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Empirical Analysis of Cost and Returns to Commercial Table Egg Production in Lagos State

G.O. Evbuomwan*

Using basic statistics and a simple gross margin analysis procedure, it was established that commercial table egg production in Lagos State is profitable. Under the same assumption and based on available statistics, the gross margin for a commercial table egg producer with 1000 laying birds has increased from ₦975,000.00 in 1998 to ₦1,050,000.00 in 2005, representing an increase of 7.7 percent. The demand for poultry products is expected to grow in view of increase in per capita income, increased awareness of the health implications of inadequate intake of protein in the human diet and the outbreak of avian influenza in Asia. Thus, increased production of table egg under the presidential initiative should be sustained.

Keywords: Egg Production, Poultry, Cost and Returns, Lagos

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I. Introduction

The overall value of livestock in Nigeria in 2004 at 1990 constant basic prices was put at ₦11.45 billion. This represents 9.5 percent of the agricultural gross domestic product (GDP) and about 3.3 percent of the

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nation's GDP. Though the value of livestock resources have grown in absolute terms in recent years, the contribution of the livestock sub-sector to the agricultural and national GDP has been on the decline over the years. For instance, in 1985, livestock, as a percent of agricultural GDP, was as high as 33.4 percent and 7.9 percent of national GDP. The implication is that, currently the contribution of livestock to agricultural GDP has been reduced by two thirds, while its contribution to national GDP has been halved. This has nutritional implications as the human population has been growing steadily. From 88.5 million as at the 1991 census, Nigeria's population is now estimated to have increased to 130.0 million.

The Food and Agricultural Organization of the United Nations (FAO) stipulates a daily requirement of 65 to 75 gm of total protein, out of which 40 percent or 36 gm should be derived from animal protein. Currently, the estimated per caput animal protein consumption is about 17 gm which indicates a shortfall. This shortfall can be corrected through maximum use of available resources to foster the production of livestock. This will in turn lead to an increase in total output of animal food products such that the generality of the populace would have adequate protein intake. This will improve the nutritional status of children and other groups who are most vulnerable to malnutrition which can lead to permanent damage of the mental faculties and physique.

Protein from livestock is said to be nutritionally superior to that of vegetable origin because it contains a complete range of amino acids that are essential for maintenance of health. Thus, protein from livestock is required to supplement those from vegetable origin to correct the serious imbalances in the nutritive value of the Nigerian diet which are dominated by foodstuffs rich in carbohydrates. Initiating bold livestock projects that will improve livestock production in the years ahead will imply a reversal of the current low per caput animal protein intake.

Poultry offers the greatest scope for increasing the quantity and quality of animal protein. Poultry meat and eggs account for about 30% of total livestock output in Nigeria, of which eggs account for over 80 percent (Table 1). Commercial poultry is well established in the country with substantial infrastructure (poultry houses, feed mills, hatcheries and processing plants) already on ground. However, most of these assets became idle for reasons associated with high cost of strategic inputs and working capital as well as competition from cheap imports. The embargo placed on the importation of poultry products in 2002 by the Federal Government is aimed at encouraging local production. The challenge therefore, is how to produce poultry products at sustainable levels in order to bridge the protein supply gap in the nearest future.

This paper, which attempts an analysis of the cost and returns to table egg production in Lagos State using the gross margin analysis procedure, is aimed at determining the sustainability of commercial egg production in Nigeria in the quest to bridge the protein supply gap, and creating employment for the teeming unemployed youths.

The rest of the paper is divided into four sections as follows, with this introduction as section one. Section two, provides a background to the poultry industry and commercial table egg production in Nigeria. Section three, presents the methodology and data analysis. Section four, presents the results and discusses the policy implications. Section five, summarizes and concludes the paper with some recommendations.

II. Background to the Poultry Industry and Commercial Table Egg Production in Nigeria

The Poultry Industry in Nigeria has undergone a significant transformation since the early fifties, from a backyard, peasant and primitive household-oriented husbandry of indescrpt breeds of semi-wild chickens, to the cash-oriented,

modern and large scale poultry which can be found in our country-side and urban centers today. It can be said that poultry keeping has become a business in Nigeria. The estimate of livestock resources as reported by Rim (1993), indicates that there are 103 million indigenous poultry and 15 million commercial (exotic) poultry in the country. It is therefore clear that much needs to be done to accelerate the transformation to commercial poultry husbandry and sustain the interest of present and intending modern poultry farmers in Nigeria.

