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## Profitability of Cattle Fattening Enterprise in Maiduguri, Borno State, Nigeria

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### ABSTRACT

The study determined the profitability of cattle fattening in Maiduguri. Data were collected from a random sample of 300 fatteners using well-structured questionnaire. The data were analyzed using gross margin analysis and stochastic profit production function. Analysis of cost and returns revealed a mean gross margin per cattle of N46, 581.63 with cost of feed accounting for more than 83.9% of the average total variable cost per cattle. This suggests that cattle fattening is highly a profitable venture and that cost of feed is the most dominant variable cost of cattle fattening. All factors used in determining the impact of variable costs on profitability were found to be negative and significant except farm size which is positive. Thus, increase in farm size will lead to increase in profit all things being equal. The lack of incentives, ineffective extension services and poor credit facilities were major constraints identified for cattle fattening enterprise.

### INTRODUCTION

Cattle fattening business play an important role in the economy of the Maiduguri town with its sole market called Kashuwan Shanu (cattle market). Cattle are brought to this market from difference localities including the neighboring countries of Chad, Niger, Cameroun as well as Sudan. Although some of these cattle are used for local consumption but most of them were fatten and transported to South Eastern and South Western part of Nigeria where the demand is very high and thus attract higher price. More often than not, the cattle are brought to the cattle market very skinny due to famine in some part of sub-Sahara and hence undergo fattening for few months depending on the cattle's health and size before taking into market for sale.

The size of a cattle is an important indicator of its performance. Generally, larger size cattle perform better in feed conversion rate than the smaller size, hence are the favorite for most fatteners. Another key factor in determining the profitability of cattle fattening is the time frame for keeping the cattle. For instance, the shorter the time frame for fattening the cattle the highly likely the more profitable will the farmer made. Feed quality is also an essential factor in cattle fattening. Cattle may however, took longer time during fattening period before taking into market for sale due to poor quality feed and lack of proper veterinary attention. It is essential also to mention finance factor as it seriously affect the cattle fattening business in the Maiduguri town.

It is important to note that most of the cattle fattening entrepreneurs in the study area were operating at small scale level because they do not have enough finance to venture into large scale production. This is due to lack of collateral to enable them to assist loan from the commercial banks who charges high interest rate and

were very strict in offering loans especially to cattle fatteners due to high risk involved in the enterprise. Besides, the few that were lucky enough to obtained the loan from Agricultural Developmental Banks (ADB) and other related agricultural financial agencies but the fund is grossly inadequate to buy large number of cattle for fattening and thus usually ended up in keeping few animals or even investing the money in other unrelated ventures such as trading or used it for social purposes such as getting marriage and festivals. More often than not, they preferred to borrow money from friends and relatives and refund after selling the fattened cattle. However, this type of borrowing money comes with conditions or agreements such as sharing the profits but not the losses. In other word, the cattle fatteners will solely bear the losses in case of any unforeseen calamities but not the creditor. The aforementioned scenarios have greatly affect the success story of the cattle fattening enterprise in the study area. Thus, the purpose of this study is to assess the profitability of cattle fattening and also determines the important factors affecting it performance. Besides, the study also aim to identify some of the constraints of cattle fattening enterprise in the area.

### MATERIALS AND METHODS

#### Study Area

The study was conducted in Maiduguri, the capital town of Borno State, Nigeria. The State shares borders with the republic of Niger to the North, Chad to the North-East and Cameroon to the East and thus served as an important town for Trans-Sahara agribusiness of cattle, Sheep, goat camel and other agricultural products such as Hide and Skin, Gum Arabic, and different varieties of grains. Majority of the people in the State are farmers, herdsman and fishermen.

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**Data Collection**

A random sampling technique was employed in selecting 10% of the cattle fatteners for the study from a sampling frame of 3000 cattle fatteners obtained from Maiduguri Town Cattle Fatteners Association. Data were obtained from the sampled fatteners using structured questionnaires. These data includes costs of production such as price of cattle, feed, wages, rent, and drugs as well as farm size.

**Analytical tool**

Stochastic profit frontier function and gross margin were used for the data analyses.

**The Empirical models for the Study**

**Gross margin model**

The gross margin model was used to estimate the profitability of cattle fattening in the study expressed as follows:

$$GM_i = \sum_i^n P_i Q_i - \sum_j^n C_j X_j \dots\dots\dots(1)$$

Where:

- GM<sub>i</sub> = Gross Margin of Cattle i (₦)
- P<sub>i</sub> = Unit price of fattened cattle i (₦)
- Q<sub>i</sub> = Number of cattle i fattened (No.)
- C<sub>j</sub> = Unit cost of variable input j (₦)
- X<sub>j</sub> = Quantity of variable input j used (Kg)

GM analysis was used in this study based on the following assumptions:

- fixed cost of production is negligible,
- all cattle were fattened for the average period of 2-4 months,
- all fattened cattle used purchased inputs such as feeds, labour, drugs and vaccine, and
- no cattle lost either as a result of disease or theft.

