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Profitability and Constraints of Broiler Production: Empirical Evidence from Ashanti Region of Ghana

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Abstract

This research was aimed at examining the profitability and constraints of broiler production in the Ashanti region of Ghana. Through multi-stage sampling technique, 114 broiler farms (farmers) were chosen as respondents for the study. Gross margin analysis, net returns and returns per Ghana Cedi invested were used to determine the profitability of broiler production. A multivariate regression (OLS) analysis was employed to examine the factors that influenced the profitability of the farms. Kendall's coefficient of concordance was then employed in ranking of constraints of broiler production. The gross margin from broiler production among the farmers ranged from GH¢1.08 to GH¢3.95 per bird (1.5kg live weight) with the mean of GH¢3.42. However, the net income (profit) ranged from GH¢0.90 to GH¢ 3.80 per bird with the mean of GH¢2.97. The result of the analysis further showed that the return per Ghana cedi invested among the farmers ranged from GH¢0.09 to GH¢0.29 with the mean of GH¢0.27. This implies that for every GH¢1.00 invested the farmers get GH¢0.27 as profit. Major production constraints identified, in order of severity, were high feed cost (ranked 1st), lack of access to credit (ranked 2nd), competition from cheap

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poultry import (ranked 3rd) and lack of government support (ranked 4th).

Key Words: Profitability, constraints, gross margin, net income, returns per Ghana cedi.

1. Introduction

In the 1960s, the Government of Ghana identified commercial poultry production as a smart way to address the steep decline in the animal protein supply. The Government's investment in the poultry industry paid off during the 1980-1990's with the domestic production accounting for about 95 percent of chicken meat and eggs in the country (Aning et al, 2008). Nonetheless, since 2000/2001, there has been an increasing decline in output from Ghana's poultry sub-sector particularly poultry meat (broiler) production. According to USDA (2008), the domestic poultry meat (broiler) production in Ghana fell to below 11 percent of demand in the year 2008. This sharp decline in output has been attributed to the soaring cost of production. A study by USDA (2010) confirmed that the high domestic cost of poultry production has culminated in the exit of many poultry farms especially the broiler farms, with prospective investors becoming increasingly unwilling to invest in the industry. The collapse of broiler farms in recent years is necessarily due to the negative effect of the high cost of domestic poultry meat (broiler) production on the profit/ net returns from the business. This study is, therefore, designed to determine the profitability of broiler production and examine the factors that influence the net returns or profit of the farms. Moreover, the study will identify and rank the constraints of broiler production among the sampled farms.

2. Literature Review

2.1 Trends in Domestic Poultry Production

The government of Ghana identified commercial poultry production as the greatest possible way of resolving the acute shortfall in the supply of

animal protein and consumption challenge in the country in the 1960's. This necessitated the establishment of an integrated poultry project in Accra. The growth of the industry was slow initially, as supplies of day-old chicks and other inputs were irregular (FAO, 2006). Frequent outbreaks of Newcastle disease during the period worsened the situation and deterred many potential farmers and investors from investing in the poultry industry.

According to Aning (2006), these constraints were overcome, and by the 1970s poultry production, supported by removal of custom duties on poultry inputs (feed additives, drugs and vaccines) and improved veterinary services was undertaken by many farmers either full-time or on part-time basis, especially in the urban areas of Accra and Kumasi. However, in the early 1980s the Ghanaian economy experienced sharp downturn which severely affected the availability of feed ingredients and other inputs and poultry production declined (FAO, 2006).