The initial government agricultural programmes in Nigeria emphasized poultry farming and contained substantial subsidies in day-old chicks, feeds. This attracted millions of peasant farmers, civil servants, professionals and entrepreneurs into poultry farming at small, medium and large scales. Following changes in governments and government policies, particularly during the structural adjustment programme, the huge subsidies in the agricultural sector were withdrawn, and many poultry farmers closed down in the face of rising feed costs, stock and raw materials. With the launch of the National Economic Empowerment and Development Strategy (NEEDS) in 2004, there is renewed emphasis on the agricultural sector, being the mainstay of the economy. Under the NEEDS programme, agricultural development is aimed at achieving food security and poverty reduction. Among the target set for the agricultural sector is the reduction of food imports from 14.5 percent of total imports to 5 percent by 2007. Hence, the ban on the importation of poultry products and other food substances that can be produced locally, under the Presidential Initiatives.

II.1 The Place of Poultry in Nigerian Agriculture

Poultry occupies a unique position in the Nigerian livestock production possibilities for several reasons. The most important of these is the fact that poultry is relatively free from the many pathological, ecological and economical

constraints which affect the commercial production of other breeds and classes of livestock in Nigeria. Some of these are:

Pathological Constraints

A tsetse fly disease known as trypanosomiasis affects all breeds of exotic and most breeds of indigenous cattle, sheep, goats and pigs to a serious extent that commercial production of these breeds is limited to latitudes north of the Benue and Niger rivers. In spite of intense prophylaxis, therapy and biological control of the vector, commercial production of these breeds and importation of exotic ones are more successful in the tsetse-free belts of Nigeria which lie North of Rivers Niger and Benue or within the plateau of Mambilla and Obudu. There is no documented evidence that poultry are susceptible to trypanosomiasis in Nigeria. Thus, poultry industry enjoy maximum ecological feasibility throughout the country hence, the adaptation of a wide variety of exotic poultry breeds into Nigeria has been very successful. These exotic stock which are genetically improved and more productive than the indigenous chicken, provide the Nigerian poultry industry with superior genetic pool and excellent opportunities for commercial poultry production.

Climatic Constraints

Climate exerts constraining influences on livestock production through its associative effects of temperature, humidity, precipitation and air movement, and its indirect influences on crop and animal feed production. Although, all livestock are subject to environmental stress in the tropics, poultry appear to be less susceptible than mammals. Comparative data between the temperate and tropical environments indicate that poultry show the most comparative performance between the two environments than any other class of livestock, that is, they have the least reduction in productivity as a result of the tropical environment. One reason may be that with higher body temperature than mammals, birds spend less production energy than other livestock in homeostatic regulations (adjustments). Under suitable tropical housing and management

practices, poultry performance in the tropics has in many instances approximated closely the performance standards of the same breeds reared in temperate environments.

Economic Constraints

The scarcity of farm credit has been blamed in part for the low agricultural production in Nigeria. Even with the establishment of more agricultural and industrial banks in the country, livestock farmers are still handicapped in obtaining adequate credits not only from lack of acceptable collateral and the general uncertainty and heavy risks associated with livestock farming but more importantly as a result of the short term nature of the loans which do not fit well with livestock enterprises in general. Poultry production does not suffer this economic constraint in that it requires far less amount of capital investment and takes a relatively less period of time to recycle the invested capital. Because of this short turnover cycle, poultry business can derive investment capital from banks.

Technical Constraint

A number of other important constraints which affect poultry to a less extent than other classes of livestock can be lumped under technical constraints. Poultry make the least demand on such requirements as land, skill, labour and storage than any other class of livestock. Under the intensive system of production, poultry enterprise requires no more than 350 sq. metres of building space or 800 sq. metres of total land space for every 1,000 adult chicks. This amount of space can accommodate only 350 pigs, 50 cattle, 200 sheep or goats, excluding pastures or runs. Less management skill is required in keeping poultry than any other class of livestock. Poultry marketing blends itself well into the Nigerian and third world meat consumption habit. Due to the scarcity of modern abattoirs and cold storage, many Nigerian households have to purchase their meat from open slaughter stands which are generally fly infested. Households which have neither the resources nor the facilities to purchase, slaughter and store whole live cattle or

goats have a reasonable alternative to purchase live chickens. Chickens are the most prolific or fecund farm animals as they give the highest turnover of animal protein per life cycle, and the highest number of offspring per female per year. Poultry enterprise requires less labour and utilizes labour more effectively than other livestock enterprises. Where deep litter is used substantial savings on cleaning can be made.

Poultry and Animal Protein Supply

With the foregoing considerations, the place of poultry in the Nigerian livestock scene is clear. Poultry is the quickest source of meat and its production involves the least hazardous and arduous process in relation to other livestock enterprises. How can these peculiarities be gainfully exploited? The level of consumption of meat and animal protein in Nigeria is estimated at about 8 gm per caput per day, about 28 gm less than the minimum requirement recommended by the FAO. The task of closing this animal protein gap in the face of the constraints discussed above is a formidable one. The outlook is also bleak with exploding population, urbanization, inflation and depletion of the national livestock herd due to extraneous circumstances of drought or legislation of those countries which enjoy grazing rights in Nigeria. Increased poultry production would appear to be the surest way of closing the protein gap at least in the short run. With its characteristic, low capital requirement and quick returns and the fact that it suffers no ecological constraints or social taboo, poultry production offers the best logical solution to our national meat scarcity.

