

**ANALYSIS OF CONSUMPTION EXPENDITURE ON ANIMAL PROTEIN BY
HOUSEHOLDS IN KADUNA METROPOLIS, KADUNA STATE, NIGERIA**

BY

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DECLARATION

I hereby declare that this thesis titled “**Analysis of Consumption Expenditure on Animal Protein by Household in Kaduna Metropolis, Kaduna, 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 citation and sources of information are duly acknowledged by means of references.

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CERTIFICATION

This thesis titled ‘**Analysis of Consumption Expenditure on Animal Protein by Household in Kaduna Metropolis, Kaduna, Nigeria**’ by UsmanDanlamiMUSA meets the regulations governing the award of the Degree of Master of Science, Ahmadu Bello University, Zaria, and is approved for its contribution to scientific knowledge and literary presentation.

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DEDICATION

This thesis is dedicated to Almighty Allah (SWT) who created the universe and the creator of all creatures.

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I glorify the name of Almighty Allah (SWT), the most high, the most merciful and the sustainer of the universe, for His assistance and protection and for seeing me through this programme successfully. May the peace and blessings of Allah be upon His noble prophet Muhammad (SAW), his household, companion and those on their foot-parts till the day of reckoning.

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Abstract

This study investigated the consumption expenditure on animal protein with more emphasis on beef and fish in Kaduna metropolis with a view of describing the socio-economic of beef and fish consuming households, estimating quantity of beef and fish demand by households, estimating share in household expenditure of beef and fish, ascertain determinant of beef and fish demand and to determine price and expenditure elasticity of beef and fish in the study area. The sample size was randomly selected and data collected from 241 respondents in the study area. The data collected were analysed using descriptive and inferential statistics such as frequency distribution and percentages; budget share index, Linear Approximate Almost Ideal demand systems (LA-AIDS) model and the own price, cross price and expenditure elasticity equations derived from the LA-AIDS model. The study revealed education level, household size and household income have influence on beef and fish consume by the households, the mean quantity of beef and fish demanded by households is 3.37kg and 4.59kg respectively while the mean price per kilogram for beef and fish is N914.94 and N578.22 respectively. Percentage share in beef and fish was 0.076% and 0.060% respectively. The estimate of factors affecting beef and fish consumption of the households gave a R^2 -value of 0.57 and 0.45 respectively. The result indicates that prices of beef and fish were significant ($P < 0.01$) and had influence on household expenditure on the product i.e. as the prices of the beef and fish increases, the household increases budget share on it making them to spend more to get more. The study further reveal that the own price elasticity of beef and fish were negative. The cross price elasticity of beef and fish with respect to other animal protein source in the system shows there exist substitution effect between all the products. Expenditure elasticity of beef and fish were less than one. Constraint faced by households in the consumption of beef and fish include high prices, low level of income, rapid spoilage and low supply. It was therefore be concluded that that beef and fish consumption can be increased when the prices are set in line with different household income levels and when the purchasing power of the household is improve.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Food which is a combination of macro and micro nutrients is a basic necessity of life (Kushwaha, Sen, and Yakassai, 2007). Food must contain all the necessary nutrients to make it balance. A balanced diet can be defined as one that contains all the six classes of food components viz carbohydrate, protein, vitamins, mineral salts, fat and oil and water. According to Neeliah and Shakar (2008), nutrition is the fundamental prerequisite for human welfare and contributes to human and social capita. Nutritious foods are those food items that contain the required macro and micro nutrient in a normal proportion, including fruits and vegetables, which contain nutrients such as vitamins, protein, carbohydrates and minerals that are required to sustain the body and healthy living. Eating food without the right nutrient composition could lead to malnutrition. Wardlaw and Kessel (2002) define malnutrition as a condition of impaired development caused by either a long-term deficiency or an excess in energy and or nutrient intake. Malnutrition is a state where adequate nutrients are not delivered to the cells to provide the substrate for optimal functioning (Akinyele, 2005).

The importance of protein as one of the macro nutrients needed by the body cannot be overemphasized. Protein is required for the growth, maintenance and repair of all body tissues, protein for human consumption usually comes from plants and animals, pant proteins are deficient in certain amino acids notably methionine, tryptophan and lysine which are necessary for proper healthy growth (Frank and Harold, 2001). According to Britton (2003), the main difference between animal protein and plant protein is that, animal products contain different ratios of amino acids and higher concentrations of

protein than most plant products do. Most plants contain proteins in lower levels. Hence, in a strictly vegetarian diet, it is important to mix and match different plants to get the variety of protein and amino acids necessary for good health. Animal proteins are said to possess superiority over vegetable protein. Animal proteins are generally referred to as complete proteins. They contain all the amino acids needed in the body as opposed to plant proteins in which one or more of these essential amino acids are lacking (Oloyede, 2005).

Nigeria with numerous natural and human resources still remains amongst the least consumers of protein in Africa (Ajana, 1999). Abiodun (2001) observed that the protein intake by Nigeria is about 53.8g with only 6.0 to 8.44 g/head/day of fish and animal origin while the United Nation/ Food Agricultural Organisation (FAO) estimated minimum protein requirements at 70gm/capita/day and the recommended protein intake from animal source to be 35gm/capita/day. It is not surprising that Nigeria is highly deficient in animal protein security with the per capita consumption put at 9.3g/day as against the 35g/day recommended by the FAO to be the minimum requirement for the growth and development of the body (Esobhawan, Ojo and Ikheloa, 2008).

Ibeawuchi, Chindo and Ahamefule, (2000) attributed the low protein intake by many Nigerians to the decline in animal production. Rosegrant and Thornton (2008) argued that population and economic growth in developing countries is contributing to the overheating of the food based economy since the demand for food, particularly animal protein which includes meat and fish has been on steady increase.

Beef and fish being important sources of protein have played important roles in the pattern of food consumption in Nigeria and they form an integral part of the diet of

Nigerian people and are considered to be essential protein foods (Elliot and Ezenwa, 1988).

Beef is a product of livestock farming which has remained an essential component of the agricultural sector of the Nigerian economy. Livestock is a good source of animal protein which is needed for proper and balanced diet and beef is the meat obtained from matured cattle. Beef is a major source of animal protein because it contains many nutrients nourishing substance needed by the human body. Its high protein content is available for the growth and repair of the body and as a source of energy. It is an important source of several vitamins, minerals and other nutrients including potassium, phosphorus, sodium, iron, zinc, manic, riboflavin and thiamine. The world demand for beef has risen sharply during the last few decades due to increase in population improvement in technology and increasing incomes (Dafwanget *al.*, 2001).

Fish is also one of the most important animal protein foods available in the tropics (Eyo, 2002). In many Asian countries, over 50% of the animal protein intake comes from fish. Although, Olatunde (1989) reported that fish constitutes 40% of animal protein intake in Nigeria, the African proportion is 17.5% (Willmanet *al.*, 1998). Fish consumption has impact on human being throughout various stages of human life, including pregnancy and childhood. According to Alexandratos (2000), the ever increasing share of fish in animal protein intake and total protein supply implies that fish has become more and more important in people's diet. Over the past 15 years, fish has enjoyed an explosive increase in demand around the world, a demand that has also boosted its price (Amaoet *al.*, 2006). FAO (1991) predicted an increase in demand for fish, pointing that the majority of this increase will result from expected economic development, population growth and changes in food habits.

1.2 Problem Statement

One of the greatest problems facing households in Nigerian is how to improve the quality and quantity of their diet as well as addressing the problem of nutritional imbalances (Abubakar, 1998). Literature have shown that Nigeria are inadequately fed and this is due mainly to lack of balance diet especially protein needed for growth and development. (Kushwaha *et al.*, 2007).

Malnutrition problems in developing countries can be examined in terms of inadequate consumption of macro nutrients (Abdullahi and Aubert, 2004). The inadequate intake of these nutrients hinders healthy growth, affect the individual ability to undertake productive activities and lowers utilization of other nutrients (Aromolaran, 2004). The deficiency of protein in the diet will invariably affect the income generating ability, manpower development and overall contribution to the nation's GDP. Malnutrition in Nigeria has been linked to food shortage both in terms of the quantity available and access to the right type (quality) of food to provide balance diets (Durojaiye, 2001).

A review of the data of food supplies available for consumption in different countries shows that the per caput proteins intakes in developing countries, Nigeria inclusive is comparatively low, not only is the total protein deficient but the quality of dietary protein available is inferior to that consumed in developed countries (FAO/WHO 2001). Most people consume the minimum level of calorie but fail to get the necessary protein and essential vitamins and minerals required for leading a healthy life (Bender and Smith, 1997)

In recent years, increased knowledge and awareness of human requirement for healthy growth have focused increasing attention on the unique roles of livestock and fisheries resources in human development (CBN, 2002).

Fish and beef which are very important sources of animal protein play vital roles in feeding the world population and contributing significantly to the dietary protein intake of millions of the populace (FAO, 1990). There is heightened awareness in the developed world of the nutritional and health benefit of fish and beef product low in fat and calories and high in protein, vitamins, minerals and poly-saturated fatty acids.

CBN (2006) put the demand for fish in Nigeria at 1.5 million metric tones per annum and the current domestic output at 600,000 metric tones per annum, thereby leaving a shortfall of 899,400 metric tones. Nigeria spends over N100 billion on fish importation annually and the fish demand in Nigeria stands at over 2.66 million tones per annum, while the importation rate is over 750,000 metric tones (Oota, 2012).

With rising population, improved income standard of living in Nigeria, the country may be facing severe beef shortage by the year 2050. According to Food and Agricultural organization FAO report, by 2050 an expanded world population will be consuming two third more animal proteins than it does today. It also stated in the report that meat consumption is projected to rise nearly 73 percent by 2050 (Cruise, 2011).

Household nutritional status has been observed to be influenced by socio-economic factors which include prices of food items and non-food items, households' income and how it is shared among basic needs (FAO, WHO and UNN 1985). According to Koutsoyianis (2001), consumption pattern of a family is determined by family income, sexes in the family, household income, Age, price sales, taste, education status, religion etc. In addition, we have socio cultural variables like family size and composition, occupational groups, taste and preferences as well as the educational level of the household head. These factors punctuate the food composition and habits of households to the extent that households compensate for nutritional requirements in other

foodstuffs by replacing consumption of protein foods which is generally believed to be expensive with carbohydrate which is less expensive, easy to prepare (Addo, 2005).

The availability and access to fish and beef within household can be an important determinant of its member's well being but there exist little or no research on the demand of beef and fish in the study area with respect to the factors that determine beef and fish demand, changes to beef and fish consumption in response to income, price of the product and prices of substitute product, price paid for the product as well as quantity of the product consumed by households. In view of this the demand study is aimed at providing answers to the following question.

