PROFITABILITY OF POULTRY PRODUCTION IN KADUNA STATE, NIGERIA

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Introduction

Agricultural business was the earliest commercial activity in the history of mankind, started long ago. The contribution of agriculture in the world over cannot be denied and the sector was credited with the role of becoming one of the great pillars of the world's economy (McConnel and Brue, 2008). In the past, poultry farming involved raising chicken in the back yard for family daily egg and meat consumption, but poultry production today is highly specialized as profit maximizing and efficient enterprise with huge business that splits into several operations as hatcheries, pullet, meat and eggs production which generates income and employment to the greater number of people in the poultry industry (Hamra 2010). World watch institute (2006) estimated that 74 per cent of the world poultry meat and 68 per cent of eggs were produced in a way that is described as intensive poultry production and free range which is an alternative to the former. More than 50 million chickens are being raised annually as sources of food from both their meat and eggs. The largest poultry producers in the world from 2006 to 2013 includes China, Indonesia, and India in Asia, United State of America, France, Germany and United

ABSTRACT

The study was conducted to investigate the profitability of poultry production in Kaduna state and 9 local governments were selected using stratified random sampling. Data was collected with the used of structured questionnaire from 166 poultry producers which consist of layers, broilers and pullet producers. Frequencies, percentages and net farm income were adopted in

Kingdom in Europe, Sou th Africa and Nigeria in Africa. The industry has been growing in terms of size, income and employment especially in Asia and Africa (FAO 2006).

In Africa, the poultry sector became the fastest growing sector between the years of 2000 and 2012 where the poultry production expanded by 5.0 percent annually. The biggest seven producers with a combined output of 3.6 million tons which accounted for almost 80 per cent of the regional total output were South Africa, Nigeria, Egypt, Morocco, Algeria, Tunisia and Libya. The expansion of the sector has contributed to income and employment generation in these countries (Evans 2013).

Poultry production in Nigeria was considered as one of the important sub sector due to its relevance in providing employment for the job seekers and creating business opportunities for entrepreneurship. It generates quick economic return to the producers and the subsector provides direct jobs opportunities to 10-15% of Nigerian populace as well as substantial income from poultry output (Afolabi et al 2013) and (Abiola 2007). Sahel (2015) described the Nigerian poultry industry as one of the largest in Africa because of the huge capital involved which was estimated to the tune of ₦80 billion ($600 million), the industry products comprises 165 million birds that produced 650,000 metric ton

the analysis of data. The study was interested on total revenue and total cost of poultry production. The total cost comprises fixed and variable cost, total variable cost consists of day old chicks (doc), feeds, cost of vaccine, electricity and cost of labor. Fixed cost items include poultry house, cage, vehicle and other poultry production equipment. The profitability of layer producers in the study area was 6.15, broiler producers' was 1.91 and pullet was 1.69 as revealed by the study. The study further revealed that variable cost took 99% of the total cost of poultry production in Kaduna state.

Keywords: Profitability, Poultry Production, Layer, Broiler and Pullet Production.

(MT) of eggs as the largest in Africa and 290,000 MT of poultry meat as the second largest, after South Africa. The livestock subsector contributed 25% - 27% to the Gross Domestic Product (GDP) and the Poultry sector contribution to the (GDP) was 10% over the years which is a sharp declined from 25% in 1999 (Achoja 2012). Poultry production is a major source of protein from their meat and egg which was considered to be one of the most nutritious food intake and acceptable by the major religions in the country (Ohajianya et al 2014).

Poultry subsector in Kaduna state provides employment opportunities to over 50 percent of the people mostly at subsistence level (Tabari 2015). Commercial poultry production was categorized as small, medium and large scale enterprises in Kaduna state, where the majority of the poultry producers fall within the category of small and medium scale producers. This subsector has an advantage over other livestock sector in providing income and greater employment opportunities to the greater number of people in Kaduna state (Emaikwu et al 2012) and (Tabari 2015).

Profitability in commercial poultry production according to Prabakaran (2003) depends on not only efficiencies in production, but it also depend on the successful marketing of the product, production and technique which include, proper planning on selecting location and lay-out, proper design of poultry house, arranging of quality input like, DOC, feeds, adopting appropriate rearing technique and taking adequate diseases control measure to ensure high efficiency and productivity, profitability in poultry production also involved proper assessment of demand, planning the size of the activity, prudent assessment of cost benefit and the rate of return in the activity which differed or vary with location and time.

Despite the employment and income as well as the nutritive value of poultry output, the production in the country in general and Kaduna state in particular is grossly inadequate as compared to the wide gap between demand of 65gm and supply of 7gm daily (Ike 2011). This was attributed to numerous problems and challenges associated with the poultry production in Nigeria such as poor breed, low eggs and poor weight as a result of diseases and pest, poor quality and unstable supply of feeds and inefficiency of management as well as poultry factor inputs.

