

PDF - MARKET AGE ENTERPRISE SIZE AND RELATIVE EFFICIENCY IN BROILER PRODUCTION IN  
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### **ABSTRACT**

The study focused on market age, enterprise size and relative efficiency in broiler production in Imo State. The main aim was to determine resource use efficiencies in broiler brooding and rearing enterprises as well as large-scale and small-scale outfits in the two enterprises. Using multi-stage sampling technique, the study area was zoned into three using the existing zoning arrangement of the Imo State Agricultural Development Programme (ADP). A total of nine L.G.As were randomly selected and a total of 180 broiler farmers (made up of 90 brooders and 90 rearers) were selected. A set of structured questionnaire was administered on the farmers to obtain required information. Data were analysed using simple statistical tools, regression models, additive multiplicative dummy variable models, profit function technique and enterprise analysis. Results showed that broiler production was profitable but rearing birds to maturity was more profitable than brooding birds and selling at four weeks old. Large-scale rearing of birds was more profitable than small-scale outfit. In brooding enterprise, no remarkable difference in profit margin existed between large-scale and small-scale. Broiler rearing farmers were found to be more technically efficient than the brooding farmers and small-scale rearers were more technically efficient than large-scale ones. The implication is that technical efficiency may not increase by increasing size of operation in rearing broiler. In brooding, large-scale outfit was more technically efficient than small-scale. Technical efficiency may be increased by increasing size of operation in broiler brooding business. None of the farmer groups achieved absolute allocative efficiency. They therefore did not maximize profit. However brooding farmers were more allocatively efficient than the rearing farmers. Large-scale rearers were more allocatively efficient while small-scale brooders were more allocatively efficient in brooding enterprise. The implication is that in broiler rearing business, allocative efficiency may be increased by increasing size of operation. Brooding farmers were found to be more economically efficient than rearing farmers. Small-scale brooders were more economically efficient than large-scale counterpart. Allocative efficiency may not be increased by increasing size of operation in broiler brooding. None of the farmer groups operated at constant returns to scale. Brooding farmers operated at increasing returns to scale while rearing farmers operated at decreasing returns to scale. Brooding farmers by operating at increasing returns to scale means that they grossly under-utilized resources, they had opportunity to increase output by increasing input use. The rearing farmers over-utilized some resources. It was recommended that farmers should brood and rear their stock to maturity to avail themselves the opportunity of allocative and economic efficiencies of brooding and technical efficiency and high profit margin of rearing.

### **CHAPTER ONE INTRODUCTION**

#### **1.1 BACKGROUND INFORMATION**

Nigeria, one of the developing countries of the world with rapid population growth, is faced with the task of providing adequate food for her citizenry. While food production increased at the rate of 2.5%, food demand increased at the rate of more than 3.5% due to the high rate of population growth of 2.83% (F.O. S, 1996). The scenario induced increase in the country's food import bills from about #8b in 1996 to over #183b in 2005 (CBN, 2005). Apart from this problem, there is inadequate animal protein in the diets of a large proportion of the population especially in the rural areas (Ojo, 2003). Animal protein is essential in human nutrition because of its biological significance.

In realization of the importance of animal protein, various governments in Nigeria have inaugurated programmes at the national, state or community levels to encourage mass production of livestock. Such programmes included the micro-credit scheme for livestock production and establishment of livestock parent/foundation stock at the community level by the United Nations Development Programme (UNDP).

Poultry is an example of such community level livestock. Poultry is a general name for several kinds of birds that are useful, mainly as food to man which include domestic fowl, duck, turkey, guinea fowl, and goose (Ayivor and Hellins, 1986) and they are reared for other useful purposes such as meat, eggs and feather (Walter, 1976; Eze, 1991). Poultry is widely grown in Africa, Nigeria and Imo State. Sonaiya (2000) pointed out that there were 82.4 million chickens in Nigeria, 11% (i.e. 10m) of which were for commercial purposes. Livestock statistics by RIM (1992) showed that there were 13.8m cattle, 34.4m goats, 22m sheep, 3.4m pigs, 104.3m local poultry, 20m exotic poultry, and 1.7m domesticated rabbits in Nigeria. Also, Imo State Ministry of Agriculture and Natural Resource (MANR, 2004) showed that there were 6.35m poultry, 1.1m cattle, 1.5m sheep, 2.85m goats, 3.32m pigs and 54,000 rabbits in the state.