- i. What are the socio-economic characteristics of beef and fish consuming households?
- ii. What are the quantity of households consumed for beef and fish?
- iii. What are the share of household's expenditure on beef and fish?
- iv. What are the factors affecting household consumption of beef and fish?
- v. What are the own price, cross price and expenditure elasticity of beef and fish?
- vi. What are the constraint faced by households in the consumption of beef and fish in the study area?

1.3 Objectives of the Study

The broad objective of the study will be to analyse the demand for beef and fish by households in the study area.

The specific objectives are to:

- i. describe the socio-economic characteristics of beef and fish consuming households

- ii. estimate the quantity of beef and fish consumed by households
- iii. estimate the share of expenditure on beef and fish consumed by households
- iv. determine the factors affecting household consumption of beef and fish
- v. determine the own price, cross price and expenditure elasticity of beef and fish
- vi. identify the constraint faced by households in consuming beef and fish in the study area

1.4 Justification of the Study

The importance of animal protein to the survival and growth of human beings cannot be overemphasized. Animal protein is one of the most important food items in the world. Protein can function as enzymes, membrane transporters and hormones. Protein helps in building and growth, in the productive systems and prevention of disease. Protein is required for the growth, maintenance and repair of all body tissues (FAO, WHO and UNN, 1985). Beef and fish which are among the highest quality protein are easily absorbable micronutrients, provide energy even when consumed in small quantities and improve the quality of diet.

Protein malnutrition has been a major problem in Nigeria because the available animal protein sources are in short supply. Global survey revealed that nearly one billion people mostly in developing countries Nigeria inclusive are protein malnourish and lacking sufficient food to live healthy and active lives (Addo, 2001). Food consumption in Nigeria has been an important issue not because it is related to poverty and food security alone but because it is highly correlated to living standard. Protein malnutrition is due to shortage in supply of animal protein, although there are other sources of protein like the plant protein sources but FAO estimated minimum protein requirements

at 70gm/capita/day and the recommended protein intake from animal source to be 35gm/capita/day.

Various researches has been done in the area of beef and fish (Kudiet.,al, 2008, Oyiakhilomen and Zibah, 2013, Olarinde and Kuponiyi, 2005; Amaoet *al.*, 2006; Duruchukwu, 2010) most focusing on the production, improvement and marketing of livestock and fishery with little emphasis laid on the demand and consumption of the product by households. Programmes like National Livestock Development Project and National Accelerated Fish Production Project are programmes implemented which were targeted at increasing meat and fish production (Adewuyiet *al.*, 2007).

This study focus on animal protein consumption with more emphasis on beef and fish, the result of the study will be useful in providing information on the determinants for beef and fish demand and the price elasticity of the products and also provide the reason why the product cannot meet up the protein requirement of the households. It is expected that information derived from the study will serve as a reference material to students researchers and policy makers at both local, national, institutional levels. Finally the study will contribute to existing empirical information on animal protein demand for the use of stakeholders in the livestock industries towards ensuring adequate supply of fish, beef and other animal protein source to reduce protein malnutrition in the country at large.

1.5 Hypothesis

- i. There is no significant relationship between the quantity of beef and fish consumed by the households and price paid for the products.
- ii. There is no significant relationship between the income of the household and the quantity of either beef or fish consumed by the households.

CHAPTER TWO

LITERATURE REVIEW

2.1 An Overview of Beef and Fish Consumption Pattern in Nigeria

The life-style of people in urban cities is different from that of their counterparts in rural areas and this also influences to a considerable extent, their food consumption patterns. Most urban low income house-holds in Nigeria are plagued with inadequate animal protein intake due to lack of money to buy them, low level of income and price of the commodity (Obayelu, Okoruwa and Ajani, 2009)

Promoting healthy diets and life-styles for individuals and population groups to reduce the global burden of non-communicable diseases requires a multipronged approach involving the various relevant sectors in the society. The agricultural and food sectors feature prominently and must be given due priority. Food strategies must not merely be directed at ensuring food security for all, but must also achieve the consumption of adequate quantities of safe and good quality food that together make up a healthy diet.

Meat consumption contributes over 70 percent of the total protein intake in many African societies which Nigeria is inclusive (Anthonio and Adeyokunnu, 1973). This observation however, underscores the significant contribution of meat in human development and body growth in the continent. Protein consumption is important in the physical, mental, and physiological development of man. It not only supports growth, mental development, and replacement of worn out tissues, but also improves health maintenance and general well-being. Unfortunately, sub-optimal consumption of animal protein by a large percentage of Nigerians has become a major concern not only to livestock producers, but also to policy makers (Madubuike, 1992).

In Nigeria, existence of diverse culture characterized by regional, physical, agro-climatic, and socioeconomic differences attests to the observed changes in food habit across the country (Jabbar and di Comenico, 1993). For example, religious obligation forbids Muslim in the North and in some part of the South from eating pork meat. Thus, pork consumption is traditionally limited among non-Muslims communities in the country. The demand for sheep and goat for those that cannot afford to buy ram reach the pick during the Muslim's Eidul-Kabeer celebration while demand for beef, turkey, and chicken reach the pick during the Christian's Christmas celebration in Nigeria. Hence, religion activities, festive period and meat price can be regarded as key determinants of the demand for animal protein in Nigeria. Nevertheless, meat from cattle, goat, sheep, pig and poultry are the main sources of animal protein in Nigeria as most of the food consumed in the country are carbohydrate which are obtained mainly in the form of starch (Oloyede, 2005).

The global food fish supply and hence consumption has been growing at a rate of 3.6% per year since 1961, while the world's population has been expanding at 1.8% for the same period (WHO, 1998). The protein derived from fish, crustaceans and mollusks accounts for between 13.8% and 16.5% of the animal protein intake of the human population. The average apparent per capita consumption increased from about 9kg per year in the early 1960's to 16kg in 1977. The per capita availability of fish and fish product has, therefore, nearly doubled in 40 years outpacing population growth (WHO, 1998). Fish contributed an increasing share of total protein intake until 1998 (accounting for between 6.5% and 8.5%) but since then, its importance has gradually declined; and in 1997, its percentage contribution was back to the level prevailing in the mid-1980 (Adeyemi, 2002).

The high price of animal protein most especially beef, sheep and goat led an average household in Nigeria to regards fish and poultry meat as a close substitute for these food-items. This observation has led to increase in per capita consumption of fish and poultry meat among Nigerians in recent years. Besides, surge in fish demand in the country have also been associated with increase in aquaculture production across the country with aquaculture fish contributing more than 200% to total fish supply in the country lately in Nigeria (Ogundari and Akinbogun 2010).

2.2 Food Consumption Pattern of Households

The consumption pattern of a household is the combination of qualities, quantities, acts and tendencies characterizing a community or a human group's use of resources for survival, comfort and enjoyment (Ahmed, Ehui, Yemesrach, 2006). Of course the type of food and non-food items consumed, vary from region to region. Consumption patterns normally contribute greatly to the social and economic policy of the country, it also depicts the level of welfare and poverty that a nation is experiencing (Ahmed, Ehui, Yemesrach, 2006).

In a developing country like Nigeria, the consumption pattern is skewed towards food i.e. food accounts for a higher proportion of the total expenditure, while in developed countries the opposite is the case. The more developed a society becomes, the less it spends on food and the more it spends on non-food items. The nutritional status of a nation is difficult to assess because it can be related to social, educational and economic condition. It may be good, fair, or poor depending on the dietary essentials, relative needs for them, and body's ability to utilize them (NBS, 2010).

Nutritional status of an individual depend solely on food intake in terms of quantity or quality, there is always interplay of many factors. In most cases in developing

countries, the nutritional status of an individual is one of de-nutrition or malnutrition, only few understands the importance of balance diet, this have its root in the ignorance and poverty status of the people (Enwonwu 1979).

In Nigeria, dietary protein sources are more of plant based with varying levels of amino acid than animal. For instance, FAO recommendation for daily protein consumption is put at 60g per person out of which 35g is expected to be from animal source. However, it was reported that the average per capita protein intake in Nigeria was 51.7g from which only 8.6g came from animal sources, where as in developed countries, the average per capita protein intake was over 70g with more than 55g of animal protein (Ikeme, 1990).

Average animal protein intake per head per day in North America, Western and Eastern Europe were 66, 39, 33 g per head per day respectively (Abdullahi, 1999). According to Olayide (1993), lack of sufficient food both in quantity and quality will account for low production which could lead to a decline in agricultural production, at the same time hindering development. Low protein composition of diet being consumed results in protein malnutrition which manifest itself in form of diseases such as marasmus, kwashiorkor or retarded growth in many Nigerian children.

Cyril, Eric and Normen, (1982) discussed that all human beings have common nutritional needs; there may be variations from one section of the community to another; and nutritional requirements changes from infancy through childhood to adolescence and adult hood.

Olarinde and Kuponiyi (2005) affirmed that the average composition of rural households' food is usually about 79 percent carbohydrate, 17 percent protein and 4

percent vitamin per month. This situation depicts food insecurity and may worsen in the next few years.

2.3 Factors that affect consumption of protein by households

Robert, Daryl, Peter and Victor, (2000) reported that the recommended amount of protein for tissue development, growth and performance differs in age and sex, for instance the adult males require more protein than their female counterparts in the same age group due to the fact that male use more energy for work while the pregnant and lactating females needs the highest quantities of protein due to the physiological state of their body. Among the factors that dictates consumption pattern are, household income, cost of food, environment, household size. The prices of foods particularly those of protein source affects its consumption since majority of the consumer are in low-income groups, they tend to appeal for the in-expensive food commodities which in most cases are the starchy food with low nutritional value, in essence, they opt for quantity rather than quality (Alderman, 1986). The differences in personal taste, educational level, religion, custom and beliefs, may affect the consumption of protein since most of the rural dwellers engaged in one agricultural activities or the other and this makes the availability of other classes of food to be very high (Pitt, 1983).

2.4 Protein and its Importance

Proteins are the major structural components of all cells of the body and amino acids are the building blocks of protein. Proteins can function as enzymes, membrane-carriers and hormones (Jensen, 1994).

As far as the human body is concerned there are two different types of amino acids: Essential and Nonessential. Nonessential amino acids are amino acids that the body can

create out of other chemicals found in the body. Essential amino acids cannot be created, and therefore, the only way to get them is through food. Protein contains approximately 22 amino acids, eight of which are essential because the body cannot produce them. Therefore, they must be obtained from our food. The sulphur – containing amino acids: methionine, cystine and cysteine are particularly important for the health of the brain and nervous system (Addo, 2005).