Towards the end of the 1980s, the poultry industry experienced some sort of slight growth. The industry experienced rapid growth during the 1990's, developing into a vibrant agricultural sector and supplying about 95 percent of chicken meat and eggs in the country (Aning, 2006). According to USDA (2008), since 2000/2001, Ghana's poultry sector has been experiencing a steep decline. This severe decline in the local poultry industry is due to the very high cost of production (USDA, 2008). By 2005, domestic poultry production was only able to meet 34 percent of demand for poultry meat as most poultry producers stopped producing broilers for meat altogether and started concentrating solely on the production of eggs. Both government and industry sources have indicated that poultry meat (broiler) production for 2007 fell to below 11 percent of demand (Aning, Turkson & Asumingl, 2008). Most of the small and medium-scale commercial broiler producers have completely closed down. According to Killebrew and Plotnick (2010), the country produced 1.27 kg of chicken meat per capita in 2008, lower than the per capita average of 1.71 kg for all of West Africa.

Due to low domestic poultry production and for that matter inability to

meet the increasing demand, imports of poultry products have increased almost 400 percent since 2000, growing at an annual average rate of 57 percent (USDA, 2008).

2.2 Constraints to Poultry Production

According to Darko (2010), the poultry industry in Ghana is being constrained by uncompetitive interest rates, lack of high subsidising cost of maize production resulting in high cost of poultry production and low productivity. Asare-Boadu (2010) also identified high prices of poultry feed as the major cause of farm failure and stressed the need for the government to intervene to control feed prices. According to Asare-Boadu (2010) having heavy subsidies for maize production, will mean the cost of poultry production is being effectively subsidized because it has an impact on the cost of feed, which is a major part of the cost of poultry. Otoo (2009) explained that the Ghanaian poultry farmers put in everything to buy feed and pay duties at the ports as well. He also stressed that while the average Ghanaian farm yields 10 bags of maize per acre, the same land in Brazil, for example, yields 36 bags. This underlines why there is a vast difference between poultry production cost in Ghana and that of other developed countries.

Otoo (2009) also identified lack of affordable credit as a constraint to commercial poultry production in Ghana. According to Otoo (2009), the cost of the commercial loans is so high that it wouldn't be viable using them to finance poultry production activities. This presupposes that lack of finance is another major cause of failure or lack of progress in the poultry industry. Darko (2010) emphasized that interest rates in Ghana far exceed the international norm. A farmer in the United State of America borrows at 4 percent interest, while his Ghanaian counterpart pays anything up to 28 percent. Asare-Boadu (2010) also stated that, even with the high interest rates, loans are not easy to come by because banks see agriculture as high-risk. Darko(2010) stated that there used to be something like an agricultural loan in the past and the interest rate was good but it's no longer there and as

a result of the high interest rate, poultry farmers could hardly borrow to improve their operations.

There is lack of policy initiative to focus attention on developing local poultry industry to meet the increasing local demand for poultry product especially meat (Owusu-Afari, 2010). According to Killebrew and Plotnick (2010), the policy and organizational environment is least favorable for poultry sector development in Ghana due to the lack of successful government support, infrastructure, or organization among producers. Owusu-Afari(2010) stated that there is a failure of legislators to recognize the need of passing laws that draw sufficient attention of government agencies responsible for agricultural development to the need of channeling adequate support to efforts being made improve poultry production. This implies that there is lack of definite government policy on developing the poultry sector. Darko(2010) added that governments keep repeating policies on poultry whenever a national budget is read and yet none of these policies has been implemented. For instance, budget statement of Ghana (2009) indicated that government would help poultry farmers to increase production to meet the domestic demand of the country by the year 2012. However, according to Owusu-Afari(2010) , no development have been seen yet in the poultry sector.

According to Owusu-Afari(2010) there are also inadequate capacity-building programmes to equip poultry farmers with proven techniques for efficient and rewarding poultry production culminating from optimal utilisation of resources.

2.3 Cost and Cost Trend of Domestic Broiler Production

The fact that total poultry production costs vary from farm to farm makes it somewhat complicated in an attempt to make accurate generalizations. However, in all cases, the major cost item is feed. About 2 kg of feed is now required to produce 1 kg of broiler; 50 years ago, 4.5 kg of feed was required. On the other hand, while about 1.7 kg of feed is required now to

produce one dozen eggs, 50 years ago, 2.3 kg of feed was needed (FAO,2006).

