ECONOMIC ANALYSIS OF BREAD BAKING ENTERPRISES IN KADUNA AND ZARIA METROPOLIS OF KADUNA STATE, NIGERIA.

BY

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(MSc / AGRIC /40919 / 2012-13)

A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN AGRICULTURAL ECONOMICS

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JANUARY, 2016

DECLARATION

I hereby declare that this dissertation titled **"Economic Analysis of Bread Baking Enterprises Kaduna and Zaria Metropolis of Kaduna State, Nigeria"** has been written by me and it is a record of my research work. No part of this work has been presented in any previous application for another degree or diploma at any institution. All borrowed information have been duly acknowledged in the text and list of references.

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CERTIFICATION

This dissertation titled **'Economic Analysis of Bread Baking Enterprises Kaduna and Zaria Metropolis of Kaduna State, Nigeria'** by Alhaji ABULLAHI meets the regulations governing the award of the Degree of Master of Science of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

I dedicate this dissertation to my lovely Dad, Alhaji B. A. Abubakar, who facilitated the completion of my study.

ACKNOWLEDGEMENT

I am deeply grateful to Almighty Allah (SWT) for favour bestowed upon me throughout the period of my study. May the peace and blessings of Allah be upon His noble prophet Muhammad (SAW), his household, companion and those on their foot-paths till the day of reckoning.

My profound and unreserved gratitude goes to my supervisors: Prof B. Ahmed and Prof Z. Abdulsalam under whose careful supervision this research work was conducted. May Almighty Allah reward them. My appreciation also goes to the entire academic and non-academic staff of the Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University, Zaria for their contributions.

I am sincerely grateful to my beloved parents: Alhaji B. A. Abubakar and Hajiya Maimuna Abdullahi, my brother; Abdullahi Man for their support, prayers, encouragement and the special virtues they have taught me through my upbringing, especially the priority they gave to my education. Special thank also goes to my lovely wife Fatima Alhaji Hussaini, brothers and sisters and the entire family members.

Finally, my appreciation to all my friends and entire colleagues, particularly Sani Alhaji, Abdullahi Badiru, Alhassan, Ebel Gomina, Abdulrahaman and my entire course mates of Ahmadu Bello University Zaria. May Almighty Allah reward you all.

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ABSTRACT

The study examined the economic analyses of bread baking enterprises in Kaduna and Zaria Metropolis of Kaduna state, Nigeria. Primary data were collected from 124 bread producers selected using multi-stage sampling technique. The data from 2015 season were collected with the aid of structured questionnaire. Data collected were analyzed using stochastic frontier production function. The maximum likelihood estimate (MLE) of the stochastic frontier model production function revealed that the inputs were under-utilized. The technical efficiency score of each respondent revealed that the most efficient producer operated at 99% efficiency, the least was found to operate at 59% efficiency level, while the average was 71%, indicating that bread producers still have the potential to increase the efficiency in their baking activities by 29% in the study area. The predicted allocative efficiencies differ substantially among the producers ranging between value 0.49 and 0.89 with the mean allocative efficiency of 0.69. The bread producers with the best and least practice had economic efficiency of 0.89 and 0.29 respectively. The mean economic efficiency was 0.51. The variance parameters of the frontier production model were Sigma-squared (δ^2) and Gamma (γ) and their estimated coefficients in the study area were 0.00894 and 0.075567 respectively. The net processing income from 50kg bag of flour in terms of other associated variable costs was estimated to be ₦6270. The return per ₦1 invested was therefore estimated to be ₦0.58. Hence, bread Production was profitable in the study areas. The major constraints were inadequate capital, high cost of raw materials, untimely supply of raw materials, problems of defaulters, lack of technical know-how, poor power supply and poor market. The study recommended that Flour, labour, salt and yeast that significantly affect technical efficiency of bread production should be increase in quantities in order to boost more output. The result of the study revealed that firewood was over-utilized. Therefore bread producers should reduce the quantity of firewood so that they can achieve both technical and allocative efficiency in its utilization.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In Nigeria, agriculture was primarily a rural based activity. But, because of the increasing demand for food and jobs for many urban dwellers, it became necessary for urban households to embark on agribusinessesas a means of filling the food demand and supply gap and providing income for other household requirements. In addition, the practice of agribusinesses has continued to increase in recent years with the structural adjustment of

the Nigerian economy. The rise in food prices, un-employment and inflation brought by the structural adjustment (BFW, 2005) and the decline in the average real income of both rural and urban households have compelled many urban dwellers into agribusinesses in the urban areas. The urban entrepreneurs, like any other entrepreneur, will typically produce to satisfy household food needs or make profit or both. If the interest were in producing for home consumption, the entrepreneur would want to obtain the optimum from his/her effort. If on the other hand, the entrepreneur produces for the market, then the cost of production and the returns accruable to the entrepreneur's effort become important measure of performance. Either of the two objectives of production requires efficient use of resources input.

Nigerian agribusinesses including bakery firms were captured in theNigeria's development plans. This is because government had identified this unit as a veritable engine of growth and had continuously put in place policies and incentive packages that will promote this segment of the economy (Osuji, 2008).

Bread is a baked food produced from flour that is moistened, kneaded, proofed with the addition of yeast. Bread is a convenience food made from wheat flour derived from bread wheat, the technology of which dates back to the ancient Egyptians at about 4000BC. Other raw materials for bread making apart from wheat flour include sugar, baking fat, yeast, vegetable oil, salt and water. Hard wheat flour is used for bread making because of gas produced by yeast during proofing and baking (Famosinpe, 2011).

The bakery production which has been increasing steadily in the country is among the largest processed food industries in Nigeria. The two major bakery industries viz bread and

biscuit account for about 82% of the total bakery products. The bakery industries in Nigeria comprise organized and unorganized sectors. The organized sector consists of large, medium and small scale manufacturers who produced packaged biscuits and bread. The unorganized sector consists of small bakery units, cottage and household-type manufacturing goods and distributing their goods in the surrounding areas (World Bank, 1995 and BFW, 2005). Bakery productsare manufactured from combinations of wheat or other flours, sugar, baking powder, condensed milk, fat (ghee), salt, jelly, dry fruits, various essences and flavoring. Different type of bakery products can be classified as dry bakery products and moist bakery products. Dry bakery products include soft biscuits, hard biscuits, cookies, crackers, fancy biscuits and cream wafer biscuits. Moist bakery products include sweet bread, milk bread, masala bread, garlic bread, fruit bread, various types of buns, cakes, pastries, muffins etc. These products are available in various sizes, shapes and forms (Indian Food Industry, 2001; Beverage and Food World, 2005).

According to Nicole *et al.* (2012), the demand for bread is expected to explode in the coming years. South Africa, Nigeria, Ethiopia, Sudan and Kenya are currently the largest and leading bread markets in Africa. The key drivers of this demand are Africa's rapidly growing population, an expanding middle class which has more money to spend, an enlarging labour force, and increasing rates of migration to African cities and towns.Africa now has more than 50 cities inhabited by over one million people. By 2020, more than 500 million Africans are projected to live in urban areas and cities. Statistics reveal that urban dwellers and city people eat more bread than people in the rural areas. Given the rapid growth of African city populations, bread is sure to remain a highly sought-after food item by African households(Nicole *et al.*, 2012).

1.2 Problem Statement

The demand-supply gap of confectionery products in Nigeria and most countries in Sub-SaharanAfrica is largely met by importation (Wada *etal.,* 2006; GAIN 2008). This is because most of the vital inputs used in production such as baking materials, wheat, yeast and other facilities are not always within the reach of the bakers (Wayagari*et al.,* 2003), thus, crippling the return on investment and discouraging the bakers from continued production of these products. This has contributed significantly to the poverty state of the nation judging from the fact that Nigeria is a developing economy and industrial development is a *sine qua non*to economic growth. One of such industrial products is bread.

Over the years the government has carried out policies aimed at boosting bread production in the country. One of these policies is the inclusion of 40% cassava in composite flour with effect from 15 July, 2012. Despite that the price of bread in Nigeria is still very high. According to publication made by the Nigeria bakers association, prices of bread, a major stable food have risen in the last three years by an average of about 25 per cent from between N80 and N120 per family size loaf to between N120 and N150 amid increase in the prices of baking materials. In January, 2011, the prices of all sizes of bread were increased by 10 per cent. Although the rise in the prices of bread was associated with sundry baking materials such as sugar, butter, flour and fat.

The current demand for bread is likely to exceed 2.2million tones considering their leading role as one of the major sources of energy, protein, iron, calcium, and several vitamins (Onwumere et *al.,* 2012). They are no longer viewed as a luxury tea-time snacks but essentially daily food component for an average Nigerian house hold. However in recent

time, there have been the recurrent loss of market share and dropping of sales volume in the bakery enterprises operation in the nation (Onwumere*et al.*, 2012).As a result, the supply of bread becomes very low in comparison to demand. This inability to meet the domestic demand could be attributed to low productivity, inefficiency in the use of resources, disincentives from macro-economic environment and traditional technologies (GAIN 2008).

The level and structure of the Nigerian bread industry reflects that bread production is mainly constrained due to lack of productivity augmenting technologies. To meet the emerging challenges, there is an urgent need to bring efficiency to the production process, either through maximizing the output or minimizing the cost (Osuji, 2008).

In reality, optimum production encompass utilizing resources in their most efficient and productive manner, providing favourable cash flows, satisfying attractiveness constraints of buyers and or production, maximizing profit in the short and long run and satisfying the current trend and preventing oversupply situation. The real challenge is to find a production mix that accomplishes all or most of these things.

The problem therefore identified centers on the productivity and efficiency levels at which bread makers use resources on these bread making. It also borders on how the various factors that explain productivity and efficiency in this bread industry can be examined so as to improve bread production in the country.Hence, the study analyzed the economics of bread production in the study areas. It was against this background that the study analyzed the economics of bread production in the study areas. In view of the foregoing, the following research questions were answered:

i. What are the socio-economic characteristics of bread producers the study areas?

ii. What are the costs and return associated with bread production?

iii. What is the resource use efficiency of bread production?

iv. What are the problems faced by the bread producers?