Protein is required for the growth, maintenance and repair of all body tissues. Protein is 90% of the dry weight of blood, 80% constituent of enzymes, hormones and antibodies (Fallon and Eing, 2001). Proteins encompass many important chemicals including immunoglobulin and enzymes. In short, they form the foundation of muscles, skin, bone, hair, heart, teeth, blood and brain and the billions of biochemical activities going on in our bodies every minute.

When we fail to consume adequate amounts of protein, the blood and tissues can become either too acidic or too alkaline. Lack of dietary protein can retard growth in children and in adult, can be a contributing factor in chronic fatigue, depression, slow wound healing and the decreased resistance to infections (Iyangbe and Orewa, 2009). One of the significant needs for protein on a world population basis is in infants after weaning and in young children. In instances where adequate protein and a proper diet are withheld for long, recovery may be incomplete due to irreversible damage and possible mental retardation.

2.5 Poverty and protein Malnutrition among Nigerians

The level of poverty in Nigeria is on the increase due to low level of income, high cost of food products particularly protein foods as well as its inadequate production of protein foods by farmers and lack of capital to establish on a large scale. The people in

the rural areas need more attention in terms of their diet most especially protein so as not to ruin agricultural production. Aromolaran (2001) confirmed that Nigeria is still struggling to meet up with the minimum food and nutrient requirements.

The evidence of poor nutrition is reflected particularly amongst low income groups. It has been estimated that 7,300 children die of malnutrition annually in Nigeria, before they reach the age of four years; while 73,000 to 84,000 infants born every year suffer from malnutrition. The pre-school children are not left out of the ill wind of malnutrition blowing in Nigeria (Ajayi and Chukwu, 2008).

Low nutrient intakes, leanness, low mid-arm circumferences and skin fold thickness and stunting are good common features in malnourished Nigerian preschooler. The presence of low height for age has been reported among school children and adolescents and this was attributed to inadequate intake of nutrients. The adults and the elderly ones have their own fair share of some degrees of malnutrition. Conditions such as gingivitis, angular stomatitis, and loss of strength, low productivity, low morale, lethargy and retardation are common in this category of people. These conditions are directly or indirectly as a result of malnutrition, pregnant and lactating women in Nigeria is reported to have low intakes of many nutrients such as protein, calcium, niacin and riboflavin (Ene- Obony, 1990; Ajayi and Chukwu, 2008). Lamorde (1998) stressed that protein and calorie malnutrition or shortage in ingested foods constantly impedes health, working efficiency, productivity and overall economic progress.

2.6 Fish, Beef and their importance in Human Diet.

The term fish is a diverse group of animal that lives in water, swims around by means of its body movement and different shaped and sized organs, located at different parts of body called - fins, respire by absorbing oxygen dissolved in the water by means of

its special organ called gills, situated on the both sides at the posterior part of the head (Helfman *et al.*, 1997). It is one of the most diverse groups of animals known to man with more than 20,500 species. There are more species of fish than all other vertebrates (Eyo, 1992). The importance of fish in the diet of man cannot be overemphasized, Fish is an important source of protein to a large teeming population of Nigeria. Fish provides 40% of the dietary intake of animal protein of the average Nigerian (FDF, 1997).

According to Adekoya and Miller, (2004), fish and fish products constitute more than 60% of the total protein intake in adults especially in rural areas. It is an excellent source of protein, calcium, phosphorus, and vitamins A and D.

Amiengheme (2005) enumerated the importance of fish in Human Nutrition as follows:

- Food fish has a nutrient profile superior to all terrestrial meats (beef, pork and chicken, etc) being an excellent source of high quality animal protein and highly digestible energy;
- Fish is a good source of sulphur and essential amino acids such as lysine, leucine, valine and arginine. It is therefore suitable for supplementing diets of high carbohydrate contents;
- Fish is also a good source of thiamine as well as an extremely rich source of Omega-3 polyunsaturated fatty acids, fat soluble vitamins (A, D and E) and water soluble vitamins (B complex) and minerals (Calcium, Phosphorus, Iron, Iodine and Selenium);
- It has a high content of Polyunsaturated (Omega III) fatty acids, which are important in lowering blood cholesterol level and high blood pressure. It is able to mitigate to alleviate platelet of (cholesterol) aggregation and various arteriosclerosis conditions in adult populations;

- It reduces the risk of sudden death from heart attacks and reduces rheumatoid arthritis;
- Omega-3 fatty acids also lower the risk of age related muscular degeneration and vision impairment; and
- It decreases the risk of bowel cancer; and reduces insulin resistance in skeletal muscles

Eyo (2002) reported that Fish has low cholesterol compared with red meat and because of its ease of digestibility and soft tissue and its high nutritional value, it is highly recommended for both the young and the old. Fish provides quality easily absorbable protein and a wide variety of vitamins and mineral. A small amount of fish is an important dietary supplement for poor people who cannot easily afford animal protein and who mainly rely on diets from plant sources. Some studies have shown that people who eat fish about twice a day run a lower risk of heart attack than those people who rarely eat fish. The Omega-3-fatty acids in fish oil are probably acting to reduce blood clotting which is part of heart attack process (FAO, 1997).

Beef is the [culinary name](#) for [meat](#) from [bovines](#), especially [cattle](#). Beef can be harvested from cows, bulls, heifers or steers. Beef [muscle](#) meat can be cut into [steak](#), [roasts](#) or [short ribs](#). Beef is among the most reliable protein food resources for human consumption, as it is a concentrated source of protein and has a range of vitamins and mineral salts (Leather and Foster, 2005).

Meat is a product of livestock farming which has remained an essential component of the agricultural sector of the Nigerian economy. Livestock is a good source of animal protein which is needed for proper and balanced diet and beef is the meat obtained from matured cattle. Beef is a major source of animal protein because it contains many

nutrients nourishing substance needed by the human body. Its high protein content is available for the growth and repair of the body and as a source of energy. It is an important source of several vitamins, minerals and other nutrients including potassium, phosphorus, sodium, iron, zinc, manic, riboflavin and thiamine. Many diets in developing countries are based on cereals or root crops and are relatively bulky, especially where fats are in short supply, and this can limit the total energy intake. This is especially true of infants after weaning and young children. The importance of meat in the diet is as a concentrated source of protein which is not only of high biological value but its amino acid composition complements that of cereal and other vegetable proteins.

2.7 Demand for beef and fish

Nigerians are large consumers of fish with demand estimate at 1.4 million metric tones annually. However, a demand and supply gap of at least 0.7 million metric tones exists nationally with import making up the short fall at a cost of almost 0.5 billion US dollars per year. Domestic fish production of about 500,000 metric tones is supplied by artisan fisher – folk (85%), despite over fishing in many water bodies across the country (Adekoya and Miller, 2004).

There has been an increasing pressure on the livestock sector to meet the growing demand for high-value animal protein. The world's livestock sector is growing at an unprecedented rate and the driving force behind this enormous surge is a combination of population growth, rising incomes and urbanization. Annual meat production is projected to increase from 218 million tones in 1997-1999 to 376 million tones by 2030 (WHO, 1998). There is a strong positive relationship between the level of income and the consumption of animal protein, with the consumption of meat, fish, milk and eggs

increasing at the expense of staple foods. Because of the recent steep decline in prices, developing countries are embarking on higher meat consumption at much lower levels of gross domestic product than the industrialized countries did some 20-30 years ago (WHO, 1998)

Sonaiya (1982), had rightly envisaged that as consumers become more articulate and organized, their demand for wholesome animal protein will exert a powerful influence upon quality, production method and strategies. He added that recent increases in expendable income of urban dwellers have tendencies to stimulate greater demand, not only for quality but also quantity of meat products. Today, the increasing human population in the face of inelastic production, strategies appears to have widened the demand supply gap and accentuates society of meat products. Regmi (2002) supported this view and noted that, the unprecedented growth that has occurred in the last half-century has created an additional demand for meat and general food in developing countries.

2.8 CONCEPTUAL FRAMEWORK

2.8.1 Economic Models for Estimation of Demand Structure

In estimating a demand relationship, various estimation functions have been developed and applied over the years, in the review of such models, Sadoulet and De January (1995) indicated that two demand system have received considerable attention because of their relative empirical expediency. These are the linear expenditure system (LES) developed by stone (1954) and the almost ideal demand system (AIDS) developed by Dalton and Muellbaue (1980).

The linear expenditure System (LES) is the only linear demand system in expenditure relative to price, which fulfills the regularity conditions of demand theory. The linearity and the little number of independent parameters make its application easy but also impose some limiting constraints. For instance, all goods are Hicksian substitutes, and cross-price derivatives are proportional to expenditure derivatives, and expenditure elasticity are always positive (no inferior goods). In addition, the Engel-flexibility is limited because of constant marginal budget shares, it also satisfies homogeneity and symmetry restriction automatically.

The Almost Ideal Demand System (AIDS) is consistent with the theoretical elasticity and consumer theory which requires general restriction. The popularity of the AIDS can be ascribed to several reasons according to Deaton and Muellbauer (1980).

Firstly, the linear approximate version of the AIDS is relatively easy to estimate and interpret. It satisfies the axiom of choice exactly.

Secondly, it is as flexible as other locally flexible functional forms, but it has the added advantage of being compatible with allegation over consumers. Thus, it can be interpreted in terms of economic models of consumer behavior when estimated with aggregate (macro-economic) or disaggregated (household survey) data.

Thirdly, it is derived from a specific cost function and therefore corresponds with a well-defined preference structure, which is convenient for welfare analysis.

Fourthly, it has enough independent parameters that all the elasticity can be identified and homogeneity and symmetry restrictions depend only on the estimated parameters and are therefore easily tested and/or imposed.

Fifthly, AIDS provides an arbitrary first order approximation to any demand systems.

Sixthly, it aggregate perfectly across consumers without invoking parallel linear Engel curve, and finally, it has a functional form which is consistent with known household budget data.

2.8.2 Theoretical Framework

2.8.2.1 Consumer Behaviour

Consumer behaviour is the study of how, when and why people buy what they buy. It attempts to explain the buyer decision-making process both individually and in groups. The theory of consumer behaviour assumes that a consumer is rational and aims at attaining the highest possible satisfaction given his income and the prevailing market prices. He attempts spending his income in a way that gives him maximum satisfaction (Agbaje, 2003). An individual's decision on what range and types of food to consume is influenced greatly by income and other factors such as social norms. Various theories exist in literature that explains people's behaviour in relation to rising income. One of such is Professor Milton Friedman's permanent income hypothesis that says consumption is based on the long run permanent income. It is only if people believed that a rise in today's income is likely to be sustained as higher future incomes will, that a large rise in current income will be matched by a large rise in current consumption. The Life Cycle hypothesis held that households or individuals maximize their utilities subject to their wealth, the main determinants of current consumption and that the average long run income would likely determine the total demand for consumer spending. According to Engel law, the income elasticity on food consumption is low since with increasing income, people's spending on food decreases and a large percentage of additional income is committed to luxuries.

