Trop. J. Anim. Sci. 5 (1): 153 - 160 (2002)
ISSN: 1119 - 4308

ECONOMIC IMPLICATION OF DIFFERENT FEED MANAGEMENT PRACTICES IN RABBIT PRODUCTION

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Target Audience: Feed producers, rabbit farmers

ABSTRACT

Some studies have shown that rabbit production is a profitable venture under the current production technique in which rabbit are fed using both concentrate and forages among the local rabbit farmers. Not much however, has been done to ascertain the economic efficiency of feeding rabbit either concentrate or forages only, despite the fact that rabbit can be kept under these two management practices as well.

This study was carried out to examine the economic implications of different feed management practices on rabbit production, using on-farm research technique, which spanned two reproductive cycles of 26 weeks. For the experiment, three Does and one Buck were used.

Data collected through the experiment were analyzed using Descriptive Statistics, Net -income Analysis, Efficiency and Productivity analyses. At the end of the two production cycles, Doe A produced no weaners due to death of its kittens. Doe B produced two weaners in the second cycle and none in the first cycle as a result of the death of its kitten too. However, Doe C produced a total of nine weaners (five and four in the first and second cycle respectively). The efficiency and productivity ratios revealed that experiment C was more efficient and productive.

Key words: Economy, feed management, rabbit and production.

DESCRIPTION OF PROBLEM

In recent years, animal protein supply in Nigeria, like in many other countries is declining. This has led to a resurgence of interest in rabbits which are prolific as well as good feed converters, and they also require low level of capital investment (1). For a successful livestock production, animal nutrition occupies a central position. Targeted feeding allows rationalization of production, higher product quality, adequate farming income and mitigation of environmental effects.

Forages can constitute 50% of rabbit diet. However, improved performance of rabbit fed concentrates and forages compared to feeding solely forage or concentrate alone have been reported. (2). However, the current urban development and seasonal variation in the availability of forages, coupled with the high cost of rabbit pellets have limited rabbit production. When forages

were in plentiful supply, local producers raise rabbits on forages alone. When in short supply or difficult to harvest, rabbits are fed commercial foodstuff. It has been confirmed therefore, that rabbits fed both concentrates and forages on the same day, performed better than rabbits fed concentrates or forage alone (2). The study also concluded that rabbits fed forage alone had the lowest weaning weight followed by rabbits fed concentrates alone. Rabbits fed the mixture of the two recorded the highest average weight for weaners. The findings of (2) need to be economically assessed because the backyard rabbit producer is not interested only in the technical details but how this is converted to the much-needed cash. Moreover, the rational rabbit producer would want to maximize profit while trying to reduce feed cost which accounts for 65.68% of the total cost of production per year per farmer (3).

Studies on rabbit have found out that rabbit rearing is a profitable business, but they did not assess rabbit production efficiency and profitability with respect to different feeding management practices (3). Hence, there is the need to study what feed is effectively combined to achieve the highest level of economic efficiency and profit. It is against this backdrop that this study was conceived to study rabbit production under three different feeding regimes and ascertain which of this are most economically viable and efficient for prospective farmers to adopt. This will provide a fairly good basis for making recommendations about nutrition pattern in rabbit that will maximize profit for potential investors. This paper determines the cost structure in rabbit production, level of profitability and efficiency of production for the three feeding regimes. It also recommends ways of making rabbit production more efficient and productive to potential rabbit farmers.

MATERIALS AND METHODS

Nature of the Experiment

Rabbits were reared in hutches using the backyard production method prevalent among local producers in the locality of the experiment. The on-farm experiment was carried out in the way local rabbit producers produce their rabbit. The experiment sought to determine the best feeding management practice for rabbit production using three different feeding regimes viz.:

1. Doe A (weighing 2.4kg), fed on forage only, representing Experiment A.
2. Doe B (weighing 2.35kg), fed on concentrate only, representing Experiment B.
3. Doe C (weighing 2.25kg), fed on both concentrate and forage, representing Experiment C.

