THE ECONOMIC PROSPECTS OF POULTRY ENTERPRISES IN OBIO/AKPOR AND PORT HARCOURT MUNICIPAL COUNCIL AREAS OF RIVERS STATE, NIGERIA.

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ABSTRACT

The study was conducted in Obio/Akpor and Port Harcourt municipal council Areas of Rivers State, Nigeria. The two local government Areas show case densely populated Areas in Nigeria and major industrial hubs with significant presence of poultry farms and ready markets. Multi-stage random method was adopted in sample collection and data were analysed using farm budgeting techniques, simple arithmetic and regression models. The study shows an unfavourable gross margin in the broiler enterprises and allocative inefficiencies in the industry as a whole. Many self rendered services and self owned factors of production were not valued and their opportunity costs were not considered by the farmers. This gave an illusionary perception of the industry to the farmer in terms of profit making. Generally, all aspects of the industry were in the first stage of a typical production function judging from the results of the regression model. Mechanized labour if affordable and self formulation of feeds were suggested to grow profits.

INTRODUCTION

From the 1960s, world production of poultry has been rising at a quicker pace than the production of other protein sources in both developed and developing nations and is expected to continue because of the ability of poultry to convert feed into meat at a lower production costs even in intensive poultry production systems. This rise in the magnitude of production is noted to be beneficial to developing countries (like Nigeria) that cannot harness adequately agricultural resources and has a poor population. This however may have resulted in falls in prices in some places because of excess supply, but the visibility of this fall in prices is not apparent in many developing countries though. This notable growth in poultry production and consumption especially in the developing countries has implications for global trading in meat products, feeds and related inputs (Landes et al. 2004; Taha 2003 in Dagne, 2015)**.**

Demand for livestock products such as the poultry, is increasing in Nigeria because of population growth and urbanization. Poultry farming comparatively is one of the fastest growing subsectors of the Agricultural industry in the country and Nigeria's poultry industry is valued at more than N1.2tn as at 2017(InvoiceApp, 2020). It is observed that the demand for livestock products is income based and elastic. The market demand for livestock products therefore has gone up significantly and poultry is one of the livestock products that is in high demand (perhaps, because of it affordability) and unlike the other livestock products, enters with relative ease into the world market because it requires low capital in both land and resources (Dagne, 2015) and without the evident religious biases that attend the demand for other livestock products like the pork.

Poultry production is common in many places, but *profitable* poultry production in many instances may be the experience of a few. Opportunities to earn more money in poultry production are better today than it was previously because of the high prices of animal protein in the cities compared to the cost of production, thus encouraging its consumption since they are cheaper to access than beef, pork and lamb. This demand is far higher than the size of poultry flocks and has raised opportunities for poultry enterprises. By implication, the outlook for poultry production is very favourable. The highest demand for poultry products is for the chickens and eggs (Kains, 1910).

Studies have shown that poultry production does not require much space and labour. This implies that individuals who are interested in livestock production have opportunities to earn additional income even as small holder enterprises. Start-up costs for starting a poultry enterprise is low, this however depends on the type of poultry and size of enterprise. Housing and ancillary structures can be constructed using available materials. Feed can be sourced easily from the environment which is mostly crop by-products. They can also scavenge however, supplementary feeds should be provided. With appropriate management, poultry can be kept healthy and productive (Hilmi et al, 2011). Also, Mohammed et al (2014) corroborates this view noting that Poultry requires minimal investment and individuals from the low income group can engage in its production even on a small scale. By implication, poultry as an enterprise offers employment either on part-time or full time basis particularly for women, even the elderly can effectively engage in the business. With this important placement in the livestock sub sector, the poultry industry can play vital roles in economic growth as it can create several employment opportunities simultaneously.

