Economic analysis of rabbit production: On farm research approach

L.O. Okojie, I.A. Ayinde and A.O. Alli

Department of Agricultural Economics and Farm Management, University of Agriculture, Abeokuta

Abstract

Many studies have justified rabbit production as a desirable and profitable venture. Most of these research investigations projected their results based on data collected through farm surveys that greatly relied on the memory recall capabilities of the respondents. These data apart from being prone to biasedness, may not be too insightful as to depict the true situation on ground. It is on this premise that this study was conceived to ascertain the cost and revenue structure as well as the profitability and efficiency of rabbit production, through actual production process using On-farm Research Approach. The findings of the study were then compared with a similar one that made use of data collection through farm survey. Three does and one buck were used as start-off for the on-farm research using the prevalent small scale traditional backyard method of rabbit production. Two cycles of production were monitored and used to project five cycle which is the average for subsistent rabbit production in the tropics. The results re-emphasize rabbit production as a profit and efficient productive venture. Two hours of labour time was found to be necessary to produce 1 kg of rabbit meat. The rate of return to investment was found to be 152% (that is, ₦ 1.52 return to every ₦1.00 invested). That for fixed cost was 1299% (that is ₦ 12.99 return to every ₦1.00 incurred on fixed asset) while the rate of return on variable cost was 274.5% that is ₦2.75 return to every ₦1.00 invested on variable inputs). These were quite higher when compared with a similar research investigation that depended on farm survey. The technical data derived from this indicate that technical data are more efficient and dependable in determining production outcomes on the filed relative to survey data. As a result of this, on-farm research was thus suggested as a way by which correct information on cost, returns and profitability of agricultural production could be obtained especially for baseline data collection.

Keywords: On-farm research, economic, rabbit production.

Introduction

It is a fact firmly established that the protein consumption of Nigerians is poor especially for the animal protein component (Akinwunmi and Ikpi, 1980; Aromolaran and Igharo, 1998). The protein supply per caput in Nigeria was reported to be 44 grammes, out of which that of animal protein constituted less than 2 percent (FAO, 1990). As a result of these, under-nutrition as well as protein and energy malnutrition have

become a scourge to be fought with all the seriousness it deserves. According to Ayinde and Aromolaran (1998), potential sources of animal protein in Nigeria include cattle, sheep, goats, poultry, fish and game. The rabbit has inherent advantages over the production of these animal protein sources because it can be used for accelerated meat production to meet the need of the populace apart from the fact that it requires smaller capital investment outlay, smaller space and little technical know how.

requires smaller capital investment outlay, smaller space and little technical know how.

In addition to this, Pagot (1992) reported that rabbit's high feed conversion efficiency (1kg of meat gained from 2.5kg of feed) is higher than most livestock species. It also has the highest percentage of protein (21%), highest production per hectare (180kg/ha) relative to other meat sources (poultry, 92%, pork, 50% and lamb, 23%) and it has the least fat content. It is on the basis of the above that studies have been carried out to determine the feasibility and viability of rabbit production. However, most of these socio-economic studies had relied on the survey method of data collection (Ayinde and Aromolaran, 1998, Enilolobo, 1997). One major problem of survey method of data collection is that data collected are usually from memory recall by respondents. The accuracy of such data also depend on the respondents mood during interview and his ability for good memory recall and proper record keeping.

This study was thus conceived to carry out an on-farm appraisal of the profitability of rabbit production, to ascertain whether similarities or differences exist between the results obtained by this study and those determined through the survey method. The study was defined specifically to:

- describe the production process,
- determined the profitability level and efficiency of rabbit production,
- identify problems affecting rabbit production,
- determine the similarities and differences of results obtained in this study from survey results on rabbit production in the same study location.

Materials and Methods

A small scale traditional method of backyard rabbit rearing technique was set up in line with the method prevalent in the locality (Abeokuta South Local Government Area). A wooden cage of 4m by 2m by 3m was constructed and divided into 8 hutches of 0.75m² each. Other fixed

inputs were 3 does and 1 buck as breeding stock, 3 nest boxes, 10 feeders, 10 drinkers, 1 bucket and a packer. The variable inputs used were concentrate feed (Growers Mash), labour, forage, drugs, tins, spent engine oil and sponge.

