Dissertation By

IBEZIAKO,

STELLA CHIAZOR

DEPARTMENT OF AGRICUL TURAL ECONOMICS

UNIVERSITY OF IBADAN IBADAN, NIGERIA.

ECONOMIC ANALYSIS OF FISH CONSUMPTION · IN IBADAN: IMPLICATIONS FOR FOOD AND NUTRITION POLICIES

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ECONOMIC ANALYSIS OF FISH CONSUMPTION IN IBADAN: IMPLICATIONS FOR FOOD AND NUTRITION POLICIES

BY

IBEZIAKO, STELLA CHIAZOR
(Matric No. 45952)
B.Sc. (Hons) Fisheries Management
University of Ibadan
Ibadan.

A PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN AGRICULTURAL ECONOMICS, UNIVERSITY OF IBADAN.

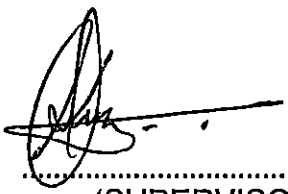
DEPARTMENT OF AGRICULTURAL ECONOMICS
UNIVERSITY OF IBADAN
IBADAN, NIGERIA.

DEDICATION

I dedicate this project to the Lord Jesus Christ,
the Alpha and the Omega, the beginning and the end,
the one who was, who is and who is to come.
and
To all those who inspite of themselves have
determined to succeed.

CERTIFICATION

I certify that this work was carried out by Miss Ibeziako, Stella Chiazor in the Department of Agricultural Economics, University of Ibadan, Ibadan, Nigeria.



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(SUPERVISOR)

Dr. V. O. Okoruwa
B.Sc. (Agric. Econs) (Ibadan)
M.Sc; Ph.D (Ibadan)
Department of Agricultural Economics,
University of Ibadan,
Ibadan, Nigeria.

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ABSTRACT

This study analyses household fish consumption in Ibadan metropolis and examines the implications for food and nutrition policies.

Cross-sectional data were collected from 124 households in Ibadan with a view to analysing the functional relationship between fish consumption and some socio-economic variables of the household. For this purpose, households were classified into low, middle and high income groups.

The study showed that majority of households in the study area are in the low income class. Income was found to be a major determinant of household fish consumption expenditure, while other factors like household size, age, occupation, taste and level of education were secondary determinants. The study also reveals that the average monthly expenditure of fish increases with increase in income and household size.

In the regression analysis, four functional forms were fitted to the collected data in which the exponential function gave the best fit for households' fish consumption expenditure. The income elasticity of demand for fish was found to be 0.12122, indicating that fish is income inelastic and is also a necessity in the study area, while the MPC for income was 0.0076. Income was found to be statistically significant at 1 per cent while household size and age were significant at 5 per cent. Education did not appear to be a significant explanatory variable influencing fish consumption expenditure in this study.

The findings of this study point to the need for increasing domestic fish production in the country through deliberate government efforts and the participation of the private sectors and NGOs in development plans, thereby increasing the daily per caput intake of fish.

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INTRODUCTION

1.1 THE NIGERIAN FISHERIES SECTOR

Nigerian fisheries unlike other agricultural sub-sectors has witnessed rapid growth over the last two decades. Between 1971 and 1989, fish production has increased by 26.5% from about 535,000 tons to 677,000 tons. Also the number of trawlers increased from 30 to 158 respectively (FDF, 1980, 1990).

The main sources of fish supply in Nigeria are domestic fish production and fish imports. The domestic fish production is derived from artisanal inland waters, artisanal coastal and brackish waters, industrial fishing in inshore and offshore waters and aquaculture (Mabawonku, 1986).

The artisanal subsector covers the operation of small scale canoe fishermen operating in the coastal areas, creeks, lagoons, inshore waters and inland rivers.

The Nigerian industrial fishery which is mainly marine and capital intensive, comprises of distant water fishery which involves the operation of deep sea trawlers and the inshore fishery that operates within the continental shelf. Aquaculture is made up of ponds, reservoirs, lakes and dams in which fish is reared for consumption.

The other sources of fish production in Nigeria is through commercially exploited marine fishery resources. The artisanal sector is responsible for between 70% (Mabawonku, 1986) to 98.83% (Tobor, 1985) of Nigeria's total domestic production, while industrial fisheries is responsible for the rest. The contribution of aquaculture as observed by Mabawonku (1986) is still very minimal being about 500,000 tonnes/year.

Ita (1984) stated that Nigeria is endowed with extensive land water masses of about 12.5 million hectares capable of producing over 500,000 metric tonnes of

fish per annum under adequate management. These include natural lakes, reservoirs and artificial ponds estimated at about 959,000 hectares and rivers with flood plains estimated at about 11.5 million hectares. All these sources are capable of supplying fish and fish products for adequate per capita consumption of the whole country if they are systematically exploited and properly harnessed.

To further show the potential of the various sources of fish supply, Ajayi and Adegbola (1985) estimated that the inshore artisanal fisheries have potential for 228,000 -270,000 metric tonnes, Lake Chad 42,000 - 55,000 metric tonnes, rivers and tributaries 206,548 - 216,248 metric tonnes and fish culture (aquaculture) 175,000 - 500,000 metric tonnes annually. Tobor (1990) also reported that aquaculture alone has the potential of meeting Nigeria's fish demand.

1.2 DEMAND FOR FISH IN NIGERIA

The inability of the domestic fish production to meet the domestic demand for fish has led to the importation of fish, despite the drain on the economy, however, with importation deficit in fish supply to meet local consumption the need still persists.

The projected fish demand in 1993 was 1.491 million metric tonnes, but effective average annual fish demand was estimated at 1.2 million tonnes (Okpanefe 1982; Tobor 1985). Average annual domestic fish production was estimated at 0.57 million tonnes with per capita consumption put at 13 kg (Adeniyi 1987). This shows that the projected fish demand far exceeds the projected per caput consumption.

Mabawonku (1989) estimated that Nigeria would have to spend not less than 3.86 billion on fish importation if the demand is to be met while the Minister of Agriculture and Natural Resources in 1994, reported that Nigeria will spend an

annual estimate of US $240 million on frozen fish importation to augment the short fall in production.

The estimated fish demand in Nigeria based on an annual per caput fish consumption of 11.0 kg regarded as adequate for a normal healthy growth, is expected to increase from 1,169,000 metric tonnes in 1989 through 1,294,000 metric tonnes in 1993; 1,432,000 metric tonnes in 1997 and 1,545,000 in the year 2000 (Tobor 1989).

Two factors contributing to the ever widening gap between fish supply and demand in Nigeria identified by Tobor 1990, are the declining trend in domestic fish production and the control of fish importation which alone in 1973, cost Nigeria a foreign exchange equivalent of 7,054,633. This figure rose to a apeak of 265,099,906 in 1980 before falling to 89,865,031 in 1985, when there was no importation of stock fish.

1.3 IMPORTANCE OF FISH AS A SOURCE OF PROTEIN

The need for protein in human diet continues to increase as the world population grows. Proteins for human consumption comes from two main sources namely plants and animals.

Plant protein have been found to be deficient in certain amino acids (methionine, tryptophan and lysine) which are necessary for healthy growth. Animal proteins on the other hand are rich in these amino acids and are described by Moses (1983) as first class or good quality proteins.

Proteins obtained from livestock population are limited by several factors including scarcity and high cost of feeds, diseases and low genetic potentials of indigenous breeds, which have caused them to be expensive. Fish provides a

cheaper source of first class proteins for human consumption and supplements to other sources of animal protein that have been on the decline (ADP Extension Guide, 1988).

Fish is an important component of the average Nigerian diet. Mabawonku (1986), reported that the proportion of protein from fish and fish products of the average Nigerian is about 40% of all animal protein consumed. Fish is a rich source of lysine and sulphur amino acids and is therefore suitable for complementing high carbohydrate diets. Fish is also a good source of thiamine, riboflavin vitamin A and D, phosphorous, calcium and iron and are high in poly unsaturated fatty acids which are important in lowering blood cholesterol level (Kent, 1984).

1.4 TRENDS IN FISH CONSUMPTION

Fish is in increasing demand in Nigeria. According to FAO (1982), Nigeria is the only country in the world that offers the most prospects for the marketing of frozen fish. This increase in consumption of fish is due to the following factors:

(i) uncontrolled increase in population

(ii) increase in national income

(iii) increasing cost of meat products

(iv) scarcity of many other protein sources such as poultry products (FAO 1982).

It has been estimated that the per caput fish consumption per day in Nigeria as early as the 1960's was 29.1 gm, this yields 2.6 gm of animal protein which represents 35% of the per caput consumption of livestock products and 30.8% of animal protein intake (Olayide, 1972). This per caput fish consumption was higher than any other livestock product in the country during the period.

Currently, about 40% of animal protein consumed in the country is derived from fish (Nigeria, 1980). The relative high per caput consumption of fish has been attributed to its greater availability at relatively cheaper prices (Osajuyigbe, 1981).

The trend in fish consumption is expected to increase in the years ahead. Okpanefe (1982), projected fish consumption in Nigeria for the years 1980 to 2000. The results showed a projected fish consumption of over 2 million metric tonnes by the year 2000, and a projected per caput consumption of 14.49 kg for that year. This, in the face of declining index of fish production means a further widening gap between consumption and production and also an increase in fish importation, resulting in an increase in the real price of fish. The overall consequences are undernutrition and food insecurity particularly among low income consumers.

1.5 PROBLEM STATEMENT

Recent surveys of nutritional problems reveal that one out of five persons in the developing world is chronically undernourished (FAO and WHO, 1992).

Despite improvements in food availability in Nigeria, hunger and malnutrition still exists in many parts of the country.

A 1991 survey conducted by the Federal Ministry of Health and UNICEF, showed that malnutrition still remains the most serious health problem in Nigeria. The national per capita daily intake was estimated in January 1989 at 2,190 kilo calories and 43 grams of protein. This is 93% of the International Standard of 2,350 kilo calories and 78% of the International Standard of 53 grams of protein per person per day (UNICEF 1991). Also, in a recent meeting of the African Regional Nutrition Strategy (1993), Nigeria was included as one of the countries

having the lowest daily per capita supplies of between 70 -90 per cent of nutrition requirements.

Protein-energy malnutrition as assessed by physical growth and body measurements, is still widespread in Nigeria affecting vulnerable groups. These include infants, pre-school children and pregnant and lactating mothers particularly from low income households (Agary 1992).

In the quest for solutions to the problems of food security and undernutrition in Nigeria, there is an urgent need for fish consumption surveys in the country, in order to reduce the incidence of protein energy malnutrition particularly among vulnerable groups, and so increase the standard of living of the average Nigerian.

1.6 JUSTIFICATION OF THE STUDY

In view of Nigeria's nutritional problems, the importance of fish as a cheap and available source of protein is being promoted and research efforts so far tend to confirm this as the alternative solution to the imminent problem of protein deficiency in Nigeria. It therefore becomes necessary to pursue more vigorously the objective of increasing the daily per caput intake of fish in the country and hence an urgent need for fish consumption surveys in Nigeria so as to accurately determine the country's fish demand with a view to meeting the consumption needs of the people.

