

RESOURCE-USE EFFICIENCY OF SMALL SCALE CATTLE FATTENING IN MAKARFI LOCAL GOVERNMENT OF KADUNA STATE.

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ABSTRACT

This study assessed the resource–use efficiency of small-scale beef cattle fattening units in in Makarfi local Government area of Kaduna state Nigeria, with the aim of highlighting some crucial areas that may require policy intervention for improvement. Purposive, multistage and random sampling methods were employed in the selection of 140 beef cattle fatteners in the study area studied. Structured questionnaire and group discussion were used in sourcing for data. The data was analyzed using descriptive statistics and efficiency ratio(r). The results further indicated that Sokoto-gudali (75.60%) and Rahaji (19.20%) were the major cattle breeds adopted for fattening. While a total of 65.6% of fatteners fed bulls for a period of 4-7 months and in open space with shade (72.80%), while the use of combination of crop residues and conventional feeds was the most popular (69.81%) in feeding stock in the study area. The result from the efficiency ratio indicated that labour was efficiently utilized while feeds, water and medication were over utilized. The results suggest the possibility of increasing farmer’s output level through the use of lower level of feeds and more of medication under the current technology of production.

Key words: Resource use, Cattle Fattening, Small-Scale, Feedlots, Efficiency Ratio

INTRODUCTION

According to World Bank, (2017), Cattle/livestock contributed a total of 12.7% of the agricultural GDP in the country, providing about two-thirds of the protein obtained from the entire ruminants, and serving as capital reserve more especially in the event of food scarcity among the poor resource farmers. Most of the cattle produced in Africa are dual-purpose with no stratification and specialty in the cattle fattening. However, according to Mbanasor,(2000), as cited by Umar,(2014),the breeds of cattle commonly fattened in Nigeria includes Red bororo, Ndama, Muturu, Bunaji,sokoto –Gudali. Cattle fattening is predominantly practiced in Savanah region and semi-arid region of Northern Nigeria where tsetse fly infestation is minimal (Oni,2006). Apart from adding to the value of beef requirements, beef cattle fattening serves as source of employment, increased revenue to the participants, and providing additional foreign exchange to the nation in instances of export,(Gabdo ,2020). According to (Oni,2006), Cattle fattening can be practiced at small scale among rural herders since its methodology is quite simple and requires little time, labour and minimal Supervision. Beef fattening serves as source of employment, increased revenue to the participants, and providing additional foreign exchange,(Gabdo,2020).The livestock sub sector is largely affected by a number of factors which includes environmental factors, poor genetic qualities of breeds, diseases and poor quality feeds and low credit supply to cattle herders(Abidin, 2008). Adaku, (2018) suggested that pastoral grazing, poor husbandry management and lack of feed supplement can lead to low beef production in ruminant and livestock in general discourages investment into the livestock sub sector and reduce farmers income .As productivity is very low in the management of livestock sub-sector in Nigeria (World Bank, 2017), and by extension of the cattle feedlot system, modernization and boosting of same become imperative. And for these to be attainable, adequate information has to be made available. Assessment of resource efficiency, types of breeds used and the level of application in cattle feedlot system is one facet of many in the livestock subsector that requires investigation for the purpose of provision of meaningful policy that would improve the system. The cost of cattle constitutes two main components, as variable and fixed cost.

Variable cost of fattening comprise of various inputs cost such as cost of calves, feeds, health care service, water and salt-lick labour charges, commission, market toll etc. (Mulla ,2016). Feeder cattle/calve is the most important input used in the fattening program which constituted the greatest cost component, the average cost of cattle purchasing. Beef production have increased in importance in Nigeria due to growing demand which has increased supply response ,however there is insufficient information on the resource –use efficiency. This study assessed resource use efficiency of small-scale cattle fattening units in Makarfi ,Kaduna state , Nigeria, with the intent of highlighting some crucial areas that may require policy intervention for improvement.

MATERIAL AND METHOD

The study area

The study area lies between latitude 11.298⁰ north and longitude 7.9692⁰east with an altitude of 407 meters above sea level. It has mean maximum and mean minimum temperature of 32.80C and 18.30C respectively. The coldest months are from November to January while March to May is the hottest period. Makarfi has a rainfall distribution which ranges from 970.7 mm to 1,142 mm annually, with a mean of 1,009.4 mm. The rain falls from the month of April to October. The vegetation of the area is tropical savannah (Kaduna State Government, 2017) with a land mass of 542.0 square kilometers, a population of about 197,900 people (NPC, 2016). Most of the inhabitants of Makarfi are predominantly farmers and traders with well-established regional markets for livestock and grains in the area.

