabbit production as well as that of the likely constraints to production of rabbit were collected. Secondary data were obtained from relevant literature and books from annual reports, journals, internets and other unpublished materials.

2.3.1 Method of Data Analysis

The main analytical tools used for the research are, the descriptive statistics, gross margin analysis, and stochastic frontier model

2.3.2 Descriptive statistics analysis

In the analysis of data, simple descriptive statistics such as percentages, frequency distribution, mean, mode, and ratios were used to show the precise description of the socioeconomic characteristics of the respondents.

2.3.3 Gross Margin Analysis

The costs and benefits of rabbit farmers in the research region were examined using this. The gap between total variable costs and gross agricultural income is known as the gross margin. Gross Margin analysis is a model that is used to assess the costs, returns, profitability, or loss per production, according to (Abu *et al.*, 201l).

Mathematically, GM is equal to TR-TVC, where TR is total revenue, TVC is total variable cost, and GM is gross margin. The profitability of farmers in the research region was indicated by the estimation of GM.

Profitability may increase with increased GM and vice versa.

$$GM = TR - TVC \text{ (1)}$$

Where GM = Gross Margin; TR = Total Revenue; TVC = Total Variable Cost

The estimation of GM revealed farmers profitability in the study area. Higher GM could mean higher profitability and vice versa.

3. Results and Discussions
3.1 Analyzing the study objectives
3.2 Description of the Socioeconomic and Demographic Characteristics of the Respondents

The results of the findings show that both males and females, young and old, Christians and Muslims engaged in rearing of rabbits. However, the number of male respondents is more than that of the female respondents as shown in table 1 below. A slight difference of 20% exists between the two. 60% 40% of respondents were women and 40% of respondents were men. The male's search for supplementary income to support their family may account for the small discrepancy. In the context of agricultural business, age is a significant socioeconomic element since it affects the availability and efficiency of labor for daily farm tasks. The respondents' mean age was 45.49

years, with a modal age group of 41–50 years. 83% of those surveyed fall into the active age range of 31 to 50 years which can result in effectiveness and competency. As indicated in the Table 2, 80 20% of respondents are unmarried, and the majority are married. One essential component of household welfare is education, which is measured by the human development index. Every respondent has had some sort of education. It is an indication of the caliber of labor and could possibly be the cause of the farmers' willingness to take risks given the adoption of rabbit production, which is still relatively new in the research field. The outcome further shows that 74.6% of the participants have completed postsecondary education, which influences their exposure to and degree of innovation adoption. It is demonstrated that 17.1% are secondary school leavers, 7.9% primary school leavers while less than 1% (0.4%) have Qur'anic education.

Meanwhile, the socio-economic characteristics of the respondents show that most of the Farmers (70.4%) practice rabbit production as minor occupation. It shows that rabbit production has not been fully taken as a major source of livelihood in the study area, this as a result of the fact that it was newly introduced and still under study. The respondents have their major occupations ranging from civil service, business, etc. A strong skill set for implementing innovation in the rabbit production industry is correlated with farming experience. Eighty-eight percent of the respondents had three to fifteen years of experience producing rabbits. The respondents had an average of five years of experience raising rabbits. It is anticipated that association membership will have an impact on the adoption of rabbit production, facilitate knowledge sharing, and offer potential answers to a range of issues that farmers may encounter. One quarter of farmers 25.8%—do not participate in any agricultural societies. However, 70.2% are members of the Rabbit Producer Association or the Cooperative Society. There are fewer rabbit farmers in the research region as a result of the majority of farmers (87%) not having access to extension services, which suggests that they lack sufficient expertise in the production and marketing of rabbits and their products.

Table 1: Socioeconomic characteristics and Demographic characteristics of respondents

Characteristics	Frequency	Percentage
Gender		
Male	144	60
Female	96	40
Total	**240**	**100**
Age		
≤ 30	36	15
31-40	71	29.6
41-50	98	40.8
≥ 50	35	14.6
Total	**240**	**100**
Mean Age	**39.9**	
Standard Dev	**9.8**	
Marital Status		
Single	48	20
Married	192	80
Total	**240**	**100**
Educational level		
Primary	19	7.9
Secondary	41	17.1
Tertiary	179	74.6
Quranic	1	0.4
Total	**240**	**100**
Experience		
≤ 3	46	19.2
3-5	85	35.2
6-9	29	12.1
>10	80	33.5
Total	**240**	**100**
Mean	**6.2**	
Standard Dev	**3.95**	
Association Membership		
Yes	178	74.2
No	62	25.8
Total	**240**	**100**

Source: Field Survey Data 2023

3.3 Estimation of the cost and revenue of rabbit production in the study area

This study estimated cost and revenue of various enterprise rabbit production. The results of this outcome were presented from in Table 2 below. The results revealed that selling of matured female rabbit (doe) and pregnant ones raked in the most revenue as the study depicts 22.08% and 9.58% for doe and pregnant ones respectively. The identified enterprises raked in over a million naira in a year. This thus suggests that the doe and pregnant doe enterprise is a high rewarding venture. However, selling of rabbit matured male, rabbit grower and weaner do not attract high revenue as these enterprises indicated a very low revenue on them.