2.8.2.2 Demand Theory

Demand theory is a theory relating to the relationship between consumer demand for goods and services and their prices. Demand theory forms the basis for the demand curve, which relates consumer desire to the amount of goods available. As more of a good or service is available, demand drops and therefore so does the equilibrium price (investpedia.com).

The branch of economics devoted to the study of consumer behavior, especially as it applies to decisions related to purchasing goods and services through markets. Consumer demand theory is largely centered on the study and analysis of the utility generated from the satisfaction of wants and needs. The key principle of consumer demand theory is the law of diminishing marginal utility, which offers an explanation for the law of demand and the negative slope of the demand curve (Amosweb, 2014).

Consumer demand theory provides insight into an understanding market demand and forms a cornerstone of modern microeconomics. In particular, this theory analyzes consumer behavior, especially market purchases, based on the satisfaction of wants and needs (that is, utility) generated from the consumption of a good.

Demand theory is one of the core theories of microeconomics. It aims to answer basic questions about how badly people want things, and how demand is impacted by income levels and satisfaction (utility). Based on the perceived utility of goods and services by consumers, companies adjust the supply available and the prices charged.

Demand, the willingness and ability to purchase a range of quantities at a range of prices, is one half of the market. The law of demand, which gives rise to a negatively-sloped demand curve, is an essential principle underlying market analysis. Modern microeconomic theory, among other topics, is concerned with understanding and explaining the law of demand (Amosweb, 2014).

Insight into this law can be found with consumer demand theory. The explanation is relatively simple--on the surface. Consumers purchase goods that satisfy wants and needs, that is, generate utility. Those goods that generate more utility are more valuable to consumers and thus buyers are willing to pay a higher price. The key to the law of demand is that the utility generated declines as the quantity consumed increases. As such, the demand price that buyers are willing to pay decreases as the quantity demanded increases.

2.8.2.3 Elasticity of Demand

The concept of elasticity of demand plays crucial role in business decision regarding manoeuvring of prices with the view of to making larger profits. For instance when cost of production is increasing, the firm would want to pass the rising cost on consumer by raising the price (Dwivedi, 2008). Whether raising the price of a product following rise in cost or otherwise will prove beneficial depends on

- a) The price elasticity of demand for a product, that is how high or low is the proportionate change in its demand in response to a certain percentage change in its price
- b) Price elasticity of demand for its substitute, because when the price of a product increases, the demand for its substitute increases automatically even if their prices remain unchanged.

The concept of elasticity therefore becomes important to consumers because it helps in getting them protected in many cases from the unscrupulous producers who are out to manipulate the consumers (Dwivedi, 2008).

Elasticity of demand according to Olukunmi (2005), explains the degree of responsiveness of the quantity demanded of a good to such forces as changes in the price of the commodity, changes in income of the consumer or changes in the prices of other commodities.

2.8.2.4 Own price elasticity of demand

Own price elasticity of demand measure the degree of responsiveness of demand for a particular commodity to changes in the price of such commodity. Changes in the price of the commodity could lead to increase or decrease in the demand of that commodity. Negative value of the own price elasticity indicates that increase in price of the commodity will lead to low expenditure on the commodity while positive value of the own price elasticity of a commodity indicates that increase in the price of the product will results to more expenses in the commodity (Olukunmi, 2005).

2.8.2.5 Cross Price Elasticity of Demand

Cross price elasticity of demand measures the degree of responsiveness of the quantity demanded of a given product to changes in the price of a related product. The sign of cross price elasticity of demand indicates either substitution effect or complementary effect. A positive value of the cross price elasticity indicates that there is substitution between a product and related product but when the values of the cross price elasticity are negative, it indicates that there is complementarity between the product and related product (Olukunmi, 2005).

2.8.2.6 Expenditure Elasticity

Expenditure elasticity measures the degree of responsiveness of quantity demanded to changes in income. It indicates either increase or decrease in demand of a product

when the income of the consumer changes. An expenditure elasticity of less than one indicates that a good is a necessity good and that quantity demanded of a product had little or no response to changes in income where as if expenditure elasticity of a product is greater than one, it shows that the product is a luxury good and a that the quantity demanded of the product respond very high to changes in income (Olukunmi, 2005).

2.9 Reviews on Food Demand Studies

The analysis of food demand as noted by Aromolaran (2004) has received attention across the globe for the last four decades because of the following;

First, food intake has been found to have a strong empirical linkage with human health and labour productivity and second, because estimated income/expenditure elasticity is regarded as important tools for the nutritional policy design and planning. This observation however, explains the proliferation of food demand studies using different methodologies and focusing on different food items across the globe (Gallet, 2010). For example in Nigeria, considerable efforts have been devoted to the analysis of food demand by both academic and policy analyst in the country for more than two decades. Oguru (1992) estimated the per capita demand for fish in Rivers State of Nigeria and concluded that the demand for fish in the State was price inelastic.

Aromolaran (1999) analyzed household preferences and determinants of consumption expenditure on meat, fish and eggs in Warri, Delta State of Nigeria, and identified variations in the consumption of these products due to income of household head, household expenditure on food and household size.

Ighoro (2002) in his study of the analysis of household consumption pattern of animal products in south-western Nigeria found out that the average monthly expenditure on fish was 35%. Goat meat, chicken, pork, turkey, bush meat and goat meat accounted for

4.3%, 5.2%, 4.6%, 4.13%, 3.4% and 1.05%, respectively. Fish was reported to have the highest frequency of animal protein consumed by households. Adeosun, (2006) emphasized that 70% of animal protein consumed by Nigerians comes from fish and he attributed the high demand and consumption of fish to improved standards in income levels, increased population and better health awareness while its relative cheapness compared with other suitable substitutes is also contributory.

Akesan(2005) reported that fish is the single most important animal protein consumed in almost all African countries. He, however, concluded that consumers usually have a natural preference for a particular fish species while acceptability may be influenced by taste, price and income of consumers.

Adetunji and Rauf (2010) investigated household demand for meat in some selected states in the Southwest Nigeria using an Almost Ideal Demand System (AIDS) Model. The findings indicated that budget share of beef decreased with an increase in the price of chicken and vice versa, but increased with an increase in its price, the budget share of goat meat, chicken and goat meat increased with an increase in their own prices respectively. The budget share of pork increased with an increase in the price of goat meat but it decreased with an increase in its own price. Also one percent change in prices of beef,goat meat and chicken would result in -0.827, -0.527 and -0.721 reduction in the quantitydemanded respectively. Goat meat and pork were confirmed to be luxury goods while chicken, beefand goat meat were normal goods.

Dalhatu and Ala, (2010) studied the study fish demand of 180 fish consumers in Sokoto metropolis where. The Data collected were analyzed using descriptive statistics and multiple regression analysis. The results of the multiple regression analysis revealed a coefficient of determination (R²) of 0.699 and F-value of 27.406 which was

statistically significant at $P < 0.01$. It was evident from the study that the higher the income level of the Respondents, the higher the expenditure on fish and fish demand also increases as household size and level of education increases. It was also revealed that disposable income, price of substitutes, level of education and household size positively influenced fish demand while price of fish influenced fish demand negatively.

Robert and Juan (2012) compared household consumption of beef and fish in Imo State with an aim of identifying the socio-economic characteristics of beef and fish consumers, determining household consumption of beef and fish and estimating the price elasticity of beef and fish. The result of their findings indicated the average household monthly consumption of beef and fish were 14.4kg and 27.21kg respectively. The average price paid by consumers for 1 kg of beef and fish were 333.33 and #266.67 respectively. The price elasticity of beef was -6.216 while that of fish was -0.505.

Ezedinma, Kormawa and Chianu, (2000) conducted a study on urban household demand for meat and meat products in Nigeria. LA/AIDS model, which allows the inclusion of demographic variables, was applied to a subset of the data on meat and meat products namely beef, mutton/goat, chicken, fish, eggs, and milk. Results indicate that urban demand for meat products will continue to increase as incomes improve, suggesting potential market opportunities especially for poultry. Intra-household demand patterns clearly indicate the importance of beef for children but contrary to expectations, there is a reduced demand for milk as the number of infants in urban households increase. The observed high income elasticity of demand for poultry products may have a positive impact on the derived demand for maize, a primary product in poultry feed. Encouraging poultry production will help restore the battered

agricultural sector of Nigeria, increase farmer income, reduce unemployment, and conserve foreign exchange earnings.

Yusuf, (2012) investigated the demand for animal protein in Ibadan using linear Approximately Almost Ideal Demand System (LA/AIDS) model to analyse data gotten from 360 households. The results revealed that the demand for beef and fish in the study area is elastic while that of chicken is inelastic. The cross price elasticity showed substitutive Relationship between fish and chicken while there is complementary relationship between beef and fish, then beef and chicken. The cross price elasticity also showed that beef and chicken are luxury goods in the study area and fish is a necessity good.

Babaji (1985) studied the fish consumption behaviour of 526 consumers in Vishakapatnam city. The study revealed that 77 per cent of respondents consumed fish for dinner and 20 per cent for lunch. About 30 per cent of the respondents did not consume fish on festival days as those days were considered auspicious, while the rest had no such notions and consumed fish irrespective of festivals.

Bakhshoodeh and Farajzadeh (2004) investigated Iranian urban consumers behaviour and determined the role of habit effect in forming the consumption pattern over the period 1980-2000. The survey items covered household consumption quantity and total expenditure on foods, including bread, flour and its products, dairy products and eggs, fats, fruits and vegetables, groceries, sugar and tea, etc. The results obtained from decomposing the total effect of price changes indicated that habit effect had a significant role in food consumption changes. That is, despite price changes for most food items, consumers tend to keep their consumption pattern almost unchanged. It is revealed that income and substitution effects are weaker than the habit effect.