Relatively few attempts have been made to study fish consumption in Nigeria. Oniye and Adeboye (1986) conducted a study on consumers preference for fish in Kaduna State, while Adeniyi (1987) conducted a similar study on fish consumption pattern in Oyo and Kwara States. Results from these studies have shown that there is a growing demand for fish in the country in the face of declining production and that given the significant positive effect of income and

family size on the quantity of fish consumed, the trend of rising fish consumption will persist into the future.

It has been revealed that a significant shortage of fish supply will result in a major rise in the real price of fish and will cause severe effects on low income consumers (FAO 1995). Considering Nigeria population growth rate, there is a need for food supplies to increase faster than population in order to ensure growth in per caput supplies, particularly among population groups with very low and inadequate nutritional levels. FAO (1995), further revealed that slow down in agricultural growth is due to the fact that people who would consume more do not have sufficient income to demand more food and cause it to be produced.

This study will therefore determine the extent to which fish consumption requirements are being met, consumers' preference for fish and the existing constraints associated with fish consumption in Nigeria. Results from this survey will be useful in addressing national policy issues, in assessing the nutrition of the nation and in designing effective food and nutrition programmes and agricultural programmes. This survey will also be useful in promoting the development of the fishery subsector as a means for increasing fish production in the country.

1.7 OBJECTIVES OF THE STUDY

The principal objective is to determine the household fish consumption pattern among low, middle and high income groups in Ibadan metropolis.

The specific objectives are:

1. To examine the socio-economic characteristics of the household and how these influence fish consumption pattern.
2. To analyse consumers' preference for fish.

3. To determine the proportion of household income spent on fish consumption in the study area.
4. To estimate the income elasticities of total fish consumption among different income groups.
5. To estimate the household marginal propensity to consume fish in the study.
6. To make policy recommendations and suggestions based on the results obtained from the findings.

1.8 HYPOTHESIS OF THE STUDY

The hypothesis to be tested in this study are:

Ho : There is no significant difference in the proportion of household income that is spent on fish consumption in the study area.

H1 : There is significant difference in the proportion of household income that is spent on fish consumption in the study area.

Ho : There is no significant difference in the socio-economic characteristics of the household on fish consumption.

Ho : There is significant difference in the socio-economic characteristics of the household on fish consumption.

1.9 PLAN OF THE STUDY

This study is divided into five chapters. Chapter two deals with the review of relevant literature pertaining to fish and food consumption and gives the theoretical framework.

Chapter three gives the research methodology and the analytical techniques that were used in the survey. Particular attention is given to choice of functional forms used in the estimation procedures.

Chapter four discusses the empirical results and findings of the study.

Chapter five gives the summary of findings, the implications for food and nutrition policies and the conclusion.

CHAPTER TWO

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 THEORETICAL FRAMEWORK

2.1.1 The Concept of Consumption

Consumption pattern describes the variation in goods and services consumed. This change can be at a given time or overtime. The motive behind consumption can be described in various ways. The most important is that relating to the nature of the demand that is, direct or otherwise.

The decision of an individual on what range of items to consume is largely influenced by his income and the price of the commodity. An increase in the consumers income or a reduction in the prices of foodstuff will automatically increase the quantity of food consumed by a household and vice-versa, all things being equal.

The effect of increases in incomes on the demand for food is based on Engels law which states that the proportion of income spent on food diminishes as income increases. Therefore as incomes increase, the marginal utility of food is less than that of other commodities because consumers would have satisfied their need for food first. A higher income would then mean that better foods would be consumed such as animal proteins, but the increase in the consumption of other commodities would be greater.

The consumer has a given income which sets limits to his maximising behaviour. Income therefore acts as a constraint in the attempt for maximising utility. The income constraint in the case of two commodities (X and Y) may be expressed as

$$Y = Px\,Qx + Py\,Qy$$

This is referred to as the budget constraint of the consumer. The consumer is in equilibrium when he maximises his utility, given his income and market prices. Two conditions must be fulfilled for the consumer to be in equilibrium. The first condition is that the marginal rate of substitution be equal to the ratio of commodity prices.

$$MRSx,y = \frac{MUx}{MUy} = \frac{Px}{Py}$$

where

MUx = Marginal Utility of Commodity X

MUy = Marginal Utility of Commodity Y

Px = Price of Commodity X

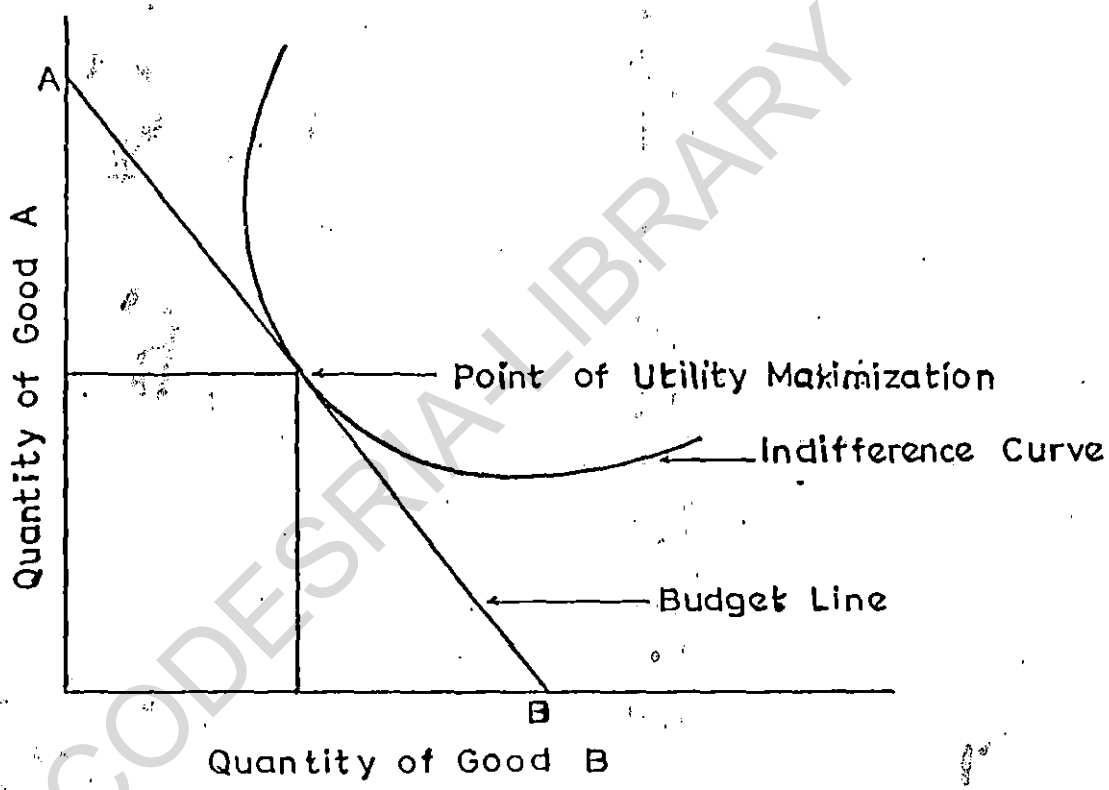
Py = Price of Commodity Y

The second condition is that the indifference curve be convex to the origin. This condition is fulfilled by the axiom of diminishing MRSx,y which states that the slope of the indifference curve decreases (in absolute term) as we move along the curve from left downward to the right.

At the point of tangency the slopes of the budget line (Px/Py) and of the indifference curve (MRSx,y = MUx/MUy) are equal:

$$\frac{MUx}{MUy} = \frac{Px}{Py}$$

Figure 2.1: Indifference Curve Showing Maximisation of Utility



2.2 LITERATURE REVIEW

Several studies have been carried out on food consumption pattern of the household in general, but relatively few attempts have been made to study fish consumption in Nigeria. In view of this, it becomes pertinent to consider the review of some previous studies on fish consumption in Nigeria.

2.2.1 Fish Consumption Studies

Various studies have been carried out on the pattern of fish consumption by the household, such as the relationship between fish consumption and income level and certain socio-economic factors that influence household consumption expenditure. However, opinions on the composition of the criteria used in these studies differ based on the perspective of the researchers.

Oniye and Adeboye (1986), in their study on consumer preference for fish in Kaduna State observed that fresh fish was most preferred by people of all groups, followed by fried, smoked and dried fish in that order. Income level was found to be a major factor influencing household fish consumption decision.

Adeniyi (1987) in a preliminary analysis carried out on fish consumption in Kwara and Oyo States, found that 60.2% of the consumers interviewed indicated that they preferred fish to any other source of animal protein, while 20.5% had preference for beef. This preference however appeared not to be reflected in the expenditure on fish, for average monthly fish expenditure was 35.53 which was less than that of beef 43.29. The reason for this discrepancy could be found in the low price of beef relative to that of fish, particularly fresh fish.

Other important factors to be considered in fish consumption studies in Nigeria include the various species of fish sold in the Nigerian market and the different forms in which fish can be bought. These forms were analysed by Mabawonku et al (1982) as fresh, smoked, sundried or salted. Thus a consumer in purchasing a particular variety or form of fish may likely depend not only on relative prices or the prices of substitutes such as meat, but more especially on the distinct characteristics or quality which the consumer attaches to what he buys. From their study, they found that a high proportion of respondents would increase their consumption of cured fish relative to others such as fresh fish and meat. Fresh fish was considered as a substitute in this case.

Fabiyi (1985), in his study on the demand for fish conducted in Calabar, found that both own price elasticities of demand for fresh and frozen fish decreased as the level of per capita income increased, while income elasticity of demand increased as per capita income increased. The calculated per capita consumption was found to be 5.18 kg and 4.31 kg per annum for fresh and frozen fish respectively. The values of own price and income elasticities indicate that more fish will be consumed at every increase in income, if both production and marketing are improved.

Adesimi and Aderinola (1983) in their study on the economic analysis of fish import demand in Nigeria, have shown that Nigerians have a relatively high marginal propensity to consume imported fish and that the volume of fish imports was very responsive to changes in socio-economic factors such as population, national income and domestic fish production.

2.2.2 Food Consumption Determinants

The knowledge of consumption pattern and how it relates to income is an important factor in setting economic policies for a balanced development. This has made a number of researchers to pay considerable attention to the study of household consumption expenditure pattern in relation to income level.

An FAO study (1969), on the effects of income on the structure of diets in Nigeria, found that calorific proportions of proteins of animal origin in the diet rises closely with income. This means that as households become more affluent, they tend to consume more of animal protein and less of staples.

Oni and Anthonio (1971) in their study on food consumption pattern in Ibadan, found that food consumption pattern in Nigeria obeys Engels law, that is, as income increases, the marginal propensity to consume food items tend to decrease. It was found that 62% of the disposable income of households in the low income group was spent on food, while 39% and 16% was spent on food by the middle and high income group respectively. The study also revealed that households in the low income group spent about 27% of their total food expenditure on animal protein. This percentage increased to 28% and 38% for the middle and high income groups respectively.

Edeh (1982), in his study on the demand for animal protein in Isi-Uzo LGA of Anambra State of Nigeria also found that consumption of animal protein increased with increase in income. 14%, 20% and 26% of total food expenditure was analysed for low, middle and high income households respectively. It was observed that the literate households spent more on animal protein consumption than its illiterate counterpart.