Though there is little official data available on local production costs, it is very evident that stakeholders are concerned about eroding competitiveness in the context of high and rising input costs. According to Aning (2006), production costs of 1kg of poultry meat(chicken) in Ghana from the year 2001 to 2005 were GH¢1.0526, GH¢1.1850, GH¢ 1.3430, GH¢ 1.6277 and GH¢ 1.7376 respectively. This represents an overall increase of 65.1 percent in poultry meat (1kg) production cost over the period with yearly increases between 6.8 percent and 21.2 percent (Aning, 2006). Furthermore, there is some evidence that poultry production costs in Ghana are well above international levels. For instance, FAO (2008), reported the broiler production cost in Ghana in 2006 to be GH¢4.09 per bird (around 1.5 kg) or GH¢2.07 per kg live weight with feed cost making up over 60 percent of the total cost. Local sales prices were quoted at US$ 5.50 (then equivalent of GH¢5.50) per bird, well above the price of an imported broiler.

Major suppliers of chicken products, such as the US and Brazil, reported costs of US$0.52 and US$0.55 per kg live weight respectively (USDA, 2008). A study by USDA (2010) reported the broiler production cost in Brazil between January to June, 2011 to be US$1.12(then equivalent of GH¢1.64) per kg live weight. According to USDA (2008), the average cost of producing broiler in Ghana (live wt 2-2.5kg/dressed weight of 1.5-1.9kg) as of the year 2008 was estimated as GHC10.00 for large-scale producers and it could be more for small-scale producers.

Furthermore, nominal maize prices in US$ terms in Ghana have fluctuated between US$151 per tonne and US$256 per tonne far above that of the major suppliers such as United States of America and Brazil (FAO,2006). Similarly the prices of all categories of poultry feed rose by 96.4 to 106.7 percent between 2001 to 2005 (Aning, 2006). According to USDA(2008), the price of maize per 50kg bag in July 2008 was GH¢45.00 (then US$45), nearly double the cost of GH¢24.70 (then US$24.70) in the

same period in 2007 whereas that of the major suppliers of chicken products to Ghana, such as the United States of America and Brazil, reported prices of US$10.77 and US$10.93 per 50kg bag respectively (USDA,2008). This implies that the increases in feed costs generally reflected the market price of maize, locally produced but often supplemented with imports(FAO, 2008). According to Aning (2006), the price of day-old chicks in Ghana also increased steeply between 2001 and 2005 from GH¢0.40 to GHC0.70. This implies that feed cost, cost of day old chicks, costs of energy among others account for the high poultry production cost in the country (FAO, 2008).

3. Methodology

3.1 Theoretical Framework

Profitability (net returns) is obtained by deducting the total cost of production from the total revenue. It is represented by the formula:

$$\text{Profitability} = TR - TC \tag{1}$$

where TR is total revenue, and TC is total cost.

$$TR = P\,Q \tag{2}$$

Equation (2) indicates that TR is the product of output price and quantity of output produced.

Also,

$$TC = TVC + TFC \tag{3}$$

where TVC is total variable cost and TFC is the total fixed cost.

Therefore,

$$\text{Profitability (net income)} = PQ - TVC + TFC \tag{4}$$

Returns per Ghana cedis invested can be calculated as follows:

$$\text{Returns/GH₵} = \text{net income/TC} \quad (5)$$

The total variable cost for this study comprises the costs of feed, disease treatment and prevention, labour, day old chicks, and miscellaneous items/services (cost of energy, water, transportation, milling cost). Similarly, the total fixed cost items include the depreciated costs of pens/farm buildings, farm equipment (drinkers, feeders, shovels, brooders, buckets, and wheelbarrow) and land rent. In addition, the factors that influence income of the sampled broiler farms were captured by ordinary least square method using multivariate regression model.