1.3. Objectives of the Study

The broad objective of this study was to examine the economic efficiency of bread production in selected Local Government Areas. The specific objectives were to:

i. describe the socio-economic characteristics of bread producers in the study areas;

ii. determine the costs and return associated with bread production;

iii. determinethe resource use efficiency of bread production;

iv. describe the constraints faced by the bread producers.

1.4 Justification for the Study

Bread is a stable food in the country today. It is consumed by all and sundry- the old, young, poor and rich consume bread on daily basis. Bread is regarded as a food for the masses. It is taken as breakfast in many houses. As at 2006, the population of Nigeria was placed at 140 million by the National Population Commission. As at the end of 2012, the population figure was estimated at about 160 million. The increase in population resulted in more increased in demand for bread. It was thus important that the profitability and economic of breadbe assessed. It was obvious that there was a possibility for the increase in its production and much can be done to realize more income from its investment. In spite of this, little or no study has been conducted to assess the economics of bread production in the study areas. With the rapid increase in population of Nigeria and

migration to the urban areas from the rural areas, there was need to increase the supply of bread in the country. However, from available records no adequate data on the production of bread in Kaduna State. Thus, this study was expected to provide the valuable bench mark information to the partially existing knowledge about bread production in the study areas.

It was also expected that the findings of this research would help in providing information and identifying problem areasfor improvements. Finally, the research would, as well, serves as a guide to governmental and non-governmental organizations in designing appropriate intervention measures in order to boost and improve the efficiency of bread production.

1.5 Hypotheses

The hypotheses tested were:

i. There is no significant difference between the cost of production and revenue in bread production in the study areas.

ii. There is no significant relationship between socio-economic characteristics and technical efficiency of bread production in the study areas.

CHAPTER TWO

LITERATURE REVIEW

2.1. Conceptual Frame work

In Nigeria bread is a staple food product prepared by baking dough of flour and water (Osuji, 2008). It has high nutritional value and its consumption is steadily on the increase due to its convenience as a ready to eat food product (David, 2006). Wheat flour is particularly well suited for bread making because of its glutamine and gladden content. These two substances combine with water to form the gluten network which is essential for dough development during bread making (Dwyer and O'Halloran, 2009).

Bread is highly nutritious and eaten in one form or another by nearly every person on earth. As an excellent source of vitamins, protein and carbohydrates bread has been an essential element of human diets for centuries in all regions (Ryan, 2006). Bread is solid foam; typical bread has the crust with the characteristic golden brown colour and white crumbs. Bread has a short life due to its chemical composition and moisture content compared to other baked products. Nutritionally, bread contains high percentage of carbohydrate and fat both of which are needed for energy and source of calories. Other nutrients like vitamins, mineral and protein are relatively in small proportion(Dwyer and Hallow, 2009).

Fats such as butter, vegetable oils, lard, or that contained in eggs affects the development of gluten in breads by coating and lubricating the individual strands of protein and also helping hold the structure together. If too much fat is included in

breaddough, the lubrication effect will cause the protein structures to divide

(Nicole *et al.*,2012). A fat content of approximately 3% by weight is the concentration that will produce the greatest leavening action. In addition to their effects on leavening, fats also serve to tenderize the breads they are used in and also help to keep the bread fresh longer after baking (Cauvain and Young, 2005).

Yeast is a leavening agent added to have desirable dough. Most leavened breads are made with yeast, a microscopic organism that feeds on carbohydrates in flour, converting them into alcohol and carbon dioxide in a process called fermentation. Breads made with yeast must be allowed time to rise before baking (Akinpelu, 2010)

Sugar is broken down by the yeast to form CO_2. It gives a slightly sweet taste desired in the product. It contributes to the browning of the crust of the product when baked. It reduces the strength of gluten and creates certain textural effects such as hardness (Akinpelu, 2010).

Salt acts to improve the flavour, texture and colour of the bread. It stabilizes yeast development and toughens the dough, which results in improvement in texture. The gluten structure is strengthened and prevented from baking during fermentation (Akinpelu, 2010).This helps to develop gluten, dissolve sugar and causes chemical leavening compounds to start a reaction. It helps the yeast growth during heating and promotes the gelatinization of starch (Dwyer and Hallow, 2009).

Bread improvers are frequently used in the production of commercial breads to reduce the time that the bread takes to rise, and to improve the texture and volume of bread. Chemical substances commonly used as bread improvers include ascorbic acid,

hydrochloride, sodium met bisulfate, ammonium chloride, various phosphates, amylase, and protease (Famosinpe, 2011).

2.2 Review of Confectionery Industry

The bakery industry in the US includes 2,800 commercial bakeries with annual revenue of $30 billion,along with 6,000 retail bakeries with total annual revenue of $3 billion. The commercial side of theindustry is highly concentrated, with the 50 largest companies generating 75% of revenue. On theother hand, the retail side is highly fragmented, with the 50 largest companies generating around 15%of revenue. In the retail industry, most companies operate just one facility. For companies of all sizes,profitability is strongly tied to the efficiency of their operations. Large bakeries are able to reacheconomies of scale advantages, while small bakeries can compete by offering specialty goods andoffering superior local services (Famosinpe 2011).

In Nigeria, the confectionery industry which has been increasing steadily in the country is among the largest processed foodindustries. The two major confectionery industries viz bread and biscuit account for about 82% of the totalbakery products. The bakery industries in Nigeria comprise organized and unorganized sectors. The organizedsector consists of large, medium and small scale manufacturers who produced packaged biscuits and bread. Theunorganized sector consists of small bakery units, cottage and household-type manufacturing goods anddistributing their goods in the surrounding areas (World Bank, 2000 and BFW, 1998.). Bakery products contain high nutritive value and are manufactured from combinations of wheat or other flours,sugar, baking powder, condensed milk, fat (ghee), salt, jelly, dry fruits, various essences and flavoring.

Differenttype of bakery products can be classified as dry bakery products and moist bakery products. Dry bakeryproducts include soft biscuits, hard biscuits, cookies, crackers, fancy biscuits and cream wafer biscuits. Moistbakery products include sweet bread, milk bread, masala bread, garlic bread, fruit bread, various types of buns,cakes, pastries, muffins etc. These products are available in various sizes, shapes and forms (Indian FoodIndustry, 2001; Beverage and Food World, 1998). Some commercial bread and biscuitscontain around 7.5% to7.8% protein respectively. In terms of cost, biscuits are amongst the lowest costprocessed food in the country when compared to other salted snacks. Most of the bakery products are easy touse during travel or at home because of its availability in variety of pack sizes (BFW, 2005).

More than 80 percent of all imported and locally produced wheat flour in Africa is used by bakeries to produce bread. The rest is used by food processors to make biscuits, cakes and pasta. Over the last decade, more bread has been consumed in Africa than maize and rice (Nicole *et al.*, 2012).

2.3 The Concept of Production

In economics, production is the act of creating output, a good or service which has value and contributes to the utility of individuals (Matz, 1992). According to Ekong (2003), production does not refer simply to the process of fabricating commodities, but also covers any activity concerned with the packaging, storage, transportation or marketing of these products as well as the rendering of personal and commercial services of all kinds. In short, any activity, which creates economic value, represents production.

2.3.1. Production Function

Koutsoyiannnis, (1979) defined production function as a purely technical relation which connects inputs and output. It describes the law of proportion and includes all the technical

efficient methods of production. According to Kebede, (2009), production function is a function showing the maximum output possible with any given set of inputs, assuming these are used efficiently.

In economics, a production function relates physical output of a production process to inputs or factors of production. The production function is one of the key concepts of mainstreamneoclassical theories, used to define marginal product and to distinguish allocative efficiency, the defining focus of economics. The primary purpose of the production function is to address allocative efficiency in the use of factor inputs in production and the resulting distribution of income to those factors, while abstracting away from the technological problems of achieving technical efficiency, professional manager might understand it (Healthfield, 1971).

2.3.2 Process of BreadProduction in Nigeria

Bread is considered to be one of the oldest 'processed' foods by the humanity. In its earliest forms bread would have been very different from how we see it in industrialized countries today and it would probably be closest in character to the modern flat breads of the Middle East (Cauvain, 2005).

Today, the bread making process is mainly based on 3 steps: dough formation, fermentation and baking. Dough formation requires the mixing of flour, water, yeast, salt and other ingredients depending on the bread type in appropriate ratios. Dough development is a relatively undefined term, which covers complex changes in bread ingredients, which are set in motion when the ingredients first become mixed. The changes are associated with the formation of gluten, which requires both the hydration of the

proteins in the flour and the application of energy through the process of kneading. Kneading is the development of gluten structure in the dough through the application of energy during mixing (Cauvain, 2005). Mixing the dough provides two functions: homogeneous distribution of components, and development of the gluten matrix. Gluten is the skeleton of wheat-flour dough and responsible for gas retention which provides the production of light loaf of bread. Mixing time varies with the flour, dough temperature, dough consistency, andmixer. Excessive mixing yield a dough with reduced elasticity and extensibility (Pomeranz, 1987).

During the fermentation process, gas is generated as a part of the metabolic activity of yeast. Many microorganisms can ferment sugars with the production of carbon dioxide, but the organism that seems to function best in dough is Saccharomyces cerevisiae or bakers' yeast. Every live yeast cell can perform many different chemical reactions, but those of most importance are in the group called fermentation. The most obvious manifestation of these changes is the production of carbon dioxide and ethyl alcohol, but these substances are merely the end result of an extremely complex series of reactions that are largely controlled by enzymes. Sugars are the substrates transformed by fermentation (Matz, 1992). A simplified equation that describes the substrate and principle end products of the fermentation reactions is: $C6H12O6 \longrightarrow 2C2H5OH + 2CO2$ Carbon dioxide is responsible for leavening the dough, while ethyl alcohol helps to make up the complex aroma of the baked products. A large part of these compounds is lost during the baking and the cooling stages (Matz, 1992). In yeast leavened dough, the products of microbial metabolism modify the dough and are essential for production of light, well-aerated, and appetizing bread (Pomeranz, 1971).

