

## Profitability of Broiler Contract Growers in Chegutu District of Zimbabwe

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### Abstract

### Original Research Article

Following the land reform programme, the Zimbabwean commercial broiler sub-sector has undergone structural transformation from predominantly being dominated by large scale producers to being a small scale producer led sub-sector. Despite this structural transformation, there are limited empirical studies on small scale poultry production performance and in particular commercial broiler contract production. The purpose of this study was to determine the profitability of broiler contract growers in Chegutu District of Zimbabwe. Cross sectional data was collected using a structured questionnaire from a population of 54 broiler contract growers. The study employed the gross margin analysis technique to establish the profitability of broiler contract production and the Ordinary Least Squares regression approach to analyse its determinants. The study found that broiler contract production was profitable with the mean gross margin per grower per batch being \$4834,20. The return per dollar invested was \$0,12 while the gross margin per bird sold was \$0,44. Feed and chick costs were established to be the major production costs constituting 62.06% and 26.36% of total variable costs respectively. Significant factors that positively contributed to profitability of broiler contract farming were selling price, gender of grower, age of grower, education level of grower, grower experience in broiler production and feed costs. On the other hand, grower years with key employee, daily management of broiler production activities by grower, batch size, vaccines and medication costs, transport costs and the food conversion ratio negatively and significantly affected profitability. The study recommends that measures should be put in place to encourage more smallholder growers to join broiler contract farming schemes as it is a profitable venture. Female growers must also be encouraged to venture into broiler contract farming as the results have shown that they are more profitable when compared to their male counterparts.

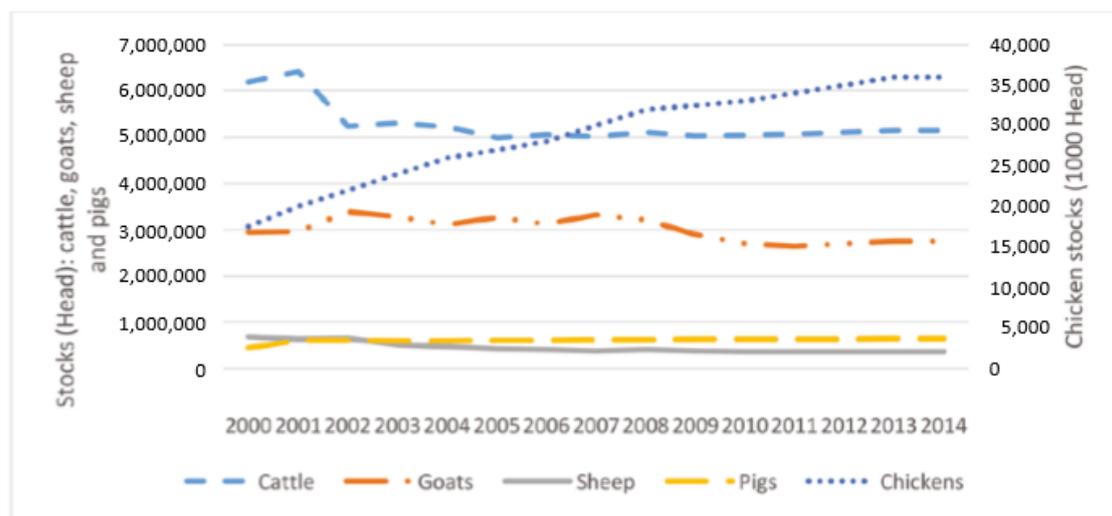
**Keywords:** Broiler contract production, Profitability, Gross margin analysis, Zimbabwe.

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## INTRODUCTION

Agriculture continues to be the mainstay of rural economic development for most developing countries. In Zimbabwe, agriculture is an important source of livelihood as 70% of the rural population is reliant on it (World Bank, 2010). Within the rural population, small scale poultry production is expected to continue its pivotal role of income generation and

contribution to nutrition for as long as poverty exists (FAO, 2018). The poultry sector in Zimbabwe has been viewed as the most vibrant of the livestock sector contributing approximately 5% of agricultural gross domestic product (GDP). The poultry sector continues to lead growth in the country's livestock sector as shown in Figure 1.