Poultry as Meat

Poultry raised for meat are called broilers. At maturity, a broiler weighs about 1.5 kg dressed carcass. This is equivalent to about 300 gm of animal protein which is sufficient to satisfy an adult animal protein requirement for 3 days. When it is considered that it takes only about 10 weeks to raise a broiler to slaughter weight and takes about 4.5 kg of feed, it is then easily appreciated that a household of six can derive their entire animal protein requirement from one broiler a day.

Poultry as Eggs

Eggs are considered a wholesome diet since an egg contains adequate amounts of protein, energy, amino acid, vitamins and minerals to satisfy the body needs. An average egg weighs about 65 gm with shell, about 50 gm without shell and contains about 6 gm of protein. A child or adult who eats egg every day is therefore sure of meeting at least one fifth of his daily requirement of animal protein from egg alone. Many good layers can produce an average of 80percent egg production. This means that ten layers of this flock could produce on the average 8 eggs a day, enough to furnish one egg a day to a household of 8 persons.

II.2 Commercial Table Egg Production: Basic Considerations

The distinction between commercial egg production and domestic backyard or hobby production is that, the former produces at a level which is far above domestic requirements and, aims at the market with a strong profit motivation, while the latter concentrates mainly on providing eggs for household use and only markets any excess. Apart from these considerations of scale and profit, a commercial producer has to produce to market demand and consumer tastes. Since margin may be slim per bird, he must acquire a sufficiently large scale of operation in order to realise a sizeable profit.

The initial homework in the planning process should include:

- (i) /An inventory of resources available:
 - (a) Land – bought or owned, size of available land, location, water facilities, power proximity and accessibility to feed source and population centre.
 - (b) Capital – owned or borrowed, interest rate, operating capital and reserve.
- (ii) Stock – choice of breed, heavy, light breed or all-purpose layer, source of

- stock and regularity of supply, expected performance level. Replacement schedule. Reputable disease-free hatcheries.
- (iii) Production System - choice of battery or deep litter system or range system.
 - (iv) Inputs and costs - equipment, buildings, transportation, feeds, wages, medication.
 - (v) Production efficiency - records, production guidelines and coefficients, culling indices, mortality, medication.
 - (vi) Legal matters - land and lease deeds, registration, national standards on quality, security, etc.
 - (vii) Marketing channels and techniques - contract sales, agencies or middlemen, purchasing, etc.

Choice of Production System

Three main systems are used in the layer business; battery cages, deep litter and range. Each of these has its merits and demerits but the range system is the least common for large-scale producers probably due to its high demand on land, supervisory labour and security. The battery system requires an initial large capital outlay but involves much less labour in replacement of litter and has a much lower level of parasite build-up and disease risk. This is the system that this paper focuses on.

Feed

The question of whether an egg producer should mix his own feeds or rely on commercial feeds depends on the size of operation and on the skill available to him. For production levels below 2,000 layers, a farmer can conveniently rely on commercial feeds, but for production levels beyond that, he may find it more economical in terms of labour utilization to produce his own feeds. For a farmer

who wishes to buy feeds, here are a few hints to help him estimate his feed requirements and financial outlay. For layers: Allow about 50 tons per 1,000 layers for the whole laying life of 455 days. Note that when a laying flock is changed from one feed to another, there is usually a slight drop in egg production for a short period irrespective of the quality of the second feed. This is due to adjustment of intake for the new feed.

Records

The value of keeping accurate, up-to-date records in a large poultry farm cannot be overstressed. Practically, all decisions to be made on culling, management adjustments, choice of breed, use of medication, change of feed etc., depend on accurate records. Without them, a farmer would be operating his business like a person going through a crowded market blind-folded. His cash losses and disease outbreak will take him unawares. Records should be kept for every section of production. In the layer unit such records as: Number of Eggs produced, Number of layers to date, Egg production percent, Mortality percent, Average feed consumption per layer per day, Average water consumption per layer per day, Date of hatch, Number and percentage of cracked or malformed eggs are essential.

These data can be summarised per month and recorded in a separate chart for adequate guidance. A monthly egg production (%) will indicate what season, breed or age of chick gives the peak production. Feed consumption and water consumption warn him of heat stress when the former decreases and the latter increases sharply. Morbidity warns him of disease incidence and the need for prophylaxis.