Duration of the fermentation process depends on the amount and the quality of the ingredients. Yeast is the most important ingredient that affects the fermentation process. The relationship between dough development time and yeast level probably comes from the contribution that enzymes present in the yeast cells, viable or dead. They modify the protein structures, which are forming with increasing dough resting time of the enzymes present, the proteolysis enzymes and the natural reducing agent glutathione are likely to play the major roles. Flour also contains enzymes, which can contribute to dough development. Since the mechanism for dough development in fermentation depends on yeast activity, the temperature of the dough play a major role in determining the time at which full development is achieved (Cauvain, 2005)

During baking several changes take place both in the crumb and crust. The browning reaction that involves both caramelization of sugars and proteinaceous materials imparts a deep color to the crust. Thermal decomposition of starch and formation of dextrin contribute to crust brightness. This is accompanied by formation of flavor and taste components. At the same time changes take place inside the loaf of bread. At early stages the increase in temperature enhances enzymatic activity and growth of yeast and bacteria. At about 50ºC-60ºC the yeast and bacteria are killed.

Above that temperature starch gelatinizes, proteins coagulate, and enzymes are inactivated. Steam is formed at around 100ºC, at which the final volume and crumb texture of the bread are set. The inside of the loaf does not exceed 100ºC; however, in the crust much higher temperatures are attained. In the temperature range of 100-150ºC, light and brown dextrin are formed which are followed by caramel (Pomeranz, 1987).

2.3.3 Concept of Efficiency in Bread Production

The decline in output of bread production over the years may not only be connected with deviations of producer's practices, but also with the use of resources at sub-optimal levels which ultimately leads to technical and allocative inefficiency (Coelli and Battese, 1996). An underling premise behind much of research in efficiency is that farmers are not making efficient use of existing technology, then efforts designed to improve efficiency would be more cost-effective than introducing new technologies as a means of increasing agricultural output (Belbase and Grabowski, 1985: Huynh, 2008: Adeleke. 2008). Production efficiency has two components: technical and allocative efficiency. Technical efficiency is the extent to which the maximum possible output is achieved from a given combination of inputs or the ability of a firm to obtain maximum output from a given set of input. Allocative efficiency is the ability of a firm to use inputs in optimal proportions given their respective prices and production technology (Coelli*et al*., 1998). Technical inefficiency occurs when the level of production for the firm is less than the frontier output and it increases when timing and methods of application of production inputs are mismanaged. Allocative inefficiency increases when the ratio of marginal products of input is not the same to the ratio of market prices (Bashkh, 2007). Another definition exits which looks at relative technical efficiency. A producer is fully efficient on the basis of available evidence if and only if the performance of other producers does not show that some inputs or outputs can be improved without worsening some of its other inputs or outputs. With this definition, there is no need for recourse to prices and other assumptions of weights which are supposed to reflect the relative importance of the different inputs and outputs (Adeleke. 2008). The measurement of technical efficiency is important. According to Jondrow*et al.,* (1982), technical efficiency reduces production costs and makes a firm more competitive.

The allocative efficiency index measures a production unit's ability to choose the input combination that minimizes cost given the best available technology. It is the ratio between the minimum costs if it were technically efficient. Because allocative efficiency implies substituting or intensifying the use of certain inputs based on their prices, inefficiencies may stem from unobserved prices, from incorrectly perceived price or from lack of accurate and timely information (Bashkh, 2007).

2.4Review of Analytical Tools

2.4.1 Stochastic Production Frontier

The production function stipulates the technical relationship between inputs and output in theproduction process (Olayide and Heady, 1982). This function is assumed to be continuous anddifferentiable in mathematical terms. The concept of efficiency is concerned with the relativeperformance of the process used in the production process (Upton, 1996). Three types ofefficiency were identified. They include: technical, allocative and economic efficiency.Measurement of efficiency according to Ogunjobi (1999) is important for the following reasons:Firstly, it is a success indicator, performance measure by which productive units are evaluated.Secondly, only by measuring efficiency and separating its effects from the effects of theproduction environment can one explore hypotheses concerning the sources of efficiencydifferentials. Identification of sources of inefficiency is important to institution of public andprivate agencies designed to improve performance. Thirdly, the ability to quantify efficiencyprovides decision makers with mechanism with which to monitor the performance of theproduction system or units under their control. In some cases, theory provides conflicting signals concerning the impact of

some phenomena on performance. In suchsituations, empirical measurement provides qualitative as well as quantitative evidence (Coelli,1995).

Technical efficiency is based on expressing the maximum amount of output obtainable fromgiven bundles of production resources with fixed technology. It is the attainment of productiongoods without wastage (Amaza and Olayemi, 1999). This is regarded as estimating averageproduction function (Olayide and Heady, 1982). This definition assumes that technicalinefficiency is absent from the production frontier. Farrell (1957) suggested a method ofmeasuring technical efficiency of a firm in an industry by estimating the production function offirms which are fully efficient (i.e. frontier production function).

Allocative efficiency on the other hand relates to the degree to which a firm utilizes inputs inoptimal proportions, given the observed input prices (Coelli*et al.*, 2002; Ogundari*et al.*, 2006).Russell and Young (1983) looked at Allocative efficiency (AE) as a condition that exists whenresources are allocated within the firm according to market prices. In a materialistic societyaccording to them, this will represent a desirable characteristic when market prices are a truemeasure of relative scarcity. This will be the case when prices are determined in perfectlycompetitive markets, but when prices are distorted by monopolistic influences or where somegoods remain outside the market system the role of prices in resource allocation is greatlyimpaired. Lau and Yotopoulos (1989) stated that a firm is said to be allocatively efficient if itmaximizes profit, that is, it equates its marginal product of every variable input to itscorresponding opportunity cost. A firm which fails to do so is said to be allocatively inefficient.In Farrell's framework, economic efficiency (EE) is an overall performance measure and is equalto the product of Technical Efficiency (TE) and Allocative efficiency (AE) i.e. EE = TE ´ AE.The simultaneous achievement of both

efficient conditions according to Heady (1952) occurswhen price relationship are employed to denote maximum profits for the firm or when the choiceindicators are employed to denote the maximization of other economic objectives.

According to Adesina and Djato (1997) economic efficiency occurs when a firm choosesresources and enterprises in such a way as to attain economic optimum. The optimum impliesthat a given resource is considered to be most efficiently used when its marginal valueproductivity is just sufficient to offset its marginal cost. Thus, economic efficiency refers to thechoice of the best combination for a particular level of output which is determined by both inputand output prices. This would lead to increase in the firm's output as well as its incomeinvariably leading to poverty reduction, improved living condition and wellbeing.One of the suggested ways of achieving reduction in poverty is utilizing of the poor endowmentfor improved income earning and in living standards. In other words, enabling the poor toincrease their level of production of economic goods, increase their income level and therebytheir living standards. An obvious way of achieving this is enabling the poor to increase theiroutput, so as not only to improve their income but also lift them above thesubsistence level.The stochastic production function is written as:

$$Y_i = f(X_i.\beta) + e_i \quad \ldots\ldots 1$$

$$e_i = v_i - u_i \quad \ldots\ldots 2$$

where:$Y_i$is the quantity of output of the i^{th} firm, x_i is the vector of the inputs used by the i^{th} firm, β is the vector of the parameters to be estimated, $e_i$is the composed error term, $v_i$is the random error outside farmer's control and $u_i$is the technical inefficiency effects.

The inefficiency of production, U_i was modeled in terms of the factors that are assumed to affect the efficiency of production of bakers. Such factors are related to the socio-economic and management variables of the bakers. The determinant of technical inefficiency is defined by:

$U_i = \delta_0 + \delta_1 1nZ_1 + \delta_2 lnZ_2 + \delta_3 lnZ_3 + \delta_4 lnZ_4 + \delta_5 lnZ_5 + \delta_6 lnZ_6$ 3

Where;

U_i = inefficiency effects

Z_1 = Age of operator (years)

Z_2 = Household size (number)

Z_3 = Education (years)

Z_4 = Source of capital (informal/formal source)

Z_5 = Access to training (number of times trained)

Z_6 = Cooperative membership (years)

δ_0 = Constant

δ_1-δ_6 = Parameters to be estimated.

These variables are assumed to influence technical efficiency of the bread bakers. The gamma ($\gamma = \sigma^2 \mu / (\sigma 2 \mu + \sigma \nu)$ which is the ratio of the variance of U $\sigma^2 \mu$ to the sigma squared (σ^2) which is a summation of variances u and v of U and V ($\sigma^2 = \sigma^2 \mu + \sigma^2 \nu$) were also determined.On the other hand, u_i is a non-negative truncated half normal random variable associated with firm specific factors which lead to the *ith* firm not attaining maximum efficiency of production. U_i is associated with technical inefficiency of the firm and ranges between zero and one. $U_i$follows an independent and identical half-normal distributed N ($0.\delta^2 u$). N represents the number of the firms involved in the cross-sectional

survey. According to Bakhsh (2007), stochastic frontier production function model is estimated using the maximum likelihood estimation procedure (MLE).