An analysis of consumption pattern in urban cities by Ojo (1983), showed that income elasticity for expenditure on all items considered were positive. Food had the highest marginal propensity of 0.23, while 0.08, 0.05 and 0.03 were obtained for accommodation, transport and clothing respectively.

Research on income elasticities were also carried out by Anthonio (1966) and Aboyade (1983). Results showed that income elasticities were low for staple commodities such as coarse grains and tubers but high for protein foods such as meat, fish and eggs. The marginal propensity figures were found to decline with increase in income signifying a decline in expenditure on food as income rises. The marginal propensity and income elasticities were highest for animal protein.

Carpe-Smith (1993) in her study on consumption pattern in rural areas of Idanre, Ifedore LGA, found that for the low income level groups, more than half of their income was spent on food, while the middle and high income groups spent less than half of their income on food. These were given as 59.65%, 42.04% and 20.65% for low, middle and high income groups respectively. These percentages also showed that little was spent on non-food items by the low income groups which dominated the rural areas, while the high income groups were able to spend more on non-food items. This suggests that as income increases, the proportion spent on non-food items increase, confirming Engel's law.

Olayide (1993) conducted a survey on differences in food consumption of academic and non academic staff in the University of Ibadan. The consumption pattern showed that academic staff who are least paid between 2,000 - 2,999 spend 42.21% of their income on food consumption, while non academic staff who are paid below 2,000 - 2,999, spend 55.54% of their income on food consumption.

The survey showed across the income classes for academic and non-academic staff that the higher the income the less the food consumption expenditure.

Thus various studies have shown that a percentage change in the household income will result in less than a proportionate increase in the consumption expenditure on all food and staples except in the consumption expenditure on meat, fish and other protein food which are fairly elastic. This suggests that in response to income increases, households would consume fish and other proteinous food relatively more than other categories of food items.

Other socio-economic characteristics such as household size and occupational status are also important factors found to influence household consumption pattern and are most frequently used explanatory variables in cross sectional consumption studies.

Oni and Anthonio (1971) in their study, found that other factors like household size and composition, occupation and age influenced the consumption of the high income households. The regression results showed that the marginal propensity to consume animal protein ranged from 0.1492 for the low income households to 0.1904 for the high income households. The low consumption of animal protein of the low income earners was associated with their low level of education.

Thomas (1972), also found in his study on the demand for food that the household consumption of a particular commodity is a function of the purchasing power of the family; family size and composition; social class and location of the family, and the amount of commodity entering the household free of charge.

Babalola (1978) in his study on effect of income on food consumption expenditure in Ado-Ekiti, showed that coefficients for the total elasticities on "all

foods" and the expenditure on starchy foods had a positive relationship with household size, but in the case of expenditure on protein foods, household size was negatively correlated with it. This indicates that as family size increases, less protein foods are consumed.

Davies (1982), studied the inter-relationship between socio-economic characteristics of food expenditure pattern and nutritional status of low income households. He found there to be a significant difference in the consumption pattern between individuals with a minimum of high school and those with a minimum of primary school.

Isamah (1992) confirmed this in his study on some socio-economic variables on household food consumption expenditure pattern in Ibadan metropolis. He found that respondents with low income bracket had at maximum secondary education while those in the high income groups had tertiary education. He found that household size and income were positively related and the percentage of expenditure on food items increased as income increased. Umoh (1994), also in his study on household food consumption and income distribution pattern in Nigeria found that the level of education positively influenced expenditure on food items.

CHAPTER THREE

RESEARCH METHODOLOGY AND ANALYTICAL PROCEDURE

3.1 THE STUDY AREA

The study area is Ibadan metropolis. Ibadan is the capital of Oyo State and one of the most populated cities in Africa. The estimated population of Ibadan as at 1991 was 1,222,570 (National Population Commission 1991 Census Figure).

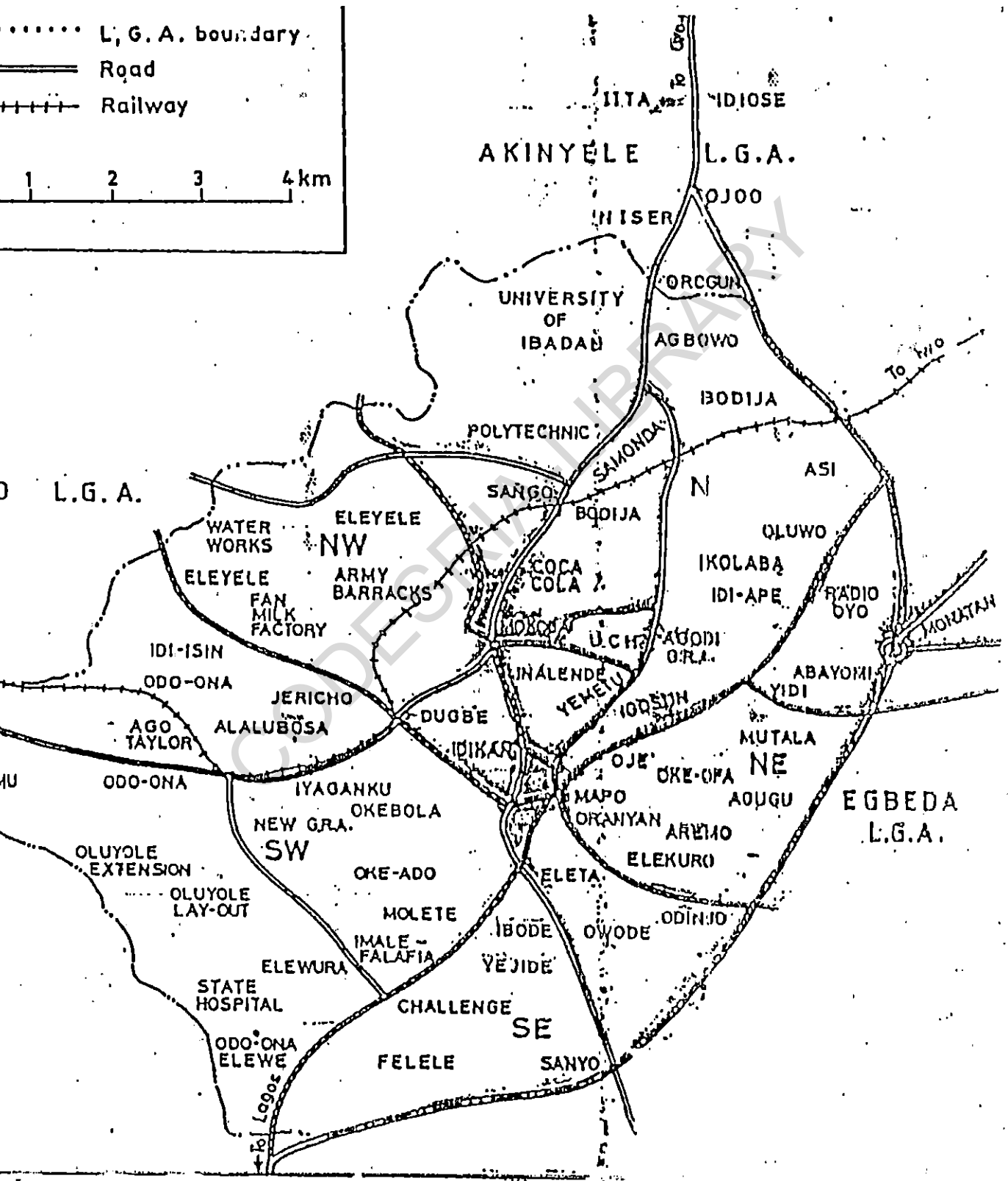
Geographically, Ibadan is located between 720' and 740' east of Greenwich Meridian and latitude 335' and 410' of the equator. The city lies in the equatorial rain forest zone and has a land area of between 445 and 455 km≤.

The city consists of five Local Government Areas (LGAs). These are Ibadan North, North-West, North-East, South-West and South-East.

Ibadan is an important commercial centre attracting various people from different parts of the country. Important markets in the metropolis include Bodija, Alesinloye, Sango, Oje, Gate, Orita-Merin, Oja-Oba, Mokola and Oranyan.

The commercial activities in the metropolitan city coupled with the educational institutions and government establishments have generated people with diverse occupational structure. These include professionals comprising of lawyers, doctors and engineers; businessmen, mechanics, furniture makers etc. However, there is little farming activity in the city and therefore most of the food consumed in the city are produced outside the city from surrounding villages and suburbs.

Figure 3.1: Map of the Study Area: Ibadan



3.2 SAMPLING PROCEDURE AND DATA COLLECTION

The target population for this study was the consuming households in Ibadan metropolis. The household is defined as the number of persons living together and eating from the same pot. This study focused on the low, middle and high income groups, to determine how income and other socio-economic factors influenced their consumption, as well as gather information on consumers' preferences and quantity of fish consumed.

Multi-stage stratified random sampling technique was used in selecting the sample needed for the analysis. The first step in the sampling procedure was to stratify the study area into cells of high, medium and low density areas. This was to ensure that each income group was adequately represented in the sample. Bodija Estate, Oluyole Estate, G.R.A. and Idi-Ishin were selected for the low density areas, while Ring-Road, Felele, Iwo-Road and Eleyele represented the medium density areas. For the high density areas, Beere, Orita-Merin, Oje and Oja-Oba were selected.

The second stage involved the selection of households by random sampling procedure. A complete list of all the households in each of the areas were obtained from the National Population Commission Census list. A total of 150 households in these areas were randomly selected with sample size distributed proportionate to size. The FAO (1992) recommended formula for nutritional surveys was used to calculate the required sample size. This was based on the total number of households in each area and the sample size of 150 required in the study. Thus for the high density areas, consisting of larger numbers of households, 88 was drawn, while 38 and 24 were obtained for the medium and low density areas respectively.

The data used for this study consisted of primary and secondary data. For the primary data, structured questionnaires were used to generate the data needed for the study. For the secondary data, relevant publication on the issues under study were extensively reviewed to derive the needed information.

Cross-sectional data relating to income distribution, fish consumption pattern and other socio-economic characteristics of the household, such as age, level of education, occupation of the household head and household size were obtained from the selected households. Information on consumers attitudes and knowledge were also obtained as this could be directly linked to their fish consumption behaviour.

A total of 150 questionnaires were administered, out of which 124 questionnaires were found adequate for the analysis after retrieving them from the respondents.

3.3 METHOD OF DATA ANALYSIS

The analytical technique that was used in this study include the following:

(1) Descriptive Analysis

Frequency tables and cross tabulation were used as explorative instruments for determining the relationship among variables.

(2) Regression Analysis

Regression analysis was used to obtain estimates of income elasticities as well as the marginal propensity to consume. Regression analysis is important and useful for describing the relationship between the endogenous and exogenous variables. It estimates the statistical significance of the exogenous variables as well as determine the overall effect of all these variables on the endogenous variables. In this study, the endogenous variable is the household's monthly

expenditure on fish, while the exogenous variables are the factors affecting the expenditure pattern.

The endogenous variable which is the dependent variable yields income elasticity with respect to expenditure. The exogenous variables which are the independent variables include price, household size, occupation, educational background, taste, etc.

3.4 DUMMY EXPLANATORY VARIABLES

In view of the non-quantifiable nature of some socio-economic variables present in the regression model, dummy variables were employed. These socio-economic variables were occupation and taste. Dummies were also used for the level of education of household heads, in order to produce more meaningful results.

