EFFECTS OF FOREST AND TREE PRODUCTS ON POVERTY AND INCOME DISTRIBUTION IN RURAL AREAS OF DELTA STATE, NIGERIA

BY

NWANDU, PETER IFEANYICHUKWU
PG/Ph.D/98/26016

DEPARTMENT OF AGRICULTURAL ECONOMICS
FACULTY OF AGRICULTURE
UNIVERSITY OF NIGERIA
NSUKKA

APRIL, 2012

EFFECTS OF FOREST AND TREE PRODUCTS ON POVERTY AND INCOME DISTRIBUTION IN RURAL AREAS OF DELTA STATE DELTA STATE, NIGERIA

A Ph.D THESIS SUBMITTED TO THE DEPARTMENT OF AGRICULTURAL ECONOMICS, FACULTY OF AGRICULTURE, UNIVERSITY OF NIGERIA, NSUKKA

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DOCTOR OF PHILOSOPHY (Ph.D) IN AGRICULTURAL ECONOMICS OF UNIVERSITY OF NIGERIA, NSUKKA

BY
NWANDU, PETER IFEANYICHUKWU
B.SC (HONS.) M.SC. (NIGERIA)

APRIL, 2012

CERTIFICATION

Nwandu, Peter Ifeanyichukwu, a postgraduate student of the Department Agricultural Economics, Faculty of Agriculture, University of Nigeria, Nsukka, with registration number PG/Ph.D/98/26016) has satisfactorily completed the requirements for the award of Doctor of Philosophy (Ph.D) in Agricultural Economics (Resource and Environmental Economics). The work embodied in this thesis is original and has not been submitted in part or full for any other diploma or degree of this or any other University.

……	……..	……..	……
Prof. E.C. Eboh (Supervisor)	*Date*	**Prof. E.C. Okorji** (Supervisor)	*Date*
……	……..	……..	……
Prof. E.C. Okorji (Head of Department)	*Date*	**Prof. Ben Ahmed** (External Supervisor)	*Date*

Dedication

To my wife, Veronica and my little angels, Precious and Praise

ACKNOWLEDGEMENT

I wish to express my profound gratitude to my supervisors, Professor E.C. Eboh and Professor E.C Okorji who is also my Head of Department, for their mentoring, encouragement, guidance and immense contribution to the successful completion of this project work. I am also grateful to all my lecturers whose constructive criticisms helped in shaping the project work.

Big thank you to my mother-in-law, Mrs R.N. Odiwe (Mamalololo), my sisters in-law, Helen Odiwe and Mrs. M.N Imafidon including Mrs. Mau Eboka for their prayers, encouragement and financial assistance towards the completion of the project. My gratitude also goes to my friend, Dr. Celestine Nzeh of the African Institute for Applied Economics (AIAE) Enugu, Mr. F. N Ayinde of Nigeria Institute for Social and Economic Research (NISER) Ojo, Ibadan, Miss Edith Nwoko of NUT Delta State wing Asaba, Miss Ifeoma Udeozo of FCE (T) Asaba and Miss B.U Onyishi of Department of Agricultural Economics, University of Nigeria, Nsukka for their goodwill and logistic supports.

May God Almighty, reward all of you abundantly in Jesus name, Amen.

ABSTRACT

The study was carried out with a view to attracting the attention of policy makers and stakeholders that aside agriculture (farming), there are other sectors of the rural economy that can help address food problems, inequalities in rural income and poverty when given attention. The broad objective of the study was to investigate the effect of forest and tree products on poverty and income distribution in rural areas of Delta State. The specific objectives were to: (i) measure and analyze relative poverty and income distribution among FTPs-dependent rural households; (ii) identify types of FTPs and describe their economic characteristics that contribute to rural household poverty reduction; (iii) value the contributions of FTPs to household income, consumption and employment; (iv) analyze household socio-economic and institutional factors affecting FTPs commercialization; and (v) ascertain measures rural households adopt to conserve FTPs primary base. Two local government areas (LGAs) identified as having forest resources were purposively selected from each of the three agricultural zones in the state giving a total of six LGAs. Four village were randomly selected from each of the six LGAs giving a total of twenty four villages. Fifteen rural households were randomly selected from each of the twenty four villages giving a total of three hundred and sixty households. Data were collected with the aid of questionnaire administered to rural households. Primary data generated were analyzed with descriptive statistics, benefit transfer method, gini coefficient, Foster, Greer and Thorbecke (FGT) model of poverty analysis. Result show an overall income inequality among FTPs dependent rural households with a Gini coefficient of 0.54. However, owners of FTPs resources show low income inequality with gini coefficient of 0.34 while non-owners of FTPs resources show highly income inequality with Gini coefficient of 0.55. FTPs income helped to reduce poverty among the rural households. This is as a result of the fact that when FTPs income was excluded from household total income, incidence, gap and severity of poverty increased from 0.4870, 0.1522 and 0.0476 respectively to 0.7903, 0.3203 and 0.0810 respectively. Rural households use a wide range of FTPs which include cultivated and wild fruits, foods, medicines, wood products, livestock fodder and browse and games. From the determined values of these FTPs, forest products were more expensive than the cultivated tree products. FTPs income of 33.8% was the second highest contributor to rural household total income aside income from agriculture which was 39.3%. However in rural household consumption, FTPs contributed the highest with 31.9%, followed by agriculture with 25% FTPs employed many members of the rural household with 87.6% of them engaged in FTPs activities. Also females were more actively involved in FTPs activities than their male counterparts ($p<0:05$). While adult females and children exploited FTPs for subsistence purposes, the adult males' reasons were found to be commercial. FTPs conservation was major challenge among the rural households. For the past two years, 68.7% of the rural households did not plant tree in any location. Education of household head, household size, access to technology, access to credit and amount of FTPs resources owned had a significant positive effect on commercialization. Recommendations made based on the findings include: integration of FTPs into National Accounting Systems; improvement in technology used for FTPs production, processing and marketing; policy shift towards participatory approach to FTPs conservation.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Background Statement

Within the framework of off-farm economy, the rural people especially the poor are dependent on forest and tree products (FTPs) for most of their livelihood. Forest and tree products are derived from natural forest, planted forests and trees outside forest. Trees outside forest include isolated trees in landscape, windbreaks, shelter belts, trees along roads and rivers, trees in agricultural systems and trees in urban environment (FAO, 2003). According to Ahmed (2000), FTPs are products from forest and all other parts or produce of trees and plants including climbers, grasses and creepers. They also include produce from animals when found or brought from a forest, peat surface soil and minerals. In this study, FTPs are defined as products derived from natural forest, planted forest (including plantations and orchards) and trees outside forest.

FTPs are made up of wood and non-wood products. The wood products are mainly timber, fuelwood and charcoal. Timber is used mainly as building materials, furniture, matches, utensils, books, newspapers, toilet tissues and fuelwood among others (WWF 2002). On the other hand non-wood forest products (NWFPs) consists of goods of biological origin (FAO, 2003). They include fruits, nuts, mushrooms, beverage, wine, clean water, medicinal plants, latex, rubber, gums, and resins, cloth, jute fibers, bast fibers, chewing sticks, tooth cleaners, sponges, decorative bead, oil, barks bark and lac, natural varnish, tanning extracts, fodder, honey, bee wax, milk cocoons and forest games. For the purpose of this study, the economic and environmental services provided by forest and trees, for example carbon sequestration, soil fertility and soil protection, watershed protection, windbreak uses or general aesthetic and spiritual values are not included.

FTPs contribute significantly to rural household consumption, income and employment. Such contributions include satisfaction of subsistence needs (for

instance food, fuel, building materials), substitution for purchased farm input (such as live fencing, animal fodder, green manure), opportunities for supplement cash income through sale of raw or processed FTPs and food security-use of forest and tree products as hunger insurance to tide over pre-harvest period (Eboh, 1997). FTPs are often used as stores of value for household savings and the role of subsistence supplies of FTPs (especially wood, food, and fodder) in reducing the expenditure pressure on the household scarce cash resources is well recognized (Eboh, 1997).

In Nigeria, timber and pulpwood industries contribute about 8 percent of agricultural's share of Gross Domestic Product – GDP (CBN 2010). This contribution is not the largest contribution of FTPs to the economy as numerous other FTPs and services not accounted for in GDP are of great importance in the daily lives of the majority of Nigerians. The most significant of these is fuelwood, on which most households depend on for cooking. About 60 – 70% of domestic energy supply comes from FTPs in Nigeria (A.I.A.E., 2005). If the population currently depending on fuel wood, for cooking were to switch to kerosene, the annual cost would be on the order of N650 – 980 billion ($4.8 – 7.3 billion) per year, which is equivalent to 9 – 14 percent of 2006 GDP (A.I.A.E. 2006). A study of NTFPs (FORMECU, 1996) estimated a total annual income of N177,627 billion from NTFPs in Nigeria. The estimate stated the study is conservative since only 19 products were used and it also excludes household consumption.

Unemployment plagues many developing countries like Nigeria both in the cities and its rural areas and growing population worsen the problem. For instance, Nigeria's population grew nearly three folds from 46.5 million people in 1965 to 140 million in 2006 (at a growth rate of 3.0% per annum) and shows no sign of slowing. There is high unemployment rate of 28% (NPC – NEEDS, 2004). FTPs can contribute significantly to the creation of jobs and increase in incomes of the rural poor. The employment chain span from production which include seedling production, planting, tending and harvesting of trees to processing and selling of forest and tree products such as wood, fruits, bark, resin, branches, leaves, fodder, berries, roots, mushrooms,

tubers, honey and forest games amongst others. These activities in turn stimulate service employment such as transportation and maintenance (Gregersen, 2000).

FTPs also generate substantial cash income for rural people, thereby contributing to their welfare and means of livelihood, and to household budget. Income earned in FTP-based activities contribute most to household food supply directly by providing cash for food purchases or indirectly in agricultural assets (example livestock) or inputs (example seeds) as outlets for savings accrued in agriculture (FAO, 1991). However an important consideration in the income of rural household is capturing the total income of the household. This can be done through valuation of all the segments through which households receive their income. Total income will help in the accurate assessment of the contributions of the different segments to the income inequalities of the rural households and by extension give the poverty situation of the rural households. Apart from timber, majority of the FTPs are not valued and are not used to calculate the income of the rural households during surveys. The values of FTPs referred to in this study is the economic value. This refers to the contributions FTPs make to human utility and welfare. It is usually quantified as money worth of the FTPs. Valuation aside from revealing the contributions of FTPs to household income will also enable comparisons to be made between the contributions of FTPs and other rural household economic activities.

There is increasing recognition within the field of forestry that gender issues are important. The focus has shifted recently to women and men's access to forest resources, as a means of improving livelihoods for the resource poor and sustainable forest management locally and globally (Furuberg, 2005). Men usually focus on the management of timber while many rural women spend many hours each day collecting NTFPs especially fuelwood which they depend on in cooking their food. Women play important roles in the harvest of FTPs, care of medicinal plants, in processing of a variety of FTPs with which they feed the small animals that they widely keep around the home as a further source of food and income. Other women enterprises include weaving, broom making, bamboo/cane processing, twine/rope

making, vending of processed FTPs, charcoal production, fish smoking and sale of leaves among others.

Furuberg (2005) also reports that women contribute to forest management. Women participate in raising of seedling, tending of tree seedlings and maintaining of the trees. Yet these contributions have been under-recognized (Furuberg, 1999), as there are significant income disparities between men and women in forestry performing the same tasks. Women are supposed to be involved in policy making and management. However, in practice, the reverse is usually the case. Kio (2000) reports that when State Department of Forestry (SDF) seek local advice they turn as men to men in the household or village.

1.2 **Problem Statement:**

Recent data from NBS (2010) confirm glaring rural poverty (73.2%) and rising income inequality (0.4334) in rural areas in Nigeria in spite of rural population engaged in food production. Against this background, it becomes necessary to explore and develop other sectors of the rural economy. The expectation is to help broaden the choice of policy alternatives in solving food problems, reduction of poverty and income inequalities in the rural areas.