**Figure 1: Shows livestock production trends in Zimbabwe**  
Source: FAOSTAT (2016)

In recent years following the land reform programme, the Zimbabwean poultry industry underwent transformation and is now dominated by small scale producers (Scoones, 2014). During the same period, the Zimbabwean broiler sub-sector has continued to experience growth which is led by the smallholder sector. In 2014 alone, the smallholder sector accounted for more than 70% of chick sales (ZPA, 2015). It is estimated that 65% of the broiler sub-sector is now dominated by small scale production (Sukume, 2011).

Many of the global poultry sectors continue with growth and industrialisation as a result of population growth, urbanisation and increased purchasing power. The growth in the global sectors has seen structural transformations in poultry sectors and more vertical integration in poultry industries. The structural change has seen growth in contract farming and inclusion of medium sized growers in the value chains (FAO, 2018).

Two options exist when it comes to broiler production in Zimbabwe – non-contract farming and contract farming. Non-contract farming is when a farmer is responsible for all the expenses of production and carries the market risk in addition to the total sum of all responsibilities of broiler production. With contract farming/integration the integrator provides all or part of the supplies needed for production together with the market. The farmer usually contributes his labour, space, equipment and other services (Sasidhar and Suvedi, 2015). Contract farming is not a new concept in poultry production. It has been used in agriculture commercialisation the world over for both developing and developed countries. Contract farming has been a tool in coordinating agriculture production and was key in private sector led agriculture development in diverse value chains (Woodend, 2003).

Contract farming has also been a component of the most successful income generating projects for small farmers in developing countries.

In Zimbabwe broiler contract farming had been historically a realm for large scale farmers with flock sizes of at least 10000 birds (Woodend, 2003). In Zimbabwe, development practitioners see contract farming as a possible way of integrating smaller growers into mainstream broiler meat value chain. This drive is mainly informed by some studies, especially in Latin America, that have found that contract farming systems can be run smoothly with small farmers (Begum *at al.*, 2009). Despite the move towards contract farming for small scale farmers, empirical studies on the performance of the small scale broiler contract farming are still limited to inform policy making (Gororo and Kashangura, 2016). The objectives of this study were to determine the profitability of broiler contract growers in Chegutu district of Zimbabwe and to analyse the main factors affecting profitability. Establishing profitability of broiler contract growers helps in appreciating sustainability of broiler contract production.

## METHODOLOGY

This research was carried out Chegutu district in the Mashonaland West province of Zimbabwe. Chegutu district has one of the largest broiler contract production scheme in Zimbabwe. Cross-sectional data was collected from a total population of 54 active broiler contract growers who operate varying batch sizes and are all contracted by one contractor using a structured pretested questionnaire.

The gross margin (GM) analysis was used to establish profitability of broiler contract growers. The gross margin can be expressed as follows:

$$GM = TR - TVC$$

Where GM is the gross margin, TR is total revenue (Price times output) and TVC is the total variable costs incurred in the production (sum of day old chicks (DOC) cost, feed cost, vaccines and medication cost, transport cost, labour cost, heating cost, bedding cost, and other costs).

Determinants of profitability were established using the Ordinary Least Squares (OLS) regression approach. The Multiple regression model is expressed as follows:

$$GM = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \beta_{16} X_{16} + \beta_{17} X_{17} + \beta_{18} X_{18} + u$$

Where GM is the gross margin and  $\beta$ s are the parameters to be estimated. The variable definitions are presented in Table 1. The *a priori* or hypothesized impact of the independent variables on the dependent variable is also shown. A (+) means the independent variable is expected to have a positive impact on the dependent variable while a (-) means the independent variable is expected to have a negative impact on the dependent variable.