The Egg

The egg is both the origin and the end product of poultry production. The fertile egg which is capable of incubation and hatching is obviously the origin of a new generation of chickens, while the table egg which ends up on the breakfast table can be regarded as an end-product. Thus, the famous poser, on whether the egg is the mother of the chicken or, vice versa refers to a fertile egg. In this discussion, we are interested only in the table egg which is produced by housing laying hens without any cocks to mate them. It should be emphasized here that the presence of the cocks is totally irrelevant and undesirable in the production of table eggs. This is because fertilized eggs apart from being more expensive to produce than table eggs are also liable to early deterioration especially under temperatures above 12°C or 80°F, because of the development of the embryo. Such eggs are discriminated against in the egg market. At the time it is laid the egg possesses its highest food value. Also because of the uneven distribution of its chemical constituents, the egg is subject to changes that diminish its original food value. These changes are mostly affected by factors of the external environment and time. The need to process eggs is therefore obvious to preserve the original food value for as long as is possible

Food Value of the Egg

A typical egg contains about 65% moisture, 12% protein, 11% ash, 11% fat and 1% of carbohydrates. It can be seen that apart from moisture, protein is the richest nutrient of the egg. On moisture-free basis, one egg contains about 35% protein. This protein is very rich in essential amino acids which are highly desirable in diets of humans and other animals. The food value of the egg is therefore enormous, especially in developing countries of the world which invariably, lie within the tropics.

The egg is reasonably protected from adverse environment and spoilage through its shell and membranes. Loss of moisture through the shell pores is retarded by means of the cuticle. The invasion of micro-organism is also prevented by the

cuticle, while the albumen contains protein which can fight the putrefaction bacteria and retard spoilage by putrefaction. The effectiveness of these defense mechanisms is of course limited by time and degree of contamination. Beyond a certain period of exposure to adverse environment, the egg will eventually succumb to microbial and other sources of spoilage.

Change in Egg Quality

The egg is considered fresh immediately it is laid. Quality changes occur during storage and reduce the taste and food value of the fresh egg accordingly. The main objectives of processing are to retain the food value and quality as much as possible and to prolong the period the egg can be utilized while in acceptable state of freshness and quality.

Egg Processing and Preservation

One of the simplest methods of prolonging the edible life of an egg is to ensure that it is not contaminated by chicken faeces or other dirt. Layers kept in deep litter system have a high incidence of contaminated eggs especially where adequate numbers of laying boxes are not provided. In this case, the layers may drop the eggs on the floor and spread dirt and faeces over them. This is one of the advantages of using battery cages for layers.

The commonest methods of preserving eggs involve chilling, treatment with chemicals and dehydration. Some techniques may involve a combination of these methods. Eggs can be stored in cold chambers for 2 – 3 months.

III. Methodology and Data Analysis

III.1 Methodology

The methodology adopted in this paper include basic statistics, trend analysis and the use of a simple gross margin analysis to determine the profitability of table egg

production in Lagos State. The data applied are the basic farm records kept by a commercial table egg producer. This is supplemented with data obtained from secondary sources which include the publications of the Central Bank of Nigeria, Federal Ministry of Agriculture and the Food and Agricultural Organisation of the United Nations.

III.2 Theoretical and Analytical Framework

III.2.1 The Concept of Profit Maximization

One of the key pillars on which the neoclassical theory of the firm stands is the assumption of profit maximization. It is a simple but controversial assumption that states that the objective of the firm is wholly and single-mindedly the maximization of profit. Many adherents of profit maximization have advanced a lot of arguments in support of their position. These include one based on the realism and predictive value of the assumption of profit maximization itself and the other based on a supposedly long-run survivalist instinct of the firm.

But there are three types of factors, which may militate against a firm achieving maximum profit (Olayemi, 2004). They are:

- (i) Uncertainty and lack of information needed for rational decision making;
- (ii) The pursuit of multiple objectives by the firm of which profit earning may be only one of them;
- (iii) Restraint imposed on the single-minded pursuit of profit maximization by such other considerations as the prevention of potential entry of new firms as competitors, the long-term survival of the firm and self-preservation of the top management of the firm, which short-run profit maximization alone, would not guarantee.

The issue of profit maximization is, therefore, not about whether the simple types of firms envisaged in traditional theory do strive to earn the highest profit achievable, given real-life uncertainty, inadequate information and other

constraints, or whether they behave as if they maximize profit, but rather about achieving a minimum satisfactory profit since firms can survive, even over the long period, without maximizing profit, if there are adequate barriers against actual entry or threat of new entry of firms in the forms of, say, limit-pricing, government legislation, product differentiation, absolute cost advantage, large initial capital requirement for entry, and large economies of scale.

III.2.2 Analytical Technique

The budgetary technique was used to determine the profitability of table egg production in Lagos State. The difference between gross revenue and total variable cost of production gives the gross margin. This is used to assess the profitability of a poultry farmer concentrating on egg production using point of lay pullets. The gross margin of an enterprise is expressed as:

$$GM = \sum p_i q_i - \sum r_j y_j \dots\dots\dots(3.1)$$

Where:

- GM = Gross margin in Naira/herd of laying birds
- P_i = Farm gate price of egg in Naira/crate
- q_i = Total eggs produced per laying flock
- r_j = Unit cost of variable input (feed) in Naira/bag
- y_j = Total quantity of feed consumed by the laying flock in Naira.