For occupation and taste they were assigned values of one and zero in the following order:

D1 (Occupation

Salary earners = 1

Otherwise = 0 ("Otherwise" here refers to professionals, own business, farmers and "others" representing apprentices, pensioners and students).

For taste representing D2

Alaran = 1

Otherwise = 0 ("Otherwise" refers to Panla, Express and "Others" which are Sawa and Kote).

For the level of Education:

D3 represents no formal education

No formal education	=	1
Otherwise	=	0

D4 (Primary Education)

Primary Education	=	1
Otherwise	=	0

D5 (Secondary Education)

Secondary Education	=	1
Otherwise	=	0

D6 (Tertiary Education)

Tertiary Education	=	1
Otherwise	=	0

3.5 FISH CONSUMPTION MODEL

The general form of regression model for this analysis is given by:

$Y = f(X1, X2, X3, X4, X5, D1, D2, D3, D4, D5, D6, e1)$

where:

Y	=	Total monthly expenditure on fish
X1	=	Total household monthly disposable income
X2,	=	Household size
X3,	=	Age of respondents
X4,	=	Price of fish
X5,	=	Household monthly expenditure on substitutes
D1,	=	Dummy variable for occupation
D2,	=	Dummy variable for taste
D3,	=	Dummy variable for "No formal education"

The co-efficient of farm size (hectare) (X6) was positive and significant at I percent. This implied that there was a direct relationship between the independent variable and dependent variable - adoption.

The co-efficient of credit availability percent (X7) is positive and significant at 1 percent. This showed a direct relationship between the variable and adoption. This was expected because improved technology adoption sometimes were cost-effective.

In contrast, no significant relationship seemed to exist between the intensity of adoption of yam/cassava/maize/melon alternate row and cassava/rice and such factors as herd/stock size, yield per hectare, no of hoes, no of matchets, household possession such as housetype, radio, bicycle, and furniture

Constraints to Adoption of the Multiple Cropping Systems

Perhaps, one of the most readily visible attributes of the rural farmers' pattern of production is the large number of crops grown. This is to guard against crops failure. However, the crops are planted in scattered positions. Even through the adoption of yam/cassava/rice cropping systems will ameliorate the shortcomings of the old systems, they have not been massively adopted. Factors that constrain their adoption are categorized into contact farmers, Extension-Agency, the multiple cropping systems and environmental related factors.

4.1.11 Table 11 Distribution of Farmers by their perceived constraints.

Constraint	Constraint mean (X) scores	
	System I	System II
	Yam/cassava/melon mean (X) score	Cassava/rice mean (X) score
Unawareness of the multiple cropping systems	1.62	1.067
Improved planting materials like cassava cuttings, seed yams and rice seeds	1.92	2.11
Low level of education	2.17	2.17
Agro-chemicals	2.14	2.18
Fund	2.47	2.45
High cost of inputs	2.19	2.45
Time	1.19	1.18
Unavailability of labour	1.41	1.15
Land tenure problems	1.44	1.09
Motivation like letters of commendations praises the farmers	1.07	0.84
Grand mean (X)	1.61	1.57

Entries in Table 11, show that unawareness of the multiple cropping system (1.62), lack of improved planting materials such as cassava cuttings, seed yams (1.92), low level of education (2.17), agrochemicals (2.14), fund (2.07), and high cost of inputs 2.19, were considered constraints for the adoption of yam/cassava/maize/melon alternate row, while improved planting materials: including cassava cuttings and rice seeds (2.11), low level of education (2.17) agrochemicals (2.18), funds (2.45), high cost of inputs (2.45), were considered constraints to adoption of cassava/Rice. The grand means X of 1.61 for Yam/cassava/maize/melon alternate row and X 1.57 for the cassava/Rice cropping systems show that out of the ten items listed,

Here x is the sample mean; Ux = U is the population mean while x = /n where is the population standard deviation and n is the sample size.

The variable is given by $$Z_c = \frac{\overline{X} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

(ii) For Small Samples (Student t-test/standard error test)

In this case, sample sizes are small (n < 30), and test of hypothesis and significance can be formulated using student t-test. $$t_c = \frac{\overline{X} - \mu}{\frac{S}{\sqrt{n-1}}}$$

where

S = sample standard deviation.

Generally, we test the null hypothesis, Ho, using a two-tailed test at either 1 or 5 per cent level of significance.

3.6.2 Rules of Decision

1. If the calculated Z or t value is less than the tabulated value at Z/t/2 degree of freedom, the null hypothesis is accepted.
2. If the calculated Z/t value is greater than the tabulated value at Z/t/2, this means that the parameter is then statistically significant and the null hypothesis is rejected.

3.7 LIMITATION OF DATA

One of the major constraints in the study was the limited time frame given to carry out the survey. Thus the sample size had to be reduced from 450 to a manageable size of 150 samples.

Other limitations of data encountered during the field survey are as follows:

In the high density areas characterised mostly by low income earners, illiteracy and the low level of education of some of the respondents made it difficult to interview them in English. This therefore involved interpreting the questionnaires into the local dialect (Yoruba) in order to obtain the needed information.

Some respondents that were self employed could not give accurate estimates of their monthly income. Other respondents could not give accurate information on their monthly expenditure on food and fish.

A number of respondents, particularly among the middle and low income earners, were unwilling to disclose their sources of income especially those who had other businesses apart from their official jobs. This made it difficult in some cases to relate income to expenditure. While some respondents understated their income believing it was for taxation purposes, some respondents overstated their income not wanting to be seen as low income earners.

Most respondents could not give estimates on the price per kilo of fish purchased, therefore this was obtained from some fish shops. The kilo of fish used for the analysis was arrived at by using the price to divide the monthly expenditure on fish. In spite of these limitations however, reliable estimates and information were still obtained and were used in the analysis.

CHAPTER FOUR

RESULT PRESENTATION AND DISCUSSIONS

This chapter focuses on the pattern of fish consumption by the households, such as the relationship between fish consumption and income and certain socio-economic factors influencing household consumption expenditure.

Households are analysed according to income groups, age of respondents, educational status and household family size. Also, the results of the regression analysis are presented and discussed.

4.1 SOCIO-ECONOMIC CHARACTERISTICS OF THE HOUSEHOLDS

Socio-economic characteristics such as household size, educational status, age distribution and occupational status are important factors found to influence household consumption pattern. Following, are the percentage distribution of the socio-economic characteristics of the households interviewed during the survey.

4.1.1 Educational Status of Households

Education is taste changing and usually affects the consumption pattern and nutrition of a household. This is because as the years of formal education increase, consumers become increasingly aware of the nutritional value of certain food items like fish, meat and eggs and subsequently increase their consumption of them. The distribution of households by level of education of household head is presented in Table 4.1.

Table 4.1 Distribution of Household by Level of Education of Household Head

Level of Education	Years	No. of Households	Percentage Distribution
No Formal Education	0	15	12.10
Primary Education	6	5	4.03
Secondary Education	9-3	43	34.68
Tertiary Education	>3	6	49.19
Total		124	100

Source: Field Survey, 1997.

The Table (4.1) shows that the household heads with tertiary education have the highest percentage distribution of approximately 49%. This was followed by households with a minimum of secondary education having about 35%. 12% of household heads have no formal education, while the lowest percentage of 4% was recorded for households with a minimum of primary education. This shows that approximately half of the respondents interviewed are highly educated with only about one-seventh of respondents having no formal education.

4.1.2 Household Size

Household size is another important variable affecting the consumption pattern of households. Table 4.2 gives the distribution of households according to their size.

Table 4.2 Distribution of Household by Size

Household Size	No. of Households	Percentage Distribution
1 - 5	76	61.29
6 - 10	43	34.68
11 - 15	5	4.03
Total	124	100

Source: Field Survey, 1997

From Table 4.2 it can be observed that a large proportion of households fall within household size of 1 - 5 persons per household, accounting for about 61% of the total number of sampled households. This was followed by household with 6 - 10 persons per household representing about 35% of sampled households. The lowest household size fell within the range of 11 - 15 persons per household, accounting for approximately 4% of the total sampled households. This tendency towards small family size in the study area may be attributable to the high level of education of respondents and their corresponding awareness of family planning measures.

4.1.3 Occupational Structure of Households

Households were classified on the basis of the occupation of the household head. This is presented in Table 4.3.

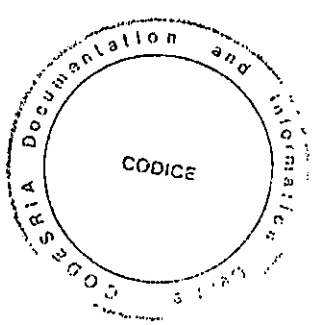


Table 4.3 Distribution of Household Head by Occupation

Occupation	No. of Households	Percentage Distribution
Salary earners	60	48.39
Own business (self employed)	37	29.84
Professional	16	12.90
Farming	3	2.42
Others*	8	6.45
Total	124	100

* Others include pensioners, apprentices and students.

Source: Field Survey, 1997.

Table 4.3 shows that majority of households sampled (60) were salary earners, accounting for about 48% of total sampled respondents. 37 of the respondents had their own business and represented about 30% of the total sample. 16 of the respondents were in the professional group comprising of doctors, lawyers and bankers and accounted for about 13% of household heads. Only 3 respondents representing 2% of the sample household heads were farmers. Eight household heads (others) comprising of pensioners, apprentices and students accounted for about 7% of sampled respondents. The high percentage of salary earners, suggests a greater tendency for employment in the industrialized urban city while the small number of farmers is a characteristic indication of the low level of farmers found in the metropolitan city of Ibadan.

4.1.4 Age of the Household Head

There is a tendency for the age of the household head to affect the consumption pattern of a household and may determine to an extent the type,

quality and nutrition of a given household. Table 4.4 gives the distribution of households by age group.

Table 4.4 Distribution of Household Head by Age Group

Age (Years)	No. of Household Head	Percentage Distribution
21 - 30	31	25.00
31 - 40	36	29.03
41 - 50	37	29.84
51 - 60	20	16.13
Total	124	100

Source: Field Survey, 1997

From Table 4.4, a large number of household heads (37) fell within the age group of 41 - 50 years and represented about 30% of the sample size. This was followed by respondents within the age groups of 31 - 40 years, 21 - 30 years and 51 - 60 years representing 29%, 25% and 16% of the total sample respectively.

4.2 CONSUMERS' PREFERENCE FOR FISH

An analysis of consumers' preference for fish is important and useful for fish production planning, trade and distribution. The tastes and preferences of consumers for fish are analysed in Tables 4.5, 4.6 and 4.7. Table 4.5 presents the animal protein preference and average monthly expenditure of consumers.

Table 4.5 Animal Protein and Average Monthly Expenditure of Consumers

Source of Animal Protein	Preference		Average Monthly Expenditure	
	Frequency	%		%
Fish	42	33.87	576.00	39.60
Beef	35	28.23	422.00	29.01
Egg	21	16.93	105.46	7.25
Milk	18	14.52	151.34	10.40
Others*	8	6.45	199.83	13.74
Total	124	100	1454.63	100

* Others include chicken, pork, goat meat and snails.