The stochastic frontier cost function is defined by:

$C = F(Wi, Yi; \alpha) expei, i= 1,2 \ldots.n$…… 4

Where;

C = Represents the minimum cost associated with production

W= Vector of input prices

Y = Bread output

α = Vector of parameters

ei = Composite error term

Using Sheppard's Lemma we obtain

$\frac{\partial C}{\partial Pi} = Xi(W, Y; \alpha)$**……. 5**

This is a system of minimum cost input demand equations (Ogundari, *et al.,* 2006). Substituting a farm's input prices and quantity of output in equation (6) yields the economically efficient input vector Xc. With observed levels of output given, the corresponding technically and economically efficient costs of production will be equal to X_{it} P and X_{ie}, respectively. While the actual operating input combination of the farm is Xi P. The three cost measures can then be used to compute the technical (TE) and economic efficiency (EE) indices as follows;

$TE = (X_{it}. P) / (X_i. P)$**……** 6

$EE = (X_{ie}. P) / (X_i. P)$**…….. 7**

The combinations of equations (7) and (8) is used to obtain the allocative efficiency (AE) index following Farell (1957)

$AE = EE / TE = (X_{ie}. P) / (X_i. P)$…… 8

The efficient production is represented by an index value of 1.0 while the lower values indicate a greater degree of inefficiency. Using the method by Bravo-Ureta and Pinheiro (1997) which was based on the work of Jondrow*et al* (1982), efficiency can then be measured using the adjusted output as shown in equation (10)

$Y^* = f(Xi; \beta) - u$ ……9

Where U can be estimated as

$$E(ui / \varepsilon i) = \frac{\sigma \lambda}{1 + \lambda^2} \quad \frac{f^*(\varepsilon i \lambda / \sigma) - \Sigma i\lambda}{1 - f^*(\varepsilon i\lambda)}$$ ……...10

Where

f* (.) and is normal density and cumulative distribution functions respectively,

$\lambda = \sigma u / \sigma v$

$\varepsilon = Vi - Ui$ and

Y* is the observed output adjusted for statistical noise

When εi, σ and λ estimates, are replaced in equations (9) and (10), it will provide estimates for U and V. The term V is a symmetric error, which accounts for random variations in output due to factors beyond the control of the baker e.g. stealing of input materials by the workers, measurements errors, etc. The term U are non-negative random variables representing inefficiency in production relative to the stochastic frontier. The random error

Vi is assumed to be independently and identically distributed as N(o, δv^2) random variables independent of the U is which are assumed to be non-negative truncation of the N(o, δu^2) distribution (i.e. half-normal distribution) or have exponential distribution.

2.4.2 Net Processing Income Approach

In this study, return to entrepreneurship in bakery industry was measure from the point of view of enterprise profitability. In order words, the analysis was limited to investment profitability. This is because profitability ratios are crucial to all investment analysis. Profitability ratios are typically based on earnings that accrued to participants. Specifically net processing income approach was used to determine the profitability of bread baking industry. Net processing income is the difference between gross profit and total cost of production (Olukosi and Erhabor, 2005). It is used to show the levels of costs and net profits that accrue to producers involved in production. The technique emphasizes the costs (fixed and variable cost) and profit of any processing enterprise. Olukosi and Ogungbile (1999) have examined two major categories of costs involved in production. These are fixed and variable cost. Fixed cost (FC) refers to those costs that do not vary with the level of production or output while variable costs (VC) refer to those costs that vary with output. The total cost (TC) is the sum of total fixed cost (TFC) and total variable cost (TVC).

The net processing income is mathematically expressed as:

Gross Profit = $\pi = P_iQ_i - \sum_{i=1}^{n} TC$ ……11

Where,

$\pi$is the gross profit in Naira per enterprise

P_i= price per unit of output (₦);

Q_i= output of individual enterprise (kg)

TC= Total cost of production (₦)

2.5.Empirical Study on Bread Production

Several studies have been carried out on bread production. For instance, Munene (2006) analyzed consumer attitudes and theirwillingness to pay for functional foods using ordered probit models and the ContingentValuation Method, he found that beliefs about the link between nutrition and health, concernabout chronic diseases, current purchasing and consumption patterns and attitude towardsfunctional foods were factors that significantly affected the respondents' willingness to pay apremium for functional foods. Similarly, Tijani (2006) in their studyon the impact of nutritional labeling on consumer buying behavior found out thatconsumers use nutritional labeling when making a purchasing decision because of theirhealth consciousness. They further revealed that the majority of respondents were willing topay more money for the nutritional information on food items.In the same vein, Bhatta et al. (2008) found available information to be an important factorinfluencing willingness to pay for organic products. The major factors identified by theconsumers include lack of information, higher prices over those of conventional foods andthe limited and erratic nature of domestic supply of organic products. Majority (88%) of theconsumers complained about irregular supply of the products which they said discouragesthem from buying more and the lack of means of differentiating organic from inorganicproducts. Oviahon et al. (2011) in their study on thedeterminants of bread consumers' willingness to pay for safety labels in Oredo LocalGovernment Area of Edo State, Nigeria,regression results revealed that educational level,new price, marital status, were the variables significant in explaining consumers' willingness to pay.

CHAPTER THREE

METHODOLOGY

3.1 Description of the Study Area

Kaduna state lies in the north western part of country's industrial zones, about 200km away from Abuja the federal capital. The state lies between latitudes 90^{o} East and 11^{o}North of the equator and between longitudes 6^{o}East and 9^{o}North of the prime meridian. Kaduna state shares boundaries with Katsina and Kano state to the north. Plateau to the north east, Nasarawa and Abuja to the south and Niger and Zamfara state to the west (Kaduna state government, 2012). The state occupies an area of approximately 68,000 square kilometers or 7% of Nigeria's land mass. The state has 23 Local Government Areas (NPC, 2006). The state is industrialized and well noted for the production of confectionary products such as bread, snacks, flour cakes, biscuits. Commercial occupation is also practiced in the state. Dying of cloth, tailoring, carving as well as marketing of their products is practiced in the state. The people of the state live mostly in organized towns and cities (Udry, 1990). A large variety of agricultural occupations also exit.

The total population of the state was6,113,503 million (NPC, 2006). Based on annual population growth rate of 3.2%, the projected population of the state was about 7,669,889 million people in 2014.This population was made up of people from different parts of the country who are engaged in different occupations such as industrial workers, students, traders, bankers and transporters. These categories of workers provide ready market for the bakery products especially bread in the state. Within the state there are a number of establishments and activities such ascompanies,research institute, higher institutions, colleges, commercial activities and farming.

3.2 Sampling Procedure and Sample Size

A multistage sampling technique was used to select respondents for this study. From the reconnaissance survey conducted in the study area,six locations were identified from Kadunametropolis and three from Zaria metropolis. The first stage involved purposive selection of Kaduna and Zaria metropolis based on the concentration of bread bakeries in these areas.The second stage involvedrandom selection of three locations: Kakuri, Kawo and Sabon-gariin order of proportion from these metropolises. Finally, a simple random sampling technique was employed in selecting bread producers from each of these locations from the list of sample frame. Eighty percent (80%) of the sample frame (155) was used as the sample size. In all, 124 bakeries were randomly selected.

Table 1: Sample Frame and Sample Size of Bread Producers.

Metropolis	Locations	Sample frame	Sample size (80%)
Kaduna	Kakuri	59	47
	Kawo	49	39
Zaria	Sabon-gari	47	38
Total		155	124

Source: reconnaissance, 2014

3.3 Data Collection Techniques

Primary data was used for this study. These were collected with the aid of structured questionnaire. The information were collected on: producer's socio-economic characteristics such as age of the operator, educational status of the operator, amount of credit received in 2014, years spent on the cooperative and access to market;Constraints faced by the producers. The output data include the total value of bread produced by adding cash receipt from selling baking products plus those consumed at home and gave out as gifts while the input data include quantity of flour, quantity of sugar, total labour

used, quantity of water, quantity of salt, quantity of fat (oil), quantity of Yeast, fueland cost of other tools such as baking pan, oven or microwave mixer, transportation and other simple implements and problems militating against bread business.

3.4Analytical Techniques

The model used for the analysis includes:

3.4.1 Descriptive statistics

3.4.2 Net processing income

3.4.3 Stochastic production function

3.4.1 Descriptive Statistics.

Descriptive statistics was used to achieve objective (i) and (iv) of the study. it involves the use of measures of central tendency such as mean, maximum, minimum, coefficient of variations, standard deviation, frequency distribution and percentages to describe the socio-economic characteristics of bread producers in the study areasand the constraint confronting the bread production.

3.4.2 Net Processing Income

The Net Processing Income (NPI) was employed to achieve objective two (ii). It was used to estimate the costs and gross profit of bread production. The formula for the net processing income model was stated as follows.

Gross Profit = π =P_iQ_i- $\sum_{i=1}^{n} TC$ ……12

Where,

$\pi$is the gross profit in Naira per bakery enterprise

P_i= Price per unit of bread output (₦);

Q_i= Bread output of individual enterprise (kg)

TC= Total cost of bread production (₦)

TC= TVC+TFC

Where,

TVC= total variable cost (₦) and

TFC= total fixed cost (₦).

Total Cost (TC) = Total Variable Cost (TVC) + Total Fixed Cost (TFC)

TVC = (flour, sugar, labour, water, salt, fat, yeast and firewood)

TFC = (depreciation of equipment (oven, mixer, vehicles and baking pan))

The fixed inputs are not normally used up at short run in a production cycle. They were depreciated using the straight line method given by:

$$D = \frac{(P-S)}{N} \quad \text{.....12}$$

Where:

D = depreciation (₦),

P = Purchase value (₦),

S = salvage value (₦) and

N = life span of asset (years).

Returns per naira invested (RNI) was obtained by dividing the gross income (GI) by the total cost (TC).

Therefore,

$$RoR = \frac{(NPI)}{TC} \quad \text{.....13}$$

Where,

ROR = rate of return on investment

NPI = Net processing income

TC = total cost.

3.4.3 Stochastic Production Frontier Analysis.

The stochastic production function was used to achieve objective iii. The stochastic production function is written as:

$Y_i = f(x_i.\beta) + e_i$……..14

$e_i = v_i - u_i$……15

Where;

Y_i = Quantity of output of the i^{th} firm

x_i= Vector of the inputs used by the i^{th} firm

β = A vector of the parameters to be estimated

e_i = Composed error term

v_i= Random error outside farmer's control

u_i = Technical inefficiency effects

$\ln Y = \beta o + \beta_1 \ln X_1 i + \beta_2 \ln X_2 i + \beta_3 \ln X_3 i + \beta_4 \ln X_4 i + \beta_5 \ln X_5 i + \beta_6 \ln X_6 i + \beta_7 \ln X_7 i + \beta_8 \ln X_8 i$

(Vi-Ui)…….. 16

Where;

ln = The natural logarithm

Y = Output of bread in kg

βo = Constant term

β_1- β_8 = Regression coefficients

X_1 = Quantity of flour (kg)

X_2 = Quantity of sugar (kg)

X_3 = Total labour used (man day)

X_4 = Quantity of water (litre)

X_5 = Quantity of salt (kg)

X_6 = Quantity of fat (oil) (litre)

X_7 = Quantity of Yeast (kg)

X_8 = Quantity of Firewood (kg)

Vi = Random variability in the production that cannot be influenced by the producer.