An important but neglected sector in the rural economy is the FTPs. About 70 – 80 percent of Nigerians depend directly on FTPs for livelihood (A.I.A.E., 2005). FTPs contribute significantly to rural household income, consumption and employment. FTPs activities help to smoothen seasonality for labour and hunger for the high and low rural households between the low and peak periods in agricultural production. However, aside the exploitation of FTPs like timber which are well documented, quantified and generally accessible to national statistics and calculations, information on the informal activities of the non-timber FTPs which are engaged in by the vast majority of the rural households are not generally known. If known, they tend to be descriptive rather than quantitative and are discounted in national statistics. Insufficient knowledge also exist concerning the valuation of the contributions of

FTPs to the rural economy. There have been no rigorous comprehensive studies on the values of FTPs, their utilizations and the economic determinants of their uses.

Few studies can be found in this regard. Okafor (1999) identified the various plant food products found in Nigeria. FRS (2000) worked on indigenous fruit trees in Nigeria with a view to determining the optimal tree species for growth in different areas of Nigeria. Eboh (1997) analysed how FTPs is a potential for enhancing food security and economic welfare among rural households. These studies merely identified the relevance of FTPs to rural households. No attempt was made to value the FTPs.

However, some partial valuations have been made. Ojo (1999) undertook a survey of NTFPs in Forest Reserves including their uses. Despite limiting the study to NTFPs, the results on the value of the products were scanty and there was no comparisons between the NTFPs and other rural household economic activities. Campbell, Vermeulen and Lynam (1994) valued FTPs direct resource utilizations using consumption levels derived from the secondary literature and local market prices to convert quantities to values. While the report suggests that FTPs use values may be important, especially given low income of rural households, it examined a subject resource utilization only and did not collect data on other household income data. This limits comparison of value between household FTPs utilization and other household economic activities.

Similarly FTPs are not used in the calculations of rural households inequality and poverty measures. This is because most FTPs are non-marketed, own consumption products which are not valued and as such not reflected in computations. Works in this area has also been few. For instance Reddy and Chakravarty (1999) explored forest dependence and income distribution in a subsistence economy. The study was comprehensive and valued the NTFPs. The study also measured the contributions of FTPs to income inequality and poverty. Attempt was made also to compare the contributions of NTFPs and other rural household economic activities to income

inequality and poverty. However, the study excluded timber and trees outside the forest which are major sources of income to rural households.

These knowledge gaps are not being targeted but are necessary for policy. This study therefore examined these issues and made some recommendations that will help improve rural household livelihood and management of FTPs resource base in the rural economy.

1.3 Objectives of the Study:

The broad objective of the study is to investigate the effect of forest and tree products on poverty and income distribution in rural areas of Delta State.

The specific objectives include to;

1. identify types of FTPs and describe their economic characteristics that contribute to rural household poverty reduction;
2. measure and analyse relative poverty and income distribution among FTPs dependent rural households;
3. value contributions of FTPs to rural household income, consumption and employment;
4. analyze household socio-economic and institutional factors affecting commercialization of FTPs;
5. ascertain measures rural household adopt to conserve the primary sources of FTPs; and
6. make recommendations for improving the contributions of FTPs to rural household livelihood and poverty reduction.

1.4 Hypotheses:

1. Household incomes are not affected by inequalities in ownership of and access to FTP resources.
2. Employment in FTPs activities is not affected by household size and gender.
3. Commercialization of FTP is not affected by household level socio-economic and institutional characteristics.

1.5 Justification of the Study

The crucial role of the Nigerian rural sector, and the urgent need to redress worsening rural poverty conditions makes this study timely and relevant. Apart from filling the critical literature gap, the study provides veritable means of assessing effect of forest and tree products on poverty and income distribution in rural areas.

In Nigeria, apart from timber, there is limited formal information on the quantitative analyses of the production and consumption pattern of FTPs by rural households. The poor rural households mostly depend on FTPs. Since the number of people engaged in FTPs both directly and indirectly are substantial, the gains made in this sector will have a wide ranging impact on the economy and its people especially the rural poor. This study is justified as it will help to provide economic valuation and some vital information, which will aid State Department of Forestry (SDF) and forest policy makers to gather some statistics and records on FTPs in relation to rural livelihood. This will also help regulate FTP removal from the forests.

Traditionally, apart from timber, FTPs costs and benefits are not used for GDP calculations. If GDP is to be a true measure of the aggregate well being of a nation rather than simply recording economic activity, it must be adjusted to take into account non-timber FTPs. Such adjustments will require economic valuation of the FTPs which this study provided. Estimates of the economic values of FTPs can help influence policy and project formulation. It will also help determine which type of economic instrument to use in targeting their production and utilization.

Discussions on socio-demographic characteristics of the rural household in relation to FTPs have generated sharp arguments often tilted towards gender (Furuberg, 2005). An outstanding problem is the near absence of women in policy-making roles and processes (Hoffman and Lewark, 1999) even when women are the principal users of forest and tree products as in Nigeria. In addition, in the household men's perceptions on production and consumption of FTPs are quite different from those of women even when women act as heads of households. While the men have greatest access to cash

economy and often generate cash as their primary activity, women's activities revolve more around the subsistence needs of the household. These imbalances cause significant income disparities between men and women and hence income inequality within the household (Furuberg, 2005). This study therefore empirically examined and analyzed these gender issues in relation to rural household FTPs production, processing, marketing and consumption. This will help to identify and assign roles to members of the rural households, which will improve efficiency in extraction and utilization of FTPs and increase income. It will also help chart a direction for sustainable management of the forest and tree products.

Similarly, this study is justified by the need to assemble available information on population involvement with forest and tree products in Nigeria, to provide estimates of those involved in these activities and to valuate and assess these activities. This will provide forest policy planners in Nigeria a good understanding of the local situation in order to select forest management improvement activities that are technically sound and of economic benefit to the rural households. Furthermore, valuation of the dependence of rural households on FTPs for income, consumption and employment as carried out in this study is important in bid to establish the potential incentives for proper management.

There is also the issue of how to improve income and income inequality in rural households through activities involving a combination of technologies that can stabilize the environment and increase productivity of FTPs production simultaneously. This study investigated into the technologies used by the rural households in production, processing and marketing of the FTPs. This will help reveal where innovations can be introduced to help improve standard and sustain productivity gains that will yield more income and satisfaction to the rural households.

To Ministry of Environment and relevant agencies charged with poverty alleviation in Nigeria, this study will be of immense benefit in their effort towards policy formulation for the eradication of poverty in Nigeria.

1.6 **Limitation of the Study**

Numerous constraints were identifiable during the course of this study.

First was the paucity of information about non-marketed FTPs and the lack of records on the inventory, extraction and value of the products. In addition, there was multiplicity of products with some traded and others out of the market mechanism and majority of the products forming the basic needs of the rural household. This makes the valuation of FTPs a major challenge. To ameliorate these problems, a combination of three methods was used. Questionnaire based interviews were supplemented by data collected by random weighing in the forest. This was supplemented by consumption assessment at 24 hour intervals through weighing of the FTPs.

Secondly, obtaining primary data from the rural households respondents on daily income and consumption of FTP was also a major challenge. Some of the rural households viewed it as an invasion of their privacy. Some households declined cooperation from the beginning of the survey while others cooperated at the beginning but lost interest later in the survey. This situation created bias in the survey as the original sample size was reduced. However, in spite of these limitations, the results were good estimates of the stated objective. Similarly, the data collected from rural households on daily income and consumption were self rating and therefore subjective. However, since it was panel data that was collected, the frequent visits by the researcher, enumerators and the use of some educated members of the rural household respondents to obtain the data helped to improve the quality of the data.

Thirdly, the prices of most FTPs were not the same during the peak period, availability of the products and during the off-season of the FTPs. This made averaging of the prices to arrive at a uniform price for the FTPs inevitable. Furthermore, obtaining a uniform standard weight that will be used to obtain a constant value for some FTPs was also a challenge. This problem was overcome through a lot of weighing and averaging of weights of the FTPs from the household, farmgate and market locations.

Lastly, the terrain and locations of some of the villages used for the study were difficult to reach. Some of them were only accessible by motorcycle and others by speed boat, which then were expensive means of transportation in the rural area.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical and Conceptual Framework

Historically, there has been a definite relationship between economic growth and trends in the distribution of income. True income is defined here as the actual and imputed market value of goods and services consumed during a year plus savings and dissavings (Zuvekkas, 1979). This include such imputed items as the rental value of owner-built housing, the value of personal services provided without charge within a household or community, and the value of clothing, implements and other items produced within a household from raw materials grown or collected by household members.

Kuznets (1955) presented evidence showing that income inequalities widened in the early periods of growth and reversed after higher levels or per capita income were achieved. Ever since the appearance of Kuzents seminal work on this relationship between economic development and income inequality, there has been much interest and speculation about the sources of income inequality in the developing world. Using various techniques, a number of empirical studies in developing countries have pinpointed the contribution of different sources of income to total income inequality.

(Pyatt, Chen and Fei 1980; Nugent and Walter 1982; Glewwe 1986; Kruijk 1987; Adams Jr. 1995 and Reddy and Chakravarty, 1999). These studies have decomposed income inequality by economic sector (example urban versus rural), income source (example income from labour versus capital versus land) and family characteristics (including educational and occupational attributes of workers) among others.

Such empirical studies are of considerable potential use to developing country policy makers because they help identify both the structure of income inequality and how the character of that inequality changes over time. With such information, policy makers can devise specific policy measures to help improve the distribution of income especially in rural areas. In forestry, there are problems of conservation policies, directed towards restricting common property rights in the forest. According to Jodha (1992) the low income group has less land and hence is dependent on forestry for a greater share of their total income. If common property right were restricted, the increase in income inequality cannot be reduced simply by increasing the reward in occupations in which some of the low income groups are engaged (Reddy et al, 1999). On the other hand, despite the dependence of the low income group on common property rights in the forest, it is not in the long interest of the low income group for the forest to degrade further under continued forest dependence and demographic pressure. Hobely (1996) suggests a return to traditional common property source management arrangements consisting of protection of the resource by those who live in the vicinity.

It is important to stress that inequalities on their own do not provide the necessary information needed to draw conclusions about poverty even though the latter concept is the true concern of those attempting to measure inequalities. Poverty as noted by Ravallion (1992) has a broader dimension than income inequalities. Defined as when one or more persons in a given society do not attain a level of well-being (or good expenditure of life) deemed to constitute a reasonable minimum by the standard of the society (Ravallion, 1992), poverty has to do with economic and non-economic dimensions. The economic aspect include those human lives that are easily quantifiable, measured and assigned money to its value. They include income and its

attributes, expenditure profile, savings, access to credit, access to productive employment and access to other factors of production such as land, labour, capital, among others. The non-economic dimension include deprivations of opportunities and choices of most basic human development to lead a long healthy creative life and enjoy a decent standard of living, freedom, dignity, self respect and the respect of others (UNDP 2000).

The definition of poverty above by Ravallion connotes relative poverty even though there are other nature of poverty like absolute poverty, chronic (structural) poverty and transient (temporary) poverty. The relative poverty concept is quite popular with poverty scholars because according to Quibria (1996), the concept is quite dynamic and as the average standard of living of the relevant community increases, the relative poverty line increase as well. It also recognizes that items considered to be necessity in one community may well be a luxury in another.

Poverty is a problem that needs better understanding of the relationship between the economy and the environment if a sustainable solution is to be found. More so, when these relationships are not usually captured by a standard circular flow diagram but which is necessary if the environment is to be managed successfully for the well-being of mankind especially the rural dwellers now and in future (Mc Nally and Othman, 2002).