III.3 Data Analysis

III.3.1 Trend in Output of Livestock Products in Nigeria

Major livestock products in Nigeria are: poultry meat, goat meat, lamb/mutton, beef, pork, milk and eggs. Available data indicate that total livestock products have increased from 1,121 thousand metric tonnes in 1985 to 2,427.4 thousand metric tonnes in 2004. On average basis, milk contributed the lion's share of 42.3

percent to total livestock products produced in Nigeria between 1985 and 2004. This was followed by eggs which contributed 23.7 percent. Next is beef at 13.1 percent, while pork accounted for the least proportion of 3.0 percent (Table 1).

Trend in Food Import Bill in Nigeria

Available information indicated that food import bill grew from 7.9 billion naira in 1985 to 45.7 billion naira in 1990. It has continued to rise and peaked at 1.6 trillion naira in 2004. Of the total food import bill, import of food and live animals and animal and vegetable oil and fat constituted an average of 10 to 15 percent between 1985 and 2004, averaging 70.3 billion naira (Table 2).

Trend in Per Capita Income

At current prices, per capita income has grown from 2,647.8 naira in 1989 to 67,137.2 naira in 2004. This is a substantial increase (2,435.6 percent) in nominal terms but in real terms per capita income have not grown by this magnitude in Nigeria over the years. For instance, if the nominal values are deflated by the exchange rate, per capita income grew from 358.2 US dollars in 1989 to 502.3 US dollars in 2004 (an increase of 40.2 percent) (Table 3).

Trend in Prices of Poultry Products

The price of poultry products have trended upwards in line with the general price level in the economy in recent years. From an average of 237.9 naira per crate of 30 eggs in 1998, the retail price of a crate of eggs increased to 428.75 in 2004 which amounts to an average increase of 10.7 percent during that period. Similarly, the retail price of an old layer increased by an average of 14.5 percent to 740 naira in 2004 from 335.42 in 1998 (Table 4).

Trend in World Meat Production, Import, Export and Consumption

Available data from the FAO indicate an upward trend in global meat production, trade and consumption. From 260 million tonnes in 2004 global meat production are forecast to grow by 2.5 percent in 2005 to 267 million tonnes in response to high prices. Global poultry output is forecast to grow at a higher rate of 4 percent in 2005 to an estimated 81.4 million tonnes. The increase is supported by rapidly rising consumption, in spite of continually rising prices and concern about continued outbreaks of avian influenza in 2005 and its spread westward. Interestingly, developing countries consumption of meat products account for 58 percent of the global total, up from 43 percent in the early 1990s. Thus developing countries meat consumption is expected to reach 31kg per caput, up more than 1kg per caput from last year and nearly double the level of 1990. This compares to an estimated consumption of 84 kg per caput by developed country consumers and the global average of 42 kg per caput. Total meat consumption in Nigeria was estimated to be 1.0 million tons in 2003. It increased to 1.1 million tons in 2004 and is expected to increase further in subsequent years (Table 5).

III.32 Cost and Benefit Analysis of Table Egg Production

III.3.2.1 Major Cost Components

As indicated earlier, the major cost elements in commercial table egg production include; land, labour, stock, equipment, feed, water and medication. These can be classified into fixed and variable costs, based on their life span and other characteristics that distinguish fixed from variable inputs. Thus, in commercial table egg production, land and poultry equipment are classified as elements of fixed cost in view of the fact that they have more than three years life span. All the other items listed above are considered as variable inputs by virtue of the fact that they are consumed on short term basis(daily, weekly, monthly), not lasting more

than eighteen months. Consequently, in addition to having enough capital to acquire the fixed cost items, a commercial table egg producer must have substantial funds to cater for the numerous variable cost items without which the project will collapse. Hence, this paper focuses on the variable cost items.

In what follows, an analysis of a typical farmer's farm records provides an insight into the trend in the prices of most of the cost items involved, in commercial table egg production in Lagos State.

Trend in Prices of Variable Inputs

Stock

Available information revealed that the price of a pullet at point of lay which was ₦300.00 (three hundred naira only) in 1997 now sells for ₦700.00 to ₦800.00. Therefore, for a small scale farmer who wants to stock 500 to 1000 laying birds he would require ₦400,000.00 to ₦800,000.00 now, which is more than double the amount required in less than a decade ago.

Feed

A twenty five kilogram bag of layers mash sold for about ₦500.00 (five hundred naira only) in 1998. Poultry feed price, like that of pullets has been on the upward trend. It sold for about ₦795.00 per bag in 2002 and currently sells for about ₦1000.00. Similarly, the implication is that a farmer requires double the amount spent in 1998 to be able to feed the same number of egg laying birds in 2005.