Source: Field Survey, 1997

From Table 4.5, about 34% of consumers indicated that they preferred fish to any other source of animal protein, while about 28%, 17%, 15% and 6% preferred beef, egg, milk and "others" respectively. This preference is also reflected in the consumers' expenditure on fish. The average monthly expenditure on fish was 576 which was more than that on beef (422) and other substitutes.

Consumers' preference for various forms of fish are presented in Table 4.6.

Table 4.6 Household Preference for Fresh, Iced, Smoked and Dried Fish

Fish Form	No. of Households	Percentage Distribution
Iced	70	56.45
Fresh	41	33.06
Smoked	10	8.07
Dried	3	2.42
Total	124	100

Source: Field Survey, 1997

From Table 4.6, more than half of the respondents (57%) preferred iced fish to fresh, smoked or dried fish. About 33% of households indicated their preference for fresh fish, while 8% and 2% of the households sampled had preference for smoked and dried fish respectively.

The most preferred type of fish by households are presented in Table 4.7.

Table 4.7 Most Preferred Type of Fish by Household

Fish	No. of Households	Percentage Distribution
Mackerel (Alaran)	74	59.68
Express	25	20.16
Stock Fish (Panla)	22	17.74
Others*	3	2.42
Total	124	100

* Others here include Sardines, Kote and Bonga fish.

Source: Field Survey, 1997

From Table 4.7, a large proportion of households (74) accounting for about 60% of sampled households preferred Mackerel (Alaran) to any other type of fish. 20% had preference for Express while about 18% preferred Stock fish (Panla). 2% of households preferred other types of fish such as Sardine, Bonga fish and Kote.

4.3 INCOME ANALYSIS OF HOUSEHOLDS

The income level of households is a major determinant of food and fish consumption and the nutritional status of the household. Aggregate monthly disposable income were used as a measure of households' purchasing power.

Table 4.8 gives the distribution of households by income group.

Table 4.8 Distribution of Household by Income Group

Income Group	Income Range	No. of Households	Percentage Distribution
Low	< 10,000	78	62.90
Middle	10,000 - 15,000	30	24.20
High	> 15,000	16	12.90
Total		124	100

Source: Field Survey, 1997.

From the table, households were grouped into three major income groups, which are low, middle and high income groups. Households with income less than 10,000 were classified as low income. The middle income group represents households with incomes between 10,000 - 15,000, while the high income group represents households with incomes above 15,000.

Table 4.9 presents the distribution of households according to their average monthly income and income group.

Table 4.9 Distribution of Household Average Monthly Income in Relation to Income Group

Income Group	No. of Households	Total Monthly Income	Average Monthly Income	% of Total Income
Low	78	401,030.89	5,141.42 (2502.66)	35.21
Middle	30	366,350	12,211.67 (1875.53)	32.16
High	16	371,600	23,225.00 (9917.63)	32.63
Total	124	1,138,980.89		100

Note: Values in parenthesis are the standard deviation.

Source: Field Survey, 1997

From Tables 4.8 and 4.9 above, majority of households sampled (78) representing about 63% of total, fell within the low income group with average monthly income of 5,141.42. 30 households accounting for 24% of total sampled, were in the middle income group with average monthly income of 12,211.67, while 16 households representing about 13% of households sampled fell within the high income group and had average monthly income of 23,225. The highest income obtained from the survey was 48,000 while the lowest was 900.

4.3.1 Frequency Distribution of Income

The frequency distribution of income determines the type of income distribution most prominent in the study area. Table 4.10 shows the frequency distribution of income in the study area.

Table 4.10 Frequency Distribution of Income

Income Group	Frequency	Relative Frequency (%)
Under 5,000	38	30.65
5,000 - 7,999	23	18.55
8,000 - 10,999	27	21.77
11,000 - 13,999	11	8.87
14,000 - 16,999	10	8.06
17,000 - 19,999	9	7.26
20,000 - 22,999	2	1.61
23,000 and above	4	3.23

Source: Field Survey, 1997

From the table, about 31% of all households sampled earn less than 5,000 per month. About 19% are in the range of 5,000 - 7,999 naira per month, while about 22% fall within the income group of 8,000 - 10,000 naira per month. Households earning between 11,000 - 13,999 naira per month constitute about 9% of all respondents interviewed, while those earning between 14,000 - 19,999, 17,000 - 19,999 and 20,000 - 22,999 naira per month, accounted for 8%, 7% and about 2% respectively of all the households sampled in the study area. Only 3% were in the income class of 23,000 and above. This pattern of income distribution is as shown in Figure 4.1.

This reveals that majority of the households in the study area fall within the low income group as confirmed in Tables 4.8 and 4.9, while those in the high income class are relatively few.

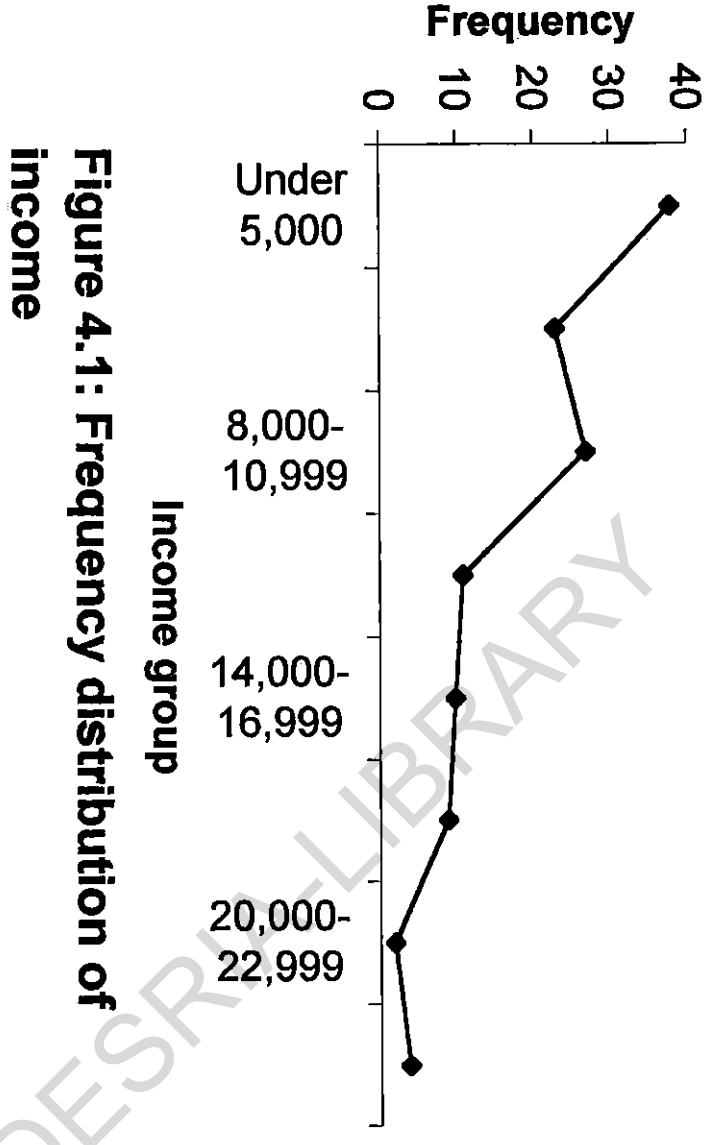


Figure 4.1: Frequency distribution of income

4.4 FOOD AND FISH CONSUMPTION EXPENDITURE ANALYSIS

Household expenditure is another important variable used in measuring household purchasing power. It is particularly useful where most respondents are self-employed and may not be able to give accurate estimates of their total income. In most consumption studies, food is presumed to take a large proportion of consumption expenditure among low income households and a lower proportion among high income households.

4.4.1 Household Monthly Expenditure on Food by Income Group

Table 4.11 shows the household monthly expenditure on food by income groups.

Table 4.11 Household Monthly Expenditure on Food by Income Group

Income Group	No. of Households	Average Monthly Income	Total Monthly Expenditure on Food	Average Monthly Expenditure on Food	% of Income Spent on Food
Low	78	5,141.42 (2502.66)	161,200	2067.00 (1586.19)	40.20
Middle	30	12,211.67 (1875.53)	141,000	4700.00 (2154.84)	38.49
High	16	23,225.00 (9917.63)	100,750	6,297.00 (2857.58)	27.11
Total	124		402,950		

Note: Values in parenthesis are the standard deviation.

Source: Field Survey, 1997.

From the Table, the average monthly expenditure on food by the low income households is 2,067. The middle income households spend 4,700 on food per month, while the average monthly expenditure on food by the high

income households is 6,297. This shows that the average monthly expenditure on food by households, increase with increase in income. The reason for this is because at every increase in income, consumers will tend to satisfy their need for food first before other non food items.

The percentage of income spent on food however, decreases with increase in income which is in line with Engels law that states that "the proportion of income spent on food declines as income increases".

4.4.2 Household Monthly Expenditure on Fish by Income Group

The household monthly expenditure on fish by income group is given in Table 4.12.

Table 4.12 Household Monthly Expenditure on Fish by Income Group

Income Group	No. of Households	Average Monthly Income	Total Monthly Expenditure on Fish	Average Monthly Expenditure on Fish	% of Income Spent on Fish
Low	78	5,141.42 (2502.66)	35,875	460 (346.30)	8.95
Middle	30	12,211.67 (1875.53)	21,060	702 (390.18)	5.75
High	16	23,225.00 (9917.63)	14,500	906.25 (338.14)	3.90
Total	124	1,138,980.89			

Note: Values in parenthesis are the standard deviation.

Source: Field Survey, 1997.

From the table, the average monthly expenditure on fish by households increase with increase in income, which is an indication that at higher incomes, better foods such as animal proteins would be consumed. The percentage of monthly fish expenditure by income group however decreases with increase in income, also confirming Engels law. While 8.95% of the total fish expenditure of an average low income earner is devoted to fish, the corresponding figures for the middle and high income earners are 5.75% and 3.90% respectively.

4.4.3 Average Monthly Expenditure on Food and Fish by Income Group

Table 4.13 compares the average monthly expenditure on food and fish by income group.

Table 4.13 Average Monthly Expenditure on Food and Fish by Income Group

Income Group	Average Monthly Income	Average Monthly Expenditure on Food	Average Monthly Expenditure on Fish	% of Expenditure on Food
Low	5,141.42	2067.00 (1586.19)	460.00 (346.30)	25.22
Middle	12,211.67	4700.00 (2154.84)	702.00 (390.18)	14.94
High	23,225.00	6297.00 (2857.58)	906.25 (338.14)	14.39

Note: Values in parenthesis are the standard deviation.

Source: Field Survey, 1997.

From the table, it can be observed that 25.22% of total monthly food expenditure was spent on fish by the low income households. For the middle income group, 14.94% of their food expenditure was spent on fish, while the high income household spent 14.39%. This reveals that the proportion of expenditure on fish by income group tends to decrease with increase in income.

Figure 4.2 shows the food and fish consumption curves. From the figure, the consumption of food and fish increases as the income of the consumer increases.

For the food, the average monthly expenditure increases at an increasing rate up to an average monthly income of 12,211.67. Above 12,211.67, the average monthly expenditure on food increases at a decreasing rate, up to an average monthly income of 23,225 and then starts declining. This observation is in accordance with Engels' law.

For fish, the average monthly expenditure increases up to the average monthly income of 12,211.67, after which it remains constant over the entire average monthly income.