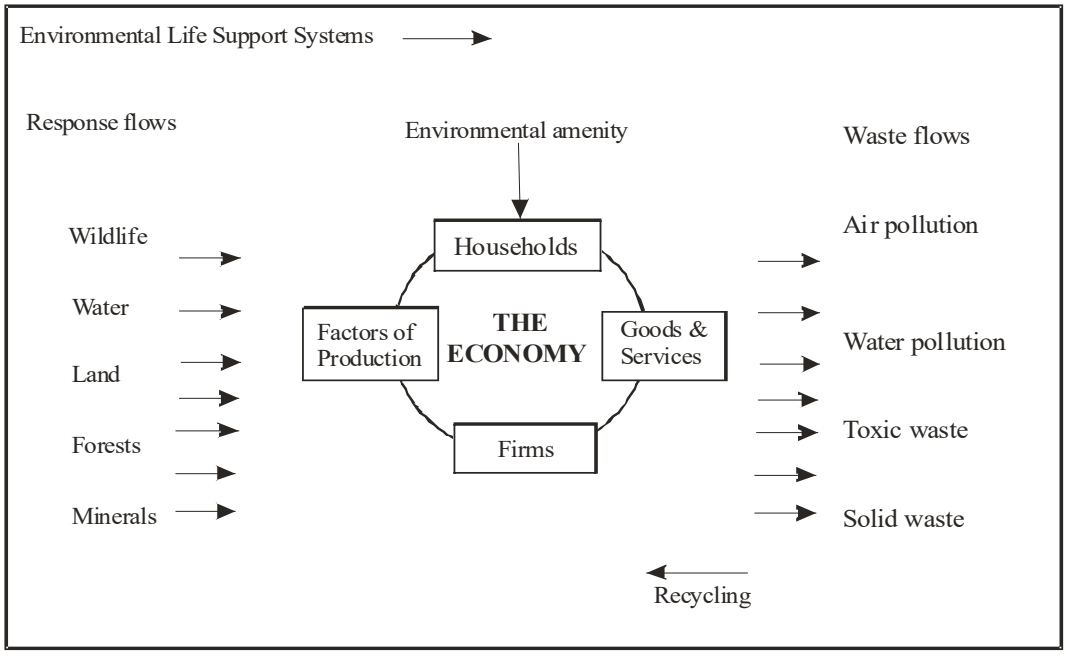

Fig. 2.1: **The Environment-Economy Linkages**

Figure 2.1 shows the economic-environment linkages. The natural environment provides a myriad of raw materials such as forest and tree products and fresh water that are combined with other forms of capital (machinery and human capital) to produce commodities for human consumption. During the conversion process, waste flows are produced and assimilated by the environment or recycled back into the production process. Where the amount of waste exceeds the capacity of the environment to absorb it, this can cause environmental deterioration.

The linkages explained are supported by the laws of thermodynamics. The first law (that matter and energy can neither be created nor destroyed) implies that resources used to produce goods and services in economic system will eventually end up back in the environmental system. For instance, goods and services are converted into useful products that are dissipated into waste gases and solids. Waste occurs during the processing of resources, the production process and by final consumers.

However not all waste can be recycled back into the economic system. This is explained by the second law of thermodynamics which recognizes that entropy increase as raw materials are converted. Waste products that are not recycled go back into the environmental system. The environment has the capacity to assimilate waste and convert it into harmless products although only up to a point. Levels of pollution beyond the assimilation capacity of the environment can cause serious harm.

Furthermore, renewable resources such as forests have the capacity to replenish themselves and if properly managed can exist in perpetuity. If the forest is used at a rate greater than the growth rate, overall numbers will fall and it could eventually be exhausted causing serious harm such as poverty to the users.

The question remains if the present human generation is using the forest responsibly or are they breaching the planets ecological limits in terms of its absorptive capacity and renewal of resources? Batemann et al (1993) identified the root causes of forest

loss as patterns of consumption and production, population growth and distribution and economic failure.

Economic failure occurs because the market price that people pay to use the forest is lower than the value society as a whole would be willing to pay (WTP) for them. This result from two things: government failures which include government forest policies and intervention in the market place. Secondly, there are underdevelopment markets (or no markets at all) for many forest and tree products and therefore they receive little or no price (OECD 1996). Economic failure highlights the need for the valuation of forest and tree products.

2.2 **Analytical Framework**

There are a number of approaches that can be used to analyze data. The first set of common, simple but important analytical tools used in data analysis is the descriptive statistical tools (McNally and Othman, 2002). These include frequency distributions, percentages, mean and standard deviation among others. On the other hand, some specific objectives and some quantitative data require indepth analysis and may need more complex analytical tools than the simple descriptive statistical tool for better understanding. However, the choice of techniques depends on a host of factors in particular the objective of the study, the availability of data, time and budget (McNally and Othman, 2002).

In this study, in addition to the descriptive statistical tools, the following specific models were employed.

- Gini coefficient
- FGT measures of poverty
- Multiple regression analysis

2.2.1 **Decomposition of Income Inequality**

At the start of any decomposition exercise, the measure of inequality that will be used for analysis is chosen. Following Foster (1985) the chosen measure should have five

basic properties. They are: (1) Pigou-Dalton transfer sensitivity; (2) symmetry; (3) mean independence; (4) population homogeneity and (5) decomposability.

Pigou-Dalton transfer sensitivity holds if the measure of inequality increases whenever income is transferred from one person to someone richer. Symmetry holds if the measure of inequality remains unchanged when individual switch places in the income order. Mean independence holds if a proportionate change in all incomes leaves the measure of inequality unchanged. Population homogeneity holds if increasing (or decreasing) the population size across all income levels has no effect on the measured level of inequality. An inequality is decomposable if total inequality can be broken down into a weighted sum of inequality by various income sources. The property of decomposability allows inequality to be partitioned either over sub-population or sources (Adam, Jr. and Alderman, 1993).

There are several measures of inequality which meet these five properties. These measures include Theils entropy index T, Theil's second measure L; the coefficient of variation; and the Gini coefficient. However, the best known indicator of income inequality is the Gini coefficient (Adams, Jr. and Alderman, 1993). Gini coefficient was used in this study.

Gini coefficient is based on the familiar Lorenz curve which relates income to the percentage of income recipients in different income brackets. Lorenz curves are an effective way of showing inequality of income within and between a distribution. The cumulative percentage of the population or source of income is plotted along the horizontal axis while the cumulative percentage of income is plotted along the vertical axis. The curve shows the actual relationship between the percentage of income recipients and the percentage of income that was actually received.

The 45 degree line shows the situation when there is an even distribution of income. This is called line of absolute equality. The closer the Lorenz curve of a distribution is to 45 degree line, the more equal the distribution of income is (Adams Jr. 1995).

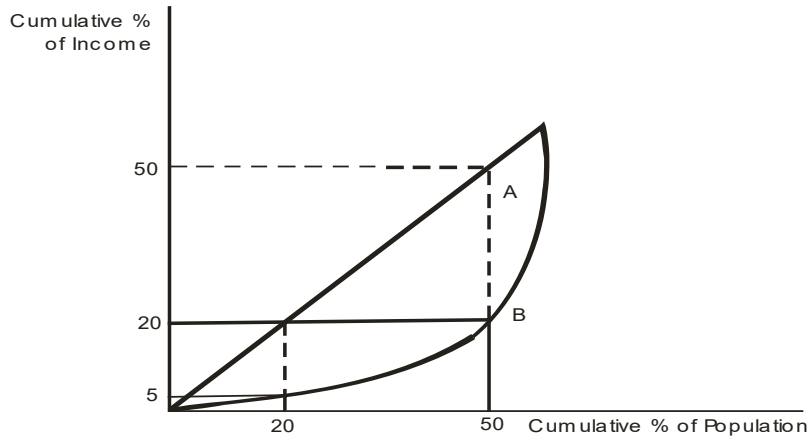

Fig. 2.2: **Lorenz Curve**

In figure 3.1 above, 20% of the population earns 5% of the income and 50% of the population earns 20% of the income. The more the Lorenz curve bends away from the 45 degree line of absolute equality, the less equal is the distribution of income.

The ratio between the areas A and B (B being the whole triangle under the absolute equality) is called the Gini coefficient. If a distribution had a completely even distribution of income, the areas A and B would be the same and the Gini coefficient would be zero. If the income were distributed so unevenly that an individual had 100% of all the distribution's income and rest of the population had nothing, the Gini coefficient in this case would be one. The closer the Gini coefficient to one, the greater the inequality of income distribution. Distributions with Gini coefficients between 0.5 and 0.7 are regarded as having unequal distribution while distributions having Gini coefficients between 0.2 and 0.35 are considered to have relatively equitable distribution (Weisstein 2004).

The source decomposition of the Gini coefficient can be developed following the notation of Shark, et al (1987).

$$G = \sum_{i=1}^{k} R_k \; G_k \; S_k$$

Where G is the Gini coefficient of aggregate household income

Sk is the share of source k of income in total household income (i.e. $Sk = \mu k/\mu$)

Gk is the Gini coefficient measuring the inequality in the distribution of income Component k within the household which can be expressed as $G_k = {}^{2}/n\mu_1 \; Y^{1}{}_k \; r_k$

Where Y_k is source income

r_k is corresponding ranks

R_k is the Gini correlation of income from source k with total household income which is the ration of the following co-variances:

$$R_k = \frac{\text{Cov } [Y_k, F(Y)]}{\text{Cov } [Y_k, F(Y_k)]}$$

Where Y_k is the source income

Y is the total income

The effect of source k income in overall household income inequality can be broken down into three components –

(a) the share of income component k in total household income (as measured by the term S_k);

(b) the inequality within the sample of income from source k (as measured by G_k);

(c) the correlation between source k income and total household income (as measured by R_k).

It is possible to use the decomposition to ask whether an income source is inequality-increasing or inequality-decreasing on the basis of whether or not an enlarged share of that income source leads to an increase or decrease in overall income inequality. On the basis of this equation:

$$g_k = R_k \quad \frac{G_k}{G}$$

Where g_k is the relative concentration coefficient of income source k in overall inequality. Which follows that income source k is inequality-increasing and inequality decreasing according to whether g_k is greater than or less than unity.

2.2.2 **Foster, Greer and Thorbecke (FGT) Measures of Poverty**

To measure poverty, the most common indicators used in practice are based on household income and household consumption expenditure. Surveys either collect both variables or do not include income while others do not include consumption. This study collected data on both household income and household consumption expenditure. Household surveys are also the single most important source of data for making poverty comparisons (Ravallion 1992). They are the only data source which can tell directly the distribution of living standard in a society. Such as household attainment of income or consumption levels, employment, occupation status, production, location, household composition, education, nutritional and health status and other individual characteristics. Household surveys are essential for a detailed picture to be given of the living conditions, in terms of income and expenditure of households in different socio-professional groups (Adeoye and Nwosu, 1998).

Another important variable in the measurement of poverty is the poverty line. There has to be an agreement about the poverty datum line. There is no universal agreement about the poverty line. One approach (Boateng et al, 1972) has been to determine some amount which demarcates a pre-selected percent of the population. Another approach (Ravallion 1992) that has found increase acceptance is the use of a constant proportion of the national mean as the poverty line. The World Bank/NBS (1985/86) studies in Nigeria's poverty analysis used this approach and constructed a relative poverty line since no absolute poverty line measure was available for Nigeria. The relative measure of poverty selects poverty line relative to the resources available within the society to address poverty. Another advantage is that the poor judge themselves according to the standard of living of others in the society (Job, 1998).

The poverty line set by the Nigerian government was used in the present study. In Nigeria, the relative poverty line was calculated with Mean Per Capita Household

Expenditure (MPCHHE) which stood at N100,203.30 per year in the 2010 NBS study. For the first level of poverty called the core poor, one-third ($^1/_3$) of the MPCHHE or ₦33,401.1 was set as the poverty line. For the second level of poverty called moderately poor, two-third of the MPCHHE or ₦66,802.20 was used as the poverty line. Those more than two-third ($^2/_3$) of the MPCHHE are regarded as non-poor.

Once a measure of well-being has been chosen, and estimated for individual or household in a sample, and the poverty line known, the next step is how to aggregate this information into a measure of poverty for each of the distributions being compared. This usually starts with choosing the indices to measure. There are three class of indices commonly used in poverty assessments. They include: (1) Head count index (H). Also called poverty incidence. It states the degree of poverty.(2) Poverty-gap ratio/index, also called poverty depth. It is the proportion that the average poor will require to at least get to the poverty line. (3) Severity-gap index. Gives more weight to the poorest, the closer the value is to one (1), the higher the seriousness or severity of poverty. These indices signify different dimensions of poverty. Some of the models used for poverty analysis may include some or all of them. Some of the models used include (Atkinson (1970), Sen (1976), Clerk, hemming and Ulph (1981), and Foster, Greer and Thorbecke (1984).