Drugs

Livestock like humans, being living things, require the application of various drugs to perform optimally. Among these are vitamins, antibiotics, dewormers and immunizers. These are routinely applied in regular doses and in increased

quantities in cases of disease outbreaks as may be relevant. Thus, for optimal performance and to forestall serious disease outbreaks, a commercial table egg producer must apply these drugs routinely and must therefore set money aside for their purchase as at when due.

Available information indicate that the price of a sachet of antibiotics has increased from ₦250.00 (two hundred and fifty naira only) in year 2000 to ₦400.00 in 2005. Similarly the price of a sachet of vitamins now sells for ₦400.00 from just ₦220.00 in year 2000. A phial of immunizers of 200 doses which sold for ₦160.00 in the year 2000 now sells for ₦300.00. In the same vein, the price of a bottle of dewormer has doubled within the last four years from ₦450.00 in 2002 to ₦900.00 in 2005.

Wages

As with the other sectors of the economy, labour wage rate has been on the increase. What with the incessant increase in the prices of petroleum products with its ramifying effects, that has prompted the organized labour to negotiate with government for upward review in wages. This has its rippling effect even on the farm sector despite the fact that it is considered the residual sector. The services of a reliable farm hand are invaluable hence they are indispensable once a farmer stock up to 500 birds in order to be able to make out time for other farm management functions or if engaged in other employment. In line with the minimum wage, labour wage rate has moved from about ₦5000.00 (five thousand naira only) per month in 1999 to ₦10,000.00 in 2005.

III.3.2.2 Revenue

For a commercial table egg producer, the sale of eggs constitutes the major source of revenue. The other source is the sale of old layers at the end of their laying life

which varies from 12 to 16 months depending how well they were managed and the quality of the stock. Also, the egg laying quality varies depending on the quality of the stock and the intensity of husbandry as indicated earlier. For a well managed farm, an egg laying ratio of 90 percent is attainable at the peak of the stocks laying life. Bearing in mind that a chicken's egg laying life assumes a normal distribution function, an average egg laying ratio of 60 percent is used in this paper in computing the stream of revenue from a flock of 1000 birds. Also, an average laying life span of 15 months is adopted.

Consequently, taking a cue from table four, which analyzed the prices of poultry products and assuming a constant price for a 15 months laying life at 60 percent egg laying performance, a 1000 birds laying unit will generate the following as revenue in the years stated below:

At a farm gate price of ₦250.00 per crate in 1998 a 1000 laying unit would have yielded $250 \times 20 \times 30 \times 15 = \text{₦}2,250,000.00$. In 2005, at ₦400.00 per crate egg revenue is estimated to be $400 \times 20 \times 30 \times 15 = \text{₦}3,600,000.00$.

That is, 1000 birds at 60 percent egg laying performance level will yield 600 eggs per day which is equivalent to 20 crates per day (30 eggs make one crate). A laying life span of 15 months is 30 days a month multiplied by the 15 months. In this analysis, the sale of old layers is assumed to be the replacement cost of the next stock. Therefore, the egg revenue is the only revenue item that will be used in arriving at the simple gross margin in a typical commercial table egg production enterprise.

III.3.2.3 Gross Margin Analysis

For a 1000 layers enterprise, in line with the recommended allowance of feed per bird stated earlier and from practice, one bird will consume one kilogram of feed per week which therefore amounts to 1000 kilograms per week. This is equivalent to 40 bags of the 25kg bag per week per flock of 1000 layers. At ₦500.00 per bag in 1998, feed cost per week will be $500 \times 40 = \text{₦}20,000.00$ for a 1000 layers unit. Therefore, for a laying life of 15 months, they will consume $\text{₦}20,000.00 \times 4 \times 15 = \text{₦}1,200,000.00$. In 2005, at double the price, cost of feed for a laying flock of 1000 birds for a 15 month laying lifespan will simply be ₦2,400,000.00.

Cost of Labour for a farm hand for the 15month period at ₦5,000.00 per month will be $15 \times 5000 = \text{₦}75,000.00$, earlier on and ₦150,000.00 now at ₦10,000.00 per month. Assuming egg revenue as the gross revenue and the cost of feed and labour as the major variable cost items, the gross revenue for a commercial table egg producer in 1998 will be $\text{₦}2,250,000.00 - \text{₦}1,200,000.00 - \text{₦}75,000.00 = \text{₦}975,000.00$.

In 2005, the gross margin will be $\text{₦}3,600,000.00 - \text{₦}2,400,000.00 - \text{₦}150,000.00 = \text{₦}1,050,000.00$. Under the same assumption and based on available statistics, the gross margin for a commercial table egg producer has increased from ₦975,000.00 in 1998 to ₦1,050,000.00 in 2005, representing an increase of 7.7 percent.