U_i= Deviation from maximum potential output attributable to technical inefficiency.

The inefficiency of production, U_i was modelled in terms of the factors that affected the efficiency of production of producer. Such factors are related to the socio-economic and management variables of the producers. The determinant of technical inefficiency is defined by:

$U_i = \delta_0 + \delta_1 1nZ_1 + \delta_2 lnZ_2 + \delta_3 lnZ_3 + \delta_4 lnZ_4$……..17

Where:

U_i = Inefficiency effects

Z_1 = Age of operator (years)

Z_2= Education of the operator (years)

Z_3 = Baking experience of the operator (years)

Z_4= Sex of the operator

δ_0 = Constant

δ_1-δ_4 = Parameters to be estimated.

C = F (W_i, Y_i; α) expeii = 1,2 ….n ……18

Where;

C = Represents the minimum cost associated with bread production

W= Vector of input prices

Y = Bread output

α = Vector of parameters

ei = Composite error term

$\ln C = \beta_0 + \beta_1 \ln X_1 i + \beta_2 \ln X_2 i + \beta_3 \ln X_3 i + \beta_4 \ln X_4 i + \beta_5 \ln X_5 i + \beta_6 \ln X_6 i + \beta_7 \ln X_7 i$ (Vi + Ui)……..19

Where;

ln = The natural logarithm

C = Total cost of output (₦)

X_1 = Cost of flour (₦)

X_2 = Cost of sugar (₦)

X_3 = Cost of labour (₦)

X_4 = Cost of water (₦)

X_5 = Cost of salt (₦)

X_6 = Cost of fat (₦)

X_7 = Cost of Yeast (₦)

X_8 = Cost of Firewood (₦)

β_0 = Constant term

β_1- β_7 = Regression coefficients

Vi = Random variability in the cost of production that cannot be influenced by the farmer.

U_i = Deviation from minimum potential cost attributable to technical inefficiency

3.4.4 Z-statistics

Z-test was used to test hypothesis (i) which is there is no significant relationship between costs and revenue ofbread producers. It was used for larger sample greater than thirty (30). Z-test model was used in the study to compare the differences in costs and revenue ofbread producers in the study area. The Z-statistic is expressed as follows:

$$Z = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2}{n} + \frac{S_1^2}{n}}} \quad \text{.....20}$$

Where Z = calculated Z value

$\overline{X_1}$ = Average costs of bread producers.

$\overline{X_2}$ = Average returns of bread producers.

S_1= Standard deviation for costs ofbread producers.

S_2 = Standard deviation for revenue of bread producers.

n= Sample size of bread producers.

3.4.5 Multiple Regression Analysis

This was used to test hypothesis (ii) that is there is no significant relationship between socio-economic characteristics andtechnical efficiency of bread producers.The regression model specification is

$$Y= \beta_0 +\beta_1X_1+ \beta_2X_2+ \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7+ \beta_8X_8+ e \text{.....21}$$

Where;

$Y_{i=}$Technical Efficiency Estimates.

X_1=Age (Years).

X_2= Education (year of schooling)

X_3= Producers experience (years)

X_4= Amount of credit (Naira)

X_5= Sex of the operator.

β_i = The coefficients for the respective variables.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Socio-Economic Characteristics of Bread Producers in the Study Area

4.1.1 Age distribution of bread producers

The socio-economic characteristics of bread producers in the study areas are presented in Table 4.1. The result revealed that about 74% of the bread producers in the study areas were within the ages of 28 – 57 years with a mean age of 48 years. This means that they are still in their active productive ages, which signifies increase in the output of bread.This finding is similar to the result from Oladeebo *et al*.,(2012) that the average age of 46 years obtained for the cassava processors indicate that they were still in their active productive years which could lead to low level of profit inefficiency.

Table: 4.1 Age distribution of bread producers

Variable	Frequency	Percentage
Age		
28-37	29	23
38-47	33	27
48-57	30	24
58-67	31	25
68-77	1	1
Mean	48	

4.1.2 Educational level of bread producers

The result in Table 4.2 revealed that about 14% of the bread producers had no formal education, about 34% had only primary education, and 42% had secondary education while about 13% had tertiary education. However, altogether about 76% of the bread producers had formal education. Illiteracy is believed to have a negative implication on efficient use of productive resources and adoption of farm innovation. This indicates that the bread producers' educational level is high. This high literate proportion of bread producers in the

study area implied that the producers would be better exposed to more reliable information sources and good decision making in their production activities. Through education, the quality of labour is improved and with it the propensity to adopt new techniques [Tijani*et al.*, 2006; Hyuha, 2006]. Thus, bread producers in the study areas would easily adopt new technologies which could improve their level of profit ceteris paribus.

Table: 4.2 Educational distribution of bread producers

Variable	**Frequency**	**Percentage**
Education		
No formal education	17	14
Primary	42	34
Secondary	52	42
Tertiary	13	10

4.1.3 Baking experience of the bread producers

The result in Table 4.3 revealed that 78% of the bread producers had 1-8 years of bread baking experience with a mean of 7 years. This implies that majority of the bread producers are experienced bakers.This finding agrees with the findings of Oladeebo *et al.*,(2012) As one gets proficient in the methods of production, optimal allocation of resources is expected to be achieved. The more experienced one is the higher the profit and the lower the profit inefficiency.

Table: 4.3 Baking experience of bread producers

Variable	Frequency	Percentage
Experience		
1-4	42	34
5-8	54	44
9-12	15	12
13-16	7	6
17-20	6	5
Mean	7	

4.1.4 Amount of credit obtained by bread producers

The results presented in Table 4.4 indicate that the majority about 81% had access to credit ranges between ₦100,000 -₦500,000 with an average amount of ₦363911. However, a large number of producershad access tofunds to finance their production activities, which in turn reduce their level of profit inefficiency. Ekong (2003) asserts that credit is a very strong factor that is needed to acquire or develop any enterprise; its availability could determine the extent of production capacity.According to Tijani*et al.*,(2006), access to credit provides aproducer with a means of expanding and improving his processing enterprise. It also determines the ease with which he adopts new practices and technologies in his enterprise. The study by Wozniak (1993) supported this fact by reporting in his study that creditincreases the net revenue obtained from fixed inputs,market conditions and individual characteristics.

Table: 4.4 Distribution of credit obtained by bread producers

Variable	Frequency	Percentage
Amount of credit		
100000-500000	100	81
501000-900000	19	15
901000-1300000	3	2
1301000-1700000	1	1
1701000-2100000	1	1
Mean	363911	

4.1.5 Membership of cooperative association

Membership of cooperatives influences adoption of improved technologies resulting in higher productivity and poverty alleviation (Amaza*et al.*, 2009). The result in Table 4.5 revealed that about 90%of the bread producers participated in cooperative association for the period of 1-15 year. The average years of membership of cooperative society is 8year.The effect of this result is that most of the bread producers in the study area enjoy the benefits such ashaving access to credit, market outlets, marketing information and information on new technologies accrued to co-operative societies through pooling of

resources together for a better expansion, efficiency and effective management of resources, and for profit maximization.This finding is in line with Odebiyi (2010) that cooperative groups ensure that their members derive benefits fromthe groups such as they could not derive individually.

Table: 4.5 Period of membership of cooperative association of bread producers

Variables	Frequency	Percentage
Cooperative association	44	35
1-5		
6-10	49	40
11-15	18	15
16-20	4	3
21-25	9	7
Mean	8	

4.1.6 Marital status

The result revealed that about 91% of bread producers are married while 9% are still single. This is a clear indication that bread baking enterprise provided a means of livelihood for the majority of the respondents in the study areas.

4.1.7 Sex distribution of bread producers

The result revealed thatmore males than females are involved in bread baking. 104 out of 124 producers representing84% are males, while 16% are female. This may not be unconnected with the tedious nature of bread baking which most female producers cannot contend.

4.2 Costs and Returns of Bread Production in the Study Area

4.2.1 Summary statistics of inputs and output

The summary statistics of level of inputs used and output realized in the study areas are presented in Table 4.6.The inputs that were used in bread production include; flour, sugar, labour, water, salt, fat, yeast and firewood. Itrevealed that the average quantity of flour used by bread operators was 233.3kg. The minimum and maximum quantity of flour used were 150 kg and 6000 , respectively. Average quantity of sugar used by bread operators was 79.43 kg while the minimum and maximum were found to be 50 and 600 kg, respectively. The mean labour recorded was 11.25 man-days while the minimum and maximum were observed to be 26.25 mandays and 232 mandays, respectively.Average quantity of water used by bread operators was251.2litres while the minimum and maximum were found to be 100 and 300litres, respectively.Average quantity of salt used by bread operators was31.37kg while the minimum and maximum were found to be 15 and 43 kg, respectively.Average quantity of fat used by bread operators was2.5litres while the minimum and maximum were found to be 0.5 and 6litres, respectively.Average quantity of yeast used by bread operators was13.9kg while the minimum and maximum were found to be 11 and 25 kg, respectively.Average quantity of firewood used by bread operators was543.6kg while the minimum and maximum were found to be 200 and 550 kg, respectively.This shows that bread production in the study areas wasof small and medium scale and labour intensive.

The coefficient of variation of each variable inputs used and output realized are presented in Table 4.6.The higher the coefficient of variation, the greater the dispersion in the variable while the lowertheratio of standard deviation to mean return, the better your risk-return tradeoff. The CV for a model aims to describe the model fit in terms of the relative

sizes of the squared residuals and outcome values. The lower the coefficient of variation (CV), the smaller the residuals relative to the predicted value. This is suggestive of a good model fit.

The low of coefficient of variation is a reflection of reliability (precision) of the result (Johnson and Welch, 1939). Johnson and Welch (1939) reported that for a normal distribution, the ratio of mean to standard deviation should be of order of three or more. They mentioned that 33 percent is often stated as the permissible upper fiducially limit of coefficient of variation (CV).