The buck (adult male rabbit) which was used to service the three does (adult female rabbits) was put on both concentrate and forage diet while its overhead cost was incorporated into the cost of production for each experiment. Mating

ratio for rabbits has been determined to be a buck to ten does (4).
The rabbits were raised in a wooden cage 4m by 3m. The cage has 8 hutches with area of 0.75sq. metre each. Other fixed inputs are 8 drinkers, 7 feeders, 2 plastic containers, 8 padlocks and 3 nest boxes. The variable inputs include labour, drug, spent engine oil, concentrate feed (Growers Mash), forage sack, sponge, broom and packer. Table 1 shows the fixed inputs, the capital cost and the depreciated cost.

The experiment covered two reproductive cycles, which spanned a total of 26 weeks. The first two weeks was used as feed adaptation period. The kittens (young rabbits) were raised to weaners stage of six weeks before being sold out. The weaners were weighed at weaner age and the average weight was calculated for each experiment. This was compared to show the disparity of weaning weight with respect to feeding regime.

Table 1: Investment cost of rabbit production under the on-farm trial

Inputs	Unit	Unit cost (₦)	Capital cost (₦)	Economically useful life (years)
Fixed Input:				
1. Cage (hutch)	8	450	3600	5
2. Padlock	8	30	240	2
3. Feeders	7	20	140	2
4. Drinkers	8	20	160	2
5. Plastic containers	2	30	60	2
6. Nest boxes	3	180	540	2
Breeding stock:				
7. a. Buck	1	500	500	5
8. b. Doe	3	600	1800	5

Source: On-farm Research Results, 2000

Data Collection Method:
Input data collected include labour use, feed acquisition and feed use pattern, drugs and other input-use pattern. Values were attached to all inputs using the current market prices. Labour use data was obtained in terms of hour spent on routine management including the time spent for getting forage. Labour cost was calculated at the prevalent wage rate of N200.00 per manday. It took an average of 3 minutes per day to feed a rabbit when forage was abundant and about 6 minutes when forage was scarce. The fixed inputs were depreciated using the straight line method. The output data collected include the number of weaners produced for the two reproductive cycles as well as the revenue records.

Analytical Technique:

Frequency and percentage tables were used to explain cost structure for both fixed inputs and variable inputs used in the rabbit production process while Profitability Analysis was used to determine the profitability of rabbit production. Profit is given as:

$$\text{Profit } (p) = TR - TC$$

Where TR = Total Revenue, which is the total money value of all the sales of weaner rabbits produced as well as the money value of the total addition to stock for the year (N).

TC = Total Cost, which is the Total Variable Cost (TVC) plus the Total Fixed Cost (TFC)

Total Variable Cost:- The cost incurred from the use of variable inputs (labour, feed, drugs, broom, packer, sponge, spent engine oil, sacks and tins) in the production process.

Total Fixed Cost:- The cost incurred from the use of fixed inputs (cage, padlock, feeders, drinkers, plastic containers, breeding stock (does and buck) and the nest boxes) in the production process for the production year. Each of the fixed cost items was depreciated using the straight line method. This is given as V - S

Where,

V = Value of the fixed input (N)
S = Salvage value of the fixed input (N)
n = Number of economically useful life (years)

Expected replacement cost was used for all the fixed inputs in order to take inflation into account and because the cost of many working capitals such as breeding stock, equipment and machinery tends to increase both in money and real terms as time passes. So it is best from a management and planning point of view to use expected replacement cost (5).

Efficiency and Productivity Ratios

Efficiency and productivity ratios (6) were used to measure the efficiency of rabbit production. These were derived from the profitability analysis. It includes:

(i) Turn over ratio $= \dfrac{\text{Gross farm Income}}{\text{Total Assets}}$

It is a measure of assets utilization and must be greater than zero. The higher it is the more efficient is the business in assets utilization.