The model can be implicitly specified as

$$NI=f(S_{E,}\, C_{I,}\, PQ_{,}\, Q_{L,}\, S_{TA}) \quad (6)$$

Where NI is net income, S_E is socioeconomic characteristics of farmers, C_I is Input costs, $P_{Q,}$ is output price, Q_L is output level, and S_{TA} is source of technical advice. Moreover, the constraints of broiler production were identified and ranked using the Kendall's Coefficient of Concordance (W). The W - value ranges from 0 (no agreement) to 1 (complete agreement). If W is 1, the respondents have been unanimous, and each respondent has assigned the same order to the list of constraints. If W is 0, it presupposes there is no overall trend of agreement among the respondents, and the responses may be regarded as essentially random. Intermediate values of W indicate a greater or lesser degree of unanimity among the various responses (Anang *et al.,* 2011). The Kendall's coefficient of concordance is computed as:

$$W = \frac{12[\sum T2-(\sum T2)/n}{nm2(n2-1)} \quad (7)$$

Where; T = Total weight score, n = Number of constraints being ranked, m = Number of respondents (Anang *et al.,* 2011).

3.2 Empirical Model Specification

The implicit multivariate regression model (5) can be specified in an explicit form as:

$$NI = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 \quad (7)$$

where, NI = Net Income, X_1 = Experience of the farmer (years), X_2 = Years of formal education, X_3 = Output level, X_4 = Technical advice from veterinary services only, X_5 = Technical advice from both the veterinary and the experienced broiler farmers, X_6 = Price of output, X_7 = Total variable cost, X_8 = Fixed cost of capital assets, βs = parameters to be estimated

3.3 Data and Sampling Technique

Multi-Stage sampling technique was employed in the selection of cross sectional data from the respondents. The first stage involved purposive selection of eight (8) districts taking into consideration the availability of commercial broiler production in those areas. The selected districts were Atwima Nwabiagya, Atwima Mponua, Atwima Kwanwoma, Kwabre East, Ahafo Ano South, Sekyere South, Ejisu-Juaben Municipal and Kumasi Metropolis. The second stage involved purposive selection of six (6) villages each from the Atwima Nwabiagya, Atwima Mponua, Atwima Kwanwoma, and Kwabre East districts, five (5) villages each from Ahafo Ano South and Sekyere South districts and four (4) suburbs from each of the last two districts (Ejisu-Juaben Municipal and Kumasi Metropolis) respectively. In all, there were 42 villages/suburbs. Thirdly, the population of farms that produced broilers between January and June 2011 from the forty-two (42) selected villages/suburbs (in the 8 selected districts) were identified. The individual farms from each village or suburb were then chosen through simple random sampling. At the end of the sampling exercise, 18 farms were selected from the Atwima Nwabiagy district, 16 farms from Atwima Mponua, 17 farms each from Atwima Kwanwoma, and Kwabre East

districts, 15 farms each from Ahafo Ano South and Sekyere South districts and 8 farns each from the Ejisu-Juaben Municipal and Kumasi Metropolis; making a total of 114farms/farmers.

3.4 Study Area

The study was carried out in the Ashanti region of Ghana. The region is located between longitudes 0.15W and 2.25W, and latitudes 5.50N and 7.46N. It occupies a land area of 24,390 sq.km (10.2 percent of the land area of Ghana). The main occupation of a very high proportion of the predominantly rural population is Agriculture. Poultry production is one of the major activities within the agricultural sector in the region. Though the high cost of domestic poultry production has resulted in the collapse of many poultry farms, the region is still one of the few regions in Ghana where large number of poultry farms and feed mills are located.