Table 4.6 shows that the coefficient of variation of all the variable inputs such as the flour, sugar, labour, water, salt, fat, yeast and firewood were 20.73, 52.88, 59.461, 12.71, 89.94, 66.69, 64.34 and 16.42 respectively. The high coefficient of variation of variable inputs implies high level of variation in the use of variable input among bread operators in the study area. The wide variation in input used by the operators could be attributed to the fact that they differ in purchasing power and size of production.

The coefficient of variation in bread output was 25.13% which implies low inconsistency in output level among bread operators in the study area. This will help the country in attaining food security as greater proportion of operatorsproduces above average. The instability in output of bread could be attributed to inconsistency and inadequacy of variable inputs among operators in the study areas.

Table 4.6:Summary of Input Utilized and Output realized in Bread Production

Variable	Mean	Std Dev.	Min	Max	CV
Flour(kg)	233.3	89.94	150	6000	20.73
Sugar(kg)	79.4	67.18	50	600	52.88
Labour(man-day)	11.25	26.61	26.25	232	59.461
Water(litre)	251.2	62.31	100	300	12.71
Salt(kg)	31.37	91.87	15	43	89.94
Fat(litre)	2.5	2.15	0.5	6	66.69
Yeast(kg)	13.9	74.07	11	25	64.34
Firewood(kg)	546.3	17.85	200	550	16.42
Yield(kg)	534400	29.68	425000	637500	25.13

4.2.2 Cost of bread production per bag in the study area.

Bread flour used by the operators in the study area was mainly from wheat. The quantity of bread flour per bag was 50kg with an average market price of ₦140 per kg and this constitutes 65.8% of the total cost of production. The quantity of sugar used was 7kg with an average market price of ₦240 per kg and this constitutes 15.8% of the total cost of production. Labour costs consisted of cost of flour mixing, bread sizing, bread packaging. The family labour was computed on the basis of opportunity cost in man-days. The wage rate varied according to firm operation performed. An average wage rate of ₦400 per man-day was used, giving the average labour cost per man-day to be ₦4498 while the total cost of fixed inputs (cost of depreciation of equipment) incurred on bread production was ₦340 and this constitute 3.2% of the total cost.

4.2.3 Return to investment per bag of flour in bread production

Results presented in Table 4.7 indicated that the total revenue (TR) was ₦16910 while the total cost (TVC + TFC) was ₦10640. The net processing income was therefore ₦6270. The rate of return on investment was 58percent, indicating that for every ₦1 invested in bread production in the study area; a profit of 58 kobo was made. Thus, it could be concluded that bread production in the study area though on a small and medium scale,

was economically viable. This finding is similar to that of Okoye*et al.*, (2009) in determinants of labour productivity on small-holdercocoyam farmers in Anambra State, Nigeria. He observed that cocoyam production is profitable by returning ₦1.80 to every₦1.00 spent.

Table 4.7:Average Costs and Return associated with Bread Production Per 50kg Bag of Flour.

Variable	Unit price (₦)	Total unit	Value (₦)	% of TC
Total revenue (TR)	190	89	**₦16910**	
Variable Cost				
Flour	140/kg	50kg	₦7000	65.8
Sugar	240/kg	7kg	₦1680	15.8
Labour	400MD	2.5MD	₦1000	9.4
Water	1.25/litre	20litres	₦25	0.2
Salt	100/kg	1kg	₦100	0.9
Fat	49/kg	0.5kg	₦25	0.2
Yeast	250/kg	1kg	₦250	2.4
Firewood	20/kg	11kg	₦220	2.1
Total variable cost			**₦10,300**	**96.8**
Fixed cost				
Depreciation of equipment (Ovum, Mixer and Baking pans			₦340	3.2
Total Fixed Cost (TFC)			**₦340**	**3.2**
Total Cost (TC) = (TVC + TFC)			**₦10640**	**100**
Net processing income (TR - TC)			**₦6270**	
Rate of return = (NPI/TC*100)			**58**	

Source: field survey (2015). * MD = man-day

Test of Hypothesis i

The null hypothesis (H_o) which stated that there is no significant difference between cost of production and revenue in bread production was tested using the result of the z-test presented in Table 4.8.It reveals that the average cost is ₦10640and average revenue is

₦16910. Calculated z-value is 48.55 and exceeds the critical value (z-critical two tails) of 1.96. Therefore $H_o$is rejected at 5% level of significance. The result of the analysis indicates that bread production is profitable in the study area.

Table 4.8: Difference between the Average Cost and Revenue of Bread producers

Variable	Average Cost	Average Revenue
Mean	10640	16910
Known Variance	1.17E+11	1.68E+13
Observations	124	124
Hypothesized Mean Difference	0	
z-calculated	-48.5466	
P(Z<=z) one-tail	0	
z Critical one-tail	1.644854	
P(Z<=z) two-tail	0	
z Critical two-tail	1.959964	

4.3Efficiency of Bread Production

4.3.1 Estimated technical efficiency of bread producers

The model specified was estimated by the maximum likelihood (ML) method using FRONTIER 4.1 software developed by Coelli (1995). The ML estimates and inefficiency determinants of the specified frontier are presented in Table 4.9. The study revealed that the generalized log likelihood function was 140.187. The log likelihood function implies that inefficiency exist in the data set. The log likelihood ratio value represents the value that maximizes the joint densities in the estimated model. Thus, the functional form that is, Cobb-Douglas used in this estimation is an adequate representation of the data.The value of gamma (γ) is estimated to be 0.076 and it was highly significant at ($p<0.05$) level of probability. This is consistent with the theory that true γ-value should be greater than zero. This implies that 7.6%of random variation in the yield of the operators was due to the operators' inefficiency in their respective sites and not as a result of random variability. Since these factors are under the control of the operators, reducing the influence of the

effect of γ will greatly enhance the technical efficiency of the operators and improve their yield. The value of sigma squared (σ^2)was significantly different from zero level of probability. This indicates a good fit and correctness of the specified distributional assumptions of the composite error terms while the gamma γ indicates the systematic influences that are unexplained by the production function and the dominant sources of random error. This means that the inefficiency effects make significant contribution to the technical inefficiencies of bread operators.

However, the estimated coefficients of the following parameters of production function (flour, labour, salt and yeast) were positive and significant at ($p<0.01$) and ($p<0.10$) level of probability and hence play a major role in bread production in the study areas. The average technical efficiency for the operators was 0.71 implying that, on the average, the respondents are able to obtain 71% of potential output from a given mixture of production inputs. Thus, in a short run, there is minimal scope (29%) of increasing the efficiency, by adopting the technology and techniques used by the best bread operators.

The estimated coefficient for flour is 0.100 which is positive and statistically significant at ($p<0.01$) level of probability. The estimated 0.100 elasticity of flour implies that increasing flour by 1% will increase bread output by less than 1% which means, all things being equal the output is inelastic to changes in the quantity of flour used. The significance of flour quantity is however, due to the fact that flour determines to a large extent the output obtained. If correct flour quantity and quality are not used, output will be low even if other inputs are in abundance.

The coefficient of labour is 0.155 which is positive and statistically significant at ($p<0.01$) level of probability. This shows that labour is an important variable in bread production in

the study areas.This implies that 1% increment in quantity of labour will increase the output of bread production by 0.155 %. The significant influence of labour is in agreement with the findings of Okoh(2009), similarly found seed and labour asdeterminant of technical efficiency in the cassava processing in Benue State.

The production elasticity of output with respect to quantity of salt is 0.026 which is positive and statistically significant at ($p<0.01$) level of probability. This implies that a 1% increase in salt will increase bread output by 0.026%.

The production elasticity of output with respect to quantity of yeast is 0.514 which is positive and statistically significant at ($p<0.01$) level of probability. This implies that a 1% increase in yeast will increase bread output by 0.514%. Yeast is a major bread augmenting input because it improves the quality of bread by raising the yield.

The result of the inefficiency model is contained in table 4.9. The estimated coefficients with negative signs attached indicate that they reduce technical inefficiency among the bread operators, while positive signs indicate that the coefficients increase technical inefficiency or reduce technical efficiency. The results showed that age of operators and operators' experience were the determinants of technical inefficiency among the bread operators. Firm size was negatively related with technical inefficiency, while age of operators and operators' experience were positively related with technical inefficiency.

The estimated coefficient of age is 0.0054 which is significant at ($p<0.01$) level of probability. The positive coefficient of age implies that the older a farmer is, the higher will be the level of technical inefficiency or the lower will be his technical efficiency in

bread production. This result agrees with Kolawole and Ojo (2007) who in their study of small scale farmers in Nigeria found age to be positively related to inefficiency.

The coefficient of producers experience is 0.029 and significant at ($p<0.01$) level of probability. This implies that the more experienced bread producers is, the higher will be his level of technical inefficiency. This finding is congruent with that of Onu *et al.*, (2000) whose result showed a negative relationship between processing experience and technical efficiency in cotton processing in Nigeria.

Table 4.9: Results of Maximum Likelihood Estimates of Stochastic Frontier Production Function of bread production

Variable	Parameters	Coefficient	Standard-Error	T-Ratio
Production Function				
Constant	β_0	9.905394	0.918263	10.7871
Flour	β_1	0.100037***	0.011673	8.570026
Sugar	β_2	-0.00201	0.024392	-0.08254
Labour	β_3	0.154976***	0.038059	4.071989
Water	β_4	-0.01427	0.016463	-0.86685
Salt	β_5	0.026166*	0.013376	1.956141
Fat	β_6	-0.00237	0.020299	-0.11653
Yeast	β_7	0.513968***	0.069659	7.378319
Firewood	β_8	0.057626	0.168265	0.342474
Inefficiency Model				
Constant	Z_0	0.266236	0.215808	1.233675
Age	Z_1	0.005444***	0.000369	14.75339
Education	Z_2	0.00165	0.003782	0.436406
Experience	Z_3	0.02912***	0.002234	13.03544
Sigma-Squared(σ^2)		0.00894***	0.003404	2.626238
Gamma(γ)		0.075567**	0.032245	2.343526
Log Likelihood Function		140.187		
LR Test		148.3805		
Number of observation		124		
Mean efficiency		0.71		

Note: ***=p<0.01,**=p<0.05 *and* *=p<0.10

4.3.2 Estimated Stochastic Frontier Cost Functions

The Maximum Likelihood (ML) estimates of the stochastic frontier cost parameters for bread are presented in Table 4.10. For the cost function, the sigma (σ^2= 0.50) and the gamma (γ=0.097) are quite high and highly significant at (p<0.01) level of probability. The high and significant value of the sigma square (σ^2) indicate the goodness of fit and correctness of the specified assumption of the composite error terms distribution (Idiong, 2005). The gamma (γ = 0.097) shows that 9.7% of the variability in the output of bread that are unexplained by the function is due to allocativeinefficiency.