Other includes lack of capital, risk and uncertainty of the business that arises from price fluctuations, unexpected depreciation of investment and general high cost of poultry production (Omodele and Okereke 2014).

Objective of the study

The main objective of the study is to investigate the profitability of poultry production in Kaduna state.

Methodology

Study area description: The research was conducted in Kaduna State as one of the 36 state in Nigeria. It has 23 local governments, with a population of 6,006,562 million as at 2006 (NPC 2006) and increased to 7.8 million (Kaduna state 2014). The state covers an area of about 48,473.2 kilometres and occupies the central portion of northern Nigeria and lies between latitude 90 and 140 north of the equator. The state extends from tropical grassland (savannah) in the south to Sudan savannah in the north. The savannah region covers the southern part with vegetation and tall trees. The Sudan savannah covers the northern part with veldt grass and short tress. The state has arable land of about 4.5 million hectares and only 2.02 million hectares are in actual cultivation. The state has vast expanse of fertile land growing both food and cash crops and it has rivers that provides opportunities for irrigation and fish farming. More than 70 percent of the work force earns their livelihood in farming from food crops, cash crops and livestock (Kaduna State 2010). Commercial poultry production is receiving wider popularity and acceptability day by day as a result of the growing demand for poultry meat and egg as well as providing employment and income to the greater number of people in the state. This research took place in 9 local government areas where commercial poultry producers concentrated, 3 local governments from zone one (northern zone) which comprises Zaria, Sabon gari and Lere local governments. Four local government from zone two (central zone) which comprises Kaduna North, Kaduna South, Igabi and Chukun. The two local governments from zone three (southern zone) were Kachia and Sanga respectively.

Source of data collection: This study was cross sectional survey that gathered information from farm records and panel procedures with the use of questionnaire and supplementary interview administered to the commercial poultry producers in Kaduna state which served as primary sources of data. The used of publications, documents, journals, library materials and theories that have Universal validity as the sources of secondary data.

Sample procedure: A stratified random sampling procedure was applied. Where by poultry producers were divided into areas and randomly selected based on the inclusion criteria, such as years of poultry production experience (minimum of 10 years) and must be commercially poultry producers and based in Kaduna state from the selected 9 local government areas of study. Chukun local government 14 farms responded, Igabi 21 and Kachia local governments16 farms, while Kaduna north 25 farms, Kaduna south 24, Lere, Sabongari and Sanga, 18, 15, 14 respectively and Zaria local government 19 farms responded. These areas are predominantly poultry producers, 166 respondents responded by submitting their questionnaires from the 250 distributed as indicated in table 1.0

Table 1.0 Response Rate of the Distributed Questionnaires

Response Rate	Frequency	Percentage (%)
Response	166	71
Non Response	84	29
Total	**250**	**100**

Source: Primary Data 2015

Table 1.1 indicated the age distribution of the respondents and their frequencies. The dominant respondents were from the ages of 36 to 40, (40.4%). Followed by the ages category of 31 to 35 (21.1%), then (17.5%) were between the ages group of 41 to 45. The age group of 46 and above constituted (9.0%) while (2.4%) were from the ages group of 20 to 25 and (6.6%) percent of the respondents were between the ages of 26 to 30.

Demographic characteristics of the respondents

Age of the Respondents		Frequency	Percent
	20-25	4	2.4
	26-30	11	6.6
	31-35	40	24.1
	36-40	67	40.4
	41-45	29	17.5
	46-above	15	9.0
	Total	166	100.0

Sources: Primary data 2015

Educational Level of Respondents

The level of education frequencies and percentages of the respondents were captured in this study and tabulated in table 1.2 below.

Table 1.2: Level of Education of Respondents

Response		Frequency	Percent
Valid	Secondary	39	23.5
	Certificate	2	1.2
	Diploma	62	37.3
	Bachelors	30	18.1
	Masters	2	1.2
	Others	31	18.7
	Total	166	100.0

Source: Primary data 2015

Table 1.2 showed the percentages of educational level of poultry producers. Diploma level of education have the greater percentage of (37.3%), followed by the secondary level of education (23.5%). The percentage with other level of education was (18.7%) and those with bachelor's level of education were (18.1%) where as those with certificate and master degrees constituted (1.2%) respectively. This indicated that, to some greater extent the poultry producers in Kaduna state attained one level of education or the other.

Table 1.3 Experience in Poultry Production

Response		Frequency
	10 years	48
	11-20 years	116
	21-30 years	1
	31+ years	1
	Total	166

Source: Primary data 2015

Results in table 1.3 above revealed that the overall poultry producers engaged in poultry production activities for 10 years were (28.9%). While the majority (69.9%) poultry producers that spent 11 to 20 years in poultry business.