**Table 1: Variables used in the Multiple Regression to Establish Determinants of Profitability**

Variable	Description	Measurement	Hypothesis
<b>Production Function</b>			
<b>Dependent Variable</b>			
GM	Gross margin per batch	\$	
<b>Explanatory Variables</b>			
X <sub>1</sub>	Selling price	\$	+
X <sub>2</sub>	Gender of grower	Dummy; Female = 1; 0 = Male	+/-
X <sub>3</sub>	Grower age	Number of years	+/-
X <sub>4</sub>	Residence of grower	Dummy: 1=non-resident on farm; 0=resident	-
X <sub>5</sub>	Grower's years of education	Number of years	+
X <sub>6</sub>	Grower experience	Number of batches	+
X <sub>7</sub>	Years with key employee	Number of years	+
X <sub>8</sub>	Key employee education level		+
X <sub>9</sub>	Experience of key employee	Number of years	+
X <sub>10</sub>	Manager of daily activities	Dummy: 1 = Owner; 0 = Key employee	+
X <sub>11</sub>	Gender of key employee	Dummy; Female = 1; 0 = Male	+/-
X <sub>12</sub>	Electricity source	Dummy: 1 = Solar; 0 = National grid (Zesa)	+
X <sub>13</sub>	Batch size	Number of chicks	+
X <sub>14</sub>	Feed costs	\$	-
X <sub>15</sub>	Vaccines and medication costs	\$	-
X <sub>16</sub>	Transport costs	\$	-
X <sub>17</sub>	Other costs	\$	-
X <sub>18</sub>	Food conversion ratio (FCR)	Number	+

## RESULTS AND DISCUSSION

### Major Variable Costs in Broiler Contract Production

Feed constitutes the largest input cost in broiler production and it accounts for 62.06% of total variable costs (Figure 2). The cost of chicks is the second largest input cost constituting 26.36% of total

variable costs. The findings are consistent with a number of authors Oluwatayo *et al.*, (2016), Al-Mamun Rana *et al.*, (2012), Shaikh and Zala (2011), Onyeagocha *et al.*, (2010) and Singh *et al.*, (2010) who also found that feed was the largest variable cost followed by chick costs in broiler production.

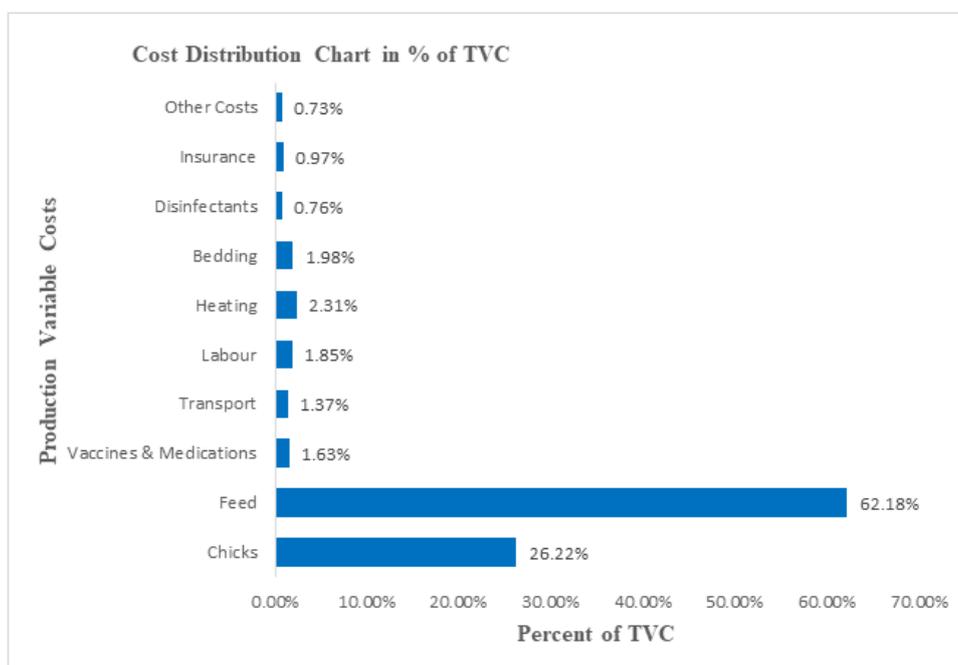


Figure 2: Distribution of total variable costs for broiler contract growers in Chegutu district, Zimbabwe

### Gross Margin Analysis of Broiler Contract Production

Table 2 below presents the gross margin analysis for all the 54 contract growers in Chegutu district. The gross margin analysis shows that the

growers are generally operating profitable enterprises with a total gross margin of \$261,047.15. The broiler contract growers in Chegutu realise a return per dollar invested of \$0.12, or \$0.44 for every bird sold.