Poultry has some advantages of being good converters of feed into usable protein in meat and eggs; low production cost per unit relative to other livestock; meat which is tender, palatable and acceptable; short production cycle and the egg which has a biological value of 1.0, is one of the most nutritious and complete food for man (Orji, Igbodi and Oyeke, 1981).

In the recent time, there has been recorded improvement in poultry production in Nigeria in that poultry eggs' and meat's contribution to the livestock share of the Gross Domestic Product (GDP) increased from 26% in 1995 to 27% in 1999 (CBN, 1999). This improvement can further be enhanced by proper analysis of resource use productivity and efficiencies in broiler production.

Broiler is a meat type chicken bred for marketing at early age and matures faster than other types of chickens (Williamson and Payne, 1977). In the livestock market today, broilers are offered for sale at different ages and sizes depending on circumstances and purposes. The market age in broiler production is the age at which producers target to offer their stock for sale. Most outstanding among them are:

four weeks brooded (brood and sale);  
seven to 12 weeks reared (mature types); and  
above 12 weeks reared (over-aged).

Broiler producers show their interests in the production of one or a combination of any of these three. On this, Oluyemi and Roberts (1979) pointed out that the exact time for marketing broilers depended on different marketing situations involving the relative costs of chicks and feeds and market preferences. The broiler producers also operate at various scales and use various techniques and available resources to achieve their production goals. Anthony (2001) considered those farmers producing not more than 500 birds as small-scale farmers; those producing between 501 and 1000 birds as medium-scale and those producing from 1001 and above as large-scale farmers. The definition of farm size or scale of operation has varied in efficiency literature, as what is considered large or small-scale is relative depending on the agricultural system setting (Ohajiana, 2002). However, the most useful economic definition of small-scale business, for example, is the one that

emphasized those characteristics which might be expected to make their performance and their problem different from large-scale businesses (Adebusuyi, 1977). In addition, Nicholas (1977) described a small-scale business as one that had relatively small share of its market and is managed by its owners in a personalized way and not through formalized structure of management.

Lawal (1979) and Akison (1982) defined small-scale industry or enterprise as one with total capital investment less than N1m or one that employed less than 15 workers. The National Directorate of Employment in 1989, defined small-scale businesses to accommodate projects with capital investment as low as N5,000.00 and employing as few as three persons. To Albert (1973), small-scale enterprises were those which had relatively little capital investment, produced in small quantities and as a result controlled a small share of the market and employed not more than 50 workers and had management, marketing and entrepreneurial functions vested in their proprietors. The definition according to Okafor (2000) is contextual as each country or public agency tends to adopt a definition criterion which accommodates the peculiar needs of public policy or which is most appropriate for the intended policy objective or the agency concerned. Important operational variables like capital investment, turnover, employment level and relative size of a firm within any industry are common features in most definitions. For example, in most developed economies like the U.S.A., UK and Canada, the definition criterion adopted is a mixture of annual turnover and employment level (Okafor, 2000).

In Nigeria, enterprise-size classification is based on a composite criterion of sales volume, capital or asset base and employment level. The official definition of various scales of enterprise has undergone many revisions from 1973 to date. At the 13th council meeting of the National Council on Industry in July 2001, micro, small and medium enterprises (MSMEs) were defined by the council as follows:

micro/cottage industry: an industry with labour size of not more than 10 workers or total cost of not more than N1.5m excluding cost of land;

small-scale industry: an industry with labour size of 11-100 workers or total cost of not more than N50m but excluding cost of land;

medium-scale industry: an industry with labour size of between 101 and 300 workers or a total cost of over N50m but not more than N200m, excluding cost of land; and

large-scale industry: an industry with a labour size of over 300 workers or a total cost of over N200m, excluding cost of land (Udechukwu, 2002).