Table 2: Revenue accrued to Rabbit Enterprise

S/N	Revenue Grouping	Rabbit Weaner	Rabbit Grower	Matured Male	Matured Female	Rabbit Pregnant	Rabbit Processed	Rabbit Fur
1	- 100,000 - 002	00	23	11	11	34	144	227
2	01 – 20,000	61	61	84	25	37	13	13
3	20,001 – 50,000	59	48	49	48	36	12	00
4	50,001 – 100,000	48	49	37	72	37	12	00
5	100,001 – 250,000	13	00	34	25	37	41	00
6	250,001 – 500,000	12	18	25	00	00	11	00
7	500,001 –1,000,000	36	41	00	06	36	07	00
8	1,000,001 – 10,000,000	00	00	00	53	23	00	00
	TOTAL	240	240	240	240	240	240	240

Source: Data Analysis

4. Conclusion and Recommendations

The study assessed the estimated cost and revenue of various enterprise rabbit production and the results revealed that selling of matured rabbit female and pregnant ones raked in the most revenue as the study depicts 22.08% and 9.58% for rabbit female and pregnant ones respectively. These identified enterprises raked in over a million naira in a year. This thus suggest that rabbit female and pregnant one's enterprise is a high rewarding venture. However, selling of matured male rabbit, Rabbit grower and weaner do not attract high revenue as these enterprises indicated a very low revenue. The analysis of the profit and loss of accrued to Rabbit enterprise

Indicated that selling the matured rabbit raked in millions of naira annually, closely followed by selling of processed rabbit. However, rabbit weaner and grower do not attract a high profit. Cross-tabulation analysis revealed that having a tertiary education enhanced the profitability of rabbit enterprise as 28.49% of the respondents that made over 250,000 naira on rabbit enterprise had tertiary education. Hence, having a degree does enhance profitability of rabbit enterprise.

This study was conducted in the state of Kwara to look at the economics of producing rabbits and the difficulties farmers experienced in raising cattle from their crop. Education increased the amount of rabbits produced in the research area since the study shows that tertiary education influences an individual's exposure to and degree of acceptance of innovation. Even while the study region has not fully adopted rabbit production as a major source of income, those who do, particularly those who engage in the business of selling mature female and pregnant rabbits, make the most money.

From the finding of this study, it is recommended that rabbit production should be encouraged in the many parts of the country since it is profitable and it generates revenue. Government agencies can also promote rabbit production as a form of job creation for graduates.

References

Aduku, A.O. and Olukosi, J.O. (2000). Rabbit Management in the Tropics: Production, Processing, Utilization, Marketing, Economics, Practical training, Research and Future Prospects. Abuja: Living Book Services, G.U. Publications, Nigeria. 250p.

Agunbiade, J.A., Adeyemi, O.A., Fasina, O.E. and Bagbe, S.A. (2001). Fortification of cassava peel meals in balanced diets for rabbits. Journal of Animal Production. . 28(1): 167-173,

Agbede, J.O. (2019). Alternative Feed Resources: Key to Profitable Livestock Enterprise in Nigeria.

Akinsola, G.B., Odum, E.E. and Oyedapo, O.O. (2021): Effects of Cuniculture commercialization on household poverty status in south western Nigeria, Pesquisa Agropecuaria ´Gaúcha. 27(1):26–42.

Ayeni, D.A., Adewumi, M.O., Bello, M.A., AdiAdi, K.F. and Osungade, A.A. (2023): Effects of rabbit production on income and livelihood of rural households in Nigeria. (2023) https://doi.org/10.1016/j.heliyon.2023.

Daodu, O.B., Shaibu, J.O., Richards, A.B., Folaranmi, E.B., Adegoke, S.A., Ajadi, S.A. and Oluwayelu. D.O. (2021): Detection and

molecular characterization of a first isolate of rabbit hemorrhagic disease virus in Nigeria. Tropical Animal Health and Production. 53(1):1–10

Effiong, E.O. (2005). Efficiency of production in selected livestock enterprises in Akwa Ibom State, Nigeria. Unpublished Ph.D. Dissertation, Micheal Okpara University of Agriculture, Umudike.

FAOSTAT (2022). The Statistics Division of the FAO. 2022. Available online: http://www.fao.org/faostat/en/#data (accessed on 22 June 2023).

Houessou, M.D., Ben, G.J., Augustin, K.N., Fr´ejus, S.,Denyse, J.R., Snelder, M., Anselme, A., and Tjard,D.C., (2022): The Urban Poor: Profile and Constraints Affecting Their Participation in Allotment Gardens, Development in Practice. 2022:1–16.

Lebas, F., Coudert, P., De Rochambeua, H. and Thébault, R.G. (2007). The rabbit – Husbandry, Health and Production, FAO Animal Production and Health Series No. 21.

Mondin, C., Trestini, S., Trocino, A., and Di-Martino, G. (2021). The Economics of Rabbit Farming: A Pilot Study on the Impact of Different Housing Systems. Animals. 11:3040.

Mukaila, A. Falola, S.U. Akanbi, L. Egwue, A. Obetta, T.L. and Onah, T.L. (2022): Effects of vegetable production on income and livelihood of rural households in Nigeria, Mustafa Kemal Üniversitesi Tarım Bilimleri Dergisi. 27(2):213–223.

Ogunwande, I.O. (2023): Measurement of Technical Efficiency of Rabbit Production among urban farmers in southwest, Nigeria. Nigeria Journal of Animal Science Technology. 6 (1):137-157.