Among these models, the Foster, Greer and Thorbecke (FGT) model also known as P-alpha ($P\alpha$) measures is currently more popular and was used in this study. This poverty measure generalizes a number of other indices and its greater popularity derives from its sensitivity to income reduction among the poorest of the poor (Reddy, et al 1999). FGT measures relate to different dimensions of poverty – P_0, P_1 and P_2 used for headcount (incidence), depth and severity of poverty respectively. The measures are based on a single formula, but each index puts different weights on the degree to which a household or individual falls below the poverty line (Ravallion, 1992).

The general mathematical feature of FGT is as follows: If households or individual income or consumption or expenditure are arranged in ascending order from the poorest y1, the next poorest y2, with the least poor Yn, FGT is defined as –

$$P\alpha = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - y_1}{z} \right) \alpha$$

where z = poverty line

q = number of individuals below the poverty line

n = the total number of individuals in the reference population

yi = expenditure of household in which the individual I, lives

α = FGT index and takes on the values of 0, 1 and 2

The quantity in the bracket $\left(\frac{z - y_1}{z} \right)$ is the proportionate shortfall of expenditure or income below the poverty line. This quantity is raised to a power α, the aversion to poverty as measured by the type of poverty index.

(I) The Head-Count Ratio (Incidence of Poverty)

If $\alpha = 0$ the FGT reduces to

$$P_0 = \frac{1}{n} q = \frac{q}{n}$$

$$P_0 = H = \frac{q}{n}$$

$\frac{q}{n}$ is the proportion of the population that falls below the poverty line. This is called the head-count or incidence of poverty.

(II) The Poverty-Gap Ratio (Intensity of Poverty)

If $\alpha = 1$ the FGT expression reduces to

$$P_1 = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - y_1}{z} \right)^1 = H1$$

where $H = \frac{q}{n}$ and $I = \sum \frac{(z - y)}{z}^{1}$

This can be seen as multiplying the head-count ratio by the income or expenditure gap between the average poor person and the poverty line.

(III) Poverty Severity Index

If $\alpha = 2$ the FGT expression reduces to

$$P_2 = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - y_1}{z} \right)^2$$

The index weights the poverty of the poorest individual more heavily than those just slightly below the poverty line. It thus add to poverty gap ratio an element of unequal distribution of the poorest individual below the poverty line.

The FGT measure has the advantage of being decomposable. The overall level measure of poverty can be expressed as the sum of source weighted by the population share of each source.

The decomposition can be expressed as

$P\alpha = \sum kj \, P\alpha j$

Where j = 1, …….. m source

Kj = population share of source j

Furthermore, it allows for the calculation of the contribution Cj of each source to the overall poverty $Cj = \frac{Kj \, P\alpha j}{P\alpha}$

For policy purpose, this index can enable the pattern and impact of various policy measures in different groups and sources of the study to be revealed. Equally, the knowledge about the share of each source or group in total poverty is essential for targeting interventions. (World Development Report, 2001).

2.2.3 **Multiple Regression Analysis**

Multiple regression analysis is an econometric tool used to estimate variables (Koutsoyiannis, 1977). It is used to determine how changes in a given variable (dependent variable) affect other variables (independent variables). The independent variables are used to induce change or explain the behaviour of dependent variables. The multiple regression model can be expressed implicitly or explicitly. Mathematically, the implicit form is expressed as: $Y = f(x_1, x_2, x_3, x_4 \ldots\ldots\ldots\ldots\ldots.. xn) + u$

Where

Y = Dependent variable

$x_1 - xn$ = Independent variables

f = functional relationship which is how Xs are transformed to Y

u = Error term, which accounts for the influence of various errors

while the explicit form is expressed as

$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 \ldots\ldots\ldots\ldots\ldots\ldots b_nx_n + U$

Where

Y = Dependent variable

b0 = Constant intercept

b1, b2, b3 ……bn = Parameter estimates (coefficients) i.e. the basic descriptive measures of population or the expected value

U = Error term

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 The Study Area

The study area is Delta State with above average forest resources. It is estimated that 70 percent of the State population is rural of which 75 percent is engaged in one form of farming or the other. The total number of farm families is estimated at 176,256 (NBS, 2004). Apart from agriculture majority of the rural population are engaged in off-farm, non-agricultural activities which include diverse forms of artisanship, business, employment in both public and private sectors, forestry and other forms of wage labour.

Delta State is one of the six States in the South-South zone of Nigeria. It is flanked by Edo State to the north. In the east by Anambra and River States and in the west by Ondo State. Bayelsa State and the Atlantic ocean forms its southern boundary with which it shares coastline of 160 kilometres with River Niger. The State has a tropical climate marked by two distinct seasons – the dry and rainy season. Average rainfall ranges from about 267cm in coastal areas to 191cm in the north of the State. The State has a minimum temperature of 28^{o}c and a maximum of 34^{o}c.

The vegetation of the State ranges from mangrove swamps along the coast to rainforest in the central areas and a "deriving savannah" in the northern extremities (grassland, wooded shrub land and immature forest). The State's wide coastal belt is interlaced with numerous rivers, creeks and creeklets while the interland has many perennial rivers and streams which form part of the Niger Delta. The total land area of the State is estimated at 17,698 square kilometres with 1,770 square kilometres of fresh water swamp, 5,840 square kilometers of mangrove swamp and 10,088 square kilometers of rainforest (Delta State Ministry of Agriculture and Natural Resources – MANR, 2001).

The State is divided into 3 Agricultural zones with 25 Local Government Areas (LGA). The 3 Agricultural Zones include Delta North (9 LGAs), Delta Central (9

LGAs) and Delta South (7 LGAs). Delta North consists of Oshimili South, Oshimili North, Aniocha North, Aniocha South, Ika South, Ika North-East, Ukwuani, Ndokwa East and Ndokwa West. Delta Central consists of Warri North, Warri South-West, Warri South, Sapele, Ethiope West, Ethiope East, Okpe, Uvwie and Udu. Delta South is made up of Ughelli North, Ughelli South, Isoko North, Isoko South, Patani, Bomadi and Burutu.

3.2 **Sample and Sampling Procedure**

Multistage sampling techniques was used for the study. The first stage was the selection from the 3 Agricultural zones in Delta State, 2 local government areas each giving a total of 6 LGAs used for the study. The LGAs were purposively chosen because they contain above average forest. The Agricultural zones and the LGAs include Delta North – Oshimili South and Ndokwa East; Delta Central – Ethiope West and Okpe, and Delta South – Patani and Isoko South. The next stage was the selection of villages. From each of the LGAs selected, 4 rural villages were selected through random sampling from the list of villages complied by the State Ministry of Lands and Survey. These villages and their LGAs were Oshimili South – Obiokpu, Oko-Anala, Oko-Ogbele and Akpako. Ndokwa East – Utchi, Abala, Oshimili and Asaba-Ase. Ethiope West – Ovade, Otefe, Jesse and Oghareki. Okpe – Jakpa, Aragba, Ometan and Jeddo. Patani – Bulou-Angiama, Koloware, Odorubu and Toru-Angiama, Isoko South – Irri, Uro, Uzere and Ada. These selection gave a total of 24 villages used for the study.

Households formed the final sampling stage. Selection of households was done through simple random sampling. The list of the total number of households in each village was compiled through the help of the village heads. Fifteen (15) households were selected from each of the 24 villages giving a total of three hundred and sixty households used for the study.

3.3 **Data Collection**

Data was gathered from both primary and secondary sources. The primary data was generated by use of structured and semi-structured questionnaires, oral interviews and

group discussions. The structured questionnaire was used to elicit information from rural households on household socio-economic and institutional characteristics, community institutions, demographic features, farm, non-farm production activities, extraction and use pattern of FTPs. Other information includes values of FTPs, frequency and intensity of household dependence on FTPs, FTPs conservation and management. The structured questionnaire was administered on 360 rural household respondents. 20 household respondents were unable to complete the questionnaire correctly making such questionnaire to be incomplete and invalid. Such questionnaire was discarded and was not used for computations. The remaining 340 household respondents' questionnaire was successfully completed and was used for the analyses of data.

The semi-structured or open-ended questionnaires which were questionnaire based interviews were constructed to elicit responses from rural households on their sources of income, income generated from these sources daily, weekly and monthly. The semi-structured questionnaire was also used to collect rural household consumption data on the different economic activities of the households. Such activities include FTPs, agriculture, agricultural labour, business, private and public sector employee, artisan and transfers. The data was collected on daily basis and collated into weeks, months and finally annually.

The semi-structured questionnaire was in form of a chart kept to be completed daily by the rural households. Here the rural households recorded their daily earnings, the quantity of products bought for consumption and own consumption, gifts given and received among others. Because of the seasonal availability of FTPs, this exercise was carried out for a year (October 2010 to September 2011). Again, because of the intensity, probing and vigorous nature of this data gathering, many household respondents declined to participate right from the onset. They felt the exercise was invading their privacy. Some of the household respondents started but were inconclusive. At the end of the exercise, 179 rural household respondents successfully completed the exercise on income while 163 household respondents successfully completed the exercise on consumption which was more rigorous. These (179 and

163 households) were the household respondents used for the income and consumption analyses respectively.

For FTPs, since they do not have standard values, the questionnaire-based interviews were supplemented by data collected through random weighing of the FTPs from in-situ and ex-situ locations and market places. Data was also collected on market and local prices of FTPs to help arrive at a reasonable average price for the FTPs. The estimates of the quantities of FTPs trade within each local government area was also collected and used for the study.

The household head and the next senior member of the household or the two most senior members of the household preferably a male and a female were interviewed. Data collection was done through the help of trained assistants, one per village. Sometimes the collection was made a little easier when there was an educated member in the household.

Before the administration of the questionnaires, they were validated by experts from the field of study. The questionnaires were pre-tested in Oshimili North LGA. This was an LGA outside the sample frame. This was done to help correct errors, eliminate defects and revise sensitive questions in the questionnaires. The pre-testing was carried out for 3 months.

Secondary data were obtained from relevant publications such as journals, books, periodicals, monographs, newsletters, among others. Sources of secondary data include Federal, State and Local Government organs on environment, Forest Research Institute of Nigeria, Nigerian Conservation Foundation (NCF) and Nigerian Institute for Horticultural Research (NIHR). Information sourced include data on demographic features, economic activities and developmental programmes of the study area. Other information includes conservation programmes, land use, village institutions, social stratification and social development activities. The survey was carried out for one year (October 2010 to September 2011).

3.4 **Data Analysis**

Parts of objectives 1, 2, 3, and objectives 4 and 5 were achieved by the use of descriptive statistics of frequency distributions, percentages, means and standard deviations.

The remaining parts of objectives 1 and 3 were achieved using the economic valuation techniques of market price-based valuation method such as Benefit Transfer (BT) method.

3.4.1 **Benefit Transfer (BT) Method**

BT approach is when the FTP has already been valued in an area. This existing value estimate is transferred to another area. The first step in this approach is to find an area that display similar characteristics to the new study area where the FTPs serve same interest and has already been valued. Next is to determine the transferability of the value to the new study area. The former area that will be used in comparison must display similar characteristics in environmental populations. This will allow for adjustments if any before transferability.

BT was used in this study to arrive at average price estimates for most of the FTPs where formal market does not exist for such FTPs and also for own consumptions. This method was used because majority of the villages in the LGAs were similar in culture, tradition and beliefs. The FTPs in the LGAs were similar and so transferability was relatively easy.

The other BT approach used was the direct transfer of unadjusted mean unit values from the former area to the new study area.

However, there was a back-up to these estimates through random weighing of FTPs and collection of their local prices and getting their averages in the study area.

3.4.2 **Gini Coefficient**

Parts of objective 2 which deals with measuring and analyzing income distribution was achieved using Gini coefficient. Gini coefficient was used to determine

inequality in FTP incomes, which was also related to inequality in levels of resource ownership.