IV Results and Policy Implications

Results of the simple analysis undertaken in this paper revealed that the output of poultry products have been on the increase particularly eggs which constitute over 20 percent of livestock products in Nigeria. Through the proportion of foreign exchange spent on the importation of food has dropped by 2 to 3 percentage points in the last four years, it is still relatively high for an agrarian

country like Nigeria. Per capita income has been on the increase in nominal and real terms and so has the prices of poultry products and poultry production inputs. Global analysis of trend in production, trade and consumption has also assumed an upward trend, despite high prices and poultry diseases outbreak in Asia, with Africa leading from the rear (Table 5), while Nigeria is not left out of the growth prospects in consumption. An analysis of the cost and returns to commercial table egg production indicated an improvement in gross margin despite the astronomical increase in prices of all inputs which confirms that production cost price increases are automatically transferred to the consumers.

The implication of this simple analysis is that the presidential initiatives which include a ban on the importation of poultry products is a step in the right direction. It has stimulated increased production in the poultry sector and the market is not saturated yet. This status quo will remain for a long time particularly with the outbreak of avian influenza which is said to be spreading westwards.

V Summary and Conclusions

In this very short paper, an attempt was made to carry out an empirical analysis of the costs and returns to a commercial table egg producer in Lagos State, which is the most urbanized state in the country. This analysis was based on the premise that protein needs in the country are yet to be satisfied while at the same time the importation of poultry products have been banned under the presidential initiative in the bid to implement the NEEDS.

Using basic statistics and a simple gross margin analysis procedure, it is apparent that commercial table egg production in Lagos State is profitable. The demand for poultry products is expected to grow in view of increase in per capita income, increased awareness of the health implications of inadequate intake of protein in

the human diet and the outbreak of avian influenza in Asia. Thus, increased table egg production under the presidential initiative is sustainable and should be maintained. In view of the huge financial outlay required to establish and maintain the project, credit institutions should continue to support the poultry sector in the interest of all and sundry.

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Appendix

Table 1: Output of Livestock Products In Nigeria ('000 Tonnes)

Year	Poultry Meat	Goat Meat	Lamb/ Mutton	Beef	Pork	Milk	Eggs	Total	Growth Rate
1985	64.0	186.0	66.0	212.0	31.0	172.0	390.0	1121.0	
1986	67.0	192.0	68.0	223.0	33.0	180.0	399.0	1162.0	3.7
1987	56.0	206.0	75.0	232.0	34.0	182.0	332.0	1117.0	-3.9
1988	54.0	209.0	81.0	260.0	36.0	188.0	260.0	1088.0	-2.6
1989	50.0	216.0	86.0	276.0	46.0	186.0	220.0	1080.0	-0.7
1990	57.0	179.0	84.0	279.0	125.0	243.0	337.0	1304.0	20.7
1991	53.0	182.0	85.0	280.0	137.0	244.0	311.0	1292.0	-0.9
1992	64.0	93.0	80.0	167.0	29.0	902.0	378.0	1713.0	32.6
1993	67.0	78.0	83.0	182.0	24.0	906.0	397.0	1737.0	1.4
1994	63.0	80.0	85.0	183.0	25.0	951.0	377.0	1764.0	1.6
1995	73.0	88.0	94.0	192.0	31.0	961.0	399.0	1838.0	4.2
1996	74.0	92.0	96.0	197.0	39.0	972.0	422.0	1892.0	2.9
1997	76.0	95.0	101.0	200.0	43.0	989.0	435.0	1939.0	2.5
1998	77.0	96.0	102.0	202.0	45.0	991.0	436.0	1949.0	0.5
1999	82.0	101.0	107.0	208.0	47.0	1000.0	450.0	1995.0	2.4
2000	88.0	107.0	113.0	215.0	50.0	1012.0	465.0	2050.0	2.8
2001	95.0	114.0	117.0	228.0	55.0	1038.0	487.0	2134.0	4.1
2002	107.0	129.0	126.0	239.0	62.0	1046.0	514.0	2223.0	4.2
2003	107.3	129.1	129.1	248.3	62.2	1108.3	532.1	2316.4	4.2
2004	108.2	129.2	132.8	256.6	62.3	1185.9	552.4	2427.4	4.8
Average	74.1	135.1	95.5	224.0	50.8	722.9	404.7	1707.1	4.4
% of Total	4.3	7.9	5.6	13.1	3.0	42.3	23.7		

Source: Central Bank of Nigeria Annual Report and Statement of Accounts, Various Issues.