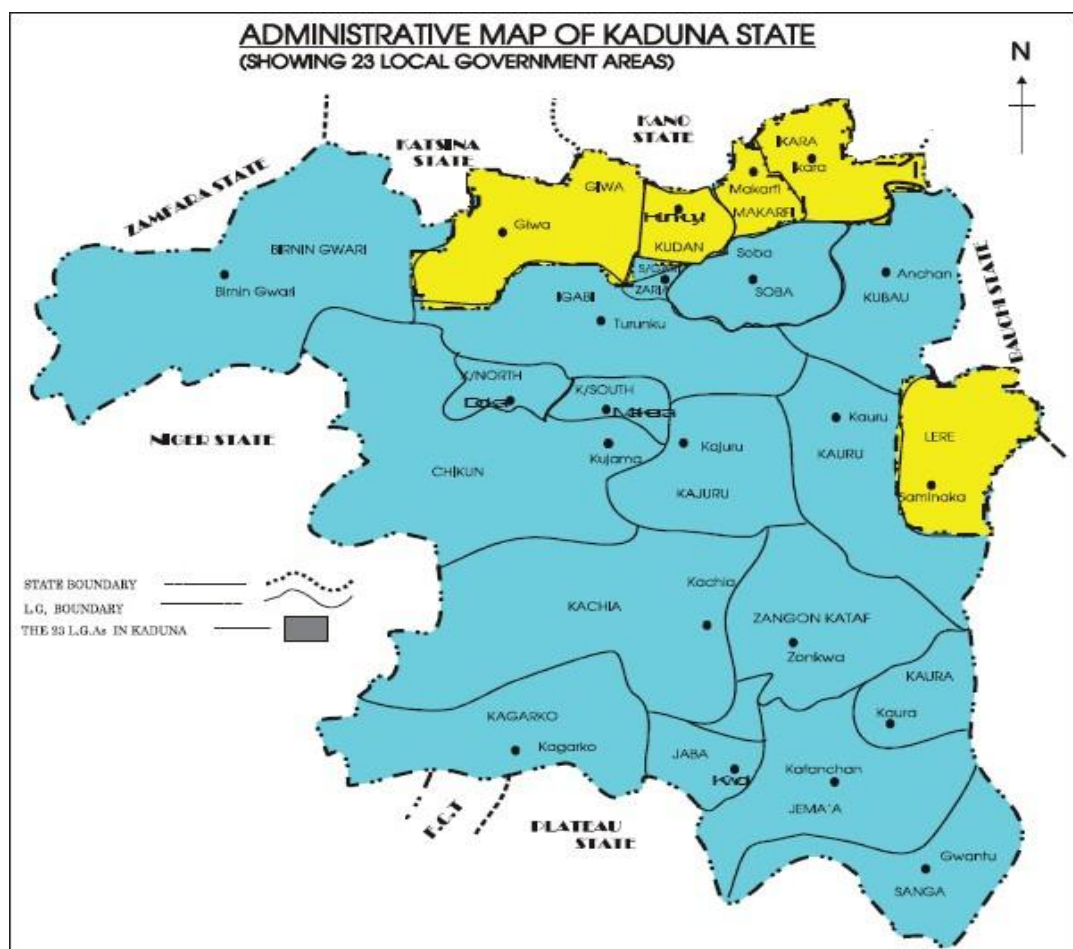
CHAPTER THREE

METHODOLOGY

3.1 Description of the Study Area

The study area was conducted in three Local Government Areas of Kaduna Metropolis. Kaduna State occupies 46,016Km² that is 5% of the land area of Nigeria. The State lies between latitude 11⁰32¹ and 09⁰02¹ North and longitude 80⁰50¹ and 06⁰15¹ East, it shares common borders with Abuja in the south east and seven other states namely Katsina, Kano, Zamfara in the North, Nasarawa, Plateau in the North East, Niger in the North West and Bauchi in the North East. The state is made up of 23 local Government Areas.

Figure 3.1: Map of Kaduna State Showing 23 Local Government Areas



The population of Kaduna State projected to 2015 using an annual growth rate of 3.18% as allowed by the National Population Commission is 8,103,472 (NPC 2006).

The tourist attractions in the state include the Nok Culture Site at Kuwi and the Maitirga Water Falls in Kafanchan. The vegetation is divided into the Northern Guinea Savanna in the North and Southern Guinea Savanna in the South. The soils are a mixture of fine sand and clay which have been described as Sandy loam in Nature. Major Rivers in Kaduna State include the Kaduna (from which the State derives its name), Kogum, Gurara, Wonderful, (Maitirga) and Galma. The State experiences a tropical continental climate with two distinct seasonal climates, dry and rainy seasons. The wet season (May to October) is heavier in the southern part of the State than in the northern part. Mean annual rainfall in the southern part (in places like Kafanchan and Kagoro) is over 1,524 mm while in the northern part (Makarfi and Ikara) is 1,016mm (Cjey 2015).

This climatic pattern is suitable for the cultivation of subsistence and cash crops round the year, although dry season farming often needs to be complemented by irrigation. Kaduna State topography is favourable for small, medium and large-scale farming and for tourism (KADP 2010). Cash and food crops are cultivated includes yam, cotton, groundnut, tobacco, maize, beans, guinea corn, millet, ginger, rice, and cassava. They are also involve in animal rearing, poultry farming and fish farming. The animals reared include cattle, sheep, goats and pigs while the fish reared include tilapia and cat fish. Although livestock resource in the state are still on a small scale which result in the importation of livestock product from other places (KADP, 2010).

Their eating habit depend on the tribes, like the Kaduna hausa usually takes towo made from maize and rice and their soup is mainly kuka while the qwari's take towo made

from sorghum. They take their beef and fish in different forms, the beef are made into soya, kilichi and boiled and cooked in their soup while the fish are smoked, fried and boiled before eating. (KADP, 2010)

3.2 Sampling procedures and Sampling Size

A Random sampling technique was used to select the households for the study. The study was conducted in Kaduna South, Kaduna North and Chikun Local Government Areas. The population of the Local Government projected to 2015 using an annual growth rate of 3.18 Areas were 830,139, 737,760 and 541,791 respectively.

Two localities were randomly selected from the three Local Government Areas which gave a total of six localities. The localities include Kakuri/Makera, Barnawa in Kaduna South, UngwanRimi, Kabala Doki in Kaduna North and NarayiHighcost, Trikania in Chikun L.G.A respectively. The projected populations of the localities using a growth rate of 3.15 are 164,035, 69,290, 111,824, 48,111, 101,796 and 50,189, Kakuri/Makera, Barnawa, UngwanRimi, Kabala Doki, NarayiHighcost and Trikania respectively.

Five percent (5%) of the households was selected from the household list obtained from Kaduna state urban planning and development authority (KASUPDA) in the selected localities. These gave a sample size of 241.

Table 3.1: Household Size and 5% Sampled Size of the Household.

Localities (5%)	Household Size	Sample
Kakuri/Makera	1322	66
Barnawa	618	31
UngwanRimi	1003	50
Kabala Doki	397	20
Trikania	960	48
NarayiHighcost	512	26
Total	4,812	241

Recognisance Survey

3.3 Method of data collection

Primary data on household monthly beef and fish consumption and expenditure was used for this study. The primary data were collected with the aid of structured questionnaire. Data were collected on the socio- economic characteristics of the households. The socio-economic characteristics include age, sex, education level of household heads, household size, household income, price paid per kg of fish and beef, the quantity of fish and beef consumed and expenditure on household food consumption.

3.4 Analytical tools

The tools of analysis that was employed for the studies include descriptive and inferential statistics.

3.4.1 Descriptive statistics:

This involve the use of minimum, maximum, mean, frequency counts, and percentages to achieve objective i, ii and vi of the study.

3.4.2 Budget share index:

This was used to achieve objective iii. It is expressed mathematically as

$$w_i = \sum_{i=1}^n \frac{\chi_i}{X} \dots \dots \dots (1)$$

Where

w_i = budget share on each of the animal protein source demanded by the households

χ_i = expenditure on each of the animal protein source demanded by the households

X = Expenditure on all food items consumed by the household

The budget share was done separately for each of the animal protein source (beef, fish, chicken, egg and goat meat).

3.4.3 The Linear Approximate Almost Ideal Demand System (LA-AIDS) Model:

The general form of the expenditure share equation for the LA-AIDS model is expressed as follows. It was used to achieve objective IV of the studies.

$$w_i = a_i^* + \sum_{j=1}^n \gamma_{ij} \ln(p_j) + \beta_i \ln\left(\frac{x}{p}\right) + \sum_{j=1}^n \delta_{ij} Z_j + e_i \dots \dots \dots (2)$$

The explicit system of demand equations for beef, fish, chicken, egg and goat meat captured during the survey was estimated simultaneously using Seemingly Unrelated Regression (SURE).

The equation below is a re-written form of the LA-AIDS model that shows how the various parameters in the equation were captured.

$$\begin{bmatrix} w_B \\ w_F \\ w_C \\ w_E \\ w_M \end{bmatrix} = \begin{bmatrix} a_1^* \\ a_2^* \\ a_3^* \\ a_4^* \\ a_5^* \end{bmatrix} + \begin{bmatrix} \ln p_B \\ \ln p_F \\ \ln p_C \\ \ln p_E \\ \ln p_M \end{bmatrix} \begin{bmatrix} \gamma_{11} & \dots & \gamma_{15} \\ \gamma_{21} & \dots & \gamma_{25} \\ \gamma_{31} & \dots & \gamma_{35} \\ \gamma_{41} & \dots & \gamma_{45} \\ \gamma_{51} & \dots & \gamma_{55} \end{bmatrix} + \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ \beta_5 \end{bmatrix} \begin{bmatrix} \ln \left(\frac{x}{p} \right) \\ \ln \left(\frac{x}{p} \right) \\ \ln \left(\frac{x}{p} \right) \\ \ln \left(\frac{x}{p} \right) \\ \ln \left(\frac{x}{p} \right) \end{bmatrix} + \begin{bmatrix} Z_1 \\ Z_2 \\ Z_3 \\ Z_4 \\ Z_5 \end{bmatrix} \begin{bmatrix} \delta_{11} & \dots & \delta_{15} \\ \delta_{21} & \dots & \delta_{25} \\ \delta_{31} & \dots & \delta_{35} \\ \delta_{41} & \dots & \delta_{45} \\ \delta_{51} & \dots & \delta_{55} \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ e_4 \\ e_5 \end{bmatrix}$$

Where:

w_B = Household budget share on beef

w_F = Household budget share on fish

w_C = Household budget share on chicken

w_E = Household budget share on egg

w_M = Household budget share on goat meat

p_B = Price of beef (₦/Kg)

p_F = Price of fish (₦/Kg)

p_C = Price of chicken (₦/Kg)

p_E = Price of egg (₦/Create)

p_M = Price of goat meat (₦/Kg)

Z_1 = Age of household head (years)

Z_2 = Sex

Z_3 = Household size

Z_4 = Household income (₦/month)

Z_5 = Educational level of household head (Number)

X = total household expenditure on all food items within the system

p = stone's price index, this was used to allow to overcome the problem of non-linearity, it is represented as $\ln p = \sum w_j \ln p_j$

$\gamma_{11} \dots \gamma_{55}$ = Price coefficient

$\beta_1 - \beta_5 =$ Expenditure coefficient

$a_1^* - a_6^* =$ Constant terms

$\delta_1 \dots \delta_5 =$ Coefficient of demographic variables

$e_1 - e_5 =$ Error term

The own and cross price elasticity equation was derive from the estimated parameters of the Linear Approximation AIDS model (LA-AIDS).