The source decomposition of the Gini coefficient can be given as

$$G = \sum_{i=1}^{k} R_k \; G_k \; S_k$$

Where **G** is the Gini coefficient of aggregate household income

Sk is the share of source **k** of income in total household income. (The sources of income **k** in this study are grouped into agriculture, agricultural labour, business, public and private sector employee, artisan, transfer and FTPs. Other sub-groups or sources include FTP resource owners and non-resource owners)

Gk is the Gini coefficient measuring the inequality within the sample of income from source **k**

$\mathbf{R_k}$ measures the correlation between source **k** income and total household income

3.4.3 Foster, Greer and Thorbeck (FGT) Model of Poverty Analysis

The remaining part of objective 2 which was on measurement of poverty among FTP dependents was achieved by using Foster, Greer and Thorbecke (FGT) model of poverty analysis.

FGT is defined in this study as:

$$P\alpha = \frac{1}{n} \sum_{i=1}^{q} \left(\frac{z - y_1}{z} \right) \alpha$$

where z = poverty line

q = number of individuals in the household below poverty line

n = the total number of individuals living in the household

yi = expenditure of household in which the individual I, lives

α = FGT index and takes on the values of 0, 1 and 2

The quality in the bracket $\left(\frac{z - y_1}{z}\right)\alpha$ is the proportionate shortfall of expenditure or income below the poverty line.

(I) If the α is raised to 0 then the poverty index measured is the Head-Count Ratio or Incidence of Poverty.

(II) If the α is raised to 1 then the poverty index measured is the Poverty-Gap Ratio or Intensity of Poverty. That is the proportion the average poor will require to at least get to the poverty line.

If the α is raised to 2 then the poverty index measured is the Severity of Poverty. The closer the value is to 1 the higher the seriousness of poverty.

This study used the relative poverty line set by Nigerian government for the measurement. The relative poverty line which is $^2/_3$ of MPCHHE is ₦66,802.20 per year. This study also used consumption (expenditure) figures of the rural households for computations. This is because of the relative steadiness of consumption figures compared to income figures. Only 163 cooperating households with 1850 individuals was used for the analyses. The major analyses carried out include first poverty analyses with the total household consumption figures with FTP consumptions inclusive. The second poverty measurement was the total household consumption excluding FTP consumption.

3.4.4 **Student t-distribution**

Hypotheses 1 and 2 were tested using t-distribution statistics. The t-test is given as:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{S^2_1}{n_1} + \frac{S^2_2}{n_2}}}$$

where $\bar{x}_1$ and $\bar{x}_2$ = Mean income of resource owners and non-resource owners respectively

S^2_1 and S^2_2 = Standard deviations of income of resource owners and non-resource owners respectively.

$n_1 + n_2$ = Number of resource owners and non-resource owners respectively

3.4.5 **Multiple Regression Analysis**

Hypothesis 3 was tested using multiple regression model represented as follows:

$$Y_1 = f(X_1, X_2, X_3, X_4, X_5, X_6, X_{7,} X_{8,} X_9) + U$$

Where

Y_1 = Commercialization of FTPs (Value of FTPs sold)

The independent variables include:

X_1 = Educational qualification of household head (Number of years spent in formal education)

X_2 = Access to technology (1 = modern, 0 = otherwise)

X_3 = Access to credit (₦)

X_4 = Access to extension services (1 = access, 0 = otherwise)

X_5 = Total household size

X_6 = Number of household members engaged in FTP employment

X_7 = Hours spent on FTP employment

X_8 = Gender of household head

X_9 = Amount of FTP resources owned (₦)

Various functional forms such as linear, semi-log and double-log were fitted to the data to obtain model estimates. The model with the best fit, in terms of F-value, R^2 and individual coefficients was the linear form and was selected for detail interpretation.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Socio-economic Characteristics of Rural Household Respondents

Socio-economic characteristics are known to influence decisions of rural households on production, processing, marketing and consumption. Some of the socio-economic characteristics (attributes) of the rural household respondents considered in this study include age of household head, number of years since household started living independently, marital status of household head, sex of household head, educational qualification of household head, occupations of household head and household size.

4.1.1 Age of Rural Household Head Respondents

The distribution of age is presented in Table 4.1 below.

Table 4.1 **Age of household head**

Age (Years)	Frequency	Percentage (%)
20 – 30	19	5.6
31 – 40	90	26.5
41 – 50	101	29.7
51 – 60	80	23.5
61 – 70	43	12.6
71 and above	7	2.1
Total	**340**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.1 shows the highest age category of 29.7% were respondents between 41 – 50 years. This category was followed by those between 31.40 years of age with 26.5% and 51 – 60 years with 23.5%. The least category was respondents 71 years and above with 2.1% while the youngest rural household head respondents was 20 – 30 years and constitute 5.6%. The mean age of FTP rural household respondents was 47 years.

4.1.2 Number of Years Since Rural Household Head Started Living Independently

The length of period since rural household started living independently will help ascertain when in the household life time that they engage more in FTP activities. The result of the analysis is presented in Table 4.2 below.

Table 4.2 **Number of years rural household started living independently**

Age (Years)	Frequency	Percentage (%)
5 – 10	42	12.4
11 – 20	109	32.1
21 – 40	165	48.5
41 – 60	22	6.5
61 – 80	2	0.6
Total	**340**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.2 shows that 48.5% of the respondent rural household heads lived independently for 21 – 40 years. This is followed by 11 – 20 years category (32.1%). 12.4%, 6.5% and 0.6% lived independently for 5 – 10 years, 41 – 60 years and 61 – 80 years respectively. The result of this analysis further confirms that the families actively engaged in FTP activities are mainly the middle and young families that are in their active age.

4.1.3 Marital Status of Rural Household Head

Table 4.3 presents the distribution of respondents by marital status.

Table 4.3 **Marital status of rural household head**

Marital Status	Frequency	Percentage (%)
Married	272	80.0
Widowed	36	10.6
Single	4	1.2
Divorced	28	8.2
Total	**340**	**100.0**

Source: **Field Survey 2010/2011**

The result of Table 4.3 indicates that 80.0% of the rural household head respondents were married. Other results show widows 10.6%, divorcees 8.28% and singles 1.2%.

The high percentage of married respondents has implications for household size which in turn influences the population engaged in FTP activities.

4.1.4 **Sex of Rural Household Head**

The sex of the rural household head is shown on Table 4.4 below.

Table 4.4 **Sex of household head**

Sex	Frequency	Percentage (%)
Male	234	68.8
Female	106	31.2
Total	**340**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.4 above shows that 68.8% of the rural household head respondents were males while 31.2% were females.

4.1.5 **Educational Qualification of Rural Household Head**

Acquisition of formal education enhances one's ability to understand and be rational in whatever endeavour one is engaged. Table 4.5 and 4.6 below reveal the formal educational status of household heads.

Table 4.5 **Educational qualification of rural household head**

Qualification	Frequency	Percentage (%)
Masters degree and above	.3	0.9
Bachelor Degree/HND	14	4.1
NCE	5	1.5
OND	7	2.1
SSCE/NABTEB	76	22.4
FSLC	80	23.5
No qualification	155	45.6
Total	**340**	**100.0**

Source: **Field Survey 2010/2011**

The distribution in Table 4.5 shows that 45.6% had no formal education. This is followed by those with First School Leaving Certificate (FSLC) with 23.5% and Senior Certificate with 22.4%. Others are 4.1% with Bachelor degree/HND, 2.1%

with Ordinary National Diploma (OND) and 1.5% with Nigerian Certificate in Education (NCE). The least (0.9%) were those with Post graduate certificates.

Table 4.6 **Number of years in formal education**

Years	Frequency	Percentage (%)
Non formal education	155	45.6
1 – 6	80	23.5
7 – 12	76	22.4
13 – 18	26	7.6
19 and above	3	0.9
Total	**340**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.6 shows that respondents with no formal education were highest and accounted for 45.6%. Those that spent only 1 – 6 years in formal education were 23.5% while the household respondents with 7 – 12 years accounted for 22.4%. Respondents with 13 – 18 years formal education were 7.6%. The least group was those that have 19 years and above formal education with 0.9%.

4.1.6 Occupations of Rural Household Heads

This study investigated the main occupations and other occupations engaged in by the rural household heads. This is with the view of getting a better understanding of mainly the income and consumption pattern of the rural households. The results of the findings were presented in Table 4.7 below.

Table 4.7 **Occupations of rural household heads**

Main Occupation	Frequency	Percentage (%)
Agriculture	340	100.0
FTP	340	100.0
Other Occupations		
Artisan	75	22.1
Business	121	35.6
Agricultural Labour	78	22.9
Public and private sector employee	66	19.4
Total	**340**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.7 shows that the common occupations engaged in by the rural household respondents in the study area were mainly agriculture and FTP activities. The respondents agreed 100% that they engage in these occupations. Table 4.7 also reveals that in other occupations engaged in by the rural households, business has the highest proportion with 35.6%. This was followed by agricultural labour (22.9%) and artisans (22.1%). The public and private sector occupations were the least with 19.4%.

4.1.7 **Household Size**

Household size is a very vital factor in determining the level of production and consumption of each rural household. It also helps in measurement of poverty and income distribution in rural households. The household size of the respondents was studied. The result of the study is shown in Table 4.8 below.

Table 4.8 **Rural households size**

Household Size	Frequency	Percentage (%)
Less than 7 persons	13	3.8
7 – 11 persons	176	51.8
12 – 14 persons	106	31.2
Greater than 14	40	11.8
No response	5	1.4
Total	**340**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.8 shows that 51.8% of the rural household respondents had household sizes ranging from 7 – 11 persons. Households with sizes ranging from 12 to 14 persons constituted the second highest proportion of 31.2%. Table 4.8 further shows that households with less than 7 persons were quite few and constitute only 3.8% while those with large household sizes greater than 14 persons constitute a significant size of 11.8%. A mean household size of 11 persons was found among the rural household respondents.

4.2 **Institutional Factors Affecting FTPs**

The rural household institutional factors affecting FTPs identified in the study areas include access to technology, access to credit, access to extension services, access to market, land ownership and access to land for collection of FTPs. The results of the findings are presented below.

4.2.1 **Access to Technology**

The results of the opinion of respondents as regard technologies used for FTP activities are shown in Table 4.9 below.

Table 4.9 **Technologies used for FTP activities**

S/No.	Technology Practice	Frequency	Percentage (%)
1.	Cutlass	340	100.0
2.	Hoe	21	6.2
3.	Pruning saw	4	1.2
4.	Harvesting pole	82	24.1
5.	Basket	340	100.0
6.	Wheelbarrow	340	100.0
7.	Shovel	116	34.1
8.	Spade	201	59.1
9.	Garden Fork	11	3.2
10	Head pan	6	1.8
11.	Hand trowel	62	18.2
12.	Hand fork	60	17.6
13.	Mattock	16	1.8
14.	Pick axe (Digger)	10	2.9
15.	Axe	282	62.9
16.	Mower	1	0.29
17.	Tractor	5	1.5
18.	Plough	0	0.0
19.	Harrow	0	0.0
20.	Hydraulic press	6	1.8
21.	Hand press	25	7.4
22.	Grinder	10	2.9
23.	Tresher	4	1.2
24.	Motorized saw	27	7.9
25.	Electricity	42	12.4
26.	Gun	0	0.0
27.	Fuel (petrol)	182	53.5
28.	Diesel	31	9.1
29.	Kerosene	152	44.7
30.	Oven	2	0.59

31.	Mobile phone	203	59.7
32.	Computer	0	0.0
33.	Fertilizer	15	04.4
34.	Improved seedling	2	0.59

S/No.	Technology Practice	Frequency	Percentage (%)
35.	Herbicide	0	0.0
36.	Insecticide	45	13.2
37.	Nematicide	0	0.0
38.	Canoe and paddle	62	18.2
39.	Motor boat	8	2.4
40.	Bicycle	145	42.6
41.	Motorcycle	80	23.5
42.	Vehicle	58	17.1
43.	Pot	33	9.7
44.	Drum	44	12.9
45.	Basin	111	32.6
46.	Knife	205	60.3
47.	Net	61	17.9
48.	Hook and line	61	17.9
49.	Trap	67	19.7
50.	Gourde	29	8.5
51.	Jerry can	93	27.4
52.	Firewood	340	100.0
53.	Charcoal	45	13.2
54.	File	176	51.8
55.	Harvesting spear	10	2.9
56.	Bag/sack	221	65.0
57.	Grater	66	19.4
58.	Frying pan	75	22.1
59.	Climbing rope	142	41.8
60.	Wagon	2	0.59

Source: **Field Survey 2010/2011**

Table 4.9 shows that apart from mobile phone with 59.7%, petrol (53.5%), kerosene (44.7%) and motorcycle (23.5%) which are modern technologies used by the rural households for FTP activities, the rural households used mainly ancient/old technologies such as cutlass (100%), basket (100%), wheelbarrow (100%), shovel (34.1%), spade (59.1%), axe (82.9%), knife (60.3%), firewood (100%), file (51.8%), bag/sack (65.0%) and climbing rope (41.8%) among others.