Thus, above the average monthly income of 12,211.67, expenditure on fish increases less appreciably than the total food expenditure by the households.

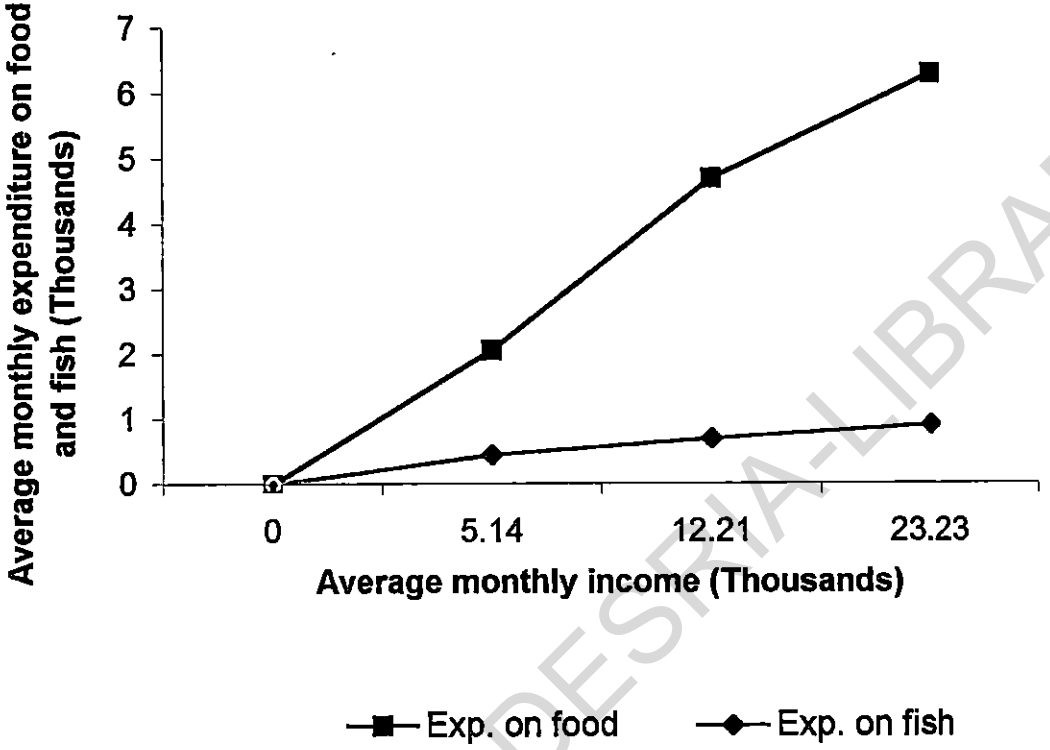


Fig 4.2: Food and fish consumption curves

4.4.4 Average Monthly Expenditure on Fish by Household Size

Table 4.14 shows the average monthly expenditure of fish according to the household size.

Table 4.14 Average Monthly Expenditure on Fish by Household Size

Household Size	No. of Households	Total Monthly Expenditure on Fish	Average Monthly Expenditure on Fish	% of Monthly Expenditure on Fish
1 - 5	76	36,750	483.55 (284.67)	22.50
6 - 10	43	29,825	693.60 (474.66)	32.27
11 - 15	5	4,860	972.00 (479.10)	45.23
Total	124	71,435		100

Note: Values in parenthesis are the standard deviation.

Source: Field Survey, 1997.

The Table shows that household size also influences the monthly expenditure on fish by households. The average monthly expenditure on fish by households having 1 - 5 persons per household was 483.55 while the average monthly expenditure on fish by households with 6 - 10 persons per household was 693.60. Households with 11 - 15 persons had average monthly fish expenditure of 972, revealing therefore that as the size of the household increases, the average monthly expenditure on fish tends to increase.

4.4.5 Average Monthly Expenditure on Fish by Occupation of the Household Head

The type of occupation of the head of the household also determines to an extent the household monthly expenditure on fish. Table 4.15 gives the average monthly expenditure on fish by occupation of the household head.

Table 4.15 Average Monthly Expenditure on Fish by Occupation of the Household Head

Household Occupation	No. of Households	Total Monthly Expenditure on Fish	Average Monthly Expenditure on Fish	% of Monthly Expenditure on Fish
Salary Earner	59	34,085	577.71 (388.47)	19.84
Own Business	38	19,540	514.21 (259.10)	17.66
Professional	16	11,160	697.50 (473.39)	23.95
Farming	3	1,400	466.67 (124.72)	16.02
Others	8	5,250	656.25 (658.33)	22.53

Note: Values in parenthesis are the standard deviation.

Source: Field Survey, 1997.

Table 4.15 shows that household heads in the professional class have the highest average monthly expenditure on fish (697.50). Salary earners have average monthly expenditure of 577.71, while household heads that are self employed have 514.21. The lowest average monthly expenditure on fish was obtained for farmers (466.67). The high expenditure on fish by the professionals indicate their increased awareness of the nutritive value of fish, and also their high

average monthly income, while the low expenditure on fish by farmers can be related to their tendency to consume more of energy rich foods such as staples as also observed by Babalola (1978).

4.4.6 Average Monthly Expenditure on Fish by the Level of Education of the Household Head

The educational status of the household head affects the consumption pattern and nutrition of the household. As the level of education of households improve, their monthly expenditure on fish is also expected to increase. The average monthly expenditure on fish by the level of education of the household head is shown in Table 4.16.

Table 4.16 Average Monthly Expenditure on Fish by the Level of Education of Household Head

Level of Education	No. of Households	Total Monthly Expenditure on Fish	Average Monthly Expenditure on Fish	% of Monthly Expenditure on Fish
No Formal Education	15	9,040	602.67 (346.30)	26.84
Primary Education	5	2,600	520.00 (74.83)	23.16
Secondary Education	43	20,790	483.49 (343.60)	21.53
Tertiary Education	61	39,005	639.43 (433.81)	28.47

Note: Values in parenthesis are the standard deviation.

Source: Field Survey, 1997.

From the table, it can be observed that the average monthly expenditure on fish by the level of education of the household head follows no definite pattern. While the household heads with no formal education spent 602.67 on fish, the corresponding amounts for household heads with primary, secondary and tertiary education were 520.00, 483.49 and 639.43 respectively.

4.4.7 Average Monthly Expenditure on Fish by Age of Household Head

The average monthly expenditure on fish by the age of the household head is presented in Table 4.17.

Table 4.17 Average Monthly Expenditure on Fish by Age of Household Head

Household Age	No. of Households	Total Monthly Expenditure on Fish	Average Monthly Expenditure on Fish	% of Monthly Expenditure on Fish
21 - 30	30	10,180	339.33 (224.02)	14.25
31 - 40	37	19,690	532.16 (269.42)	27.56
41 - 50	37	26,265	709.86 (470.26)	36.76
51 - 60	20	15,300	765.00 (419.55)	21.42

Note: Values in parenthesis are the standard deviation.

Source: Field Survey, 1997

From Table 4.17 the household average monthly expenditure on fish increases as the age of the household head increases. Households between 21 -

30 years spend 339.33 as their average monthly expenditure on fish. Households between 31 - 40 years spend 532.16 while those between 41 - 50 years spend 709.86. The average monthly fish expenditure of households between 51 - 60 years is 765.00. This can be explained from the fact that as the household head increases in age, there is a tendency for the family size to increase and therefore greater responsibilities in terms of expenditure on food items and other domestic consumption.

4.4.8 Average Monthly Expenditure on Fish and Beef by Income Group

Table 4.18 compares the average monthly expenditure on fish and beef by income groups.

Table 4.18 Average Monthly Expenditure on Fish and Beef by Income Group

Income Group	No. of Households	Average Monthly Expenditure on Fish	Average Monthly Expenditure on Beef	% of income spent on beef	% of income spent on fish
Low	78	460.00	219.94	4.28	8.95
Middle	30	702.00	560.48	4.59	5.75
High	16	906.25	1148.88	4.94	3.90

Source: Field Survey, 1997

The table (4.18) reveals that the average monthly expenditure on fish and beef increases as income increases. For the low income group, the average monthly expenditure on fish is 460.00 while that on beef is 219.94. The middle

income group spend 702.00 of their monthly expenditure on fish and 560.48 on beef, while for the high income group the average monthly expenditure on fish is 906.25 and that on beef is 1,148.88.

The table shows that the low and middle income groups spend more on fish than beef. This can be explained by the fact that there is a high tendency for the consumer to buy more fish than beef due to the relative cheapness of fish to meat.

However, for the high income group, the expenditure on beef is more than that on fish. This is because as consumers become more affluent, there is a general tendency to consume more of beef and less of fish.

Fish and beef consumption curves are presented in Figure 4.3. The figure shows that the consumption of fish and beef increases as the consumers' income increases. However, above the average income of 12,211.67, the consumption of fish decreases while that of beef continues to increase. This implies that at higher incomes consumers' expenditure on beef far exceed that on fish.

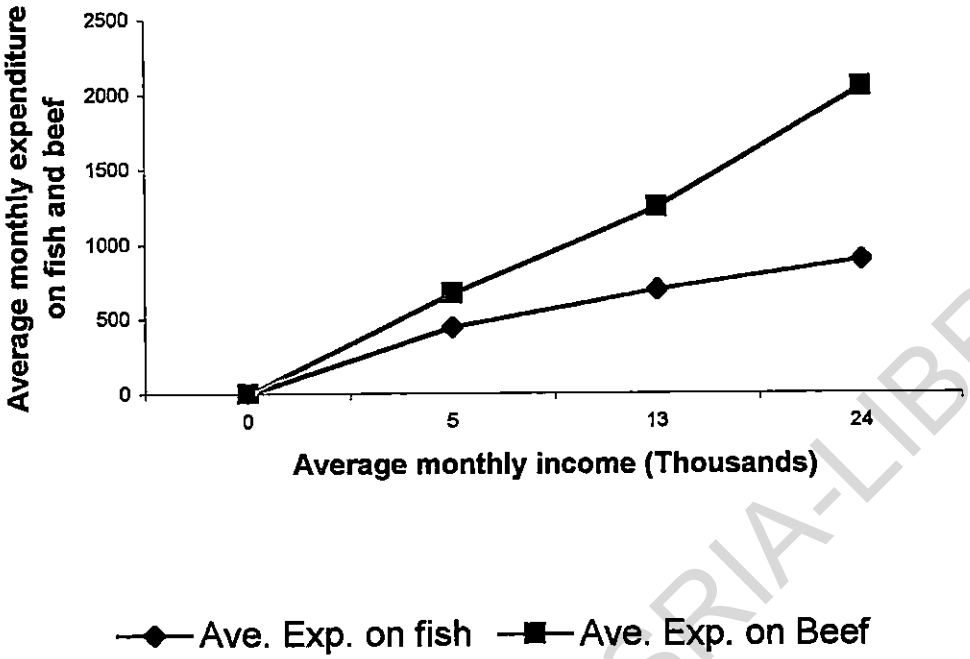


Figure 4.3: Fish and beef consumption curves

4.5 REGRESSION ANALYSIS RESULT

The regression results of data analysis for each of the functional forms are as shown in Table 4.19. From the four functional forms fitted to households' fish consumption expenditure pattern, the exponential function gives the best fit and hence the lead equation. This is determined by the R≤, T-ratio obtained from the equation, the number of statistically significant variables and the economic theory of consumption expenditure pattern.