3.4.4 Own price and Cross price elasticity

$$\square_{ii}^M = -1 + \frac{\gamma_{ii}}{w_i} - \beta_i \text{(Own- price)} \dots \dots \dots (3)$$

$$\square_{ij}^M = \frac{\gamma_{ij}}{w_i} - \beta_i \left(\frac{w_j}{w_i} \right) \text{(Cross- price)} \dots \dots \dots (4)$$

3.4.5 The Expenditure elasticity

The Expenditure elasticity of beef and fish demand was computed as follows

$$\epsilon_i = 1 + \frac{\beta_i}{w_i} \dots \dots \dots (5)$$

The equations above were used to achieve objective V of the study.

Where

$\square_{ii}^M =$ Own- price elasticity of beef and fish demand

$\square_{ij}^M =$ Cross- price elasticity of beef and fish demand

$\epsilon_i =$ expenditure elasticity of beef and fish demand

$\gamma_{ii} =$ price coefficients of beef and fish in its share equation

$\gamma_{ij} =$ price coefficient of the other animal protein source in the share equation of beef and fish

$w_i =$ household budget share on beef and fish

w_j = house hold budget share on the other animal protein sources (chicken, egg and goat meat)

Although the main focus of the work is on beef and fish, other animal protein sources like chicken, egg and goat meat were included to test the interrelationship between the different animal proteins sources included in the model. It is to test the effect of the price of each of the protein source on one another, to know if they have a complimentary or substitution effect on each other.

3.5 Apriori Expectation

The socio-economic characteristics which include age, household size, education level and household monthly income are expected to be positive. The own price elasticity of beef and fish are expected to be negative, the cross price elasticity of beef and fish are expected to be positive and expenditure elasticity are expected to be positive.

CHAPTER FOUR

RESULTS AND DISCUSSION

The results and discussion section present the research findings and analysis of those findings. The section discuss in details the result from the descriptive and inferential statistics used in analyzing the data obtained from the field.

4.1 Socio-Economic Characteristics of Respondent

Socio- Economic characteristics is an economic and sociological combined measure of an individual or family economic and social position. In examining socio-economic characteristics of the sample households, factors such as age, household size, education level and household income and occupation are measured (National Centre for Education Statistics, 2008). The socio-economic factors that were considered in this study include gender, age, household size, education level and household income. The socio-economic characteristics of the respondent are presented in Table 4.1.

Table 4.1: Distribution of socioeconomic characteristic of households in the study area

Socioeconomic characteristics	Frequency	Percentage
Sex		
Male	127	52.70
Female	114	47.30
Age (Years)		
21-30	65	26.97
31-45	118	48.96
46-60	54	22.41
>60	4	1.66
Minimum.	20	
Maximum.	65	
Household size		
1-4	82	34.02
5-8	119	49.38
9-11	24	9.96
>11	16	6.64
Minimum.	1	
Maximum.	25	
Education level		
No formal education	7	2.90
Primary education	12	4.98
Secondary education	59	24.48
Tertiary education	163	67.63
Household monthly income (₦)		
10,000-49,000	108	44.81
50,000-99,000	63	26.14
100,000-149,000	30	12.45
150,000-199,000	17	7.05
200,000-249,000	6	2.49
>249,000	17	7.05
Minimum.	15,000	
Maximum.	460,000	
Frequency of monthly beef consumption		
0	14	5.81
1-15	108	44.81
16-30	83	34.44
31-45	34	14.11
>45	2	0.83
Frequency of monthly fish consumption		
0	8	3.32
1-15	97	40.25
16-30	104	43.15
31-45	29	12.03
>45	3	1.24

4.1.1 Sex Distribution

The result in Table 4.1 indicates that 53% of the households heads are male while 47% are female, Although results of previous studies (Yakaka and Baba, 2012, Adetunji and

Adepoji, 2011) shows that female respondents are usually less compared to male respondents, this result showed a considerably increase in female respondents since the subject of the study borders on household nutrition in which females are usually more informed than males.

4.1.2 Age Distribution

The result revealed that the mean age the respondent is 38 years. This corresponds with the findings of Baba (2007) and Yakaka and Baba (2012) who reported a mean age of 39 in their study determinant of ruminant meat demand in the Maiduguri, Borno State. Age could be an important determinant in the quality and quantity of protein requirement of an individual and households because food consumption pattern generally follows the body consumption (Amao *et al.*, 2006).

4.1.3 Household Size

The distribution shows that the mean household size of the respondent is 6 people. Household positively influence the consumption of beef and fish as indicated by Robert and Juan (2012) in their study micro level analysis of beef and fish consumption in Imo State. The more the number of people feeding from the same pot, the more the consumption.

4.1.4 Education Level

The study revealed that majority of the respondent had gained one form of education with only 3% without formal education but the report goes contrary to that of Adetunji and Adepoji (2011) in their study evaluation of households' protein consumption pattern in Orire Local Government Area of Oyo State which reported a low level of education.

Education could be an important factor in determining the nutritional status of the households.

4.1.5 Household Income

The result indicated that the mean income of the respondent is ~~N~~₦69, 433 per month. The finding disagrees with that of Robert and Juan (2012) that reported a mean monthly income of ~~N~~₦35, 543. Income could be a major determinant of demand and budget share allocation among households. The reason for the difference in the mean age of the two studies could be due to differences in education background. In the study with mean income of ~~N~~₦35, 543, majority (80%) of the respondents had gained just primary school while the study with mean income of ~~N~~₦69, 433, majority (68%) had gained tertiary education. Tertiary education graduates will get more paying jobs than people with just primary certificates.

4.1.6 Beef and Fish Consumption by the Household

The result indicated that 6% of the households don't consume beef while 3% of the households do not consume fish in the month they were sampled. It indicated that majority of the households (45% and 43% consume beef and fish 16 to 30 times in a month. It also showed that 34%, 14% and 1% Of the households consume beef 1 to15, 31 to 45 and 46 and above times respectively while 40%, 12% and 1% consume fish 1 to15, 31 to 45 and 46 and above times respectively. This result is an indication that some households consume beef and fish more than ones in a day.

4.2 Quantity and Price of Beef and Fish consumed by Households.

The quantity of beef and fish consume by the household is the amount of the product consume by the household in a month, it was measured in kilogram. The price paid per unit of the product is the amount used to purchase a kilogram of the product.

The quantity of beef and fish consumed by the household as well as the price paid for a kilogram of beef and fish are shown in Table 4.2.

Table 4.2 Quantity and Price of beef and Fish consumed by the households in the study area

Quantity and Price	Frequency	Percentage
Quantity of Beef (Kg)		
<1	15	6.22
1-10	223	92.5
11 and above	3	1.24
Quantity of Fish(kg)		
<1	8	3.32
1-10	221	91.7
11 and above	11	4.97
Price of Beef (₦)		
500-1000	239	99.17
1001-1500	2	0.83
Price of Fish (₦)		
500	125	61.87
600-1000	116	38.13

The result indicated a mean monthly consumption of 3.37kg and 4.59kg for beef and fish respectively. This finding goes contrary to that of Robert and Juan (2012) who reported a mean monthly consumption of 14.4kg and 27.21kg for beef and fish respectively in their study on micro level analysis of beef and fish consumption in Imo state.

The study indicated a mean price of ₦915 and ₦578 for beef and fish respectively in the month of June, 2014. This finding disagrees with the findings of Robert and Juan (2012) in their study on micro level analysis of beef and fish consumption in Imo state who reported a mean price of ₦333 and ₦221 for beef and fish respectively.

The changes in the mean quantity and mean price of both beef and fish could be due to increase in population, increase in price of production of the product and also inflation.

The National population Commission gave an annual growth rate of population to be

3.18 percent, with population increasing at this rate per year, the country domestic production will probably be far from meeting the country's demand thereby leading to high prices of the available one. Cost of production is another important factor that could lead to high prices of the product. Inflation according to Nigeria Bureau of Statistics increases from 7 percent in 2012 to 9.4 percent in 2014. This could be a reason why the price of both beef and fish are at its increase.

4.3 Household Expenditure on Beef, Fish, Chicken, Egg and Goat meat.

The share of household expenditure on beef, fish, chicken, egg and goat meat consist of the total money incurred in the consumption of the products by the households. It is the total budget on the animal protein food for a month. The share of each of the protein source was gotten by dividing the amount spend on the products by the total amount spend on food by the households (10977000) multiply by 100.

Table 4.3: Share of Monthly Household Expenditure on Beef, Fish, Chicken, Egg and Goat Meat.

Protein Product	Expenditure(₦)	Total Food Budget(₦)	Budget Share(%)
Beef	835850	10977000	7.61
Fish	659275	10977000	6.01
Chicken	645100	10977000	5.88
Egg	209440	10977000	1.91
Goat meat	170401	10977000	1.55

The budget share on the animal protein presented in Table 4.3 indicates that Budget Share on beef, fish, chicken, egg and goat meat were 7.61%, 6.01%, 5.88%, 1.91% and 1.55% respectively. This indicated that beef constituted a large proportion of household expenditure followed by fish among the animal protein food included in the system. The results conforms with the findings of Ezedinma, Kormawa and Chianu, (2006) and Yusuf (2012) who reported that a large proportion of the household monthly

expenditure devoted to animal protein food are spent on beef followed by fish. The reason for the observed pattern of highest proportion of household budget share on beef followed by fish is due to the price per kilogram of the product. Beef with a price of 1000 to 1500 naira per kilogram will have a large income allocated to it as compared to fish with price tag of 500 to 700 naira per kilogram.

4.4 Determinants of the Factors Affecting Animal Protein Consumption

The factors affecting beef and fish consumption was estimated using the Linear Approximate Almost Ideal Demand System (LA-AIDS) model using seemingly unrelated (SURE) estimator. The result is presented in Table 4.4.

Table 4.4: Seemingly unrelated regression estimate of the factors affecting animal protein consumption of the respondents.