The experiment spanned for two reproductive cycles using 3 does and 1 buck as the breeding stock. A cycle lasted for 11 weeks (from the gestation period through parturition to weaning stage) after which the rabbits were sold at weaner prices (which is also the common local practice). Input output quantity and costs were determined for each cycle. Since most of the survey analyses were done per year, attempt was made to project the result of the on-farm research over a year made up of 5 cycles. It is an established fact (National Research Council, 1991), that rabbits can breed for 9 or more cycles per year under good management and early re-breeding. At subsistence level however, an average of 5 cycles per year is common taking into account the management level and the weather effect. This informs why the projection for a year was based on 5 cycles. The rabbits were fed both concentrates and forages in the mornings and evening respectively. The value of forage was determined using the man-day equivalent of labour used in harvesting and transporting the forage to the research location.

Method of data analysis

Data obtained were analysed using percentage, tables, profitability analysis and efficiency measurements;

$$\pi = TR - TC$$

where a

π = Profit (₦) or return to management (RMGT)

TR = Total revenue (output multiplied by unit price of output) in Naira

TC = Total cost [Total fixed cost (depreciated) plus Total Variable cost in Naira]

Total fixed cost was depreciated because the fixed inputs were not used up in a production cycle. The straight line method of depreciation was used to depreciate the fixed assets because

Economic analysis of rabbit production

it is favoured by most accountants (Johnson, 1990). It is given as:

$V = S/n$; where

V = Value of the asset,

S = Salvage of the asset

n = Number of economically useful life of the fixed asset in years.

The salvage value is assumed to be zero for the purpose of this calculation because the fixed assets in rabbit production seldom have second hand value. Efficiency measurements (Ayinde and Aromolaran, 1998) used include:

- b. Rate of Return to Investment (RRI), which is given by : $RRI = (RMGT/TC) \times 100$
- c. Return on fixed cost of production (RFC) or Gross Margin, given by: $\text{Total Revenue (TR)} - \text{Total variable cost (TVC) in Naira}$
- d. Rate of Return on Fixed Cost (RRFC), given by $(RFC/\text{Total Fixed Cost}) \times 100$

e. Return on Variable Cost (RVC) given by $TR - TFC$ in naira.

f. Rate of Return on Variable Cost (RRVC), which is given by $(RVC/TVC) \times 100$.

Results and Discussion

The production process:

The breeds of rabbits used for the experiment are the English Spot, a cross breed and a New Zealand White. The English Spot is an average litter size of kittens and the Cross Breed- 7, while the New Zealand White had an average of 5 kittens. This indicates that the English Spot is more productive: These three breeds are the commonly-reared breeds in the location of the on-farm research. The percentage mortality suffered in the first cycle and second cycle is one (1) percent respectively. These were due largely to accident rather than management problem (Table 1).

Table 1: Stock results of the two cycles of rabbit production

Operation	Week number	Number of Rabbit Produced	Number of Dead Rabbit	Number Remaining	Mortality (%)
Start up stock	Zero week	3 matured Does and a Buck	Nil	-	-
1 st Production Cycle	1 st - 11 th Week	21 Weaners	1	20	4.76
2 nd Production Cycle	11 th - 22 nd Week	21 Weaners	1	20	4.76
Total Cycles	(2 at 22 nd Week)	42 Weaner	2	40	4.76
Average Rabbit Produced	11 Weeks	21 Weaners	1	20	4.76

Sources: On-Farm Research Results, 1999.

Cost structure of rabbit production

Cost of housing accounted for 43% of the total fixed cost of production (Table 2A) closely followed by the cost of breeding stock (30%).