Table 2: Overall gross margin analysis for broiler contract growers in Chegutu district, Zimbabwe

		Combined	Per bird model
<b>Total Revenue</b>			
	Total Sales (TS)	2,372,059.63	4.03
<b>Variable Costs</b>			
	Chicks	553,448.90	0.94
	Feed	1,312,629.62	2.23
	Vaccine and Medications	34,465.17	0.06
	Transport	28,972.92	0.05
	Labour	39,007.02	0.07
	Heating	48,842.22	0.08
	Bedding	41,788.68	0.07
	Disinfectants	15,958.22	0.03
	Insurance	20,493.73	0.03
	Other costs	15,406.00	0.03
<b>Total Variable Costs (TVC)</b>		2,111,012.48	3.59
<b>Gross Margin (GM)</b>			
	TR - TVC	261,047.15	0.44
<b>Total Birds Sold</b>		588,375.00	1.00
<b>Return per Variable Cost</b>			
	GM/TVC	0.12	0.12

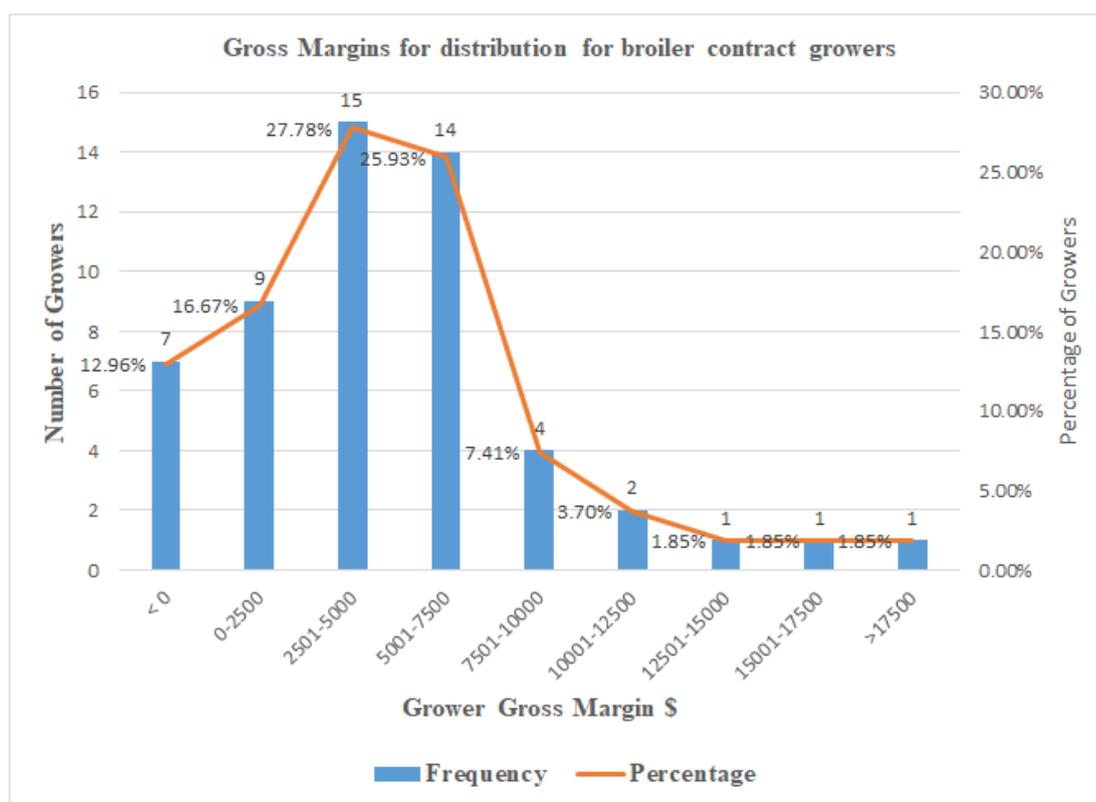
The mean gross margin per grower is \$4834.21, with a minimum of -\$3319.32 and a maximum of \$23335.57 (Table 3).

**Table 3: Gross margin analysis per broiler contract grower in Chegutu district, Zimbabwe**

Description	Mean Values
Mean Total Variable Costs (TVC)	39166.90
Mean Gross Margin (GM) (\$)	4834.21
Mean minimum gross margin	-3319.32
Mean Maximum gross margin	23335.57
Total Live mass Sold (kg)	20369.66
No. of Birds Sold (each)	10895.83
GM/ Total kg sold (\$)	\$0.24

Figure 3 shows the distribution of gross margins of broiler contract growers. The figure shows that seven (12.96%) of the contract growers had negative gross margins nine of the contract growers

(16.67%) had a gross margin of between 0 to \$2,500.00. Only 3 (5.55%) of the contract growers had gross margins above \$12,500.00.