4. Results and Discussion

4.1 Profitability Analysis

The result of the profitability analysis of the broiler farms is presented in Table 1.0 The total variable cost per bird (1.5kg live weight) ranged from GH¢9.41 to GH¢12.04 with the mean of GH¢10.43. The total fixed cost of capital assets per bird among the sampled farms ranged from GH¢0.29 to GH¢0.96 with the mean of GH¢0.45. The total production cost per bird among the broiler farms ranged from GH¢9.70 to GH¢13.00 with the mean of GH¢10.88. In addition, the total revenue per bird ranged from GH¢12.00 to GH¢15.00 with the mean of GH¢13.85. The analysis further indicated that the gross margin from broiler production among the farmers ranged from GH¢1.08 to GH¢3.95 with the mean of GH¢3.42. However, the net income (profit) ranged from GH¢0.90 to GH¢ 3.80 with the mean of GH¢2.97. The result of the analysis further showed that the return per Ghana Cedi invested among the farmers ranged from GH¢0.09 to GH¢0.29 with the mean of

GH¢0.27. This implies that, on average, for every GH¢1.00 invested the farmers get GH¢0.27 as profit.

Table 1
Cost of Production and Returns per Bird (1.5kg Live Weight)

Variable	Minimum (GH¢)	Maximum (GH¢)	Mean (GH¢)
Variable Cost Items			
Labour	0.57	2.97	1.03
Disease Prevention & Treatment	0.10	0.61	0.37
Day Old Chick	1.20	1.80	1.44
Feed	5.41	9.45	7.26
Energy	0.07	0.21	0.15
Water	0.01	0.07	0.03
Transportation	0.03	0.10	0.07
Milling	0.04	0.16	0.08
Total Variable Cost (TVC)	9.41	12.04	10.43
Fixed Cost Items			
Land Rent	0.03	0.12	0.05
Buildings	0.17	0.52	0.30
Farm Equipment	0.07	0.32	0.10
Total Fixed Cost (TFC)	0.29	0.96	0.45
Total Production Cost (TVC+TFC)	9.70	13.00	10.88
Total Revenue (TR)	12.00	15.00	13.85
Gross Margin (TR-TVC)	1.08	3.95	3.42
Net Income (TR-TVC+TFC)	0.90	3.80	2.97
Return per GH¢	0.09	0.29	0.27

Source: Field Data (2011)

4.2 Factors that Influenced the Net Income (Profit) of the Farms

The ordinary least square (OLS) estimates of the multivariate regression model that explains factors that influence net income together with the t-ratios and their statistical significance levels are presented in table 2.0. The F-values of 466.60 was significant at 1 percent. This is an indication of the

overall good fit of the model. The adjusted R-square of 0.9706 implies that about 97 percent of the variation in the net income is jointly explained by the explanatory variables. The result indicates that farming experience did not have significant positive impact on net income contrary to the expected. This could probably be due to the fact the some of the experienced farmers relied on their experience and were adamant to adoption of new practices resulting in an increase in bird mortality rate as well as the cost of production. Similarly, educational level of the farmers had positive effect on net income but the impact was not significant.

Table 2
Ordinary Least Square (OLS) Estimates of the Factors that Influence Net Income

Variable	Parameter	Estimate
Constant	$ß_0$	0.0724
		(0.5700)
Farming experience(years)	$ß_1$	0.0010
		(0.3700)
Educational level(years)	$ß_2$	0.0088
		(-0.5300)
Farm size (number of birds produced)	$ß_3$	0.0001*
		(1.9700)
Technical advice from veterinary services only	$ß_4$	-0.0349
		(-1.200)
Technical advice from both veterinary and farmers	$ß_5$	-0.0496*
		(-1.8100)
Output Price (price per bird)	$ß_6$	0.9840***
		(55.1200)
Total variable cost per bird (GH¢)	$ß_7$	-0.9858***
		(-51.880)
Fixed cost of capital assets per bird (GH¢)	$ß_8$	-0.9834***
		(-15.700)
F- Value (prob.)	*fv*	466.60***
		(0.0000)
Adjusted R-square	$A\text{-}R^2$	0.9706

Source: Field Data (2011)

The figures in parentheses are the t-ratios. ***, **, * denote that coefficients are statistical significant at 1%, 5percent and 10percent respectively.