Table 1.4: Types of Poultry production

Poultry Production Farm	Frequency	Percentage (%)
Layers	104	62.6
Broilers	55	33.3
Pullets	7	4.1
Total	**166**	**100.0**

Source: Primary data 2015

Table 1.4 above revealed the type of poultry production in Kaduna State where 62.6% for layer production, 33.3% for broiler and 4.2% and the average number of batches for broiler and pullet production was 5 and 3 per farm per year with average production of 40,056 and 38,933 respectively while the layer average production per farm per year 39,982 birds.

Method of data analysis
Descriptive analysis, statistics such as, frequencies and percentages, were used to describe socioeconomic characteristics of the respondents. The measurement was based on net farm income analysis (NFI) which was obtained from total revenue and total cost of poultry production.

The total cost comprises fixed cost and variable cost of factors. Total Variable cost consist of DOC, feeds, vaccine, electricity and cost of labor. The fixed costs are those cost that are fixed in poultry production such as, housing, cage, vehicle and other poultry equipment. The fixed inputs are not normally used up at a short run in a production cycle. They were depreciated using the straight line method given by:

$$D = \frac{(P-S)}{N}$$

Where:

D= depreciation (₦),

P= purchased value (₦),

S= salvage value (₦),

N= life span of asset (years).

Return per Naira invested (RNI) was obtained by dividing the total revenue (TR) by the total cost (TC).

Therefore; $$RNI = \frac{(TR)}{TC}$$

Where:

RNI = returns per naira invested

TR = total revenue from poultry input sales

TC = total cost

Result and Discussion

Table 3.0 Profitability of Layer production in Kaduna state

Layers production	Value (₦/year)	% Cost contribution
Total Variable Cost		
Cost of Day old Chicks	8082315.2	15.211
Cost of Feeds	38947528	73.298
Cost of Vaccine/Drugs	2983514.1	5.615
Cost of Labour/salary	3014316.8	5.673
Cost of Electricity	73518.455	0.138
sub-total	53101192	99.935
Total Fixed Cost		
Cost of Equipment	1799.7828	0.003
Cost of Repairs/maintenance	32605.657	0.061
Sub-total	34405.439	0.064
Total Cost of production	**53135598**	**100**

REVENUE	
Sales of Eggs	322161020
Sales of Spent layers	4703828.3
Sales of Manure/litters	29742.424
Sales of Bags	960.202
Total Revenue	**326895551**
Net Farm Income	**273759953**
Return per Naira Invested	**6.15**

Source: Primary data 2015

Table 3.0 indicated the total cost of layer production, which consists of variable and total fixed cost. Where, Day One Chicken (DOC), feeds, vaccine/drugs, labor electricity were regarded as variable cost. The total fixed cost comprises poultry equipment, repairs and maintenance. The total variable cost was the major cost in layer production which constituted 99.93 percent of the total production cost while fixed cost was less than 1% (0.128). The costs feeds constituted the greater percentage of 73.3% in layer production in particular and poultry production in general. This finding agreed with the studies of Gangwar (2013), Vincent at el (2010) and Nwandu et al (2015) and (Mairuri and Muturi (2013).

The revenue and profit was from the sales eggs at average of (N600/crate), spent layers (N850/chicken), manure/litter and sales of bags. This was obtained from differences between the total cost and total revenue. Return per naira investment was 6.15 per every one naira invested in the study area. The profitability was indicated by (RNI) as highly profitable investment based on the decision rule which stated that (RNI>1) implies profitability of the investment, (RNI<1) is a loss in the investment, while (RNI=1) implies the breakeven point of the poultry investment. The profitable of layer production was confirmed by the study of Afolabi et al (2013), Tijjani at el (2012) and (Evbuomwan 2005).

Table 3.1 below, indicated the cost of broiler production in the study area, where the major cost the total variable cost consists of 99.93 percent of the total production cost, while the total fixed cost was 0.069 percent of the total cost of production.

The revenue and profit was from the sales of broiler chicken (N750/chicken), manure/litter and feed bags as revealed by the study. The profitability of (N1.91, RNI) in broiler production in Kaduna state was in line with the studies of Bamiro et al (2013), Hamra (2009) and (Balamuran and Gunaharang 2009),.

Table 3.1 Profitability Broiler production in Kaduna state

Broilers production	Value (₦/year)	% Cost contribution
Total Variable Cost		
Cost of Day old Chicks	5509036	34.025
Cost of Feeds	8909150	55.025
Cost of Vaccine/Drugs	1293128	7.987
Cost of Labour/salary	284234.4	1.755
Cost of Electricity	184446	1.139
Sub-total	16179994	99.931
Total Fixed Cost		
Cost of Cage/housing	4112	0.024
Cost of equipment	1784	0.011
Cost of Repairs/maintenance	5227.2	0.032
Sub-total	11123.2	0.069
Total Cost of production	16191118	100
REVENUE		
Sale of broilers	29042711	
Sales of manure	1927032	
Sales of Bags	34470	
Total Revenue	**31004213**	
Net Farm Income	**14813095**	
Return per Naira Invested	**1.91**	

Source: Primary data 2015

Table 3.2 below, showed the cost of pullet chicken production in Kaduna state, the greater percentage of the total cost was consumed by the total variable cost of 99.96%.on the other hand 0.03% constituted the fixed cost.