There are different kinds of poultry farming viz: chickens, turkeys, geese, ducks, etc, however, chicken is the most popular as most farmers keep them either for egg production or for meat. Chicken and egg are in regular demand and this make their farming very profitable because it is seen as a veritable source of animal protein outside fish, cattle, goat, beef, etc and also cheaper (InvoiceApp, 2020). In our modern society, poultry farming is a big business that comprises hatcheries, pullet or egg production among others. Also, biogas and organic fertilizer can be prepared from poultry waste. The production of fish and cattle for meat require longer time duration, poultry however, requires a relatively shorter time that is faster and easier. Poultry is adjudged a sector that can grow vertically and produce maximum number of eggs and meat using minimum land. Omolayo (2018) noted that livestock production is a critical and foundational part of Nigeria's agricultural economy whose contribution is way beyond direct food production. It incorporates the generation of employment, a source of income to farmers, the development of the country's economy, a source of vocation for interest farmers etc and observed the poultry industry is a prominent sub sector in the livestock industry. According to the researcher, the Poultry industry is unique because it offers a very high turnover rate and, the fastest returns to investment in livestock enterprises.

Viewed from the size of the market, Nigeria is the largest producer of egg in Africa followed by South Africa. Nigeria has started the production of her day old chicks because of the ban on imports in 2003. This has induced growth in its domestic production. However, the poultry sector in Nigerian's agriculture is very fragmented with most of the chicken raised by individuals in people's 'backyards' or poultry farms with less than 1,000 birds (InvoiceApp, 2020). Poultry farming involves a wide range of activities, from subsistence farming to highly commercial operations and comprises diverse enterprises with numerous business interests that traverse even into poultry hardware businesses (Omolayo, 2018). The various production systems employed in rearing poultry birds include battery/intensive system, semi-intensive system and the free range (Ray and Roy, 1991 in Adei and Asante, 2012).

Chicken meat production has helped in bridging the gap in animal protein availability and consumption. Poultry meat is universally accepted(there is no known religious bias against the consumption of poultry meat) and a superior source of protein containing a comparatively higher amount of essential amino acids and other essential nutrients such as minerals and vitamins. In the contemporary times, poultry breeders have developed the commercial broiler that attains marketable size and weight within a short period of 6 to 7 weeks (Noonari and Memon, 2015). In spite of the many advantages and positive market outlook, the poultry industry in Nigeria faces increasing challenges. Some of these challenges include concerns over food safety, product quality, and environmental factors associated with commercial poultry production systems. On a global scale, there is competition occasioned by trade liberalizations that may not favour the nascent poultry enterprises in our clime and growing consumer choices which they cannot cope with for now have them on edge. The global competition is noted to be a concern for many smallholder poultry farmers in developing countries like Nigeria, because the existing production and marketing systems are not developed or as efficient yet and cannot compete (Dagne, 2015). These have not favoured the local farmers who have regularly suffered from the effects of dumping of products in the local markets by the well established farms abroad who evidently are enjoying the economies of scale.

Poultry meat is noted to be high in nutrition; however, its production in Nigeria is facing limitations evident in the wide gap between demand and supply of the product. Some observed major problems in poultry production in Nigeria are technical inefficiency, high production cost, inadequate extension services, limited training facilities, low capital base, inefficient management, economic inefficiency, diseases and parasites infestations and poor housing among several others (Omolayo, 2018). Literature searches also reveal that there is limited information on profit prospects in poultry farming in the study Area. Most studies focused on budgetary analysis of cost and returns without assessing the effects of monetary cost impacts associated with production factors on the level of profit which is necessary in determining the economic viability of the poultry enterprise in Nigeria. This necessitated the study on the profit prospects of both broiler and layers enterprises in the study area. The study and resulting findings will generate information that will be useful to investors in the sector.