4.2.2 **Access to Credit**

Credit plays an important role in production, processing and marketing of FTPs. The respondents rating on their access to credit as regard FTPs are given in Tables 4.10 to 4.15 below.

4.2.2.1 **Credit Received for FTP Activities**

Table 4.10 **Credit received for FTPs activities**

		Frequency	Percentage (%)
Have you received credit for	Yes	13	4.1
FTP activities?	No	307	95.9
Total		**320**	100.0

Source: **Field Survey 2010/2011**

Table 4.10 above shows that 95.9% of the respondents said that they did not receive any credit for FTP activities while only 4.1% admitted that they received credit.

4.2.2.2 **Reasons Credit was not Granted for FTPs Activities**

Table 4.11 **Reasons why credit was not granted for FTPs activities**

	Frequency	Percentage (%)
No collateral	173	54.7
Interest rate is high	7	2.2
Too much official bureaucracy	129	40.8
Delay in granting loan	8	2.2
Total	**316**	100.0

Source: **Field Survey 2010/2011**

Table 4.11 shows that 54.7% of the respondents stated that they did not have access to credit because they do not have collateral. 40.8% were of the opinion that credit was not granted to them because of too much official bureaucracy. 2.2% stated that the interest rate was high and that there was delay in granting credit respectively.

4.2.2.3 **Amount Granted as Credit**

Results of the opinion of the rural household respondents on the amount granted to them as credit for FTP activities are given in Table 4.12 below.

Table 4.12 **Amount granted as credit for FTPs activities**

	Frequency	Percentage (%)
Less than 10,000	1	7.7
10,001 – 20,000	4	30.8
20,001 – 50,000	5	38.4
50,001 – 100,000	3	23.1
Total	**13**	100.0

Source: **Field Survey 2010/2011**

Table 4.12 shows that few rural respondents said that they got credit for FTP activities. 38.4% revealed that they were granted between N20,001 to N50,000, 30.8% were given between N10,001 to N20,000. 23.1% were given 50,001 to N100,000 while the least was 7.7% and was given less than N10,000.

4.2.2.4 Number of times credit was received for FTPs activities

The opinion of rural household respondents credit recipients for FTP activities were sought. The results of the findings are presented in Table 4.13 below

Table 4.13 **Number of times credit was received for FTPs activities**

		Frequency	Percentage (%)
How many times have you received credits for FTP activities	1	9	69.2
	2	4	30.8
Total		**13**	100.0

Source: **Field Survey 2010/2011**

Table 4.13 shows that 69.2 % of the rural household respondents received credit only once while 30.8% received credit twice for FTPs activities.

4.2.2.5 Financial Institutions that granted credit for FTP activities?

Table 4.14 **Financial institutions that granted credit for FTPs activities**

	Frequency	Percentage (%)
Cooperative Society	10	76.9
Non-governmental Organization (NGO)	3	23.1
Total	**13**	100.0

Source: **Field Survey 2010/2011**

Table 4.14 reveals that only two financial institutions granted credit to rural respondents for FTP activities. These financial institutions were Cooperative society and Non-governmental Organization (NGO). However, between these financial institutions, cooperative society granted the highest number of credit with 76.9% to the rural household respondents while NGO granted credit to 23.1% of the rural households.

4.2.2.6 **Repayment of Credit**

Table 4.15 **Repayment of credit**

		Frequency	Percentage (%)
Did you repay the credit in full?	Yes	13	100.00
	No	0	-
Total		**13**	100.0

Source: **Field Survey 2010/2011**

Table 4.15 shows that all the rural household respondents that received credits for the purpose of FTP activities repaid the credits in full. In other words, there was a 100% repayment rate by rural household that were granted credit.

4.2.3 **Access to Extension Services**

The rural household respondents were asked if they had access to extension services on FTP activities. Their responses are given in Table 4.16 below.

Table 4.16 **Access to extension services on FTPs activities**

		Frequency	Percentage (%)
Have you ever received extension	Yes	0	-
Services on FTPs?	No	338	100.0
Total		**338**	100.0

Source: **Field Survey 2010/2011**

Table 4.16 shows that 100% of the rural household respondents said that they did not receive any extension services on FTP activities.

4.2.3.1 **Residence of Extension Agent**

Table 4.17 **Residence of extension agent**

		Frequency	Percentage (%)
Do you have extension agent	Yes	0	-
Living in the village?	No	338	100.0
Total		**338**	100.0

Source: **Field Survey 2010/2011**

Table 4.17 reveals that 100% of the rural household respondents said that no extension agent was living in their village.

4.2.4 **Access to Market**

The opinion of respondents were elicited for different variables on the accessibility of market to rural households for FTP activities. The variables examined include location, that is where rural households sell FTPs, reasons for selling at the location, distance and type of road network. The results of the findings are given in Table 4.18 to 4.21 below.

Table 4.18 **Location where FTPs are sold**

Location	Frequency	Percentage (%)
Farmgate	71	20.9
Village market	237	69.7
Nearest commercial town	32	9.4
Total	**340**	100.0

Source: **Field Survey 2010/2011**

Table 4.18 shows that 69.7% of rural household respondents sell their FTPs at the village market, 20/90% sell at farmgate while 9.4% sell at the nearest commercial town.

Table 4.19 **Reason for selling at the location**

Reasons	Frequency	Percentage (%)
To reduce cost	34	10.0
To avoid problem of transportation	141	41.5
To attract fair pricing	68	20.0
To increase customers awareness	57	16.8
Because of low customer patronage	21	6.2
Market location is far	2	0.6
Customers undertake the transportation and handling charges	2	0.6
There is no storage facilities	15	4.4
Total	**340**	100.0

Source: **Field Survey 2010/2011**

Table 4.19 shows that 41.5% of the respondents indicated that they sell at the location to avoid problem of transportation. Other reasons given include to attract fair pricing (20.0%), to increase customers awareness (16.8%), low customer patronage (6.2%) and no storage facilities (4.4%). The reasons with the least ratings were that market

location was far and that the customers undertake the transportation and handling charges with 0.6% respectively.

Table 4.20 **Distance from production site to market**

Distance	Village Market		Nearest Town Market	
	Frequency	Percentage	Frequency	Percentage
Less than 1km	22	6.5	84	34.4
1 – 5 km	273	81.0	134	54.9
6 – 10 km	38	11.3	20	8.2
11 – 20 km	4	1.2	6	2.5
Above 20km	-		-	-
Total	**337**	**100.00**	**244**	**100.00**

Source: **Field Survey 2010/2011**

* km = kilometre

Table 4.20 shows that 81.0% of the respondents said that the distance between where the FTPs were produced to the village market was 1 – 5km. 11.3% said that the distance was 6 – 10km. 6.5% admitted that village market was less than 1km while 1.2% said that the distance was 11 – 20km.

On the distance between where the FTPs are produced and the nearest town market, 54.9% stated that the distance was 6 – 10km away; 34.4% gave the distance as between 1 – 5km. 8.20% lived 11 – 20km away while 2.5% lived a distance of above 20km away.

Table 4.21 **Type of road from production site to market**

Road network	Frequency	Percentage (%)
Earthen road	252	74.1
Tarred road	88	25.9
Total	**340**	100.0

Source: **Field Survey 2010/2011**

Table 4.21 reveals that 74.1% of the respondents claimed that the kind of road network that exist between the production site and the market was earthen road while 25.9% claimed that the road was tarred.

4.2.5 **Land Ownership and Access**

The results of the opinions of respondents on land ownership and access are shown in Tables 4.22 and 4.23 below.

Table 4.22 **Land ownership**

		Frequency	Percentage (%)
Does the household own any land	Yes	131	38.9
	No	206	61.1
Total		**377**	100.0

Source: **Field Survey 2010/2011**

Table 4.22 reveals that 61.1% of the respondents said that they do not have land while 38.9% said that they possessed land.

Table 4.23 **Access to land for FTP activities**

Land Resource		**Frequency**	**Percentage (%)**
Cultivated arable land	Yes	168	49.4
	No	172	50.6
Total		**340**	100.0
Non-cultivated arable land	Yes	210	61.8
	No	130	38.2
Total		**340**	100.0
Privately owned forest	Yes	111	32.6
	No	229	67.4
Total		**340**	100.0
Community forest	Yes	335	98.5
	No	5	1.5
Total		**340**	100.0
Reserve forest	Yes	305	89.7
	No	35	10.3
Total		**340**	100.0
Free zones (common forest)	Yes	335	98.5
	No	5	1.5
Total		**340**	100.0
Plantations	Yes	116	34.1
	No	224	65.9
Total		**340**	100.0
Trees outside forest	Yes	256	75.3
	No	84	24.7
Total		**340**	100.0

Source: **Field Survey 2010/2011**

Table 4.23 shows that rural households had access to FTPs in community forest (98.5%); free zones/common forests (98.5%); trees outside forests (75.3%); non-cultivated arable land (61.8%). However, rural households were not allowed much access into reserved forests (89.7%); privately owned forests (67.4%) and plantations (65.9%). There was split of opinion as regards cultivated arable land. While 50.6% said they were not allowed access, 49.4% said they were allowed access. It should be observed also from the analyses of Table 4.23 that allowing access to these land resources were not rigid in principle.

4.3 Identification of FTPs, their Financial Values and Economic Characteristics

The opinion of respondents on types of FTPs, their period of availability, financial values and economic value were studied. The results of the findings are presented in Table 4.24 below.

Table 4.24 **Identification of FTPs, their financial values and economic characteristics**

	Identification of FTPs		Period of Availability		Financial Values		Economic Values					Respondents Rating on variables	
S/N.	Common name	Local Name (Igbo)	Season	Peak Period	Unit of Measure	Price N	Consumption	Duration	Production Input	Asset Formation	Sale	Frequency	%
1.	Mango	Mango	Mar – May	April	1kg	75	*				*	335	985
2.	Sour sop		Apr – Aug	June	1kg	143	*				*	327	96.2
3.	Lime (citrus)	Oroma nkilisi	All season	Dec.	1kg	40	*				*	262	77.1
4.	Sweet orange	Oroma	All season	Dec.	1kg	28	*				*	338	99.4
5.	Almond tree (umbrella treefruit)	Frutu	Nov – Mar	Jan	1kg	32	*				*	284	83.5
6.	Guava	Gova	Apr – Jul	June	1kg	54	*				*	320	94.1
7.	Paw paw	Popo	All season	All season	1kg	86	*				*	331	97.4
8.	Coconut	Aki oyibo	All season	Nov	1kg	102	*				*	331	97.4
9.	Palm fruit	Akwu	Dec – Apr	Feb	1kg	200	*				*	328	96.5
10.	Palm kernel	Aki	All season	Feb	1kg	84	*				*	328	96.5
11.	Kolanut	Oji	May – Aug	June	1kg	154	*		*		*	279	82.1
12.	Cocoa	Koko	May – Aug	June	1kg	500	*		*		*	265	77.9
13.	Cashew fruit	Kachu	Dec – May	Mar	1kg	334	*				*	318	93.4
	Cashew nut		All season	Mar	1kg	365	*				*		
14.	Avocado pear	Ube oyibo	May – Aug	June	1kg	80	*				*	272	80.0
15.	Native pear	Ube	May –Aug	June	1kg	100	*				*	338	99.4
16.	African apple	Udara	Dec – May	Feb	1kg	500	*				*	268	78.8
17.	Ducanut (ogbono) seed	Ogbono big tree (ukpor)	Jan – Mar	Feb	1kg	1050	*				*	325	95.6
	fruit					150							
18.	Wild mango seed	Ugiri	Apr – June	May	1kg	1050	*				*	325	95.6
	fruit				1kg	150							
19.	Bread fruit	Ukwa	Mar – Aug	May	1kg	178	*				*	262	77.05
20.	Wall nut	Ukpa	May – Sept	July	1kg	100	*				*	275	80.9
21.	*Vitex donianu*	Mbebe	Mar – Jul	June	1kg	55	*				*	204	60/0
22.	*Spondias mombin*	Ugogo (fruit)	July – Sept	Aug	1kg	42	*				*	204	60.0