Explicitly, the functional regression equation of the exponential function, is given by

$$\log Y = 2.113 + 0.00001320X1 + 0.022455X2 + 0.005228X3 + 0.001426X4 + 0.00002857X5 + 0.07367D1 - 0.00894D2 - 0.0093D3 + 0.0540D4 - 0.0819D5 - 0.0656D6$$

$R\leq = 0.442$

$F = 8.08$

The value of the coefficient of determination, R≤ of the result is 0.442 and is statistically significant at 1 per cent level. This implies that the explanatory variables account for 44.2 per cent of the variation in the value of households fish consumption expenditure. The F-test indicates that the overall equation is statistically significant at 1 per cent level.

Table 4.19 Regression Results of Household Fish Consumption in Ibadan

Functional Forms	Constant Term	Income	Household Size	Age	Price of Fish	Substitute	Occupation	Taste	No Formal Education	Primary Education	Secondary Education	Tertiary Education	R^2	F
		X1	X2	X3	X4	X5	D1	D2	D3	D4	D5	D6		
Exponential	2.1130*** (0.2068)	1.320E-5*** (3.61E-6)	0.0225** (0.0096)	0.0052** (0.0027)	0.0014 (0.0023)	2.857E-5 (2.576E-5)	0.0737* (0.0439)	-0.0089 (0.0751)	-0.0093 (0.1100)	0.0540 (0.1196)	-0.0819 (0.1042)	-0.0656 (0.1058)	0.442	8.08***
Double-Log	-0.0198 (0.6779)	0.4240*** (0.0863)	0.0396 (0.1034)	0.3993 (0.2572)	0.1766 (0.3492)	0.0257 (0.0351)	0.0714* (0.0419)	-0.0151 (0.0665)	0.0193 (0.1065)	0.0599 (0.1157)	-0.0349 (0.1014)	-0.0340 (0.1017)	0.481	9.42***
Linear	-135.80 (310.70)	0.0164*** (0.0054)	36.5200** (14.3900)	4.3590 (4.1280)	2.1360 (3.4960)	0.0313 (0.0387)	85.6400 (66.0500)	-65.2000 (112.8000)	51.9000 (165.3000)	3.2000 (179.8000)	-22.3000 (156.5000)	-12.4000 (158.9000)	0.362	5.79***
Semi-Log	-2615.00** (1081.00)	429.600*** (137.700)	74.0000 (164.9000)	456.2000 (410.2000)	347.000 (556.900)	38.2300 (55.9000)	71.8200 (66.9100)	-87.2000 (106.1000)	62.1000 (169.8000)	6.9000 (184.5000)	19.0000 (161.6000)	25.8000 (162.2000)	0.331	5.03***

Source: Computed from field survey.

Note: *** t-values significant at 1%
** t-values significant at 5%
** t-values significant at 10%
Values in parenthesis are the Standard Errors.

The coefficient of income is positive and statistically significant at 1 per cent level, showing that income is directly related to expenditure on fish. This suggests that a change in income will cause expenditure on fish to change in the same direction. That is, the higher the income, the higher the fish consumption expenditure.

The coefficient of household size is positive and statistically significant at 5 per cent level of probability, thus suggesting that household size is also directly related to expenditure on fish. It also implies that an increase in the size of the household will lead to an increase in the fish consumption expenditure.

The coefficient for age is positive and statistically significant at 10 per cent level of probability. This shows that the age of the household head can also be directly linked to the fish consumption expenditure of the household. It also shows that the higher the age of the household head, the higher the consumption expenditure on fish.

The coefficient for price is positive, thus indicating that the price of fish is directly related to the expenditure on fish. This therefore suggests that the higher the price, the higher the expenditure on fish consumed. It is necessary to note however, that the coefficient of price is not statistically significant at any acceptable level.

The coefficient for substitutes is positive but not significant at any acceptable level.

4.6 INCOME ELASTICITY AND MARGINAL PROPENSITY TO CONSUME FISH

4.6.1 Income Elasticity

The income elasticity is defined as the percentage change in the quantity of a commodity consumed to a one per cent change in income. For normal goods, income elasticity is always positive while it is negative for inferior goods.

Elasticity also varies relative to other explanatory variables. Thus, there are elasticities of consumption expenditure relative to household size, price, expenditure on substitutes, age and level of education of the household head.

For this analysis, by considering the lead equation which is the exponential function, the elasticity of fish consumption is given by:

Elasticity of fish consumption expenditure

$$= \frac{dY}{dxi} \cdot \frac{xi}{Y} = biXi$$

where Xi are the mean values of each of the explanatory variables. Therefore the estimated elasticities for each of the explanatory variables are as shown in Table 4.20.

Table 4.20: Estimated Elasticities of Consumption Expenditure on Fish Relative to the Explanatory Variables

Explanatory Variables	Elasticities
X1 (Income)	0.1212
X2 (Household size)	0.1150
X3 (Age)	0.2066
X4 (Price of fish)	0.1206
X5 (Price of substitutes)	0.0251

Source: Field Survey, 1997

From the computed elasticities, fish consumption expenditure is income inelastic since the value obtained is less than unity, thus indicating fish to be a

necessity in the study area. The computed elasticity with respect to income is positive, therefore a proportionate increase in income will lead to an increase in consumption expenditure of fish by 12%.

For the age, the elasticity obtained implies that a proportionate increase in the age of the household head will lead to an increase in the consumption expenditure of fish by about 20%.

With respect to the price of fish, the value obtained shows that fish is price inelastic since the price elasticity of demand for fish is less than one. A proportionate increase in price of fish will increase consumption expenditure of fish by 12%.

For the substitutes, a proportionate increase in the price of substitutes will cause an increase in fish consumption expenditure by about 3%.

4.6.2 Income Elasticities of Fish Consumption Among the Income Groups

Table 4.21 shows the income elasticities of fish consumption among the different income group.

Table 4.21 Income Elasticity of Fish Consumption by Income Group

Income Group	Income Range	Average Monthly Income	Elasticities
Low	<10,000	5,141.42	0.0679
Middle	10,000-15,000	12,211.67	0.1612
High	>15,000	23,225.00	0.3066

Source: Field Survey, 1997.

From the table, the income elasticity increases as the average income of the group increases. For the different income groups, a unit change in come will lead to a proportionate change in expenditure on fish. The values obtained also shows that the elasticity of income tends towards unity as income increases implying that at very high incomes, the demand of fish tend to be more elastic.

This is further confirmed in Figure 4.2 which shows that above the average monthly income of 12,211.67, the consumption expenditure on fish becomes fairly constant.

4.6.3 Estimated Marginal Propensity to Consume (MPC) Fish

By considering the lead equation

$$\log Y = 2.113 + 0.00001320X1 + 0.022455X2 + ...$$

$$..... -0.0.0656D6$$

The MPC is obtained by:

$$MPC = bi\ Y,$$

where i = 1,2,3 ...., and bi represents the regression coefficients for each of the explanatory variables. Therefore the MPC with respect to households' monthly income is given by:

$$MPC = biY = 0.00001320 \times 576.0887 = 0.0076$$

This implies that with an increase of one naira in income, the consumer will increase expenditure on fish by 0.0076 which is the additional increase in income.

The estimated MPCs of each of the explanatory variables are given in Table 4.22.

Table 4.22: Estimated Marginal Propensities to Consume Fish Among the Income Groups

Explanatory Variables	M.P.C
X1 (Income)	0.0076
X2 (Household size)	12.9361
X3 (Age)	3.0118
X4 (Price of fish)	0.8215
X5 (Price of substitutes)	0.0165

Source: Field Survey, 1997

From Table 4.22, the MPC relative to household size is 12.9361 implying that with a unit increase in the size of the household, the consumer will increase monthly expenditure on fish by 12.94. Also, the MPC relative to the price of fish is 0.8215, thus suggesting that with a unit increase in the price of fish, the consumer will increase expenditure on fish by 0.82, while for substitutes a unit increase in the price of substitutes will increase expenditure on fish by about 0.017.

4.6.4 Marginal Propensity to Consume Fish Among the Income Groups

The estimated marginal propensities to consume fish among the different income groups are shown in Table 4.23.

Table 4.23 Estimated Marginal Propensities to Consume Fish Among the Income Groups

Income Group	Income Range	Average Monthly Income	Average Monthly Expenditure	M.P.C
Low	<10,000	5,141.42	460.00	0.0061
Middle	10,000-15,000	12,211.67	702.00	0.0093
High	>15,000	23,225.00	906.25	0.0120

Source: Field Survey, 1997.

From the table, the MPC increases as the average monthly income of the income group increases. This implies that for the low income consumer, a unit change in income by one naira will result in a proportionate change in fish expenditure by 0.0061. This proportion increases as the income of the consumer increases.

4.7 ECONOMIC IMPLICATIONS OF DUMMY PARAMETERS

From the lead equation, only the occupation of the household head is statistically significant at ten percent level of significance while taste and education of the household head are not significant at any acceptable level of significance, that is, one, five or ten per cent level.

The coefficient of taste is statistically insignificant at one per cent level implying that the average fish expenditure of the household with respect to Alaran is not significantly different from that of Express, Panla and other types of fish.

The education coefficients with respect to the different levels of education are negative with the exception of the primary education which is positive. This suggests that the level of education is inversely related to fish consumption expenditure as also observed by Adeniyi (1987). The coefficients for education, were also statistically insignificant at 1 per cent level, thus showing that there is no significant difference in fish consumption expenditure among the household heads having no formal education, primary, secondary or tertiary education.

4.8 TEST OF HYPOTHESIS OF THE STUDY

Two main hypothesis were tested for this study by subjecting relevant variables of each hypothesis to the t-test statistical tool. The various t-test values were then compared at the appropriate level of probability to either reject or accept the hypothesis.

1. There is no significant difference in the proportion of household income that is spent on fish consumption.

The result of the t-test used to analyse the hypothesis showed that the t-test value of 3.65 obtained is significant when compared to the probability t-value of 0.000. This indicates that the hypothesis is accepted at that level of significance. Thus the null hypothesis is rejected.

2. There is no significant difference in the socio-economic characteristics of the household on fish consumption.

The result of the t-test obtained indicates that the t-test values for household size, age and occupation are significant at 1, 5 and 10 per cent level of probability accounting for 60 per cent of the variation in the value of the household fish consumption expenditure. This implies that the socio-economic variables have significant influence on fish consumption. Thus the null hypothesis is rejected.

CHAPTER FIVE

SUMMARY, IMPLICATIONS FOR FOOD AND NUTRITION POLICIES AND CONCLUSION

5.1 SUMMARY OF MAJOR FINDINGS

This study examines fish consumption pattern among consuming households in Ibadan metropolis with a view to analysing the trends of fish consumption, consumers' preference for fish and the functional relationship between the quantity of fish consumed and selected variables. The variables examined include income of the household, taste, price of fish, occupation, household size, level of education and age of the household head which were found to influence households fish consumption expenditure.

Cross-sectional data was used to obtain the needed information from the selected households through the use of structured questionnaires.