Variables	Beef	Fish	Chicken	Egg	Goat meat
Log of Beef Price	0.0269* (9.29)	-0.0120* (-3.95)	-0.0056** (-2.15)	-0.0017 (-1.27)	0.0036* (-3.03)
Log of Fish Price	-0.0119* (-3.06)	0.0258* (6.19)	0.0001 (0.03)	-0.0035*** (-1.80)	0.00004 (0.02)
Log of Chicken Price	-0.0047* (-3.16)	-0.0032** (-2.03)	0.0252* (18.58)	-0.0017** (-2.22)	-0.0009 (-1.49)
Log of Egg Price	-0.0010 (-0.64)	-0.0033** (-2.03)	-0.0511* (-3.63)	0.0132* (17.04)	-0.0014** (-2.18)
Log of Goat meat Price	-0.0041* (-2.97)	-0.0003 (-0.23)	-0.0013 (-1.04)	-0.0024* (-3.57)	0.0141* (24.39)
Log of Expenditure	-0.0917* (-10.12)	-0.1058* (-10.90)	-0.0669* (-8.06)	-0.0347* (-7.58)	-0.0106* (-2.78)
Age	0.0002 (0.88)	0.0003 (0.99)	0.0004*** (1.74)	-0.0002 (-1.55)	0.00003 (0.31)
Gender	-0.0070*** (-1.80)	0.0039 (0.94)	0.0024 (0.64)	-0.0019 (-0.96)	-0.0007 (-0.044)
Household Size	0.0011 (1.30)	0.0017*** (1.82)	0.0002 (0.19)	0.0011** (2.49)	0.0002 (-0.46)
Education Level	0.0066** (2.32)	0.0064** (2.10)	0.0049*** (1.88)	-0.0023 (-1.62)	0.0007 (0.61)
Household Income	1.30e-07* (2.75)	2.39e-07* (4.71)	1.24e-07* (2.86)	2.96e-08 (1.24)	1.27e-08 (0.64)
Constant	0.4554 (10.99)	0.4831 (10.89)	0.2976 (7.85)	0.1907 (9.11)	0.0625 (3.59)
R-Square	0.57	0.45	0.67	0.65	0.74
Ward- Test(χ^2)	324.77	198.03			

NB: ***,** and * indicates statistical significance at 10%, 5% and 1% levels respectively. Values in Parenthesis are calculated t- values

The result of the analysis gave a coefficient of determination R^2 are 0.57 and 0.45 for beef and fish respectively, the implication of this is that for the beef equation, 57% variation in the dependent variable of the household budget share in beef was explained by the independent variables while 45% variability in the household budget share on fish was explained by the independent variables included in the model.

In the beef demand equation, the coefficient of price of beef was found to be positive and statistically significant at 1% probability level, this implies that a unit increase in the price of beef will increase the budget share on beef by a unit of 0.0269. The

findings agrees with that of Adetunji and Rauf (2012) who stated that budget share on beef increases with an increase in its price. The coefficient of fish price was found to be negative and statistically significant at 1% probability level implying that a unit increase in the price of fish will decrease the household budget share on beef by a magnitude of 0.0119. The coefficient of chicken price and goat meat price were found to be negative and statistically significant at 1% probability level, it implies that a unit increase in the price of chicken and goat meat will decrease the household budget share on beef by a magnitude of 0.0047 and 0.0041 respectively.

Expenditure on food of the household was found to be negative and statistically significant at 1% probability level, this implies that a unit increase in household food expenditure will decrease the household budget share on beef by a magnitude of 0.0917. The finding disagrees with that of Yusuf (2012) who reported an increase in household expenditure on beef by 0.1531 with a unit increase in household food expenditure.

Sex had a negative relationship with household beef budget share and was significant at 10% probability level, this indicate that female heads are more likely to obtain more beef for the family than male head. The coefficient of education level was found to be positive and statistically significant at 5% probability level, this implies that an increase in the education level of the household increases the budget share on beef of the household by a magnitude of 0.0066. An explanation to this is that there is increase awareness to the nutritional benefit of beef due advance in education status. The monthly income of the household had a positive relationship with the household expenditure on beef and was statistically significant at 1% probability level. This implies that increase in household income will increase the budget share on beef. A

reasonable explanation to this is that an increase in household income leads to an increase in the purchasing power of the household.

In the fish demand equation, the coefficient of fish price was found to be positive and statistically significant at 1% probability level, it implies that a unit increase in the price of fish will increase the household budget share on fish by a magnitude of 0.0258, this findings agrees with that of Yusuf (2012) but disagree with that of Dalhatu and Ala (2010) who reported a decrease in monthly expenditure on fish with a unit increase in its price. the coefficient of beef price (-0.0120), chicken price (-0.0032) and egg price(-0.0033) were found to be negative each, beef price was found to be statistically significant at 1% probability level while chicken price and egg price were statistically significant at 5% probability level respectively. The result implies that a unit increase in the price of beef, chicken and egg will decrease the budget share on fish by a magnitude of 0.0120, 0.0032 and 0.0033 respectively.

The coefficient of household food expenditure was found to be negative and statistically significant at 1% probability level indicating that a unit increase in the expenditure of the household will decrease the household budget share on fish by a magnitude of 0.1058.

The coefficient of household size, education level and household income was found to be positive and statistically significant at 10%, 5% and 1% probability level respectively, this implies that a unit increase in the household size will increase the household budget share on fish by a unit of 0.0017, this could be attributed to increase in the number of persons that will fed from the household pot. The result also implies that an increase in education level of the household will increase the household budget share on fish by a magnitude of 0.0064, it could be due to increase in awareness on the nutritional benefit of fish as source of protein to the body. The coefficient of household

income was found to be positive and statistically significant at 1% probability level indicating that a unit increase in household income will increase the household budget share on fish.

4.5 The own price, cross price and expenditure elasticity of beef, fish Chicken, Egg and Goat meat.

The own price shows how the price of beef and fish could affects its own demand, cross price indicates how the price of other animal protein (chicken, egg and goat meat) could affect the demand of beef and fish while expenditure elasticity indicates hoe the household income can affect the demand of beef and fish. The estimated own-price, cross-price and expenditure elasticity are presented in Table 4.5.

Table 4.5: own price, cross price and expenditure elasticity of beef, fish Chicken, egg and goat meat.

	Beef	Fish	Chicken	Egg	Goat meat
Beef	-0.90477	0.13197	0.085631	0.137365	0.054365
Fish	0.070856	-0.88991	0.068396	0.107354	0.041126
Chicken	0.070236	0.102979	-0.92881	0.105935	0.039631
Egg	0.022884	0.033075	0.013041	-0.95839	0.012159
Goat meat	0.018139	0.027236	0.017414	0.026903	-0.9803
Expenditure Elasticity	0.98795	0.98239	0.98862	0.98183	0.99316

The diagonal values represent the own price elasticity. The negative values of own price elasticity coefficients for the estimated variables are consistent with economic theory and are in conformity with theoretical a priori expectations. The coefficient suggest reveal that the variables (beef, fish, chicken, egg and goat meat) are price inelastic, this suggest that the households are very sensitive to price changes for the animal protein source they consume. The positive values of the cross-price elasticity of the all protein source indicated that there is substitutability between all the animal proteins products consume by of the household, this finding is contrary to that (Ezedinma et al., 2006) who reveal that on an aggregate meat product do not substitute

for each other. The expenditure elasticity of the animal protein product consume by the households are in conformity to a priori expectation. The positive coefficient according to a priori expectation implies that the animal products are normal goods. They have expenditure elasticity less than one implying they are necessity goods in the study area. It indicates that a unit increase in the household income will increase the demand for either of the animal protein product consume by the household. This finding is in line with previous work by (Seale *et al.*, 2003) who reported an expenditure elasticity of less than one for all meat products.

4.6 Constraints to beef and fish consumption by households

Constraint to beef and fish consumption are those factors that limit the consumption of the product by households. A number of constraints that affect household consumption of beef and fish were enumerated by the respondents. These are as presented in Table 4.6.

Table 4.6: Distribution of the Household According to Constraints faced in consuming Beef and Fish

Constraints	Frequency	Percentages
Beef		
High Prices	148	41
Low Level of Consumer Income	86	24
Beef Spoilage	55	15
Low Supply	47	13
Insufficient Numbers of beef market	26	7
Total	362*	
Fish		
High Prices	127	35
Fish Spoilage	105	29
Low Level of Consumer Income	66	18
Low Supply	42	12
Insufficient Numbers of beef market	25	7
Total	365*	

*multiple response

The result presented in table 4.6 is a multiple response on the constraint faced by household in consuming beef and fish. The constraint as enumerated by the respondents

was arranged according to the severity of the problems faced by the consumer in demanding the product.

The result indicated that high prices of beef and fish (41% and 35%) were a major constraint faced by the respondents in consuming beef and fish respectively. High prices of the product could be as a result of high transportation, high cost of production and high cost of preservation. A report in the premium times (2013) indicated that high prices of cattle that lead to high cost of beef was as a result of insurgency in some Northern part of the country which is known as an area with high cattle production. In the report, it states that insurgency in this part of the country has caused 70% decrease in the supply of cattle to markets in Kaduna leading to over 100% increases in its price. Baba and Drew (2014) also attributed high cost of transportation of food product to some part of the country to Boko Haram insurgency in some part of the North.

24 and 18% of the respondents reported that low level of consumer income is a constraints faced in consuming beef and fish respectively. Low level of consumer income could be as result of poor jobs. Unemployment rate in the country leaves the people to take job with meagre pay. Low pay off affects the purchasing power of the consumers. According to the Nigeria Bureau of Statistics (2014), unemployment rate has increased drastically from 5.30% in 2006 to 23.9% in 2014, with the alarming rate of this people taking job even with low pay. This affect the amount of beef and fish consume by the consumer.

15% and 29% of the respondents attributed rapid spoilage of beef and rapid spoilage of fish as a problem faced in consuming the products. Rapid spoilage of both beef and fish could be as a result poor power supply to power refrigerator use for preservation of the product. According to a report from John (2014), a visit to some part of Kaduna

Metropolis (Barnawa, UngwanRimi, Makera/Kakuri) revealed that power supply situation was worse off. Lack of power supply leads to high cost of preservation which in turn increase the price of the product.

13% and 12% of the respondents reported that low supply of beef and low supply of fish was a constraint faced in consuming beef and fish respectively. Low supply of the product could be as a result of shortage of the product due to high cost of transportation, insurgency and high cost of preservation as a result of poor electricity supply.

In an interview involving a correspondent of premium times and a cattle dealer in Kaduna state indicated that 110 trucks of cattle use to be supply to the market weekly before insurgency in some part of the North but now the supply has gone down to a paltry 60 trucks weekly (premium time news, 2013). The reduction in supply of cattle could be a reason for low supply in beef in the market, low supply in beef invariably affects the demand of fish which is a substitute to beef.

7% and 7% of the respondents indicated that insufficient numbers of the beef market and fish market are constraint faced in consuming beef and fish in the study area. Low supply of the product could lead to low distribution which leads to insufficient market.

4.7 Test of Hypothesis that price and income does not have significant relationship with the household demand of beef and fish.