Table 2: Proportion of Foreign Exchange Spent on Food Importation (In Million Naira)

Year	Food & Live Animals	Animal & Vegetable	Total Food	Total	Food as % of
		Oil & Fat	Import	Import	Total
1985	686.10	79.80	765.90	7,932.90	9.65
1986	802.10	124.80	926.90	5,983.60	15.49
1987	1,873.90	65.80	1,939.70	17,861.70	10.86
1988	1,694.20	64.30	1,758.50	21,445.70	8.20
1989	2,005.90	92.60	2,098.50	30,860.20	6.80
1990	3,763.50	136.00	3,899.50	45,717.90	8.53
1991	7,785.50	715.90	8,501.40	89,488.20	9.50
1992	11,738.40	1,002.10	12,740.50	143,151.20	8.90
1993	13,912.90	1,325.00	15,237.90	165,629.40	9.20
1994	16,767.30	1,627.90	18,395.20	162,789.30	11.30
1995	88,349.90	8,306.40	96,656.30	755,127.70	12.80
1996	75,954.60	7,314.10	83,268.70	562,626.60	14.80
1997	100,640.30	11,840.00	112,480.30	845,716.70	13.30
1998	102,165.10	10,886.40	113,051.50	837,418.90	13.50
1999	103,489.90	12,073.80	115,563.70	862,515.70	13.40
2000	113,630.50	14,444.60	128,075.10	985,022.39	13.00
2001	160,209.10	20,365.63	180,574.73	1,371,409.10	13.17
2002	138,993.52	20,497.18	159,490.70	1,457,091.43	10.95
2003	146,122.53	24,772.39	170,894.92	1,507,422.81	11.34
2004	147,380.40	32,409.82	179,790.22	1,638,353.67	10.97
Average	61,898.28	8,407.23	70,305.51	575,678.26	11.28

Source: Central Bank of Nigeria Annual Report and Statement of Accounts, Various Issues.

Table 3: Trend in per capita income in Nigeria

Year	Population In Million	Growth Rate	Per Capita Income In Naira	Growth Rate	Exchange Rate N/\$
1989	84.9		2,647.8		7.4
1990	86.7	2.1	3,005.8	13.5	8.0
1991	88.5	2.1	3,661.0	21.8	9.9
1992	91.3	3.2	6,059.1	65.5	17.3
1993	94.1	3.1	7,408.1	22.3	22.1
1994	96.7	2.8	9,425.0	27.2	21.9
1995	99.5	2.9	19,876.4	110.9	21.9
1996	102.7	3.2	26,684.5	34.3	21.9
1997	105.7	2.9	26,819.3	0.5	21.9
1998	108.8	2.9	25,013.8	-6.7	21.9
1999	111.9	2.8	30,181.4	20.7	92.3
2000	115.2	2.9	39,851.5	32.0	101.7
2001	118.8	3.1	44,228.0	11.0	111.9
2002	122.4	3.0	45,317.8	2.5	121.0
2003	126.2	3.1	57,992.3	28.0	129.3
2004	129.9	2.9	67,137.2	15.8	133.5
Average	105.2	2.9	25,956.81	26.6	54.0

Source: Central Bank of Nigeria Annual Report and Statement of Accounts, Various Issues.

Table 4: Trend in Prices of Poultry Products in Lagos State, (In Naira)

Year	Egg Dozen	Growth Rate	Egg Crate	Growth Rate	Old Layer	Growth Rate
1998	99.39		237.92		335.42	
1999	95.42	-4.0	226.88	-4.6	337.5	0.6
2000	104.65	9.7	242.7	7.0	392.39	16.3
2001	127.7	22.0	293.43	20.9	417.6	6.4
2002	132.36	3.6	312.08	6.4	480.7	15.1
2003	145.57	10.0	349.56	12.0	630.42	31.1
2004	198.11	36.1	428.75	22.7	740	17.4
Average	129.0	12.9	298.76	10.7	476.29	14.5

Table 5a: Trend in Meat Consumption in Nigeria (In Million Tons)

Year	Bovine	Ovine	Pig	Poultry	Total
2003	0.3	0.2	0.2	0.2	1
2004	0.3	0.2	0.2	0.2	1.1
2005	0.3	0.3	0.2	0.2	1.1
2006	0.3	0.3	0.2	0.2	1.1
Trend in Africa					
2003	4.7	2	0.8	3.9	12.8
2004	4.9	2	0.9	4.1	13.2
2005	5	2.1	0.9	4.3	13.7
2006	5.1	2.1	0.9	4.3	13.9
World Trend					
2003	61.5	12.2	98.6	76.6	253.5
2004	62.7	12.7	100.9	78.5	259.9
2005	64.3	13	102.6	81.5	266.6
2006	66	13.3	104.9	83.9	273.6

Source: FAO World Tables 2005.

Table 5b:

Projected World Meat Production, Imports, Exports and Consumption in 2006 (Million Tons)

Poultry Meat				
	Production	Imports	Exports	Consumption
World	84.0	8.7	8.8	83.9
Africa	3.5	0.8	16.7	4.3
North & Central America	23.9	1.2	3.2	21.9
South America	14.2	0.3	3.3	11.2
Asia	27.7	3.6	1.2	30.1
Europe	11.5	0.9	1.0	11.5
Oceania	1.0	0.1	25.1	1.0
Developed Countries	37.7	4.0	4.3	37.4
Developing Countries	46.4	4.7	4.5	46.6