

Harnessing the Values along the Food Supply Chain of Poultry Production in Nigeria

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Target audience: Agripreneurs, policy makers, researchers, Ministries of Agriculture and Grant providers.

Abstract

This review assessed the numerous channels through which values can be harnessed along the supply chain in poultry farming in Nigeria with the attendant multiplicative effect on job creation in line with the sustainable development goal (SDG). The findings in this review highlight the present situation in the Nigerian poultry production system and possibility of enhancing per annum production. Literature is abundant with reports of many agricultural by-products that end up as wastes along the production system whereas these so-called wastes are a latent industry in disguise capable of generating wealth and bringing food to the table. This review also efficiently captured the concept of food security such that food can be made readily available to all people at all times and everywhere.

Keywords: Values, harness, food supply, poultry, food security

Description of Problem

Food supply chains constitute the lifeline for human existence on the planet (1). Projections about world population has indicated that by the year 2050, there will be 9.6 billion people on the planet and one of the biggest challenges that will confront mankind will be how to feed the escalating population (2,3). To combat this problem, it was reported that sustained intensification of food production and adoption of technology-based agricultural practices would suffice (4).

The current trend in globalization as signaled by the distance food has to be transported to reach consumers has grossly influenced the supply systems and leaves many gaps for numerous agro-merchandise to spring up (5). Animal products produced locally are

characterized by proximity of production places to consumers and meet a number of criteria such as animal welfare, capacity to generate employment, fair trading relations, producer profitability, and health, cultural and environmental issues (6). By this standard, food supply chain is viewed as a 'value chain systems' in which food and raw materials advance in value as they move through the chain (7). These progressive value additions along the chain present potential economic ventures which in themselves are dynamic and self-sustaining as agriculture is a continuum.

However, the Nigerian 'agricultural landscape' has been highlighted as being plagued by two key agricultural gaps namely: inability to meet domestic food requirements and inability to export quality products

required for market success (8). These gaps constitute an important 'ingredient' in product development and could be 'windows' through which market for products can be established.

This review therefore seeks to identify the various potential values that abound along the food supply chain in the Nigerian poultry production system and harness such, for sustainable national food security.

Tropical Agriculture

Tropical Africa is defined as sub-Saharan Africa excluding the South African Republic and it covers 23 million km² surface area of which 9.5 million km² (40%) is infested by the tsetse fly (9). Because of an increasing demand for animal-source foods, an increasing desire to reduce poverty and an increasing need to reduce the environmental impact of poultry production, tropical farming systems with poultry must increase their productivity (9). The feed resource base within any given land-use farming pattern determines animal productivity; conversely, the land-use pattern sets bounds on the role(s) of livestock within the farming system (10). The challenge to poultry development planning usually is to strike acceptable and sustainable balances between these sometimes conflicting interests. The still rapidly expanding human population in most of the developing world however continues to focus attention on land use, not only to meet the populations' staple food need but also their living space requirements. The trends to urbanization across sub-Saharan Africa, West Asia/North Africa, Asia and Latin America suggest that 54, 75, 56 and 84%, respectively, of the populations on these continents will live in cities by the year 2050 (4). These fundamental demographic forces demand the attention of livestock planners now and towards the future (11). They dictate and emphasize on land-use efficiency in which the synergisms of soil, plant and animal interactions must be fully exploited. Coupled

to this, concerns to conserve the natural resource base and to limit the emissions of carbon dioxide, methane and other environmentally damaging impacts, will further add to the complexities of development planning (12). Bio-energetic efficiency must become the keystone of poultry farming systems in the future. Inevitably, this means integrated crop-livestock systems throughout the tropics and subtropics (13).