Pullet production profitability was (N1.69 RNI) in this study as indicated in table 3.2. The profit was realized from the sales of point of lay chicken (N1227/pullet) by the producers as the birds attained the ages of 18-20 weeks. The pullet production is profitable as confirmed by the RNI. The variable cost constituted the major cost of 99.6% of the total cost of pullet production.

Table 3.2 Profitability Pullet production in Kaduna state

Pullet production	Value(₦/year)	% Cost contribution
Total Variable Cost		
Cost of Day old Chicks	8663333	30.779
Cost of Feeds	15958667	56.698
Cost of Vaccine/Drugs	705250	2.506
Cost of Labour/salary	2137433	7.594
Cost of Electricity	673233.3	2.392
Sub-total	28137917	99.969
Total Fixed Cost		
Cost of Cage/housing	3008.333	0.011
Cost of equipment	3850	0.014
Cost of Repairs/maintenance	1803	0.006
Sub-total	8661.333	0.031
Total Cost of production	28146578	100
REVENUE		
Sales of pullet chicken	47237083	
Sales of manure	541083.3	
Total Revenue	**47778167**	
Net Farm Income	**19631589**	
Return per Naira Invested	**1.69**	

Source: Primary data 2015

In table 3.3 below indicated the total physical product (TPP) of broiler production was 40,056, 39,982 for layer production and 38,933 for pullet production respectively. The average physical product (APP) was 5,722 for broiler production, 1,599 for layer production and 3,244 for pullet production and the marginal product (MP) was 747, 1163 and 1773 for broiler, layer and pullet production in Kaduna state.

Table 3.3: TPP, APP and MPP of Poultry Production

Poultry products	Broiler birds	Pullet birds	Layer birds

Total Physical Product (TPP)	40,056	38,933	39,982
Average Physical Product (APP)	5722	3244	1599
Marginal Physical Product (MPP)	747	1773	1163

Source: Primary data 2015

Table 3.4 indicated the gross income margin (GIM) of poultry production in the study area which confirmed the profitability of poultry production in the study area which is in line with (Evbuomwan 2005). The result was obtained from the differences of total revenue (TR) and the total variable cost (TVC). The Average total cost (ATC) and average revenue (AR) was also obtained from the sales of poultry output as indicated in the table, the AR of layer output was higher due to sales of eggs in the study area within the study period.

Table 3.4 Poultry production Gross income margin in (₦/Naira)

Poultry Production	TVC	TR	GIM	ATC	AR
Layer Production	53,101192	326,895.551	273,794,359	1328.99	8176
Broiler Production	16,179,994	31,004,213	14,824,219	404.12	774.02
Pullet Production	28,137,917	47,778,167	19,640,250	722.95	1227

Sources: Primary data 2015

Conclusion and Recommendation

Poultry production was a profitable investment in Kaduna state as indicated by the result of this study, especially the layer production, this development contributed to income and employment generation in the state. The poultry production growth margin analysis in table 3.4 have further confirmed the profitability of poultry production in Kaduna state. The major problems faced by the poultry producers as found by the study, were the high cost of major poultry inputs, such as nutritious feeds, Doc and vaccine. Lack of these inputs in sufficient quantity and quality has contributed to the low level of egg production, poor chicken quality in term of weight gain especially the broiler chicken, poor and low performing breed. Variable cost of production was considered to be a major factor that influences profitability of poultry production, apart from the high cost of inputs the market of broiler chicken has a low patronage by the general public due to two reasons:

Firstly, chickens were mostly consumed during festivity period. This led to the low production of broiler chicken in Kaduna state. Secondly, the major consumers of broiler chicken were big restaurants and fast food shops who had resolved to produced their broiler chicken to meet their

demand this is one of the majority reason that broiler production does not exceed 5 batches by the greater percentage of the producers within a year. This violates the principle of full time broiler production gain, which considered 6-10 batches in a year for substantial gain in poultry business production (Osewu 2014) and (Prabakaran 2003). The low profit in pullet production was as a result of uncertainty and disappointment from the buyers which discouraged many poultry producers to produced pullet birds in Kaduna state.

Poultry production in Kaduna state should be improved by reducing the cost of poultry inputs through government policy of encouraging the producers of poultry inputs, especially feeds and vaccine/drug. This would enhance production of poultry output at lower cost which will increase profitability of poultry producers, income employment in Kaduna state.

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