Large-scale business, therefore is one that is beyond the scope of small-scale business, having a formalized management structure with relatively large capital investment and personnel.

But for the purpose of this study, the definition assumed a different dimension. It was difficult to come across a reasonable number of broiler producers with stock up to 500 birds at the time in the study area. Because of this, a small-scale outfit in the enterprise is taken to be one with less than 300 birds per production period, mainly managed by the owner and sometimes employing one or two regular labourers. The practice is that family labour is used for production. Average investment is not more than N200,000 in most cases. Therefore a large-scale outfit is one that has 300 birds and above in a production period. Use of paid labour rather than family labour is rampant. This type is formalized in its management structure. Average investment is above N200,000.

Efficiency is concerned with relative performance of the processes used in transforming given inputs into outputs. It is the use of resources in achieving organizational objectives (James and Freeman, 1992). The aim of resource use efficiency is to find ways of increasing output per unit of input and attaining desirable inter-firm, intra-firm and inter-sector transfer of production resources in order to provide the means of raising our economic level (Awoke, 2003). Efficiency can be measured in a number of ways, but each has in common the notion that the value of output in the long-run must exceed, or at least be equal to the cost of inputs plus work flow activities. On this, Farrel (1957) and Carlson (1972) had earlier

distinguished between two types of efficiency, technical and allocative. Technical efficiency is borne out of the techniques used. It is the ability of farmers to use the "best practice" in the production processes so that not more than the required or necessary inputs are used to produce "best" level of output (Timmer, 1970; Carlson, 1972). It can be defined as the maximization of the ratio of physical output to physical input without taking into consideration factor input and product output prices (Bishop and Toussaint, 1958; Arene and Okpukpara, 2006). Therefore a production method that uses more of physical resources than the alternative in the production of a unit output is technically inefficient (Chukwuji, Inoni, Ogisi and Oyaide, 2006). The measurement of firm's specific technical efficiency is based on observed output from the best production (Okoruwa and Ogundele, 2008). Allocative or price efficiency, on the other hand, deals with the choice of optimum combination of inputs consistent with relative factor prices. A farmer, therefore is considered allocatively efficient in the use of a resource if he is capable of equating marginal value product (MVP) to its factor price. Onyenwuaku (1994) contended that allocative efficiency of any two groups of farms required that they were characterized by constant returns to scale, production function of similar slopes and the same configuration of input and output prices.

Economic efficiency is the product of technical and price efficiencies (Ohand and Kim, 1978) and it indicates the cost per unit of output for a farm which perfectly attains both efficiencies. It is the ability to maximize profit. In order to attain economic efficiency there must be necessary and sufficient conditions (Arene and Okpukpara, 2006). Necessary condition involves the attainment of the technical efficiency. Sufficient condition is attained when price relationship of the factors and outputs are reconsidered. An economically efficient input-output combination would be on both the frontier function and expansion path (Ogundari and Ojo, 2006). The level of technical efficiency is influenced by managerial characteristics such as technical knowledge and skills, education and extension contacts as well as institutional factors such as, farm size, tenancy, access to credit and supply of inputs (Ali and Byerlee, 1991).

## **1.2 STATEMENT OF PROBLEM**

Nigeria is faced with the problem of malnutrition particularly in terms of protein intake (Shaib, 1984). The minimum protein intake per day of 65g, as recommended by the World Health Organization (WHO), is yet to be attained, instead, the per capita consumption per day is about 6.5g representing 10% (Oluyemi and Roberts, 1979; Ibe, 2000). The issue is that of protein availability and its configuration. It is recommended that more than one third of the minimum protein intake for an adult per day should be of animal origin. This is because animal protein contains the essential amino-acids which are more balanced and readily available to meet nutritional needs than plant protein (Onyenuga, 1971; Ojo, 2003).