	Identification of FTPs		Period of Availability		Financial Values		Economic Values					Respondents Rating on variables	
S/N.	Common name	Local Name (Igbo)	Season	Peak Period	Unit of Measure	Price N	Consumption	Duration	Production Input	Asset Formation	Sale	Frequency	%
23.	Tramarindus indics	Icheku	Feb – Apr	Mar	1kg	335	*				*	295	86.8
24.	Pepper fruit	Mmimi	May – Sept	July	1kg	1250	*				*	265	77.9
25.	Bitter kola	Akilu	May – Oct	July	1kg	1000	*				*	284	83.5
26.	Alligator pepper	Ose oji	Nov – Apr	Mar	1kg	200	*				*	244	71.8
27.	*Xylopia aethiopica*	Uda	Jun – Sept	July	1kg	500	*				*	218	64.1
28.	Hot leaf	Uziza	All season	Jan	1kg	600	*				*	221	65.0
29.	Scent leaf	Alulu isi	All season	All season	1kg	100	*				*	265	77.9
30.	*Grongronema latifolia*	Utazi	All season	July	1kg	500	*				*	262	77.05
31.	*Brachystegia eurycoma*	Achi	Oct – Dec.	Nov	1kg	900	*				*	244	71.8
32.	Curry leaf	Cury	All season	All season	1kg	180	*				*	234	68.8
33.	Salad leaf	Okazi	All season	All season	1kg	1500	*				*	260	76.5
34.	Locust bean	Ogiri	Jan – Mar	March	1kg	257	*				*	278	81.8
35.	Oil bean	Ukpaka	Sept – Dec	Oct	1kg	200	*				*	223	65.6
36.	Palm wine	Mmanya nkwu	All season	All season	1ltr	120	*				*	328	96.5
37.	Raphia palm wine	Mmanya ngwo	All season	All season	1ltr	140	*				*	314	
38.	Palm oil	Ofi igbo/ mmanu nni	All season	Dec	1ltr	153	*		*		*	332	92.4
39.	Kernel oil	Mmanu aku	All season	Dec	1ltr	400	*		*		*	301	88.5
40.	Local gin	Ogogoro	All season	All season	1ltr	150	*				*	262	77.1
41.	Mushroom	Elo	All season	All season	1kg	1000	*				*	207	60.9
42.	Water leaf	Mgborogi	Apr – Jun	May	1kg	90	*				*	260	76.5
43.	Bitter leaf	Onugbu	All season	All season	1kg	20	*				*	321	94.4
44.	*Pterocarpus sp*	Oha	Nov – Jan	Dec	1kg	300	*				*	198	58.2
45.	Wild medicine	Ogwu igbo	All season	All season			*				*	278	81.8
46.	Moringa	Alom akwukwo	All season	All season	1kg	1800	*				*	93	27.4

S/N.	Identification of FTPs		Period of Availability		Financial Values		Economic Values					Respondents Rating on variables	
	Common name	Local Name (Igbo)	Season	Peak Period	Unit of Measure	Price N	Consumption	Duration	Production Input	Asset Formation	Sale	Frequency	%
47.	Root	Mkporogu	All season	All season	1kg	500	*				*	245	72.1
48.	Native Soap	Ncha	All season	All season	1kg	250	*				*	212	62.4
49.	Leaf litter (as fertilizer)	Manu	All season	All season					*			183	53.8
50.	Temitorium	Mkpuakika	All season	All season					*			104	30.6
51.	Livestock fodder	Nni anu	All season	July					*			231	67.84
52.	Tooth pick	Nfa eze	All season	All season	1kg	600				*	*	263	77.4
53.	Chewing stick	Atu	All season	All season	1kg	1500	*			*	*	321	94.4
54.	Firewood	Nkwu	All season	All season	1kg	15	*		*	*	*	340	100.0
55.	Charcoal	Unyi	All season	All season	1kg	29	*		*	*	*	295	86.8
56.	Timber	Timba	All season	All season					*	*	*	244	71.8
57.	Building wood	Osisi uno	All season	All season						*	*	276	81.2
58.	Hand fan	Akupe	All season	All season	1(0.14kg)	30					*	198	27.4
59.	Axe handle	Isi anyike	All season	All season	1(0.5kg)	400					*	243	71.5
60.	Mortar	Odo	All season	All season	1(8kg)	3000					*	260	76.5
61.	Pestle	Aka odo	All season	All season	1(2kg)	800					*	260	76.5
62.	Hoe handle	Isi agwe	All season	All season	1(0.2kg)	300		*			*	292	85.9
63.	Furniture		All season	All season				*			*	274	80.6
64.	Arrow	Mkpisi uta	All season	All season	1(0.2kg)	50		*			*	205	60.3
65.	Bow	Uta	All season	All season	1(1.8kg)	800		*	*		*	205	60.3
66.	Fishing rod	Osisi ukpo	All season	All season	1(0.4kg)	100		*	*		*	223	65.6
69.	Canoe	Ugbo	All season	All season	1(250kg)	25000		*	*		*	218	64.1
70.	Paddle	Amala	All season	All season	1(2.2kg)	1500		*	*		*	218	64.1
71.	Harvesting pole	Ngwu	All season	All season	1(1.4kg)	800		*	*		*	255	75.0
72.	Stake	Aruru	All season	July	1kg	40			*		*	318	93.5
73.	Thatching bundle	Akanya	All season	July	1(4kg)	500		*			*	108	31.8
74.	Raphia palm pole	Ofolo	All season	July	1(0.3kg)	40		*	*		*	112	32.9
75.	Oil palm leaves	Igwu nkwu	All season	All season	1kg	10			*		*	241	70.9

S/N.	Identification of FTPs		Period of Availability		Financial Values		Economic Values					Respondents Rating on variables	
	Common name	Local Name (Igbo)	Season	Peak Period	Unit of Measure	Price N	Consumption	Duration	Production Input	Asset Formation	Sale	Frequency	%

76.	Jute	All season	All season	All season	1kg	350			*		*	224	65.9
77.	Broom	Aziza	All season	All season	1kg	250		*			*	340	100.0
78.	Basket	Nkata	All season	All season	1(0.57kg)	150		*	*			312	91.8
79.	Pot	Ite	All season	All season	1.6kg	1000		*	*		*	98	28.8
80.	Cooking pot		All season	All season	1kg	500		*	*		*		
81.	Hat	Okpu	All season	All season	1(0.1kg)	100		*			*	101	29.7
82.	Mat	Ute	All season	All season	1 roll (1.4kg)	350		*	*		*	198	58.2
83.	Bag (Jute)	Akpa	All season	All season	1(0.4kg)	800		*	*		*	108	31.8
84.	Rope	Elili	All season	All season	1 roll (1.2kg)	300			*	*	*	279	82.1
85.	Wrapping leaf	Akwukwo uma	Dec – June	Feb	1kg	111			*		*	108	31.8
86.	Cane	Ekwe	All season	All season	1kg	280			*		*	224	65.9
87.	Sponge	Asisa/ogbo	All season	All season	1kg	600	*		*	*	*	198	58.2
88.	Bamboo	Otosi (small)	All season	All season	1kg	10			*		*	305	89.7
		Otosi (big)	All season	All season	1kg	50							
89.	Gourde	Akpa	All season	All season	1kg	20							
90.	Rubber pana	Roba	All season	December	1kg	170		*			*	287	84.4
91.	Wild fish (cat fish	Atuma	All season	All season	1kg	800	*				*	340	100.00
	dog fish)	Asa	All season	All season	1kg	2000							
92.	Crab	Nshiko	All season	September	1kg	600						302	88.8
93.	Prawn	Isha (okpo)	All season	September	1kg	1800	*				*	302	88.8
94.	Cray fish	Igwiligwu	All season	September	1kg	1000							
95.	Snail	ejuna	All season	July	1kg	850	*				*	319	93.8
96.	Insect (termite)	Aku	Seasonal	April	1kg	200	*				*	178	52.3
97.	Flying bird	Nnunu (Asha)	All season	All season	1(3kg)	800	*				*	201	59.1
98.	Wild fowl	Okwukwu ofia	All season	All season	1kg	800	*				*	198	58.2
99.	Fruit bat	Usu ofia	All season	September	1kg	500	*				*	216	63.5

S/N.	Identification of FTPs		Period of Availability		Financial Values		Economic Values					Respondents Rating on variables	
	Common name	Local Name (Igbo)	Season	Peak Period	Unit of Measure	Price N	Consumption	Duration	Production Input	Asset Formation	Sale	Frequency	%
100.	Honey	Nmanu anwu	All season	March	1ltr	600	*			*	*	318	93.5
101.	Bee wax	Ebiliba anwu	Jan – Apr.	March	1kg	150			*		*	318	93.5
102.	Alligator	Nche anwu	All season	All season	1kg	200	*				*	207	60.9
103.	Grasscutter	Nchi	All season	All season	1kg	1715	*				*	321	94.4
104.	Rabbit	Eyi	All season	All season	1kg	143	*				*	326	95.9
105.	Antelope	Ngbada	All season	All season	1kg	600	*				*	261	76.8
106.	Deer	Ene	All season	All season	1kg	1200	*				*	188	55.3
107.	Squirrel	Osa	All season	All season	1(0.5kg)	200	*				*	243	71.5
108.	Monkey	Monki abiali	All season	All season	1kg	600	*				*	112	32.9
109.	Snake	Agwo	All season	All season	1kg	1200	*				*	89	26.2
110.	Wild pig	Ezi ofia	All season	All season	1kg	800	*				*	95	27.9
111.	Edible worm		All season	All season	1kg	3000	*				*		
112.	Crocodile	Agu iyi	All season	All season	1kg	800	*				*	183	53.8
113.	Land crocodile	Oba	Aug – Dec	October	1kg	400	*				*	188	55.3
114.	Water snail	Mkpu	Aug – Dec	October	1kg	84	*				*	184	54.1

Source: **Field Survey 2010/2011**

Table 4.24 shows that rural households use a wide range of FTPs. These include a considerable variety of cultivated and wild fruits, wild foods, wild medicines, livestock fodder and browse, fertilizers like leaf litters and termiteria and wood products such as firewood, charcoal, construction and building materials, furniture, agricultural implements, cane products, thatches, mats, hats, household utensils, fishing and hunting implements. Although there were different species of the FTPs in the study area, the study valuated the most common species.

In addition, the period of availability of these FTPs were also examined in Table 4.24. This is mainly in connection with FTPs that are consumed. Results show that three remarkable periods were identifiable. The first was during dry season, between November and April of the following year. The FTPs include mango, orange, palm fruit, cashew, African apple and honey among others. The second period of availability of these FTPs was when most agricultural crops have been planted but not yet harvested. That is May to August. Such FTPs include sour sop, guava, avocado pear, African pear (native pear), breadfruit, walnut, pepperfruit, bitter kola, vegetables, among others. Thirdly, there were those FTPs that were available in all season. This category include citrus, pawpaw, coconut, utazi, palm wine, raphia palm wine, local gin, wild fish, moringa, snails, games like grasscutter, rabbit, squirrel, monkey, wild fowl, firewood and charcoal among others.