Feed, that is concentrates and forage accounted for 62% of the total variable cost while labour accounted for 32% of the total variable cost (Table 2B). Total fixed cost accounted for 13%

of the total cost of production while the total variable cost accounted for 87% of the cost of production. Furthermore, 55% of the total cost

of production was expended on feeding while labour accounted for 28%. The cost of hutches was 6% of the cost of rabbit production.

Table 2: Cost structure of production per year

A. Fixed Cost	Cost (₦)	% of Total Fixed Cost	% of Total Cost
Breeding stock	420.00	30.22	3.84
Housing (Hutches)	600.00	43.15	5.49
Padlocks	120.00	8.63	1.10
Feeders	75.00	5.40	0.69
Drinkers	75.00	5.40	0.69
Bucket	40.00	2.88	0.37
Nest boxes	60.00	4.32	0.55
Total Fixed Cost	1,390.00	100.00	12.71
B. Variable Cost	Cost (₦)	% of Total Variable Cost	% of Total Cost
Feed (concentrate)	3,926.05	41.13	35.90
Forage			
Labour	3,035.00	31.79	27.75
Drugs	421.15	4.41	3.85
Others	115.00	1.20	1.05
Total variable cost	9,547.20	100.00	87.29
Total cost of production	10,937.20		100.00

Sources: On-Farm Research Results, 1999.

Profitability analysis of rabbit production

Based on the outcome of the on-farm research carried out for the two cycles of the production process, the income-expenditure of rabbit production was projected for a year. Table 3 indicates that a rabbit farmer having 3 does and 1 buck as breeding stock will produce an average of 100 weaners per year with the use of good management strategies, 5% mortality rate and an average of 5 breeding cycles per doe (under the subsistence farming practice).

The results also indicate a positive net income (profit or return to capital, labour and management) of ₦16,662.80 per year, suggesting that rabbit production is a profitable

business. Rabbit enterprise was also found to be very efficient enterprise. Apart from the positive net income, the rate of return to investment was 152 percent implying that for every ₦ 1.00 spent on rabbit production, ₦ 1.52 was obtained as profit (Table 4). Moreover, the rate of return on both fixed and variable cost were 1299% and 274.5% respectively implying that for every ₦1.00 invested on fixed assets in rabbit production ₦12.99 is generated while for every ₦12.99 incurred on variable inputs, ₦2.75 was generated as return. Profitability in rabbit production can therefore be enhanced given increased efficiency in the use of variable input especially feed and labour.

Economic analysis of rabbit production

Table 3: Projected annual net income analysis for rabbit production

A.	Revenue	Value (₦)
i.	100 Weaners at ₦ 250.00 each	25,000.00
ii.	10 Mating service at ₦50.00/Doe	500.00
iii.	3 Matured Does at ₦ 550.00 each	1,650.00
iv.	Matured Buck at ₦ 450.00 each	450.00
	Total revenue	27,600.00
B.	Cost	
1.	Variable cost	
i.	Feed (concentrate)	3,926.05
ii.	Forage	3,040.00
iii.	Labour	2,045.00
iv.	Drugs	421.15
v.	Others (spent engine oil, tin, broom, packer and sponge)	115.00
	Total variable cost	
	Fixed cost	9,547.80
2.	Housing (hutches)	600.00
i.	Padlocks	120.00
ii.	Feeders	75.00
iii.	Drinkers	75.00
iv.	Bucket	40.00
v.	Nest boxes	60.00
vi.	Breeding stock	
vii.	a. Buck	90.00
	b. 3 Does at ₦ 110.00 each	330.0
	Total fixed cost	1,390.00
	TOTAL COST	10,937.20
	NET INCOME	16,662.80

Sources: On-Farm Research Results, 1999.

Table 4: Efficiency of rabbit production

	Efficiency ratio	Value
i.	Return to capital, labour and management (Net income ₦)	16,662.80
ii.	Rate of return to investment (%)	152
iii.	Return on fixed cost or gross margin (₦)	18,52.80
iv.	Rate of return on fixed cost (%)	1299
v.	Return on variable cost (TR - RFC) (₦)	26,210.00
vi.	Rate of return on variable cost (%)	274.50

Sources: On-Farm Research Results, 1999.