Note: technical advice from fellow broiler farmers only was used as the base of the three.

In addition, farm size had a significant positive effect on net income.

This could be as result of cost advantage from economies of scale. The negative coefficients for technical advice, technical advice from both experienced broiler farmers and veterinary services as well as technical advice from veterinary services only implied that these variables reduced net income. This indicates that as the money spent on veterinary services increased the net income decreased. Similarly, as bird mortality increases because of over-reliance on fellow farmers for technical advice, cost of production increases and net income reduces. The result further indicates that an increase in output price significantly (1 percent) increases net income. Moreover, total variable cost and fixed cost of capital assets significantly reduced net income. That is, the higher the total variable cost/fixed cost, the lower the net return.

4.5 Analysis of Broiler Farmers' Constraints

The study revealed the various challenges faced by the sampled broiler farms in the study area as shown in table 3. The constraints were ranked with 1 as the topmost and 12 as the least problem based on the outcome (mean scores) of the analysis of the data on farmers constraints using the Kendall's coefficient of concordance (W). Thus, the constraint with the least mean score is ranked the most pressing problem with the highest mean score being the least pressing. The Kendall's W was 0.843 and significant at 1% indicating that there was 84.3% agreement among the rankings by the sampled broiler farms. This implies that about 84.3% of the respondents considered high feed cost as their topmost problem followed by lack of access to credit, competition from cheap poultry import in that order as shown in table 3.

Surprisingly, the farmers claimed they hardly hear of capacity building programmes for poultry farmers in recent years yet they (farmers) ranked it as the least of their concerns or constraints (ranked 12). Since capacity-building programmes are meant to equip farmers with new ideas and techniques for efficient production, failure to acknowledge its importance as revealed in this study could lead to inefficiencies in production or cost

management. This implies that, the farmers did not even consider their own cost management difficulties or inefficiencies as significant constraint to production.

Table 3
Constraints of the Sampled Broiler Farms and their Rankings

Constraints of the Sampled Broiler Farms	Mean Score	Rank
High feed cost	1.14	1
Lack of access to credit	2.27	2
Lack of Government support	3.96	4
Competition from cheap poultry import	3.25	3
Diseases outbreaks	4.60	5
Marketing difficulties	6.78	6
High cost of medication	9.92	10
High cost of day old chicks	8.20	8
High labour cost	9.28	9
Lack of quality day old chicks from most local hatcheries	8.08	7
Inadequate capacity building programmes for farmers	10.29	12
High energy cost	10.23	11
Test Statistics		
Kendall's W	0.843	
Chi-Square	1057.000	
Asymptotic Significance	0.000***	
Sample	114	

Source: Field Data (2011) *** represent 1% level of significance

4. Conclusions and Policy Recommendations

The study revealed that profit (net income) per bird (1.5kg live weight) among the broiler farmers ranged from GH¢0.90 to GH¢3.80 with the mean of GH¢2.27. The result of the analysis further indicated that for every GH¢1.00 invested the farmers get GH¢0.27 as profit. In addition, increases in output price and farm size were identified as factors that significantly improve profit in broiler production. However, increases in total variable cost and total fixed cost were the factors that significantly reduced profit in broiler production. Major broiler production constraints identified, in order of severity, were high feed cost (ranked 1st), lack of access to credit (ranked

2nd), competition from cheap poultry import (ranked 3rd) and lack of government support (ranked 4th). The results of the analysis indicated that in spite of the constraints that the broiler farmers faced they were still able to make considerable amount of profit. This study recommends that feed cost, which constituted the major component of the total variable cost and was considered by the farmers, as their main constraint to broiler production should be subsidized by the government to help boost domestic production.

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