(ii) Expenses structure $= \dfrac{\text{fixed cash Expenses}}{\text{Total cash Expenses}}$

It must be greater than zero but less than 1

$$\text{Gross Ratio} = \frac{\text{Total Expenses}}{\text{Gross farm Income}}$$

It must also be greater than zero. The higher the gross ratio, the lower the efficiency and the lower the gross ratio the more efficient is the business.

Productivity Ratios

Measure of productivity is assumed to be usually average values. They can be expressed in physical quantity of gross output per unit factor input (7). Here, gross output per doe was used as a measure of productivity, given the importance of the doe to produce income generating output (weaners).

RESULTS AND DISCUSSION

The experimental results show that Doe A produced no weaner (Table 2) at all in the two cycles of production while Doe B produced two weaners for the two cycles. The reasons that can be adduced for this according to (8) is that the mortality in experiment A may be as result of inadequate lactation while in B, it may be as a result of inadequate nutrient minerals in the feed. For Doe C, a total of 9 weaners were produced with three cases of mortality. One of the weaners was crushed to death while the remaining two were drowned in the water put in the drinking trough.

The average weight gain of weaners per manday of labour used in production was higher (838g) in Doe C relative to Doe B, which was 616g. This implies that rabbit fed with both concentrates and forages converts a unit of labour into more flesh than the rabbit fed concentrates only.

Cost Structure in Rabbit Production:

The cost of hutch and breeding stock constitute the highest component of the fixed cost. The cost of hutch takes 41% of the total fixed cost while that of the breeding stock constitutes 16%. With respect to the variable cost, labour cost is the highest (37%) for the rabbits raised under forage feeding alone. While it is the least (26%) for rabbits raised solely on concentrates and forage. This implies that more labour is utilized in the management of rabbit produced by feeding forage alone, while rabbits raised on concentrates alone utilized the least quantity of labour. Feed cost was generally the highest cost component of the total variable cost. For rabbits raised on forage, the forage cost (which is the inputed cost of labour mandays used in cutting grass) accounted for 51% of the total variable cost. While for rabbits raised on concentrates alone, feed cost accounted for 66% of the total variable cost. For a feeding management combining the two, concentrate feed had the higher cost (41%) while forage accounted for 21% of the total variable cost. On a general note, labour and feed costs were found to be the most important cost component in rabbit production.

Profitability of Rabbit Production.

The cost and returns for the two cycles were computed for each experiment

and the profitability of each production option was determined (Table 2). Rabbits raised on forage alone yield a negative profit (loss) of ₦114.00. This is particularly due to the loss of kittens (which should have been the main output) in both cycles; thereby making cost incurred to supersede returns.

Table 2: Profitability of Rabbit Production under the Three Feed Management Practices

Items	Experiment A (N)	Experiment B (N)	Experiment C (N)
A. REVENUE			
i. 1 Doe at	60000	60000	60000
ii. 1 Buck at N500.00	50000	50000	50000
iii. Sales of weaners at N250 each	Nil	500.00 (2 weaners)	2250.00 (9 weaners)
a. TOTAL REVENUE	110000	160000	335000
COSTS			
1. Variable Cost			
i. Cost of labour (Management)	36400	39600	56800
Ii. Cost of Concentrate	-	101490	75260
Iii. Cost of Forage	50400	-	40000
Iv. Cost of Drugs	300	300	600
v. Cost of Broom	3000	3000	3000
Vi. Cost of Packer	1000	1000	1000
Vii. Cost of Sponge	500	500	500
Viii. Cost of Spent Engine Oil	1000	1000	1000
Ix. Cost of Sacks	2000	2000	2000
x. Cost of Tins	4000	4000	4000
(b) Total Variable Cost	98600	152890	184160
2. FIXED COST			
I. Breeding Stock	8800	8800	8800
ii. Hutch	7200	7200	7200
iii. Padlocks	1200	1200	1200
iv. Feeders	-	800	800
v. Drinkers	800	800	800
vi. Plastic Containers	1200	1200	1200
vii. Nest Box	3600	3600	3600
c. Total Fixed Cost	22800	23600	23600
(d) TOTAL COST (b+c)	121400	176490	207760
PROFIT (a-d)	-11400	-16490	127240