Survey result vis-à-vis results

Table 5 shows that better results could be obtained from technical data available from on-

farm research relative to the survey procedure. This is because farmers are more prone to inflating production cost and not giving a true

picture of their revenue earnings. Moreover, family labour used by survey reports are not always quantified. This accounts for the high

cost of labour in On-farm research results. It is however ideal to account for all costs in any production process.

Table 5: On-farm research results vis-à-vis survey results*

	Item	On-farm Results	Survey Results
i.	Housing as percentage of total cost	5.49	20.14
ii.	Total fixed cost as percentage of total cost	12.71	28.11
iii.	Feed cost as percentage of total cost	35.90	65.68
iv.	Labour as percentage of total cost	27.75	1.71**
v.	Total variable cost as percentage of total cost	87.29	71.88
vi.	Rate of return on investment (%)	152	56
vii.	Rate of return on fixed cost (%)	1299	300
viii.	Rate of return on X fixed cost (%)	274.5	178.3
ix.	Return to capital, labour and management	High	High

Sources: On-Farm Research Results, 1999.

Note:

*The survey results considered here is that of Ayinde and Aromolaran(1998). Given that the research work was based in the same study location where the experiment was carried out and the same production practices still prevailed.

**Hired labour only.

Problems affecting rabbit production

The result of the on-farm research brought to the fore some problems militating against rabbit production. These are:

- High feed cost: Rabbit pellet was too costly such that its inclusion in feeding rabbit will increase the cost of production and reduce the rate of return to variable cost. This is why Growers Mash which is less costly was used for the on-farm research. This also explains why farmers could not use rabbit pellet to feed their rabbit.
- Inadequate marketing outlets: Sales of rabbit was done mainly at the weaners stage. Very few people showed enthusiasm towards the purchase of matured rabbits for consumption.

Conclusion

The on-farm research approach on the economics of rabbit production further confirmed the fact that rabbit production is both profitable and efficient. The disparity in the findings of this study vis-a-vis the survey report is an indication that respondents may not have

been giving up to date information about their income from farm production. It is therefore important that on-farm researches be encouraged to generate baseline data on farm production for effective policy formulation and development. This could be achieved through multi-disciplinary approach involving basic scientists and social scientists working in concert to achieve research objectives.

References

- Akinwunmi, J.A. and Ikpi, A.E. 1980. "Development in the Nigeria poultry industry: The case of hatchery and feed". *Nigeria Rural Development Study*. Paper No. 8.
- Aromolaran, A.B. and Igharo, J.A. 1998. "Analysis of household consumption pattern of animal production in South Western Nigeria": In Oduguwa, O.O., Fanim, O.A. and Osinowo, O.A. (eds). *Proceedings of the NSAP Silver Anniversary Conference*, 21-26 March, 1998. Gateway Hotels, Abcokuta, Nigeria.

Economic analysis of rabbit production

- Ayinde, I.A. and A.B. Aromolaran.** 1998. "Economics of rabbit production in Abeokuta South Local Government Area of Ogun State, Nigeria". *Nig. J. Anim. Prod.* 25(1): 100 – 105.
- Enilolobo, S.O.** 1997. "Resource use efficiency in rabbit production in Abeokuta and its environs" Unpublished B.Agric. these. Department of Agricultural Economics and Farm Management, University of Agriculture, Abeokuta, Nigeria.
- FAO.** 1990. ESN Nutrition profile: Nigeria. Rome Italy.
- Johnson, D.T.** 1990. The Business of Farming: A guide to Farm Business management in the tropics. Macmillan, London.
- Pagot Jean** 1992. Animal production in the tropics and Sub-tropics. Macmillan (CTA).
- Lukefahr, S.D.** 1992. The rabbit project manual. Heifer project International Publication, Little Rock, USA.
- National Research Council** 1991. Microlivestock; little known small animals with a promising economic future. National Academy Press, Washington, D.C.

(Received 14 November 2000; Accepted 18 November 2003)