The results of stochastic frontier cost function for bread production in KadunaState are shown in Table 4.10. The estimated coefficients of the parameters of the cost function are positive except that of water which is negative. The cost variables flour, sugar, water, salt, fat, and yeast were significant at ($p<0.01$) level of probability.

The coefficient of the cost of flour is 0.2438 and statistically significant at ($p<0.01$) level of probability. The implication of this is that 1% increase in the cost of flour will give rise to 0.2438% increase in the cost of bread production.This implies that flour is important in bread production in bread enterprise.

The coefficients cost of sugar is 0.0394 and significant at ($p<0.01$) level of probability level. The implication of this is that 1% increase in the cost of sugar will give rise to 0.0394% increase in the cost of bread production.

The coefficients cost of water is -0.02791 and significant at ($p<0.01$) level of probability. The implication of this is that 1% increase in the cost of water will give rise to 0.02791% decrease in the cost of bread production.

The coefficients cost of salt is 0.058 and significant at ($p<0.01$) level of probability. The implication of this is that 1% increase in the cost of salt will give rise to 0.058% increase in the cost of bread production.

The coefficients cost of fat is 0.648 and significant at ($p<0.01$) level of probability. The implication of this is that 1% increase in the cost of fat will give rise to 0.648% increase in the cost of bread production.

The coefficients cost of yeast is 0.121 and significant at ($p<0.01$) level of probability. The implication of this is that 1% increase in the cost of yeast will give rise to 0.121% increase in the cost of bread production.

The result of the inefficiency model of the stochastic frontier cost function revealed that age, education and operators experience were the determinants of allocative efficiency among the bread operators. The coefficients of the variables were all significant at 1 % level of significance with exception of education that is significant at 5% significance level.

The coefficient of age is 0.020476, indicating that the older a producer is, the less allocative efficient he will be. This agrees with the findings of Kolawole and Ojo (2007), who in their study of the economic efficiency of small scale food production in Nigeria found age to be positively related to allocative inefficiency.

The coefficient of level of education is -0.02989. The estimated coefficient of -0.02989 implies that the allocative efficiency of bread producers will increase by a magnitude of -0.02989 as education increases by one unit. Education enhances producers' ability to seek and makegood use of information about production inputs (Kebede, 2001). However, this variable is not significant in enhancing the allocative efficiency or reducing the allocative inefficiency of bread producers.

Producers experience has an estimated coefficient of -0.22768. This implies that the more experienced a bread producer is, the lower will be his allocative inefficiency.The estimated coefficient of -0.22768 implies that the allocative efficiency of bread producers will decrease by a magnitude of -0.22768 as experience increases by one unit. This finding disagrees the finding of Tsoho *et al.*, (2012) who reported that farming experience was positively related to the economic efficiency of dry season vegetable out growers in Sokoto State, Nigeria.

Table 4.10: Results of Maximum Likelihood Estimates of Frontier Cost Function for bread production

Variable	Parameters	Coefficient	Standard-Error	T-Ratio
Production Function				
Constant	β_0	0.860098	0.435635	1.974351
Flour	β_1	0.243778***	0.016381	14.8819
Sugar	β_2	0.039499***	0.014166	2.788268
Labour	β_3	0.009404	0.033437	0.281248
Water	β_4	-0.02791**	0.013146	-2.12324
Salt	β_5	0.05822***	0.009092	6.403337
Fat	β_6	0.647577***	0.015249	42.46601
Yeast	β_7	0.121028***	0.023434	5.164711
Firewood	β_8	-0.02317	0.043117	-0.53737
Inefficiency Model				
Constant	Z_0	-1.32918	0.589267	-2.25565
Age	Z_1	0.020476***	0.00783	2.615181
Education	Z_2	-0.02989*	0.016569	-1.80374
Experience	Z_3	-0.22768***	0.067995	-3.34856
Sigma-Squared(σ^2)		0.503892***	0.151512	3.325759
Gamma(γ)		0.097421***	0.001543	63.13739
Log Likelihood Function		71.22339		
LR Test		71.3873		
Number of observation		124		
Mean efficiency		0.69		

Note: ***=p<0.01,**=p<0.05 *and* *=p<0.10

4.3.3 Distribution of bread producers according to technical efficiency estimates in the study area.

The frequency distribution of the technical efficiency estimates for bread producers in the study areas as obtained from the stochastic frontier model is presented in Table 4.11. It was observed from the study that 19% of the producers had technical efficiency (TE) of 0.61 and above while 81% of the producers operated at less than 0.6 technical efficiency levels. The producers with the best and least practice had technical efficiencies of 0.99 and 0.59 respectively.The mean technical efficiencywas0.71.This implies that on the average, output

fell by 29% from the maximum possible level attainable due to inefficiency. Also, 80% of the producers were estimated to have technical efficiency exceeding 0.4, indicating there were some 20% technical inefficient producers in the study areas.

The study also suggest that for the average producers in the study area to achieve technical efficiency of his most efficient counterpart, he could realize about 71% (1-0.71/0.0.99*100) cost savings while on the other hand, the least technically efficient producers will have about 59% (1-0.59/0.99*100) cost savings to become the most efficient producers. This finding is in line with Okoye, (2005) who observed that average cocoyam farmer in the state would enjoy cost saving of about 32.9% (1-0.65/0.97) if he or she attains the level of the most efficient producer among the producers in the study area.

4.3.4 Distribution of bread producers according to allocative efficiency estimates

The result revealed that 19% of bread producers had allocativeefficiency (AE) of 0.61 and above while 81% of the bread producers operate at less than 0.6allocative efficiency levels. This implies that the greater majority of bread producers were not allocative efficient as 19% of them attained efficiency level greater than 0.61 and above. In other words, the clustering of allocative efficiencies in the region of 0.61 – 1.00 efficiency range implies that thebread operators are not efficient. That is, the bread operators are not efficient in producing bread at a given level of outputusing the cost minimizing input ratio as about 19% of the bread producers have allocative efficiencies of 0.61 and above. High values of allocative efficiencies represent less efficiency or more inefficiencyamong the bread producersduring the course of bread production in the studyareas. The estimatedallocative efficiencies differ substantially among the bread producers ranging between the minimum

value of 0.50 and maximum value of 0.90. This means that the most allocative inefficient bread producers operated closer to their cost frontier or minimum cost of 1.00. The mean allocative efficiency was0.69.The study also revealed that for an average bread producers in the study areas to become the most allocativeefficient bread producers, he will need to realize about 23% cost saving i.e. [1-(0.69/0.90)*100]while on the other hand, the least technically efficient bread producers will need about44% [1-(0.50/0.90) x100]cost savings to become the most allocative efficient bread producers.

4.3.5 Distribution of bread operators according to economic efficiency estimates

The frequency distribution of the economic efficiency estimates for bread producers in the study area as obtained from the stochastic frontier model is presented in Table 4.11. It was observed from the study that 12% of theproducers had economic efficiency (EE) of 0.61 and above while 88% of the bread producers operate at less than 0.6 efficiency level. The mean economic efficiency of the 124 sampled bread producers in the study area is 0.51. The producers with the best and least practice had economic efficiencies of 0.90 and 0.29 respectively. This implies that on the average, output fall by 49% from the maximum possible level due to inefficiency. Also 12% of the producers were estimated to have economic efficiency exceeding 0.8, indicating there are some 20% economic inefficient producers in the study areas.

The study also suggest that for the average producer in the study areas to achieve economic efficiency of his most efficient counterpart, he could realize about 43%(1-0.51/0.90*100) cost savings while on the other hand, the least technically efficient producers will have about 68 percent (1-0.29/0.90*100) cost savings to become the most efficient producers. However, the average economic efficiency of the bread producers is 51%. This indicates that breadenterprise were economically inefficient.

Table 4.11: Frequency Distribution of Technical, Allocative and Economic Estimates from the Stochastic Frontier Model

Efficiency Level	**Technical Efficiency**		**Allocative Efficiency**		**Economic Efficiency**	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
0.10-0.20	0	0	0	0	25	20
0.21-0.40	25	20	25	20	76	61
0.41-0.60	76	61	76	61	8	6
0.61-0.80	23	19	23	19	15	12
0.81-1.00	0	0	0	0	0	0
Total	124	100	124	100	124	100
Minimum	0.586287		0.498055		0.292003	
Maximum	0.997569		0.898055		0.895872	
Mean	0.711762		0.694829		0.507795	

Test of Hypothesis ii

The null hypothesis (H_o) which stated thatthere is no significant relationship between socioeconomic characteristics and technical efficiency of bread production was tested using the result of regression analysis presented in Table 4.12.Based on the result the null hypothesis is rejected because of the four variables included in the model,three variables (age, education andoperators experience) significantly influence technical efficiency at various levels of significance.

Table 4.12: Socioeconomic Factors influencing Technical Efficiency of bread production in the Study Area

Variable	Coefficients	Standard Error	T-Stat
Constant	0.808002	0.053161	15.19906
Age	0.004138**	0.008316	2.009667
Education	-0.00692***	0.002053	-3.37081
Experience	-0.00412*	0.0022	-1.87309
Amount of Credit	-1.6E-08	3.38E-08	-0.4728
R Square	0.567		
Adjusted R Square	0.523		
F-Value	5.419		

Note: ***= p<0.0 1l,**=p<0.0 5 and *= p<0. 10

4.4 Constraints toBread Production in the Study Area.

The problems faced by bread producers in the study area were ranked as shown on Table 4.13. It was found that about 27% of the bread producers'ranked inadequate capital as the major constraints to expand their production. This affects bread production in the study areas, because the meager savings the producers might have made or the funds generated from relatives is not sufficient to satisfy various activities in bread production. Credit can affect the development of any enterprise; its availability could determine the extent of production capacity. This agrees with findings of Nasiru, (2010) who noted that access to credit facility could have prospect of improving the production capacity of bread bakers and contributing to uplifting their livelihoods. About 22% of the bread producers rankedhigh cost of inputs like flour, sugar, yeast, firewood and labouras the second constraints.. About 16%, 11%, 10% and 3% of the bread producers' ranked Untimely supply of raw materials, Problems of defaulters, Lack of technical know-how, Poor power supplyand poor market as the 3rd, 4th, 5th, 6th and 7th constraints faced in bread production respectively.