Traditional Feed Resources

In the short term, the development of feed resources to raise poultry productivity throughout most of the developing world must be based on better use of traditional feeds. Generalizations are difficult to make across the diversity of production systems and their very different feed crops. However, the first step in all systems must be to tackle critical nutritional deficiencies, be they mineral-, protein- or energy-limiting (4). In extremely difficult conditions, this may simply mean strategic supplementation of the diets of selected poorly thriving animals in order to reduce mortality (13). At another stage it will mean improving feed utilization through the treatment of by-product feeds (ammonia, urea); diet supplementation with balanced high energy feeds, (urea/molasses blocks, etc.), coupled with the feeding of by-pass protein (11). The underlying strategy is to build on the existing system and introduce simple technologies to suit the local conditions. Parallel to improvement in the feeding regime, due attention must be given to the major prevailing animal disease challenges. It was concluded by (9) that poultry production systems that pass from subsistence to commercial poultry production will:

- (1) shift from rural to urban markets;
- (2) become part of a different value chain (with lower prices, higher demands for product quality and increased competition

from peri-urban producers and imports); and
(3) have to face changes in within-farm mechanisms and crop-livestock relationships.

Food Supply Chain

The food industry has an important place in the Nigerian economy. A food supply chain is a network of food-related business enterprises in which food products move from production through consumption, including pre-production and post-consumption activities (14). It was also stated that food supply chain is the series of processes, operations and entities that help to take the food from its raw material state to our plates (7). The food supply chain connects the agricultural sector, the food industry and the distribution sectors (Figure 1). Since the agriculture sector is an indispensable source of raw material for the food industry, then the integration of agriculture sector and food industry in food supply chain is an excellent instrument for promoting the development of production systems (10). The food supply chain starts with the producer (an agriculture-focused organization) and the food sourced at this stage moves through various methods of processing

which can elicit business enterprises for as long as the processing continues. The movement is facilitated by a host of logistics and transportation companies. These companies make sure that the food reaches us on time and at the right quality as revealed in a typical food supply chain in Figure 3. The supply chain is thus, important for the sustainable development of poultry production in Nigeria since it has to structure and function in a systematic way between producers and consumers. Farmers who are the main stakeholders of the food chain play an important role.

Consideration as Value Chains

In some cases, operators across the supply chain integrate vertically to appropriate a larger share of the total revenue, though at the cost of lower flexibility in supplier selection. Transformation of poultry production systems can influence market power along the chain (15). The food value chain is the network of stakeholders involved in growing, rearing, processing and selling the animal products – from farm to table and may also become an important vehicle to address global poverty (11). The value chain provides opportunity to

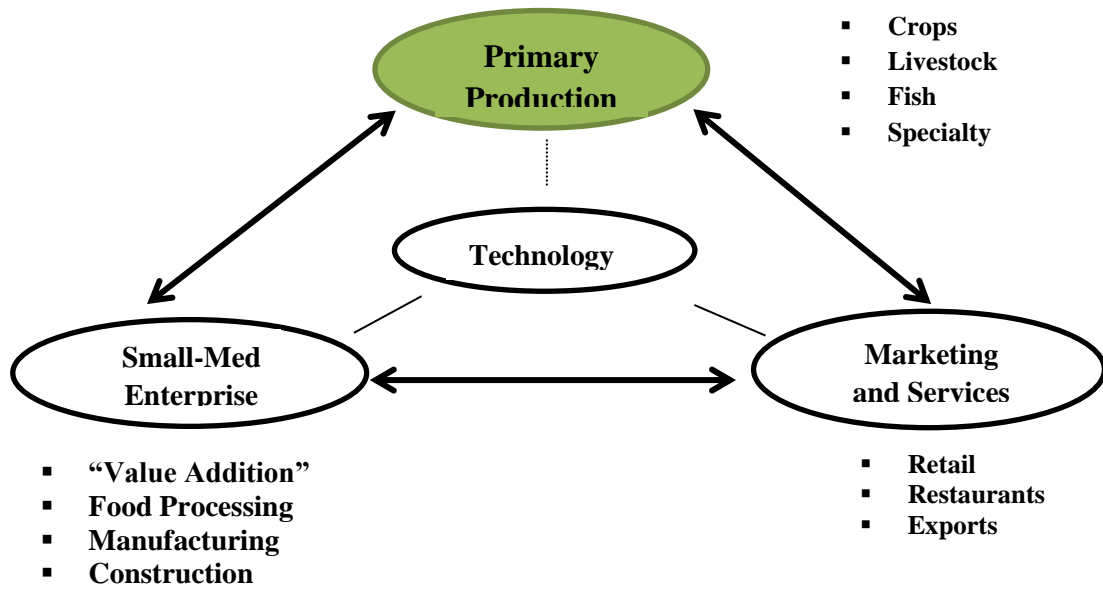


Figure 1: Interrelatedness of Agriculture with other industries with a Technology-core.
Source: (24)