MATERIALS AND METHODS
The study was conducted in Obio/Akpor and Port Harcourt local government council Areas of Rivers State, ranked among the highly populated municipal council Areas in Nigeria. The huge industrial establishments these local governments parade, number of poultry farms and population density which provides a ready market for poultry products informed their choice for the study. The population of the study comprised of poultry farmers in the study Area from which fifty (50) poultry farmers were randomly selected. Structured questionnaire and personal interviews were adopted in data collection.
Gross margin and profit functions were used to analyse the data. Gross margin was used to assess a

level of profit in the poultry farms/enterprises. Gross profit though simple to calculate may not produce an accurate picture of a business' performance since depreciation is not captured in the analysis (Eyiyere, 2004). Gross margin considers the expenses in input acquisition in production subtracted from a firm's sales or revenues which will result in a company's first level of profit or gross profit. The gross margin assesses efficiency of a firm in using factors of production to generate profit. A higher margin is an indication of good management.

Gross Margin = TR – TVC

Net Returns = TR – TC(Not applied in this analysis because depreciation in farm assets were not evaluated)

Profit = π = TR-TC

Where:

π = Profit

TR = Total Revenues

TVC = Total Variable Cost

TC = Total Cost

Profit maximisation requires that input be applied until the value of its marginal product is equal to the price of the input→ VMPx = Px that is $Py\left(\frac{\partial y}{\partial x}\right) = Px$.

This can be re-written as $Py\Delta Y = Px\Delta X = \frac{\Delta y}{\Delta x} = Px/Py$.

Where:

Δ = change in numeric value

Y = output of poultry birds in numeric number and the amount of eggs respectively as the case may be

X = variable inputs

Py = price of outputs and

Px = price of inputs

The point where change in input cost equals that of monetary benefits is an indication of allocative efficiency.

Response of profits to input cost was specified by the application of frontier production function as:

InY = $\beta 0$ +$\beta 1$ $\ln X_1$ + $\beta 2$ $\ln X_2$ + $\beta 3$ $\ln X_3$.......... βn $\ln X_{n + (VI-UI)}$

Where ln= Natural logarithm.

Y = Profit from broilers sales (and layers or the value of eggs sold as the case may be) within the production period. The Xs represent costs on:

X_1= feed (kg)

X_2 = stock size

X_3 = labour

β_0 = constant term

$\beta 1 - \beta n$ = Regression Coefficients (parameters to be estimated)

Vi = random error term/variable which is assumed to be identically and independently distributed normal mean of zero and independent of Ui

Ui = Non-negative random variable which is assumed to account for technical inefficiency of the farm

The monetary values of the various coefficients of the inputs and output were incorporated into the equations to compare the magnitude of monetary changes (the economic and allocative efficiencies) respectively.

RESULTS AND DISCUSSION

1.1 Gross margin analysis of poultry farms in the study area

The gross margin profile of poultry farmers in the study Area considered both cash (paid) costs and non-cash (estimated) costs. The returns to investment were assessed based on the prevailing market value of either the birds or their eggs at the period of study. The gross margin of the various farm types is presented in Tables 1.1, 1.2 and 1.3. It involved the evaluation of the costs and sales/revenue as separate components of the gross margin

Table 1.1: Cost analysis of poultry farms in the study Area

Farm type	Average number of birds	Average variable cost/unit/₦
Layer birds	224	888.78
Broiler birds	218.2	749.85

Source: Amadi, 2020

Table 1.2: Sales analysis of poultry farms in the study Area

Farm type	Variable	Average Quantity sold/month	Price/₦/unit	Sales value/₦/month
Broiler farms	Sales from broiler birds	52.3	2816.33	147294.06
Layers farms	Sales from eggs(in crates)	1459.2	878.85	1282417.92

Source: Amadi, 2020

Table 1.3: Gross Margin analysis of poultry farms in the study Area

Farm type	Total variable cost	Total revenue	Gross margin/₦/month	Gross margin/enterprise
Broiler farms	163617.27	147294.06	-16323.21	-326.46
Layers farms	202641.84	1282417.92	1079776.08	21,595.52