Table 4.13: Constraints faced by the Bread Producers

Constraints	**Frequency**	**Percentage**	**Rank**
Inadequate capital	124	27	1st
High cost of raw materials	100	22	2nd
Untimely supply of raw materials	73	16	3rd
Problems of defaulters	50	11	4th
Lack of technical know-how	49	11	5th
Poor power supply	45	10	6th
Poor market	13	3	7th
Total	454	100	

Multiple Responses Allowed*

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

This study focused on the economic analysis of bread baking enterprises in Kaduna and Zaria metropolis of Kaduna State, Nigeria. Three locations were randomly selected in order of proportion from two metropolises and 124 producers were randomly selected in this area. Primary data were collected from 124 bread producerswith the aid of structured questionnaire. The statistical tools used to analyze the data were descriptive statistics, stochastic production frontier function model, net farm income and profit function model.

The results of the socio-economic analysis shows that (74%) of the producers fall within the age range of 28-57years, the majority of the producers (76%) had one form of formal education. Majority of the producers (78%) belong to cooperative society for the period of 1-8 years.

The average costs incurred and revenue obtained per 50kgbag of flour for bread production were estimated to determine the profitability or otherwise of bread production in the study area (table 3). The total revenue (TR) is ₦16910 while the total cost (TVC + TFC) is ₦10640. The net processing income is therefore ₦6270. The rate of return on investment is 58percent, indicating that for every ₦1 invested in bread production in study area; a profit of ₦0.58 was made. Thus, it could be concluded that bread production in the study areas on a small and medium scale, was economically viable.

The stochastic frontier production function was estimated for technical, allocative and economic efficiency. It was observed from the study that 19% of the producers had technical efficiency (TE) of 0.61 and above while 81% of the producers operate at less than 0.6 efficiency level. The mean technical efficiency for the 124 sampled producers in the study areas was 0.71. The producer with the best practice has a technical efficiency of 0.99 while 0.59 was for the least efficient producers. This implies that on the average, output fall by 29% from the maximum possible level due to inefficiency.The mean allocative efficiency was 0.69. The result indicates that average bread producers in the state would enjoy cost saving of about 71% while allocatively inefficient producer will have an efficiency gain of 59% to attain the level of most efficient producers among the respondents. The mean economic efficiency was 0.51. The producers with the best practice have an economic efficiency of 0.90 while 0.29 was for the least efficient producers. This implies that on the average, output fall by 49% from the maximum possible level due to inefficiency. Finally, among the constraints identified in the study area, the majority of the respondent attested to the fact that inadequate capital and high cost of raw materials were major constraints faced.

5.2 Conclusion

The study revealed that bread producers in the study area did not achieve absolute efficiency in the use of variable inputs. However, the study showed that bread production among producers was profitable, thus yield and profit were being maximized due to certain efficiencies in the use of some variable inputs.

5.3 Contribution of the Study to Knowledge

i. It was found that bread production is profitable by returning 58 kobo for every ₦1.00 spent.

ii. The study revealed that bread production in the study areas is profitable with net processing income of ₦6270 despite the problems identified.

iii. It was revealed that bread firms were economically inefficient in the study area having an economic efficiency of 51%.

iv. The study revealed that bread producers in the study areas achieved technical efficiency of 71%.

v. Age, education, producers experience and firm size were the socio-economic characteristics that significantly influence the technical efficiency of bread production in the study area at 10%, 5% and 1% levels of significance.

5.4 Recommendations

From the findings of this study, the following recommendations were made:

i. Flour, labour, saltand yeast that significantly affect technical efficiency of bread production should be increase in quantities in order to boost more output.

ii. Most of the respondents complained of high cost of farm input such as Flour, sugar, salt, fat and yeast as part of the constraints they faced. The cooperative societies could link –up the producers with sources of input production. This will enable the groups to buy inputs at factory cost thereby helping to reduce cost of production.

iii. The result of the study revealed that firewood was over-utilized. Therefore bread producers should reduce the quantity of firewood so that they can achieve both technical and allocative efficiency in its utilization.

iv. Problems of high cost of raw materials, power supply and untimely supply of raw materials can be minimized if more producers embraced cooperative association so that they can pooltheir resources together for seeking information on new technology, marketing and effective management of resources.

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APPENDIX 1: QUESTIONNAIRE

A. SOCIO –ECONOMICS CHARATERISTICS

1. Name of producer……
2. Sex: Male ( ) Female ( )
3. Age (years)……
4. Marital status: Married ( ) Single ( )
5. Highest level of Education:

(a) No Formal Education ( ) (b) Primary school Education ( ) (c) Secondary School Education ( ) (d) Tertiary Education ( )

6. Family Size (All the number of the people depending on you for living)…….

(a) No of Adult Male ( ) (b) No of Adult female ( ) (c) Children >15yrs ( ) (d) Children <15yrs ( )

7. How long have you been in bread baking enterprise? (Years of experience)……
8. Do you belong to any co-operative/Association? Yes ( ) No ( )
9. If yes, (Years of participation) ----------
10. What benefit did you derive as a member?
11. Do you have access to credit (a) Yes ( ) (b) No
12. What is your major source of capital for bread baking enterprise?

A. Personal savings ( ) b. credit (borrow) ( ) c. Friends and family ( )
d. Money Lenders (Borrow) ( )

13. If you borrow, what were the sources of the credit?

a. commercial bank( ) b. Bank of Agriculture ( ) c. Cooperative Society ( ) d. Money Lenders ( )

e. Friends and Family ( ) f. Others (specify)……

14. How much did you borrow to finance last production? (Fill for the source you indicated in Q .12)

SOURCE OF LOAN	AMOUNT(₦)	INTERST RATE (%)
Commercial Bank		
Bank of Agriculture		
Cooperative Societies		
Money Lenders		
Friends And Family		
Others (Specify)		

15. Have you been visited by an extension agent? Yes ( ) No ( )
16. If Yes, How many times in last one year……..?
17. What activities did the agent teach you? .....
18. Of what benefit were the techniques learnt to you to the success of your baking enterprise?
.....
19. Have you been trained on bread baking enterprise? Yes ( ) No ( )
20. If yes, which organization conducted the training?
21. Was the training beneficial to you?

a. Not beneficial ( ) b. somehow beneficial ( ) c. beneficial ( ) d. very beneficial ( )

B. INFORMATION ON INPUTS

(ii). How did you acquire your baking enterprise? *(Tick below)*

No of Firm	**Mode of Acquisition**				
	(a) Inheritance	(b) Lease	(c) Borrowed	(d) Gift	(e) Purchased
1					

2					
3					

(iii). what does it cost to rent a baking enterprisein your community? ....……..... Naira

23. **Variable inputs (Last production Cycle)**

(i). Flour (Kg)

No of firm	Quantity of Flour (Kg)	Cost (₦)
1		
2		
3		

(ii). Sugar

No of firm	Quantity(Kg)	Cost(₦)
1		
2		
3		

(iii). Salt

No of firm	Quantity(kg)	Cost(₦)
1		
2		
3		

(iv)Yeast

No of firm	Quantity(kg)	Cost(₦)
1		
2		
3		

(v) Firewood/Electricity

No of firm	Quantity(kg)	Cost(₦)
1		
2		
3		

(vi) Fat (oil)

No of firm	Quantity(litres)	Cost(₦)
1		
2		
3		

(vii) Water

No of firm	Quantity(litres)	Cost(₦)
1		
2		
3		

(iv). Labour input

(a). Flower mixing

Plot No	Hire Labour			Family Labour		
	No of people	No of Hours	Cost (₦)	No of people	No of Hours	Cost (₦)
1						
2						
3						

(b). Bread sizing

Plot No	Hire Labour			Family Labour		
	No of people	No of Hours	Cost (₦)	No of people	No of Hours	Cost (₦)
1						
2						
3						

(c). Bread packaging

Plot No	Hire Labour			Family Labour		
	No of people	No of Hours	Cost (₦)	No of people	No of Hours	Cost (₦)
1						
2						
3						

24. Where do you sell your bread?

a. Factory gate ( ) b. Rural market ( ) c. Urban market ( )

25. When do you sell your bread?

a. immediately before packaging ( ) b. immediately after packaging ( ) c. months after packaging ( )

26. CONSTRAINTS TO BREAD PRODUCTION

S/n	Constraints
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

24. What can you suggest as solutions to these constraints?

…….

…….

…….

Thanks for your Attention

APPENDIX II: REGRESSION RESULT

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.632124
R Square	0.56732
Adjusted R Square	0.52271
Standard Error	0.105333014
Observations	124

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	0.300604042	0.060121	5.4187085	0.0001597
Residual	118	1.30921517	0.011095		
Total	123	1.609819213			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
constant	0.808002117	0.053161306	15.19906	1.467E-29	0.7027283	0.913276	0.70272826	0.913276
age	0.004138	0.008316	2.009667	0.1734042	-0.000508	0.0027845	-0.0005076	0.0027845
education	-0.006921294	0.002053306	-3.370805	0.0010136	-0.010987	-0.0028552	-0.0109874	-0.0028552
farming experience	-0.00412	0.002199574	-1.87309	0.8511293	-0.004769	0.003942	-0.0047695	0.003942
amount of credit	-1.5962E-08	3.3762E-08	-0.472795	0.6372326	-8.28E-08	5.09E-08	-8.282E-08	5.09E-08
firm size	-0.020822544	0.006331362	-3.288794	0.0013264	-0.03336	-0.0082847	-0.0333604	-0.0082847