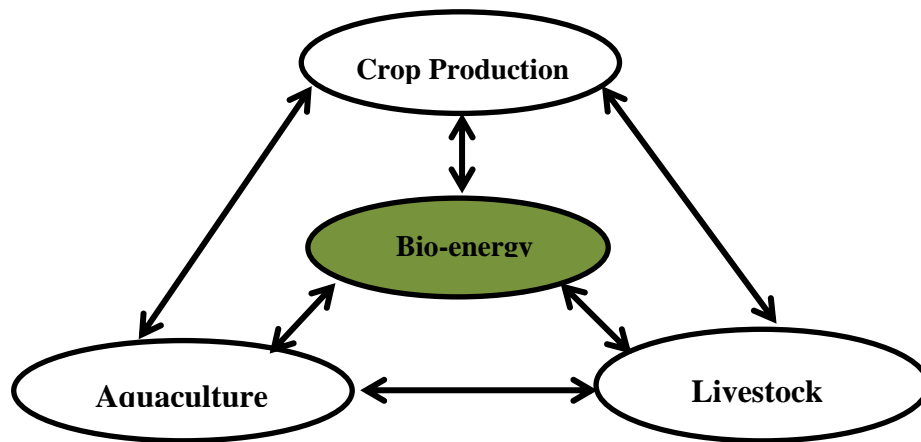


Figure 2: Integrated Production Systems
Source: (24)

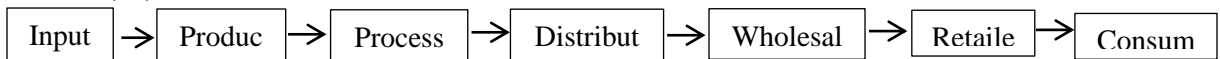


Figure 3: Link in a typical food supply chain.
Source: (1)

alleviate poverty and increase food security by investment and employment within the sector. Increased trade within the sector allows people in developing countries to improve their livelihoods and get access to essential services. The value chain, when focusing on food and food animals production and processing with the aim of reducing food wastage and increasing food security, should also pay attention to food accessibility, food safety and nutrition (15).

Consumers' Choice

Global food consumption patterns have shown two diverse scenarios (14). Firstly, the developed world has seen an increased propensity towards consuming processed food, led by demand from a time-starved working population. The preference for ready-to-eat food products has led to innovations within the retail and packaging environments to service this demand. One of the reasons for this is the economies of scale that the food industry achieves when processing food for the retail environment (15). Also, consumers in the developing world are moving from a cereal, grain-based diet to a protein- and meat based diet (14). However, an increase in meat production requires increased animal feed and more input of raw materials. To increase the availability of animal feed, food production must take an overly intensive form of farming (16) with a focus on growing animal-feed-based crops rather than crops required for human consumption which will have an impact on food security.

Sustainability

The global food chain is a significant contributor to global greenhouse gas (GHG) emissions. GHGs are produced at all stages in the chain, from food production (and its inputs) through food processing, food distribution and consumption to the disposal of waste. Hence, sustainability within the food

supply chain must be considered on a number of fronts. These include energy consumption, carbon emissions, water usage, food availability, ethical behavior and economic sustainability. The food supply chain should be mapped with a systems' perspective in order to understand the links and the locations that are non-sustainable. Mapping the chain also provides a map of energy usage across the chain and an opportunity to reduce energy consumption (14).