Sampling Procedure and Sample Size

A multi-stage sampling technique is used to select the cattle fatteners to be interview for this study. In first stage, five wards is purposely selected due to their prominence and intensity in small scale cattle fattening, In the second stage, total of ten villages were selected from the five wards based on probability proportional to size. And the final stage a total of 106 respondents were selected by simple random sampling technique from a total of 144 small scale cattle fatteners whose list was collected from livestock unit, Makarfi local government council. Yammane (1967) was used to draw a sample size of 106 small-scale cattle fatteners from the study area .A structured questionnaire was used to collect the required data. The data is basically taking regarding the farmers' sex, age, education, farm size, social status, supply in market, expenditure and household size as well as some factors associated with cattle fattening such a, cooperatives membership, extension visit etc.

Data Analysis

The study used the efficiency ratio (based on the ratios of the marginal value product MVP) to the marginal factor cost MFC). In this study we calculated resource use efficiency as Allocative efficiency given as:

$$E_i = MVP/MFC \dots\dots\dots (1)$$

Where: E_i = Allocative efficiency of ith input MVP =Marginal Value product of input and it's given by MPP_{xi} (PY) MFC = Marginal factor cost of input MPP_{xi} = Marginal physical product of resources PY= Out price per unit .In this study the coefficient satisfies the condition of MPP_{xi} (PY) and are direct MVPs since the output is measured in monetary terms. The lead equation was linear, therefore MVP of input variables not measured in naira (labour, feeds medication) were computed thus;

$MVP_i = \left(\frac{b_i Y}{x_i} \right)$.Where; MVP_i = Marginal Value product of input b_i = regression coefficient of input x_i = quantity of input used. Y = Total revenue (#).The Marginal factor cost (MFC) was taken to be the market price of the input since it was bought from a competitive market (Iruo *et.al*, 2013). For the inputs measured in value (Naira) terms rather than physical units, their allocative efficiency parameters are calculated thus;

$$E_i = MVP_i \dots\dots\dots (2)$$

The farmer maximizes its profit with respect to an input if the ratio of its MVP to its MFC is one. A ratio of less than unity shows over utilization of the resource and profit and profit will be increased by

decreasing the rate of used of the input. A ratio greater than one means underutilization of the resources and an increase in the rate of use of the input will increase profit level of the firm (Iruo *et al*, 2013).

RESULTS AND DISCUSSION

Types of Breeds, Types of Housing and Duration of the Cattle Fattening:

The findings of this study on the breeds of beef cattle used in fattening, the length of period engaged and the types of housing for animals are shown in Table 1. A popular local breed known as *Sokoto gudali* accounted for majority (60.3%) of the breeds used for fattening purposes in the State. This is followed by another local breed referred to as *Rahaji* (18.8%). A composition of fatteners who used others breeds formed the minority. The popularity of this particular breed in the area stemmed from the perception of farmers of its ability to resist most diseases and minor infections of cattle. However, Madziga *et al*. (2013) in a comparative experiment conducted on four breeds of cattle for fattening at Northwestern aspect of Nigeria reported that *Sokoto gudali* and *Rahaji* breeds had better values for feeds consumed and therefore, weight gained and return on investment over *Bunaji*. Similarly, Table 1 gives a reflection of length of period spent in fattening bulls before sale. Most of the cattle feedlot farmers (66.0%) keep bulls for a duration of 4-6 months before selling them off in the State. Those fatteners that feed their stock for a period of 1-3 months only, followed in terms of percentage, with farmers who keep the bulls for over six months. In terms of housing used for the bulls, a larger chunk (88.6%) of the fattening units was in the open with mostly fences made of thatched roofs. In other words, the animals were left in the open without shade, basing this act on the believe that fattened bulls that are exposed to sunshine tend to take lots of water, and in turn enhance digestibility of feeds thereby leading to accumulation of fats and by extension gain weight fast .The implication of the above result indicates that cattle feedlot system is still not appropriately modernized in the area of study. This is taking into cognizance the types of housing in which the animals were exposed to harsh weather conditions thereby limiting their performances; and the long duration of keeping animals which economically is irrational as shortening the fattening period would have increased returns on investment. All these indices are pointed toward maintaining old methods of practices within the domain.