**Figure 3: Distribution of gross margins for the broiler contract growers in Chegutu district, Zimbabwe**

#### Determinants of Profitability of the Broiler Contract Production

Table 4 presents the results of the analysis of the determinants of profitability of the broiler contract farmers in Chegutu district of Zimbabwe. Overall, the estimated model was good with the explanatory variables explaining 85% of the variation in gross

margin amongst the contract growers and the F-value of 18.17 was highly significant at 1% level of significance.

Except for residence of the grower ( $X_4$ ), key employee education level ( $X_8$ ), experience of key employee ( $X_9$ ), gender of key employees ( $X_{11}$ ), electricity source ( $X_{12}$ ) and other costs ( $X_{17}$ ), all the other explanatory variables significantly influence broiler contract farming.

**Table 4: OLS estimates of the determinants of broiler contract farming profitability**

Variable	Coef.	Std error	T	P >  t
Constant	6812.62	11081.66	0.61	0.543
Selling price (X <sub>1</sub> )	8232.437	4541.468	1.81	0.078
Gender of grower (X <sub>2</sub> )	971.4792	563.6312	1.72	0.094
Grower age (X <sub>3</sub> )	53.68906	22.29406	2.41	0.021
Residence of grower (X <sub>4</sub> )	793.28	771.9282	1.03	0.311
Grower's years of education (X <sub>5</sub> )	253.3053	109.493	2.31	0.027
Grower experience (X <sub>6</sub> )	342.695	93.76934	3.65	0.001
Years with key employee (X <sub>7</sub> )	-134.0377	69.24883	-1.94	0.061
Key employee education level (X <sub>8</sub> )	-849.1226	558.5094	-1.52	0.138
Experience of key employee (X <sub>9</sub> )	-81.41077	86.71328	-0.94	0.354
Manager of daily activities (X <sub>10</sub> )	-1780.749	696.6214	-2.56	0.015
Gender of key employees (X <sub>11</sub> )	-729.5254	849.806	-0.86	0.396
Electricity source (X <sub>12</sub> )	-386.8855	518.3177	-0.75	0.460
Batch size (X <sub>13</sub> )	-0.7323007	0.3089698	-2.37	0.023
Feed Costs (X <sub>14</sub> )	0.6442611	0.154975	4.16	0.000
Vaccines and medication costs (X <sub>15</sub> )	-2.768859	1.217739	-2.27	0.029
Transport costs (X <sub>16</sub> )	-2.740953	1.240054	2.21	0.034
Other costs (X <sub>17</sub> )	1.452608	0.9482075	1.53	0.135
Food conversion ratio (X <sub>18</sub> )	-16565.28	2311.81	-7.17	0.000
R <sup>2</sup>	0.9034			
Adjusted R <sup>2</sup>	0.8536			

ANOVA <sup>a</sup>					
Model	Sum of squares	Df	Mean square	F	P >  F
Regression	1.0449e+09	18	58050291.2	18.17	0.000
Residual	111791335	35	3194038.14		
Total	1.1567e+09	53	21824463.7		
Dependent variable: Gross margin per batch					

The selling price (X<sub>1</sub>) significantly and positively influence the profitability of broiler contract farming. A unit increase in the selling price of broilers increased profitability by \$8,232.44 and this result was significant at 10% level of significance. The result was consistent with the findings of Etuah *et al.*, (2013) and Cevger *et al.*, (2003). The results also showed that there was a positive and significant relationship between gender of grower (X<sub>2</sub>) and profitability and the result was significant at 10% level of significance. Female contract growers earned \$971.48 more profit when compared to male contract growers. Grower age (X<sub>3</sub>) positively and significantly influenced broiler contract farming. An additional year in the age of the contract grower increased profitability by \$53.69 and the result was significant at 5% level of significance. Thus older growers were more profitable. This was probably because older growers possessed more experience, could have extensively invested in the enterprise and also allocated a substantial amount of time on the project. Mulaudzi (2015) however found that grower age significantly and negatively influenced profitability.