Value Addition to Poultry

Value addition to poultry products is the process of increasing the economic value and consumer appeal of such commodity (17). Value addition technologies include processing and preservation techniques, dehydration and drying technology (solar driers), freezing technology, packaging and labeling among others. Value addition is an important approach in today's business environment where innovation in farming and agri-food processing are important to remain competitive and to optimize returns from an enterprise. It may entail producing a commodity for a special market, changing the form of the commodity before it is marketed, changing how a commodity is packaged and labeled for the market, and changing the way a commodity is to an existing one (5).

Value addition therefore creates jobs which are critically needed at this time of unemployment owing to economic recession. Post-production technology including packaging, processing and storage facilities stabilize food production base as well as insure against excessive dependence on food imports (18). Processing involves the conversion of raw materials either by physical or chemical means to storable or more marketable products (17). It is also referred to as a method of preservation to ensure availability of products during periods of scarcity in its fresh state or converted form as in cheese, ghee, butter,

yoghurt and ice cream which are processed products of milk. Processing preserves the milk, its products and prolongs the shelf life. Value addition along this production line affords or creates a new business opportunity entirely thereby constituting a channel through which resource can be deployed.

Poultry as Panacea to Economic Recession

According to the report by (11), for Nigeria to attain total economic recovery, it needs to create 40 million jobs for its youth before 2030 which is an average of about 3.1 million jobs annually. This is because Nigeria is adding more young people to the job market than any other African Country. Many countries that came out of recession quickly use what their people produce with their hands. Thus, the more creative we are as individuals, the more money each person can make and the better for our people and the country (11).

Poultry productivity, entrepreneurship, and value addition result in wealth creation in rural areas. Developing effective clusters in form of cooperatives and commodity associations that can add value to unprocessed raw materials, and promoting value chains across food processing and packaging, food storage and transportation, food safety, distribution systems, and exports, are all central to moving out of the economic recession in Nigeria (11). Growth in poultry production creates income opportunities for the poor in both the farms and non-farm economy while lowering food prices for both rural and urban poor consumers. Poultry production has a high multiplier effect through generation of high economic and social returns and enhanced economic diversification as well as social development (19, 20). However, the peculiar problems associated with herdsmen, religious differences and political heterogeneity can be overcome relatively with ease when stakeholders can come from the different agro-ecological zone and reach a consensus on how

our common problems can be solved while the populace reaping from the coherence.

Value Chain Along the Nigerian Poultry Sector

Two distinct sub-value chains can be identified in the Nigerian poultry sector (21): Traditional sector and commercial sector. The commercial sector is composed of commercial farms and the industrial sector as shown in Figure 4. The industrial and commercial sectors are interwoven while the traditional sector can rely on its own multiplication of chicken often using exotic breeds. The starting point for the commercial sector is the production of day-old chicks (DOC) that are sold to commercial farms and backyard producers (22). Commercial farms engage in egg production while also marketing the spent layers. Backyard producers rather engage in broiler production. Both products are channeled through weekly and daily markets to consumers. Further actors to mention are transporters, middlemen and retailers who are also instrumental in the distribution to the final consumers.

Up to 80% of the day-old chicks are produced and used in the southwest of the country; the southeast and northwest regions source all day-old chickens from other regions. A few hatcheries in Plateau State supply day-old chicks for that zone and send a substantial quantity to Kano State in the north central (11).

Both major feed millers and smaller toll milling companies are important actors, handling about 40% of about 1.2 million tons per year of compound feed produced in Nigeria. There are three types of feed millers, namely custom, toll and integrated farms. The custom millers mill and market their feeds under registered trade names. The dominant trade names in the market include: Amo Sanders, Top Feed and Poultry Feed amongst others. Some of these custom millers have

adopted franchising as an operational method for achieving a wider reach across the country. The toll millers are spread across major locations with significant concentrations around small to medium scale poultry farms. They operate by milling feed to the specification of customers (poultry and catfish farmers) and charge a fee per quantity milled. The customers either bring their own feed ingredients or purchase them from the millers if the millers have them in stock. The third category of feed millers is the integrated poultry farms, which own feed mills and produce feed for their own use. The feed millers acquire their grains from grains merchants or buying agents who source their grains mostly from the northern parts of the country. These merchants have established networks for aggregating grains from smallholder farmers and have measured the logistics of grain transportation across the country. The feed mills mostly depend on importers for the supply of feed ingredients such as fish meal, lysine, methionine, soymeal

etc. These importers also use intermediates to reach the feed millers; these are spread across the country but have a higher concentration in the south.