The descriptive analysis showed that approximately half of the respondents (49%) were highly educated with only about twelve percent having no formal education.

For household size, it was observed that there was a greater tendency towards small family sizes of 1 - 5 persons per households accounting for sixty-one per cent of total household sampled. The corresponding values for household size of 6 - 10 and 11 - 15 were thirty-five and four per cent respectively.

With respect to the occupational distribution of the households, a large proportion of household heads were salary earners representing forty-eight per cent of sampled households. Thirty per cent of the households sampled had their own business, while thirteen per cent and seven percent comprised of professionals and "others" respectively.

An analysis of consumers' tastes and preferences for fish revealed that forty-two per cent of consumers preferred fish to any other source of animal protein, while thirty-five per cent had preference for beef. This preference was also reflected in the expenditure on fish by households which was more than that on beef.

Majority of the households, representing sixty per cent of households sampled preferred Mackerel (Alaran) to any other type of fish. Thirty per cent of the households preferred Express while eighteen per cent had preference for stock fish (Panla). Also, more than half of the respondents preferred iced fish to fresh, smoked or dried fish. Dried fish was the least preferred among households.

For the purpose of this study, households were grouped into low, middle and high income groups. Sixty-three per cent were in the low income group and accounted for the highest percentage of total households sampled. Twenty-four per cent were in the middle income class, while thirteen per cent were in the high income group.

The food and fish consumption expenditure analysis of households revealed that the average monthly expenditure on food and fish tends to increase with increase in household income, but the percentage of income spent on food and fish decreases with increase in the income of the household in accordance with Engels law.

For the average monthly expenditure on fish by household size, it was observed that the average monthly expenditure on fish increases as the household size increases. This was found to be true for the average monthly expenditure on fish by the age of the household head. As the age of the

household head increases, their average monthly expenditure on fish also increase.

However, for the level of education of the household head, the average monthly expenditure on fish showed no definite pattern.

The average monthly expenditure on fish by the occupation of the household head, shows that the monthly fish expenditure of professionals and salary earners are higher than household heads who are self employed and those that are farmers.

The result of the regression analysis gives the exponential functional form as the lead equation. In this equation, income is statistically significant at 1 per cent level of significance while the household size and age are statistically significant at 5 per cent. Occupation however, is significant at 10 per cent level of significance.

The estimated elasticity for income was found to be 0.1212 which is positive and less than unity implying that total expenditure on fish is income inelastic. Fish was also found to be a normal good in the study area. For the income groups, the income elasticities increase as the average income of the group increases. Also, the elasticity of income tends towards unity with increase in income implying that at very high incomes, the demand for fish tends to be more elastic.

The elasticities of all the explanatory variables were positive and less than unity indicating that a proportionate unit increase in any of these variables will lead to an increase in fish consumption expenditure.

The MPC of income was 0.0076 indicating that with a one naira increase in income, the household will spend about 0.0076 on fish. The MPCs of the

explanatory variables were found to be 12.9361, 3.0118, 0.8215 and 0.0165 for household size, age, price of fish and substitutes respectively.

For the dummy variables, the average monthly expenditure on fish with respect to occupation was significant at 10 per cent, while it was insignificantly different with respect to taste and the level of education of the household head. However, the coefficients for the educational levels were negative with the exception of the primary education, suggesting that education is inversely related to fish consumption expenditure.

5.2 IMPLICATIONS FOR FOOD AND NUTRITION POLICIES

The findings from this survey has brought to light issues that are of paramount importance and of relevance to Nigeria's development policies.

The overall objective of Nigeria's food and nutrition policy is that of improving household food security and guarantee that families have access to adequate food in both quantity and quality. It also aims to meet the nutritional requirements needed for a healthy body growth and development and thus improve the standard of living of the average Nigerian.

The study has revealed that the study area is basically a low income area and that approximately half of the consumers do not have sufficient income to demand more fish and cause it to be produced. Furthermore, the positive effects of income and household size on the quantity of fish demanded, points to the need for increasing fish production in the country.

Increasing domestic fish production has been realised as one of the principal means of improving the daily per caput intake of fish as it will help stabilise fish prices, improve nutrition and contribute to the overall economic growth of the country.

It is also important to ensure that the real incomes of the poor increase significantly as growth occurs, in order to improve their nutritional benefits.

The objective of increasing fish production however will require deliberate government intervention in the following areas.

(i) Increasing the capital investment allocation made to the fishery subsector.

(ii) Provision of subsidized fishing inputs such as outboard engines, fishing gears and nets etc.

(iii) Provision of improved transport and storage facilities.

This will stimulate fish production, improve fish marketing channels and help to address the constraints and needs of producers, distributors and consumers.

It has been revealed that a slight increment in income distribution in favour of the low income class will improve food consumption for many of these consumers. The government through policy formulation and implementation can help to improve food distribution, through reducing disparities in purchasing power, providing incentives to producers and promoting efficiency of marketing systems.

There is a need to improve household food security among the urban poor and this can be achieved through ensuring stable food availability at the national, regional and household levels; enhancing households purchasing power;

improving post-harvest storage; use of appropriate technology for food processing and increasing agricultural productivity.

Also, existing programmes and projects in agriculture and non-agriculture sectors should be strengthened and new ones initiated to increase household income especially in the poorer segments of the population.

Strengthening the family, social and economic unit most responsible for nutritional well being is also essential. It is especially important for women to have access to the resources and education they need to better care for themselves and their families. This includes empowering Women In Development (WID) programmes in the areas of education, training and income generating activities.

Local and state governments including communities should be encouraged to promote nutritional surveillance and surveys and nutrition information. Also, the private sector and Non-Governmental Organizations (NGOs) should be encouraged to support and promote food and nutrition programmes.

There is a need for increased assistance from external agencies to strengthen development activities or programmes in the area of food and nutrition. This can be through assisting the National Committee on Food and Nutrition (NCFN) in its food security and nutrition policy preparation and programme development.

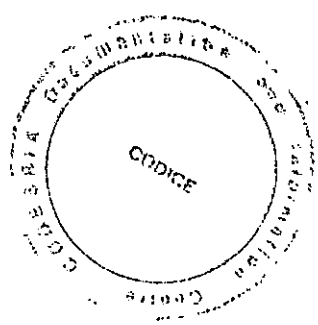
Assistance should also be directed to support baseline studies for proper situation analysis in Nigeria.

Finally, there is a need to create consumer awareness of nutrition information through education and media promotion.

5.3 CONCLUSION

This study reveals that income is the major determinant of households fish consumption expenditure, while other factors such as the household size, age, level of education and occupation are secondary determinants. The study also shows that while food is a major expenditure item for most of the households, their average monthly expenditure on fish is relatively low and was found to be lowest for the low income group.

The positive effect of income and household size have shown that the rising fish demand will persist into the future. There is a need therefore to increase domestic fish supply in the country and ensure fish supplies to consumers at affordable prices. This calls for deliberate government efforts and the participation of the private sector and NGOs in development plans and in the effective implementation of food and nutrition programmes. This will go a long way in improving the daily per caput intake of fish and meeting the nutritional requirement of the average Nigerian.



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DEPARTMENT OF AGRICULTURAL ECONOMICS
UNIVERSITY OF IBADAN, IBADAN
NIGERIA

RESEARCH TOPIC: ECONOMIC ANALYSIS OF FISH CONSUMPTION IN IBADAN METROPOLIS: IMPLICATIONS FOR FOOD AND NUTRITION POLICIES.

QUESTIONNAIRE

PART 1: GENERAL INFORMATION

1. Area/Street .....
2. Sex: Male ..... Female .....
3. Marital Status: Single ..... Married .....
4. Age (Years) .....
5. Level of Education

   Years of Formal Education .....

   (i) No formal education .....

   (ii) Primary (Years) .....

   (iii) Secondary (Years) .....

   (iv) N.C.E. (Years) .....

   (v) Polytechnic/University (Years) .....

PART 2: HOUSEHOLD CHARACTERISTICS

6. Sex of Household head: (i) Male ..... (ii) Female .....
7. Household size .....

8. Indicate the number of people that are at present living in your household.

   (a) Adults: (i) Male ..... (ii) Female .....

   (b) Children (< 18 years) (i) Male ..... (ii) Female .....

9. What is the occupation of the head of the household?

   (i) Salary job ..... (ii) Own Business .....

   (iii) Farming ..... (iv) Professional (e.g. Lawyer, Doctor) .....

   (v) Others (specify) .....

PART 3: HOUSEHOLD INCOME

10. What is the estimate of the monthly income of the head of the household? .....

11. What is the total monthly income of other members of the household?

   (i) Wife/Wives .....

   (ii) Others .....

12. What are the other sources of income of the household head?

Sources	Amount per month ()
Own Business	
Farming	
Others	

13. What is the estimate of the aggregate/total income accruing to the household per month? .....

14. How much of the household income is saved? .....

PART 4: HOUSEHOLD FISH EXPENDITURE

15. On the average, how much is spent on food by your household per month?

    .....

16. How much was spent on food by your household last month?

    .....

17. How much does your household spend on fish per month?

    .....

18. How much was spent on fish by the household last month?

    .....

19. How often do you buy fish? (Please tick)

    (i) Daily ..... (ii) Weekly .....

    (iii) Monthly ..... (iv) Occasionally .....

20. Where do you normally buy your fish?

    (i) From wholesalers .....

    (ii) From retailers .....

    (iii) Other sources (specify) .....

21. Suppose your income were to increase by 10%, what will you do?

    (i) eat more fish .....

    (ii) eat less fish .....

    (iii) eat about the same as before .....

    (iv) eat more meat .....

22. What types of fish do you prefer (Please tick)

(i) Alaran (Mackerel) ..... (ii) Panla .....

(iii) Express ..... (iv) Others (specify) .....

23. What form of fish do you prefer to buy (Please tick)

(i) Fresh..... (ii) Smoked..... (iii) Dried .....

(iv) Iced ..... (v) Others (specify) .....

24. Why do you like to buy or eat fish? (Please tick)

(i) Nutritious .....

(ii) Cheaper than other sources of animal protein .....

(iii) It is readily available in the market .....

(iv) Other (specify) .....

25. At what price do you buy say a kilogram of fish? .....

26. Is your preference for fish determined by one or more of the following (please rank from 1 to 4 according to order of preference. 4 most determining; while 1 represents least determining factor)

(i) Price of fish in the market .....

(ii) Family Size .....

(iii) Availability of fish in the area .....

(iv) Market location .....

(v) Type of fish available in the area .....

(vi) Other (Specify).....

27. Suppose the price of fish were to increase by 50% what will you do?

(i) Buy less fish .....

(ii) Buy more .....

(iii) Buy the same quantity .....

(iv) Will not buy fish .....

(v) Buy more meat or other substitutes .....

(vi) Others (specify) .....

28. Could you please estimate your monthly spendings on the following animal protein often regarded as substitutes to fish?

Source of Protein	Quantity Purchased	Price Paid Per Unit ()	Amount Spent Monthly ()
i. Beef			
ii. Chicken			
iii. Pork			
iv. Eggs			
v. Milk and Milk Products			
vi. Others (specify)			

29. If the price of these substitutes increases, what will you do?

(i) Buy more fish .....

(ii) Buy less fish .....

30. Do you have any useful information that you would like to give me particularly with regards to fish marketing and consumption.

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