**Stochastic Profit Frontier Model**

The stochastic Cobb-Douglas profit frontier model expresses as follows:

$$\log \pi_i = \alpha_1 + \beta_1 \log X_1 + \beta_2 \log X_2 + \beta_3 \log X_3 + \beta_4 \log X_4 + \beta_5 \log X_5 + \beta_6 \log X_6 + \mu_i \dots\dots\dots 2$$

Where:

- $\pi = \pi_i$  = Gross margin for i cattle fattener
- X<sub>1</sub> = feed cost (₦)
- X<sub>2</sub> = labour cost (₦)
- X<sub>3</sub> = j=3: cost of drug (₦)
- X<sub>4</sub> = j=4: other costs (₦)
- X<sub>5</sub> = j=5: rent (₦)
- X<sub>6</sub> = j=6: Farm size (number of cattle fattened).
- β<sub>5</sub> = coefficients to be estimated
- μ = error term
- α = constant

**RESULTS AND DISCUSSION**

Profitability analysis for cattle fattening enterprise  
The result of profitability analysis was presented in Table 1. The purchasing price per cattle is considered to be fixed in this study with average of N90, 000 per head, and therefore not included in the variable cost. Thus,

the result showed that cost of feed alone accounted for 83.94% of the total variable cost constituting the highest proportion of the total cost of production.

This implies that feed is an essential variable cost in cattle fattening production. However, this is not surprising as most previous studies on cattle fattening have concluded that feed costs represents the major component of total variable costs (Dolewikouet al., 2016; Mohammedet al., 2015; Sarmaet al.,2014; Umar et al., 2008 and Jibrinet al., 2008). Others production costs including wages, drugs, and rent that constitutes 3.04%, 1.89% and 2.62%, respectively. Despite high cost of feed, the findings of the study indicates that cattle fattening is a profitable venture with profit per cattle of ₦46,581.63 which is similar with findings of Umar et al., (2008) but much higher than that of sheep fattening with profit of ₦16,448.33 per ram (Zalkuwiet al., 2014). Nevertheless, care should be taken because this profit could be reduced drastically if the period of fattening exceeded the normal production cycle of two to four months due to increase in feeding costs without proportional increase in cattle size, indicating point of diminishing returns. Aydin et al (2017) in their study of Cost-benefit analysis of different fattening systems with Tuj and Hemşin lambs in controlled conditions reported that intensive system is the most profitable venture, followed by semi-intensive system and then extensive system. Similarly, Maloleet al., (2014) study two schemes of beef fattening scheme in Tanzania with scheme 1 fed on cottonseed hulls (CSHL) based diets and scheme 2 on cottonseed cake (CSC) based diets.

They reported that both the schemes were profitable business but with scheme 2 more profitable. This could be attributed to high quality of diets and shorter fattening period in scheme 2. On the contrary, the findings of Syrūčeket al., (2017) shows that bull fattening is unprofitable venture due to high price of weaned bulls entering the fattening operation. Furthermore, Yidirimet al., (2009) reported that profitability rate was positive for

**Table 1:** Profitability analysis per cattle fattening

Items	Cost per unit (₦)	Percentage (%)
Buying price	90,000.00	
<b>Variable costs</b>		
Feed	41,025.93	83.94
Wages	1,487.92	3.04
Drugs	928.52	1.89
Rent	1,278.22	2.62
Other costs	4,156.45	8.50
Total variable cost	48,877.04	100.00
Total costs	118,877.04	
<b>Revenue items</b>		
Selling price	165,458.67	
Total revenue	165,458.67	
Gross margin	46,581.63	

overall cross-breed cattle fattening farms but negative for native-breed fattening farms. They contributed this unprofitability of native-breed cattle fattening due to high production costs, low feed conversion rate and low selling price.

**Factors affecting the profitability of cattle fattening enterprise**

The result of those factors affecting the profitability of cattle fattening in this study is presented in Table 2. The estimated coefficient of feed cost variable is found to be negative and statistically significant. The significance of the feed cost coefficient derives from the fact that it is the key inputs in cattle fattening. However, the negative sign of the feed cost coefficient suggests that an increase in it would eventually lead to a decrease in the cattle fattening profitability.

This finding agrees with Bahta and Baker (2015), who reported that feed prices have a significantly negative effect on profits. On the contrary, Mohammed et al., (2015) reported that feed quantity have positive and significance influence on profitability due to increases in weight gains as the animal consumes more feed. The difference in the findings of this study and their studies is due to the fact that the two studies used quantity as a unit of measurement of feed rather than cost. Otherwise, the results could have been the same.

The estimated coefficient of hired labour is also found to be negative and statistically significant. The negative sign of the labour coefficient indicates that cattle fattening is highly labour intensive. Thus, profitability would increase with a decrease in the labour cost and vice versa. This finding is consistent with Utamiet al., (2018) who also found a significant and negative relationship between number of household members (i.e. labour) and profitability.