Poultry shops generally market various inputs of the poultry sub-sector, one of which is branded feeds obtained from custom feed millers. Poultry farms that do not have their own feed mills therefore have the options of patronizing the toll millers, custom millers or poultry shops. The Nigerian poultry sector, despite many problems such as a rise in the price of feed, avian influenza, the global financial crisis and inadequate credit, is still in expansion; this will lead to an increase in backyard and small scale producers, particularly in urban and peri-urban zones, increasing the concentration of poultry and causing concern about human and poultry health (12). Breeders and hatcheries play critical roles in the commercial poultry because they supply day-old chicks to all commercial farms.

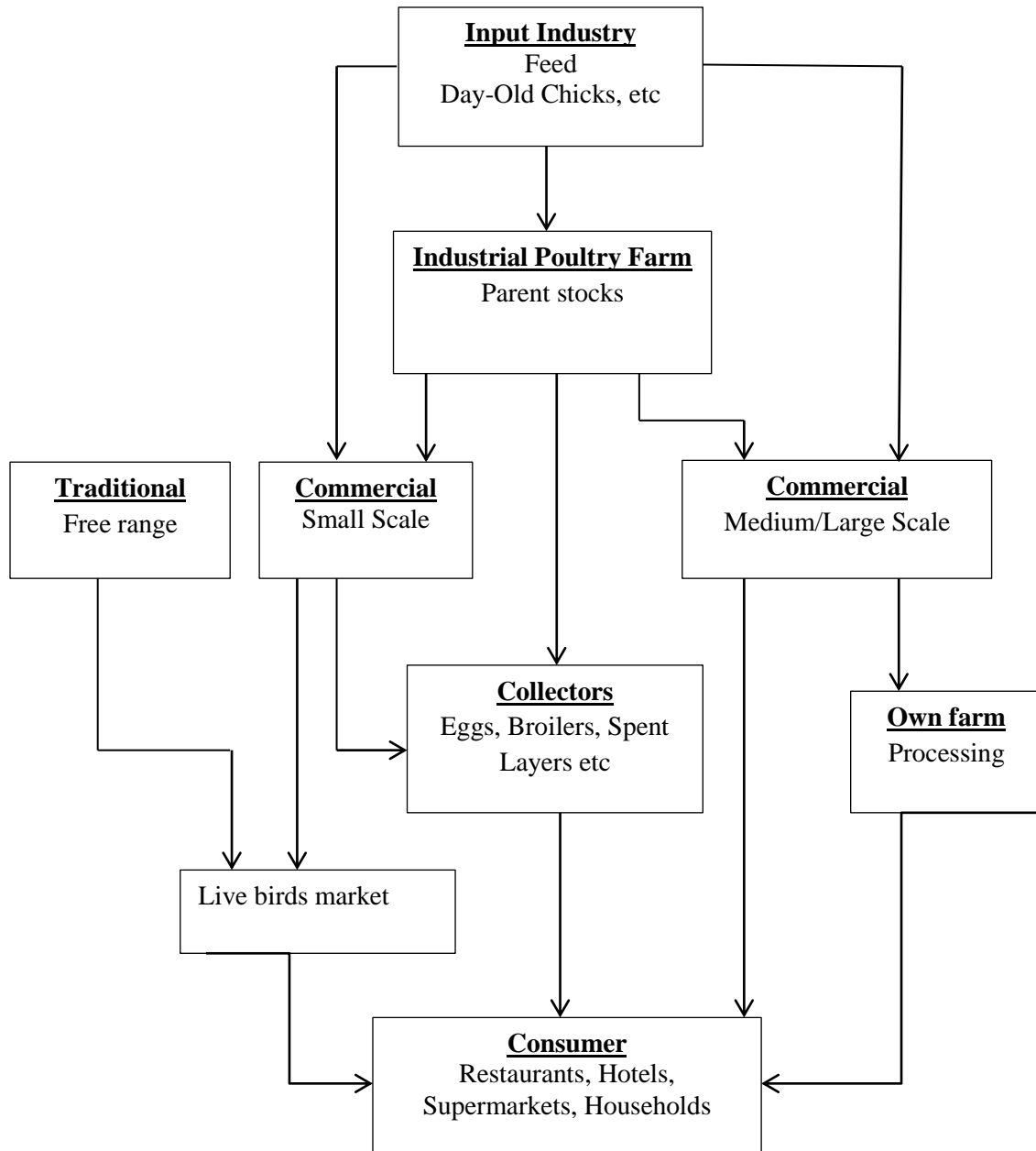


Figure 4: Poultry Value Chain in Nigeria.
Source: (21).

The poultry sector has been able to attract the financing sector. Given the profitability of the sector, medium to large egg producers, day-old chicken producers as well as feedstuff producers have been able to acquire finance from various financial institutions. However, prospects for growth suggest that the need for finance is substantial.

End Market Analysis in the Nigerian Poultry Industry

Without any hard statistics published on the actual market size for poultry products, by market segments (11), four major market segments identified to capture the majority of the purchases of chicken meat and eggs in Nigeria are:

- Catering companies;
- Fast food outlets;
- Household consumers; and
- The hotel industry.

Catering Companies

Catering companies source a variety of goods from across Nigeria, including an assortment of food items, which account for the bulk of their cost model. Poultry products constitute a significant portion of these food items, thereby making catering companies an important end market for chicken. The estimated demand for processed chicken meat amongst large catering companies has been estimated to be \$35 million per annum for processed chicken meat.

Catering is also one of the sectors which has been marked for 100% Nigerian content by the Nigeria Content Development and Monitoring Board (23). This means that catering companies must source the entire inventory of the goods and services they provide on contracts from within Nigeria.

Fast Food Outlets

Fast food outlets are an important end market for chicken meat in Nigeria due to