Regrettably, animal products contribute only about 15-20% of the protein intake of the nation (FRN, 1997). Irrespective of the fact that Nigeria is endowed with abundant livestock production facilities, she has remained a net importer of livestock products (Abubakar, 1998). Developing the poultry industry, especially the broiler sub-sector, is observed to be the fastest way of bridging the protein deficiency gap in Nigeria (Ikpi, 1979; Akinwumi, 1997). Though there have been some sincere efforts to increase the local production of poultry in general, the demand still far exceeds the supply. One may start to wonder whether broiler farmers employ their production resources well or not? In an answer to this question, Branckaert and Gueye (2000) had asserted that most of the conditions required by the industrial poultry sub-sector are not met in poor countries, including Nigeria. There are inability to purchase most improved birds, drugs, vaccines, equipment, non-availability of highly skilled manpower, inability to control diseases and non-existence of national domestic market to absorb poultry products at attractive prices by consumers. In fact Gueye (2003) admitted that before commercial or industrial poultry production can be developed to medium or large-scale units, either for broiler or egg production, it is important to achieve either self-sufficiency in cereal production or to generate the necessary hard currencies that may be needed to purchase necessary but expensive inputs. This is because, the need to

produce high quality and quick maturing broilers has been militated against by high competition between man and livestock over relatively lesser source of protein concentrate and basal energy feedstuff (Okeke, Usman and Anamayi, 2004). These problems can influence resource use efficiency in broiler production.

Equally, there are controversies over enterprise size and relative efficiency in agricultural policy formulation and implementation. For example, the implementation of agricultural policies most often favour large scale farmers under the presumption that they are more economically efficient than small-scale farmers (Dorner, 1972; Khan and Maki, 1979; Kydd and Christiansen, 1982; Lele and Agarwal, 1989; Deininger and Binswanger, 1995). However, some previous studies in Asia and Nigeria on farm sizes and relative efficiency have shown some conflicting results. Lau and Yoto Poulos had shown that small-scale wheat farms in Indian Punjab were more economically efficient than large farms. In Nigeria Trosper (1979) and Awoke (2003) found that small-scale farms were economically more efficient than large farms.

Some research results showed that large farms were more economically efficient than small farms (Khan and Maki, 1979; Nehring et al., 1989; Bravo-ureta and Rieger, 1990; and Kumbhakar, 1993). Okon (2005) blamed the inefficiency of resource use in small-holder farms on dominance of elderly men and women in agriculture. There is, however, no evidence of differences in the relative economic efficiency or its technical and price efficiency components between large and small farms (Sidhu, 1974; Bagi, 1982; Bagi and Huang, 1983; Bravo-ureta, 1986; Moussa and Jones, 1991; Dittoh, 1991; Ohajianya and Onyenwuaku, 2002).

Awoke and Okorji (2004) observed that resource use in developing countries such as Nigeria is faced with the problem of under utilization of capacity which is associated with low returns. For instance, problem of demand and supply militated against efficient use of land resources.

However, such information are lacking on farm size and enterprise type (i.e. broiler brooding and broiler rearing) in broiler production in Imo state of Nigeria. Literature was lacking in resource use efficiency in broiler brooding and rearing as well as relative efficiency in sizes of operation in them. A comparative analysis of efficiency of resource-use among broiler farmers in Imo state would therefore provide empirical evidence of gaps that may exist in the farmer's current level of technology. These gaps would serve as intervention points for relevant stakeholders for arresting any difference that may precipitate animal protein crisis in Imo state and Nigeria in general, as inefficiency directly translates to low productivity and profitability. Hence, the study sets to discover resource use efficiencies among the market ages in production, otherwise called broiler brooding and rearing enterprises as well as large-scale and small-scale outfits in the two broiler enterprises. It will identify and provide better information about the variables of variations in efficiency of resources use among the groups of farms. It will try to formulate policy measures that will reduce the difference if any.

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