Furthermore, the estimated coefficient of drug is negative and statistically significant. This suggests that cost of drug is a significant but negative factor associated with changes in the profitability of cattle fattening. Similarly, the estimated coefficient of both rent and other variable cost (salt leak, potash, water and transportation) is found to be negative and statistically significant. Hence, profitability of cattle fattening is expected to increase

with a decrease in the rent and other variable cost and vice versa. The finding agrees with Jibrinet al., (2008) who also found a significant relationship between rent and performance of cattle fattening. However, the estimated coefficient associated with farm size that is number of cattle fattened is positive and statistically significant. This implies that profitability tends to increase as the number of cattle fattened increases. This finding agrees with Mohammed et al., (2015) who also reported the positive and significant relationship between farm size and profitability of cattle fattening enterprises; although Utamiet al., (2018) found a positive relationship between profitability and number of cattle fattened but the relationship is statistically insignificant.

**Table 2:** Factors affecting the profitability of cattle fattening

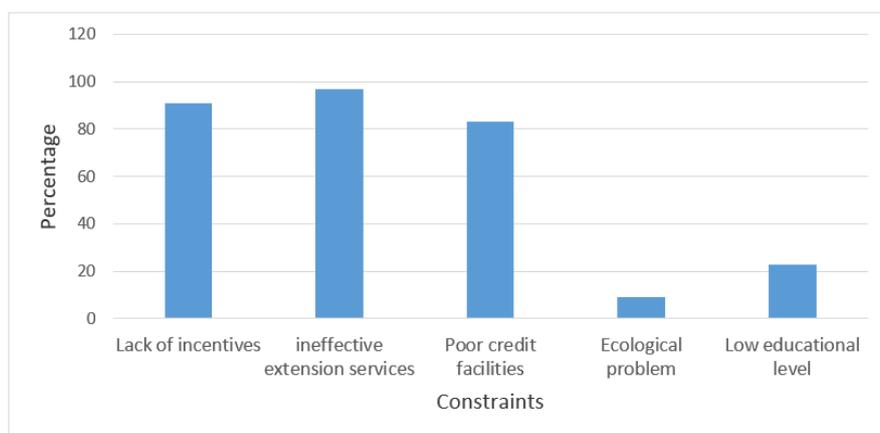
Variables	Coefficient	Std. error	t-ratio
Constant	-0.093	0.014	-3.106*
Feed(X1)	-0.728	0.314	-16.070*
Labour(X2)	-4.831	0.047	-9.123*
Drug (X3)	-9.654	0.147	-2.634**
Other cost(X4)	-0.981	0.211	-3.050**
Rent(X5)	-0.674	0.141	-2.692*
Farm size (X6)	1.179	0.032	2.692**

\* Significant at 1% level \*\* Significant at 5% level

**Perceived constraints of cattle fattening enterprise**

Figure 1 shows the perceived constraints of cattle fattening by the respondents. The lack of incentives, ineffective extension services and poor credit facilities constitutes 91%, 97% and 83%, of the problems, respectively. The other constraints include ecological problem (9%) and low education level (23%).

Lack of incentives is one of the major problems of cattle fattening in the study area and it could have negative impact on the profitability as provision of incentives tends to enhance performance. The ineffective extension personnel is the most dominant problem which implies only few and the privilege ones received information on how improve their cattle fattening venture to make



**Figure 1:** Perceived constraints of cattle fattening enterprise

more profits. Poor credit facilities is yet another pressing problem affecting the cattle fatteners as most of them relied on their personal saving, friends and relatives as main source of their investment fund.

The possible implication of this finding is that the capacity for expansion of the farm size in term of animal number could be restricted and hence negatively affect the profitability of cattle fattening. However, ecological problem is not considered as a threat by the cattle fatteners due to the favorable weather that is conducive for cattle fattening in the study area. The findings also shows that most of the sampled respondents were educated and thus, can easily perceive and utilize any valuable information on good cattle fattening management practice disseminate to them.

## CONCLUSION

Cattle fattening in the study area was found to be a profitable venture despite the high cost of feed which constitutes a greater percentage of the total variable cost. However, this profit can increase drastically if the cost of feed could be reducing by certain percentage while the production cycle remains constant. Therefore, formulating feed with high nutritional value with local ingredient that is cheaper will help in improving the performance of cattle fattening in the area. Similarly, major cattle fattening constraints were identified in the study area. These include lack of incentives, ineffective extension services and poor credit facilities. These problems need to be addressed to improve the general profitability of the cattle fattening. Furthermore, all the factors affecting the profitability of cattle fattening are found to be negative and statistically significance except farm size, which is positive. Consequently, performance of cattle fattening tend to increase by reducing the cost of those factors that have negative impact on profit. On the other hand, profitability could also increase by increasing the number of cattle fattened all things being equal thereby benefiting from economic of scale.

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