The result for the test of hypothesis on whether the price and income of the households affects the demand of beef and fish are presented in table 4.7.

Table 4.7: Test of Hypothesis

Hypotheses	Parameter	Coefficient	Standard Error	t-value	Decision (H₀)
1a	Quantity of Beef and Price	0.0269*	0.0028	9.52	Rejected
1b	Quantity of Beef and Price	0.0258*	0.0042	6.19	Rejected
2a	Income and Quantity of Beef	1.30e-07*	4.74e-08	2.75	Rejected
2b	Income and Quantity of Beef	2.39e-07*	5.07e-08	4.71	Rejected

The estimate of the LA-AIDS model was used to test the hypothesis of the study, the values of the result was presented in table 4.7. The result indicate that the price of beef and fish were found to be statistically significant and positively influences household consumption of beef and fish respectively, therefore the null hypothesis which states that there is no significant relationship between the amount of beef and fish consumed by the household and price paid of the products is rejected and the alternate hypothesis accepted.

The household income was also found to be statistically significant and positively influences the consumption of beef and fish by households, therefore the null hypothesis which states that there is no significant relationship between the income of the household and quantity of beef and fish consumed by the household was rejected and the alternate hypothesis accepted.

CHAPTER FIVE

SUMMARY, CONCLUSION, RECOMMENDATIONS AND CONTRIBUTION TO KNOWLEDGE

5.1 Summary

Food as a combination of macro and micro nutrients must contain all the necessary nutrients to make it balance, among the nutrient is protein, protein is of animal and plant origin and estimated minimum protein requirements for the body is put at 70gm/capita/day and the recommended protein intake from animal source to be 35gm/capita/day. Nigeria households are faced with the problem of improving the quality and quantity of their diet as well as addressing the problem of nutritional imbalances. This study focused on analyzing the consumption expenditure on animal proteins in Kaduna metropolis with a view of estimating quantity of beef and fish demand by households, estimating share in household expenditure of beef and fish, determining the factors affecting animal protein consumption and to determine price and expenditure elasticity of beef and fish in the study area. The study involved a random selection and analysis of data from 241 respondents from the three Local Government Areas which were purposively selected from Kaduna Metropolis. Data collected was analysed using descriptive statistics such as frequency distribution and percentages. The inferential statistics used in the studies include budget share index, Linear Approximate Almost Ideal demand systems (LA-AIDS) model and the own price, cross price and expenditure elasticity equations derived from the LA-AIDS model.

The study revealed that socio-economic factor have influence on beef (gender, education level, and household income) and fish (education level, household size and household income) demanded by the households, the mean quantity of beef and fish demanded by households is 3.37kg and 4.59kg respectively while the mean price

perkilogram for beef and fish is N914.94 and N578.22 respectively. Percentage share in beef and fish was 0.076% and 0.060% respectively. Estimated determinant on demand gave a R^2 -value of 0.57 and 0.45 respectively. The result indicates that prices of beef and fish had influence on household expenditure on the product. The own price elasticity of beef and fish were negative. The cross price elasticity of beef and fish with respect to other animal protein source in the system shows there exist substitution effect between all the products. Expenditure elasticity of beef and fish were positive. Constraint faced by households in demanding beef and fish include high prices, low level of income, rapid spoilage and low supply.

5.2 Conclusion

Based on the findings of the studies on the analysis of beef and fish demand by households in Kaduna metropolis, Beef constitute the largest animal protein source consume by the household. The common factors that influence consumption of the product include socio-economic factors (especially education and income), price of the product (beef and fish), and price of substitute goods. The own price elasticity are negative which indicate that changes in prices of beef and fish have a relatively small effect in the quantity demanded of the product. The cross price elasticity were positive, it indicate substitutability between the products in the system. The study also reveals that both beef and fish are necessity goods as indicated by the values of the expenditure elasticity.

It can therefore be concluded that beef and fish demanded can be increased when the prices are set in line with different household income levels.

5.3 Contribution to Knowledge

- i. The study reveals that prices of the product (beef and fish) had influence on the expenditure of the products. It shows that a unit increase in price of the product will increase the household expenditure on beef and fish by 0.0269 and 0.0258 respectively.
- ii. The reveals that increase in household total food expenditure reduce household budget on beef and fish by 0.0917 and 0.1058 respectively. This is an indication that increase expenditure on other food items will reduce budget share on beef and fish.

5.4 Recommendation

On the basis of the findings of the study, the following recommendations are made for the improvement of beef and fish demand in the study area.

- i. Effort should be made by government to increase capital investment in the livestock and fishery sector so as enable atmosphere for increasing cattle and fish production that will make beef and fish to be adequately supplied at an affordable price.
- ii. Provision of jobs and entrepreneurship training by government, private sectors and other cooperate bodies to the jobless are means that ensures income generation which invariably increase the purchasing power of consumers. This will contribute positively to improvement of nutritional status of the people.
- iii. Farmers in the study area should be encouraged by stakeholders in the livestock sectors to venture into cattle production to ensure availability of beef at cheaper prices. Since insurgency has led to high cost of transportation and have led to low supply and high cost of the product, if farmers in the study area are

encourage to go in to cattle production and fish farming, the problem if not totally solved will be reduced.

- iv. Government and relevant institution involved should make credit easily assessable to livestock farmers, provision of inputs like feeds at subsidized rate and enabling environment to ensure increase production of cattle and fish to reduce price of beef and fish.
- v. It is not only farmers that are supposed to who engaged in fish farming, households with backyard spaces can do that by constructing ponds for small scale fish farming, this will help in making fish to be available for consumption. This can only be achieved through awareness.

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Appendix1: Questionnaire for the study

A. INFORMATION ON SOCIO-ECONOMIC CHARACTERISTICS OF THE RESPONDANT

1. Name (optional):
2. Phone Number(s):
3. Age:
4. Gender: (a) Male [] (b) Female []
5. Household size(Numbers family members that feed from you).....
6. Education level: (a) No Formal Education [] (b) Primary School Education [] (c) Secondary School Education [] (d) Tertiary Education [] (e) Others (specify).....
7. Household Monthly Income: ₦.....

B. INFORMATION ON FOOD CONSUME BY HOUSEHOLDS

8. What are the major type of food stuffs consumed by your household (list):
.....
.....
.....

9. Where do you purchase (buy) your food stuff: (a) Market [] (b) Farm [] (c) Road side [] (d) Import [] (e) others (specify).....

10. What is your household total Expenditure (amount spent) on food stuff in a month

₦

C. INFORMATION ON BEEF (cattle meat) AND FISH CONSUMED BY HOUSEHOLDS

11. Do your households consume beef (cattle/cow meat)? (a) Yes [] (b) No []

12. Do your households consumefish? (a) Yes [] (b) No []

13. If yes, where do you purchase the items (beef and fish) from?

Products	Place of Purchase					
	Market	Farm	Slaughter	Mini Mart	Import	Others (specify)
Beef						
Fish						

14. How do you purchase (buy) buy the product (fish and beef)?

Product	Mode of purchase				
	Pieces	kilogram	Cartoon	Basket	Others (specify)
Beef					
Fish					

15. What is the unit price of each of the products (beef and fish)?

Product	Unit price of the product in Naira (₦)				
	Pieces	kilogram	Cartoon	Basket	Others (specify)
Beef					
Fish					

16. How many times does your household consume the items (beef and fish) in month?

Product	Number of times of consumption
Beef	
Fish	

17. What quantity of beef and fish does your household consume in a month

Products	Quantity consumed in a month
Beef	
Fish	

18. What is your total monthly Expenditure (amount spends) on each of the product (beef and fish)?

(a) Beef (₦).....

(b) Fish (₦).....

19. In what form do your households consume the product:

Beef: (a) Cooked [] (b) Fried [] (c) Smoked [] (d) Dried []

(e) others (specify).....

Fish: (a) Cooked [] (b) Fried [] (c) Smoked [] (d) Dried [] (e) others

(specify).....

D. INFORMATION ON OTHER ANIMAL PROTEIN SOURCE SUBSTITUTED FOR BEEF AND FISH BY HOUSEHOLDS.

20. Tick from the options the animal protein source you consume other than beef or fish.

(a) Chicken [] (b) Egg [] (c) Goat meat [] (d) pork (pig meat) [] (e) Turkey []

(F)Chevon (sheep meat) []

21. Why do you consume the sources ticked above other than beef and fish?

(a)

(b)

(c)

22. Where do you get the other product listed above?

Products	Place of Purchase					
	Market	Farm	Slaughter	Mini Mart	Import	Others (specify)
Chicken						
Egg						
Goat meat						
Pork (pig meat)						
Turkey						
Chevon (sheep meat)						

23. How do you purchase the product?

Products	Mode of Purchase				
	Pieces	kilogram	Cartoon	create	Others (specify)
Chicken					
Egg					
Goat meat					
Pork (pig meat)					
Turkey					
Chevon (sheep meat)					

24. What is the unit price of each of the other products consumed by your households?

Products	Unit price of the product in Naira				
	Pieces	Kilogram	cartoon	Create	Others (specify)
Chicken					
Egg					
Goat meat					
Pork (pig meat)					
Turkey					
Chevon (sheep meat)					

25. How many times does your household consume the other products in a month?

Product	Number of times of consumption (frequency)
Chicken	
Egg	
Goat meat	
Pork (pig meat)	
Turkey	
Chevon (sheep meat)	

26. What quantity of each of the product does your household consume in a month?

Product	Quantity consume
Chicken	
Egg	
Goat meat	
Pork (pig meat)	
Turkey	
Chevon (sheep meat)	

27. What is your monthly expenditure (amount spend) on each of the product consumed by your household aside beef and fish?

Product	Monthly Expenditure in Naira
Chicken	₦
Egg	₦
Goat meat	₦
Pork (pig meat)	₦
Turkey	₦
Chevon (sheep meat)	₦

28. In what form does your household consume the products?

Products	Form of Consumption				
	Cooked	Fried	Smoked	dried	Others (specify)
Chicken					
Egg					
Goat meat					
Pork (pig meat)					
Turkey					
Chevon (sheep meat)					

29. Tick among the following options the constraints (problems) faced by your households in consuming beef and fish.

BEEF

- (a) Insufficient Market []
- (b) Low Supply []
- (c) Rapid beef Spoilage []
- (d) High prices []
- (e) Low level of consumer income []
- (f) Others (specify).....

FISH

- (a) Insufficient Market []
- (b) Low Supply []
- (c) Rapid fish Spoilage []
- (d) High prices []
- (e) Low level of consumer incom[]
- (f) Others (specify).....

30. Suggest possible solutions to the constraint mention above

- (a).....
- (b).....
- (c).....
- (d).....