Source: On-Farm Research Results, 2000

Rabbit raised on concentrate alone also yielded a negative profit of (₦165.00). This is particularly accounted for by the high cost of concentrate, which also was accounted for the poor output level associated with this production method. However, rabbit production combining the two methods was profitable, yielding ₦1272.40 as profit, despite the fact that the cost of feed accounted for 63% of the total variable cost and 55% of the total cost. The reason for this is that more weaners were sold to offset the costs incurred in the production process.

Efficiency and Productivity of Rabbit Production:

The efficiency of rabbit production was determined using the gross ratio, expense structure ratio and the turnover ratio while gross output per doe was used as a measure of productivity.

The value for these ratios in respect of the three cases considered in the on-farm research is given in table 3.

The efficiency analysis shows that the gross ratios to be 1.10, 1.10 and 0.62 for experiment A, B and C respectively. Hence, producing rabbit using both concentrates and forage is the most efficient. The expense structure ratios are 0.19, 0.13 and 0.11 for experiment A, B and C respectively. The higher the expense structure ratio, the less expensive the business. Hence, raising rabbit with forage only is the least expensive. The turnover ratios are 4.83, 6.78 and 14.20 for experiment A, B and C respectively. The higher the turnover ratio, the more efficient the business. Therefore, producing rabbit using the combination of forage and concentrate is the most efficient.

Table 3: Profitability Analysis of Rabbit Production

Ratios	Experiment A	Experiment B	Experiment C
Gross ratio (Total Expense/ Gross Farm Income)	(1214/1100) = 1.10	(1764.90/1600) = 1.10	(2077.6/3350) = 0.62
Expense structure (Fixed cash expense/ Total cash expense)	(228/1214) = 0.19	(236/1764.90) = 0.13	(236/2077.6) = 0.11
Turnover ratio (Gross Farm Income/ Total Asset)	(1100/228) = 4.83	(1160/236) = 6.78	(3350/236) = 14.20
Gross output/Doe	Nil	2 Weaners	9 Weaners

Source: On-farm Research Results, 2000.

Generally, production of rabbit through the feeding of the concentrate and forage is the most economically efficient meth(3350/236) = 14.20od of production. Feeding forage only is the least expensive and the least efficient method of production. Incidentally too, since the rabbit producers are rational, the most predominant local practice in raising rabbit is the best method identified by this study.

CONCLUSIONS AND APPLICATIONS

Rabbit production under a good feeding management has been found to be profitable, productive and economically efficient. Production of rabbit using forage alone is the least expensive option but the accompanying low productivity

make it a less desirable option for recommendation to the rabbit producers, while raising rabbit using concentrate only is more cost intensive relative to its efficiency and productivity.

Moreover, the limiting factors to rabbit production are hutch, breeding stock as well as labour and feed cost. The reduction of the cost of these inputs would raise the profitability of rabbit production.

Availability of feed ingredients especially maize at cheaper price would reduce the overall cost of livestock feed. This is possible through massive production of maize to meet local consumption needs and for livestock feed production.

Feeding management in poultry whereby a single line of feed in water trough where birds can eat at the same time have been developed. However in the case of rabbit, the animal has to be fed separately which consumes more labour time. It is therefore advocated that research should be carried out towards getting a good hutch design that will combine low cost and high labour efficiency in terms of feeding and other routine management.

Local breeds of rabbit that is highly prolific and have good mothering ability should be developed to assist the emerging rabbit business.

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