The education level of the grower (X<sub>5</sub>) positively and significantly influenced profitability and

the result was significant at the 5% level of significance. Each additional year of grower level of education increased profitability by \$253.31. This result is consistent with the result of Xaba and Masuku (2013). Education is an important factor in that it arms a grower with skills that may benefit the enterprise. An educated grower has the ability to read, interpret and understand different resources that contribute to knowledge benefiting the enterprise. The ability to comprehend and access knowledge is enhanced by certain levels of education which may influence the degree of comprehension. Huffman (2000) also asserts that farmer education has potential for contributing to agriculture production. Grower experience (X<sub>6</sub>) in broiler production positively and significantly influenced profitability and the result was significant at 1% level of significance. An additional unit increase in grower experience increased profitability by \$342.70. The finding was consistent with Mulaudzi (2015).

Years with key employees (X<sub>7</sub>) was found to significantly and negatively influence profitability. An additional year with the key employee reduced profitability by \$134.04 and the result was significant at 10% level of significance. The finding was inconsistent

with the a priori expectation and no explanation for this could be established. Contract growers who were entirely responsible for the management of daily activities ( $X_{10}$ ) earned \$1780.75 less profit when compared to those growers whose enterprises were managed by the key employee and the result was significant at 5% level of significance. This finding was inconsistent with the a priori expectation. Kahan (2008) explains that the farmer is the key decision maker and should take the day to day decisions of the business.

Batch size ( $X_{13}$ ) was found to significantly and negatively influence profitability and the result was significant at 5% level of significance. A unit increase in the number of birds reduces profitability by \$0.73. This finding was inconsistent with the results of Yusuf *et al.*, (2016), Mulaudzi (2015), Etuah *et al.*, (2013) and Al-Mamun Rana *et al.*, (2012). This may be due to failure by growers to meet the management demands of larger batches.

Feed cost ( $X_{14}$ ) was found to positively and significantly influence profitability and the result was significant at 1% level of significance. A unit increase in feed cost increased profitability by \$0.64. Thus increased expenditure on feed increased profits through increasing bird weights. The finding was consistent to the results of Al-Mamun Rana *et al.*, (2012) and Onyeagocha *et al.*, (2010). A unit increase in vaccines and medication costs ( $X_{15}$ ) reduced profitability by \$2.77 and the result was significant at 5% level of significance. The finding supported Cevger *et al.*, (2003). Similarly, an additional unit increase in transport costs ( $X_{16}$ ) reduced profitability by \$2.74 and the result was significant at 5% level of significance. Transport cost is a direct cost and thus reduces gross margins.

The feed conversion ratio ( $X_{18}$ ) had a negative and significant relationship with profitability. Also known as the feed to meat ratio, this number is simply the amount of feed given to a chicken divided by the weight of the cleaned carcass. FCR impacts on financial margins substantially (Aviagen, 2011). A unit increase in the FCR reduced profitability by \$16565.28 and the result was significant at 1% level of significance. This implies the lower the FCR the higher the gross margin. This is consistent with a priori expectations that lower FCR for a given weight level indicates efficient feed conversion thus relative productivity hence higher gross margins. The finding was consistent with the results of Kawsar *et al.*, (2013), Rifky (2010) and Cevger *et al.*, (2003).

## CONCLUSION AND RECOMMENDATIONS

This study sought to establish the profitability of broiler contract production in Chegutu district of Zimbabwe and to analyse the determinants of profitability for broiler contract farming. The study

results of the study showed that broiler contract farming was profitable with a mean gross margin of \$4,834.20 per grower. On average, growers realise a return of \$0.12 per dollar invested of variable costs or \$0.44 per bird sold. Feed and Chick costs were established to be the major production costs constituting 62.06% and 26.36% of total variable costs respectively.

Significant factors that positively contributed to profitability of broiler contract farming were selling price, gender of grower, age of grower, education level of grower, grower experience in broiler production and feed costs. On the other hand, grower years with key employee, daily management of broiler production activities by grower, batch size, vaccines and medication costs, transport costs and the food conversion ratio negatively and significantly affected profitability of broiler contract farming.

The study recommends that measures should be put in place to encourage more smallholder farmers to join broiler contract farming schemes as it is a profitable venture. Female headed households must also be encouraged to venture into broiler contract farming as the results of this study have shown that they are more profitable when compared to their male counterparts.

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