Source: Amadi, 2020

The gross margin, cost and returns analysis of these enterprises are shown in tables 1.1 1.2 and 1.3 respectively. Generally, the gross margin was low and profits where it occurred was also low. The results suggest the broiler enterprises were making losses. This is because the opportunity cost of family supplied labour was not valued and, equipment, land and other accessories owned by the business were not also valued and added as part of production cost. The layer enterprises had a better profit prospect. Gross margin in business can impact the chances of attaining breakeven and also on the value of profit that can be earned beyond breakeven. The implication of this is that it can directly impact risk and returns. Managing Gross margin will help these enterprises avoid problems arising from price fluctuations ie, prices that are too low and direct costs that are too high (Ebben, 2004) and can also affect turn over.

The study shows that Layer enterprises had a modest Gross margin and better turnover. Narsey (2013) stated that products with low turnover rates require higher mark-ups for significant profits to be made. Products that have higher turnovers have lower mark-ups. This may have accounted for the low mark-up in layers enterprises.

High profits and margins may suggest efficiency in management. It should be noted however that an enterprise with high profit margin may experience fewer sales than the one operating at a low profit margin that notwithstanding, high margin products have higher prices than the costs of production implying that low sales volume may be sufficient to cover all expenses.

Effects of cost of factors of production on profit range in layers farms in the study Area
Table 1.4: Estimate of the effects of cost factors on profit range of layers farmers in the study Area

COEFFICIENTS

VARIABLES	Linear Regression β	t	Semi Log β	t	Exponential Reg β	t	Double Log β	t
Constant	12932.705	0.122	209073.560	0.303	7.273	1.101	37.071	1.369
Feed	1.933	0.061	62517.973	0.707	-0.001	-0.401	-2.956	-0.853
Labour	1.974	1.378	2810.547	0.607	-3.314E-005	-0.370	0.096	0.529
Med	8.691	2.404	12157.099	1.509	0.000	1.470	0.386	1.222
Land	-0.769	-5.542	-11525.339	-2.608	-1.309E-005	-1.509	-0.257	-1.484
Transport	-0.659	-0.184	-14155.477	-1.325	0.000	0.595	-0.182	-0.435
Equipment	-0.237	-0.459	-772.093	-0.086	-9.067E-006	-0.281	0.330	0.939
Water	16.534	0.898	8149.808	1.376	0.001	1.118	0.246	1.058
Stock size	-0.807	-8.420	-67998.318	-2.874	-1.142E-005	-1.906	-1.253	-1.351
DIAGNOSTIC ANALYSIS								
R-Square	0.777		0.404		0.238		0.246	
Adjusted R-Square	0.732		0.293		0.082		0.105	
Std Error of the estimate	81519.54		127488.5981528		5.10		4.9973680	

Source: Amadi, 2020

From the results, there were varying cases of factor elasticity which in many cases were marginal on the range of profits and in some cases the acquisition of these were eating into the profit(negative values). This result suggests that there may be issues with over stocking, excess feed application and prohibitive cost charges in the cause of marketing perhaps. The employment of an experienced farm manager may be

a simple solution to this. Cases of negative response (excess use of the given factor which indicates diminishing returns) to profits, suggests allocation inefficiency. Empirically, this has reflected in a low or marginal elasticity of these factors in the production activities based on the sample.

Estimate of the effects of cost factors on profit range of broiler farmers in the study Area

Table 1.5: Estimate of the effects of cost factors on the profit range of broiler farmers in the study Area.