large and increasing demand from a population which is fast adapting to eating out. According to a 2011 estimate, there were 800 outlets with a total worth of NGN 190 billion (\$1.25 billion) (24) across the country, representing 60 recognized brands, in addition to a host of smaller ones. Chicken is a major product for them. Fast Food outlets in the large and medium categories generally require the following types of processed, packaged chicken:

- Whole chicken
- 9 piece chicken parts
- Sausages
- Nuggets
- Patties

Household Consumers

The vast majority of household consumers purchase live chicken through live bird markets (LBMs). Individuals account for over 90% of sales in LBMs, which are also frequented by institutional buyers looking to buy at small scale. It is common for LBM's to operate on a daily basis in urban areas, while weekly markets are more common in rural areas.

Poultry products, along with other high-protein foods such as beef and mutton are still considered luxury items in Nigeria. Only 5% of daily energy supply is provided by animal products in Nigeria, which is below the average of 9.5% for West Africa (24).

For the majority of Nigerians, particularly those living in rural areas, poultry consumption is saved for special occasions. This highlights a key characteristic of the market for chicken meat in Nigeria – seasonality.

The Hotel Industry

Hotels maintain a steady business in Nigeria due to the supply of guests generated by the presence of the vast centers of attraction. Hotels are also institutional purchasers of chicken meat and eggs, although

they demand much smaller volumes than other end markets. However, they are significant since they are also a year-round market for broiler meat. The source of purchase of poultry products varies with the brand, size, and standing of a hotel.

Conclusion and Applications

1. The Nigerian poultry production system is endowed with numerous opportunities that are yet untapped. In order to fully maximize these opportunities, it is necessary to identify where these opportunities are 'hidden' and the potential values that they can afford.
2. The numerous values along the supply chain of the animal production systems should be harnessed towards the enhancement of the agricultural GDP while the prospect of job opportunities is increased.
3. Moving out of economic recession will require solutions to the identified production gaps through production of sufficiently high quality foods for Nigerian market and the export market to earn foreign exchange.

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