Table 1: Distribution of Cattle Fattening Units Based on Type of Breed, Duration of Fattening and Housing type

Parameter	Frequency	Percentage
<i>Breed of Cattle :</i>		
<i>Sokoto –Gudali</i>	64	60.3
<i>Bunaji</i>	12	11.3
<i>Rahaji</i>	20	18.8
<i>Red-bororo</i>	10	9.4
<i>Total</i>		
<i>Duration of fattening:</i>		
<i>1-3 months</i>	12	11.3
<i>4-6 months</i>	70	66.0
<i>Above 6 months</i>	14	13.2
<i>Type of Housing:</i>		
<i>Corrugated iron sheet</i>	5	4.7
<i>Mud hut with thatched roof</i>	60	56.6
<i>Shade constructed</i>	7	6.6
<i>Open space</i>	34	32

Source: Computed from field Data (2022)

3.2. Types of Feeds Used by Cattle Feedlot Farmers:

The availability of feeds in terms of quantity and quality for livestock production, noted Amole and Ayantunde (2016) and Jimma *et al*. (2016), has been one of the most difficult issues to contend with in the Sahelian zone of West Africa as most of the stock owners heavily rely on wild grasses and crop residues for raising their animals. A reflection of this finding is shown in Table 2. The latter revealed the distribution of cattle feedlot farmers according to types of feeds used in fattening in Adamawa State, Nigeria. Majority (74.81%) of the feedlot farmers used a combination of crop residues and conventional

feeds for fattening bulls in the surveyed sites. But all the farmers (100%) made use of salt licks and/or multivitamins to provide stock with additional supplements for the fulfilment of nutrient requirements. A few of the farmers (22.96%) fed their bulls with crop residues only, while those that fed their stock with conventional feed stuffs only accounted for the minority, and therefore, absolutely negligible. Agus and Widi's (2018) report stated that in both feedlot and extensive systems of management, the utilization of low-quality feeds, mainly from crop residues or agricultural by-products and other nonconventional feedstuffs is a common practice, because they are in abundance and inexpensive. This is a clear indication of the prominent position of feeds and feedings of fattening stock in the area.

Table 2: Distribution of Cattle Fattening units Based on Type of Feeds-stock used

Type of feed stock	Frequency	Percentage
Conventional feeds only	10	9.4
Crop residues only	6	5.6
Crop residues and conventional feeds only	86	81.1
Salt licks and multi-vitamins	4	3.7

Source: Computed from field Data (2022)

Labour as Input in Beef Cattle Feedlot System in the Study Area

The result on labour input in terms of man/hour for the operations in cattle feedlot units in the State is shown in Table 4. It could be observed that feeding of animals accounted for the largest chunk (42.7 %) of labour input in the beef cattle fattening system in Adamawa State. Provision of water to animals and cleaning of housing trailed with 20.6 % and 32.0%, respectively. Of course, medication/healthcare, as expected, recorded the least. The fact remains that this service occurs when the need arises, and it may be even once in the entire period of the exercise. However, family labour which is perceived by the individual farmers as service without cost, accounted for 71.5% of the whole total input in the exercise, with only 28.5% provided by hired labour. What this finding implied is that labour as crucial input as it is in the cattle feedlot system in the State is majorly supplied by members of farming households. This is also an indication of how low the level of sophistication of management applied in achieving output. In other words, using cheap labour is a coping strategy to minimize cost of production in order to maximize outputs.

Table 3: Labour Units for Fattening Period of 120 days (Man-hour per Bull)

Operation	Family Labour	Non-Family Labour	Total	Percentage
Feeding bulls	500	100	600	42.7
Watering	200	90	290	20.6
Cleaning of housing	300	150	450	32.0
Medication/health care	2.67	61	63.7	4.5

Source: Computed from Field Data (2022)

Resource –Use Efficiency in Cattle Fattening.

The result in table 5 presents the resource use efficiency of small scale cattle fattening in the study area. The ratio of marginal value product (MVP) to marginal factor cost (MFC) showed that labour input had MVP (7874.1) and MFC (6723.4) respectively, this implies that 1.2 was efficiently allocated and used by the cattle fatteners in the study area .The result further indicated that small scale cattle fatteners in the area over utilized the resources of feeds and over utilized capital. The result suggest that there exist the possibility of increasing output under the existing level of technology through the use of lower levels of feeds and use of more of medication capital inputs. In order to attain absolute efficiency, there should be a decrease in feed-use by 10% while decreasing capital use by 0.24% respectively.

Table 5: Resource Use Efficiency of Cattle Fattening in Makarfi

Resource:	MPP	MVP	MFC	$r = MVP/UFC$
Feed	0.037	1294.1592	3626.448	0.3568
Medication	83.435	9819.2840	288.244	34.0658
Labour	0.228	7874.1849	6723.4375	1.17115
Salt-lick	0.224	7739.5616	172.384	44.8961

CONCLUSION AND RECOMMENDATION

Conclusively from the findings of the study, it could be stated that indigenous breeds of *Sokoto gudali* and *Rahaji* were the main bulls used for fattening in Makarfi, Kaduna State, Nigeria, and a mixture of crop residues and conventional feeds was the popular plane of feeding stock, with most farms utilizing resources efficiently. However, there was still avenue for improvement. Stemming from these findings, soft credit facilities to accord fatteners leverage of initial off-setting the cost of bulls and frequent extension services to same, for modernization of beef cattle feedlot system in the domain are highly recommended.

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