| | COEFFICIENTS | | | | | | | |
	Linear Regression		Semi Log		Exponential Log		Double Log	
VARIABLES	β	t	β	t	β	t	β	T
Constant	135167.783	0.643	1959022.200	0.754	10.550	7.777	21.081	4.014
Feed	18.810	0.345	-358528.543	-1.108	0.000	0.682	-1.514	-2.315
Labour	-1.426	-0.282	2199.459	0.161	1.169E-005	0.358	0.007	0.237
Med	18.788	1.525	-33687.651	-1.650	.000	1.461	-.045	-1.102
Land	-5.574	-1.728	-13963.412	-0.854	-2.154E-005	-1.035	0.028	0.839
Transport	-2.917	-0.240	19502.534	0.715	-4.775E-005	-.609	0.097	1.762
Equipment	-.734	-0.533	-9102.674	-0.308	2.819E-006	0.317	-0.049	-0.822
Water	1.430	0.527	2172.297	0.129	6.515E-006	0.372	0.006	0.168
Stock size	2.199	6.271	126728.328	3.972	3.911E-006	1.729	0.185	2.870

DIAGNOSTIC ANALYSIS								
R-Square	0.559		0.359		0.174		0.306	
Adjusted R-Square	0.471		0.227		0.008		0.164	
Std Error of the estimate	316959.90		377149.82		2.0453587		0.7622078	

Source: Amadi,2020

In broiler production, some factor applications also had negative effects (diminishing returns) on production pointing to excess use of the given factors. Generally, the R-squared (this can be expressed as a percentage) were low in both the broiler and layer farms (except in linear regression analysis) in the study Area. This implies that there were many factors impacting the poultry industry in the study Area that were not captured in the regression equation. This calls for further studies or researches.

Evaluation of the allocative efficiency status of poultry farmers in the study Area

The understanding of allocative efficiency operations in a farm or business is one of the necessary conditions in making good and informed decisions in farm management. It indicates the level of output that equates marginal cost to marginal benefits. By this principle, the price of the product or Services should be equal or almost equal to the marginal benefit arising from the use of that product or service. The allocative efficiency estimates of broilers and layers farmers in the study Area is shown in tables 1.5 and 1.6 below

Table1. 5: Allocative efficiency status of layers farmers in the study Area

Variables	Output level (Y)	Marginal cost(PxΔX)	Marginal revenue (PyΔY)
Feed	224.0	3325	878.85
Stock Size	**224.0**	510.14	878.85
Labour	**224.0**	11038.46	878.85

Source: Amadi, 2020

Table1. 6: Allocative efficiency status of broiler farmers in the study Area

Variables	Output level (Y)	Marginal cost(PxΔX)	Marginal revenue (PyΔY)
Feed	**218.2**	3631.80	3000
Stock Size	**218.2**	422.7	3000
Labour	**218.2**	11350	3000

Source: Amadi, 2020

Resource allocation is considered efficient when the marginal cost of factors of production is equal or almost equal to the marginal benefits at a given output level. The tables above shows evidences of resource allocation inefficiency. In both layer and broiler farms, there are indications of inefficiency in terms of resource allocation. In the layers farms, expenses on labour and feed must be reduced while the stock size increased. The forces of demand and supply of labour in the labour market may have influenced the prices of labour, the same forces may have also affected that of feed however, mechanized farming methods if affordable may reduce expenses on labour and grow profits and, individual compounding of feed may also reduce expenditure on feeds because, field survey suggests that some of the feeds administered were imported and the landing price may be high.

It is advised that stock size be increased in the broiler enterprises judging from the table because the marginal revenue is higher than marginal cost. Increases in the quantity of labour administered should be reduced because marginal cost is far higher than marginal revenue (this may imply excess labour application or prohibitive labour costs). Feed administration should be mathematically reduced to equate the marginal cost to marginal revenue as the result shows the marginal cost of feeding the birds was slightly higher than the marginal revenue.

CONCLUSION

The poultry industry in the study Area is apparently a developing one from the results obtained and analysed and still in the first stage of a production function according to the regression results. In terms of allocative efficiency, the industry is yet to achieve the desired level of allocative efficiency. Sales volume seems low and the gross margin prospect is not commendable especially in the broiler section. However, they are still in business because the opportunity cost of most self rendered services are not considered or valued especially labour, land and working equipment.

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