Table 4.24 also provided the financial values of the FTPs. Although there were different species of most of these FTPs in the study area, the study valuated the most common species. Results show that the values of most of the forest products are more expensive than the cultivated tree products and livestocks. For example, 1kg of avocado pear was N80.00 while that of African pear (native pear) was N100.00. 1kg of mango fruit was N75.00 while 1kg of wild mango was N150.00. Bitter leaf was N20.00 per kg while wild water leaf was N90.00 per kg and salad leaf (okazi) was N1,500.00 per kg, mushroom was N1,000.00 per kg. 1kg of sweet orange was N28.00 while African apple was N500.00 per kg. In the livestock area, 1kg of domesticated pig was N500.00 while 1kg of wild pig was N800.00. 1kg of

goat meat was about N500.00 while that of a deer was N1,200.00. 1kg of fish pond cat fish was about N500.00 while 1kg of wild cat fish was N800.00.

Finally, the views of respondents on the economic values (uses) of the FTPs were also given in Table 4.24. Results show that a number of FTPs – foods, fruits, wild medicines and goods were straight forward consumption goods as can be seen from the high ratings by respondents. Examples are mango, sour sop, palm fruit, coconut, breadfruit, native pear, African apple, wild fish, games, soap, chewing sticks, among others. Some FTPs are used as durables such as furniture, bows, building woods, timber, canoes, thatching bundle, pots, rubbers, among others. A significant number are used as production inputs. These include cocoa, palm oil, raphia palm wine, leaf litter, termitaria, dye, stakes, bamboo, firewood, charcoal, wrapping leaf, rubber, honey, fodder and browse, baskets, mats and fishing rods. Lastly, virtually all FTPs are sold by rural households to generate income.

4.4 Valuation of FTPs Contribution to rural Household Income and Consumption

The economic activities engaged in by the rural households were valued and categorized into FTPs, Agriculture, Agricultural labour, Business, Public and Private sector, Artisans and Transfers. The study established the contributions of income and consumption from these sources to the total income and total consumption of the rural household. The rank of FTP income and consumption among these economic activities were also determined. The results of the findings are presented below in sections 4.4.1 and 4.4.2.

4.4.1 Valuation of FTPs Contribution to Rural Household Income

The income from FTP activities was compared with the income from other economic activities of the rural household with the intention of determining the effect of FTP income on the rural household total income. The results of the rural household respondents are presented in Figure 4.1 below.

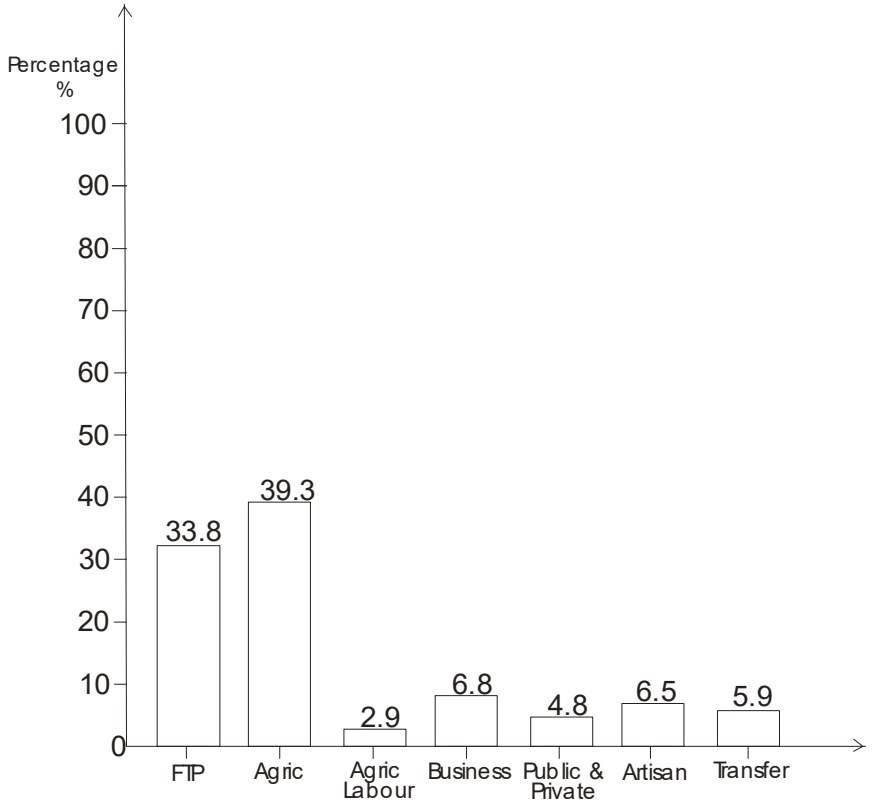

Figure 4.1 **Contributions of different economic activities to rural household income**

Result of the bar chart in Figure 4.1 shows that the greatest contributor to rural household total income was agricultural income with 39.3%. This was followed by FTP income with 33.8%. There was huge gap between the income contributed by agriculture and FTPs from other economic activities. For instance, business contributed 6.8%, artisan 6.5%, transfers 5.9%, public and private sector 4.8%. The least contribution of 2.9% came from agricultural labour.

4.4.2 **Valuation of FTPs Contribution to Rural Household Consumption**

The value of the rural household consumption from FTPs and its contribution to total consumption was compared with the value of the consumption contributions from other economic activities of the rural household to total consumption. The result are presented in figure 4.2 below.

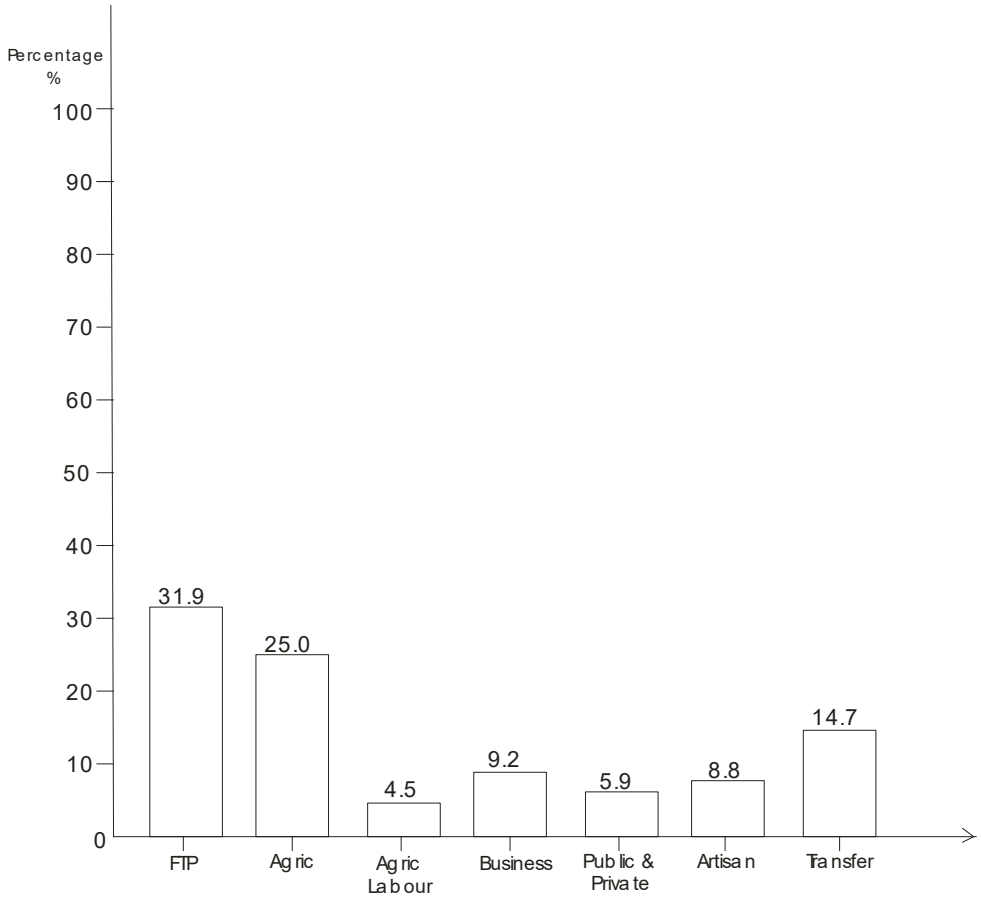

Figure 4.2 **Contributions of different economic activities to rural household consumption**

Figure 4.2 shows that the highest contribution to the total consumption of 31.9% came from FTP consumption. This was followed by consumption contribution from agriculture with 25.0%. Transfers contributed 14.7%. Others include contributions from business 9.2%, artisan 8.8%, public and private sector 5.9%. The least contribution of 4.5% came from agricultural labour.

4.5 Valuation of contributions of FTPS to rural household employment

4.5.1 Valuation of contributions of FTPS to rural household employment

The total contribution of FTPs to rural household employment was analyzed in this section. Comparison was also made on FTP employment status by gender. The results of the findings are presented in Table 4.25 below.

Table 4.25 **Rural household members FTP employment status**

Gender	Total number in sample	Number engaged in FTP employment	Percentage (%)
Adult male	258	240	93.0
Children male	593	494	83.3
Total male	**851**	**734**	**86.3**
Adult female	321	308	96.0
Children female	790	668	84.6
Total female	**1111**	**976**	**87.9**
Total household members	**1962**	**1710**	**87.6**

Source: **Field Survey 2010/2011**

Table 4.25 shows that 87.6% of the rural household members were engaged in FTPs employment. The result also shows that almost all the members living in the household were involved in FTP activities. However, the adult females with 96.0% were more involved in FTP activities, followed by adult male with 93.03%. The children female (84.6%) and children male (83.3%) were also very much engaged in FTP employment. On gender, the females with 87.85% were more involved in FTP activities than their male counterparts with 86.3%.

4.5.2 FTP Employment Engaged in by Members of the Rural Household

The type of employment engaged in by members of the rural household has become an important issue in FTPs production and management. Table 4.26 shows the views of the respondents on the types of FTP employment identified in the study area and employment the members of the rural households are engaged.

Table 4.26 **FTP employment engaged in by members of the rural household**

S/N	Employment	Adult Male Fre	Adult Male %	Adult Female Fre	Adult Female %	Children Male Fre	Children Male %	Children Female Fre	Children Female %	Total Fre	Total %
	Production										
1.	Seedling production	35	38.4	32	35.2	12	13.2	12	13.2	91	100.0
2.	Planting, tending and harvesting	54	28.9	73	39.0	27	7.9	33	9.7	187	100.0
3.	FTPs collection	143	16.7	131	38.6	65	19.0	87	25.7	340	100.0
4.	Lumbering	75	70.1	-	-	19	17.8	13	12.1	107	100.0
5.	Firewood collection	76	22.4	107	31.6	80	23.4	77	22.6	340	100.0
6.	Cane collection	64	51.6	20	16.1	40	32.3	-	-	124	100.0
7.	Bamboo collection	176	57.5	20	6.5	110	36.0	-	-	306	100.0
8.	Charcoal production	32	40.0	21	26.2	15	18.8	12	15.0	80	100.0
9.	Fishing	123	58.6	16	7.6	71	33.8	-	-	210	100.0
10.	Hunting	159	78.3	13	6.4	31	125.8	-	-	203	100.0
11.	Pottery	-	-	25	51.0	11	22.5	13	26.5	49	100.0
12.	Tapping	169	60.1	20	7.1	80	28.5	12	4.3	281	100.0
13.	Brewing/wine making	32	36.3	24	27.3	16	18.2	16	18.2	88	100.0
	Processing										
14.	Processing of FTPs	60	17.8	134	39.3	63	18.4	83	24.5	340	100.0
15.	Weaving	17	18.9	36	40.0	15	16.7	22	24.4	90	100.0
16.	Broom making	24	7.0	134	39.4	82	24.2	100	29.4	340	100.0
17.	Basket making	24	7.0	134	39.4	82	24.2	100	29.4	340	100.0

S/N	Employment	Adult Fre	Male %	Adult Fre	Female %	Male Fre	Children %	Female Fre	Children %	Total Fre	Total %
18.	Cane processing	64	51.6	20	16.1	40	32.3	-	-	124	100.0
19.	Bamboo processing	176	57.5	20	6.5	110	36.0	-	-	306	100.0
20.	Twine/rope making	21	9.6	78	35.8	51	23.4	68	31.2	218	100.0
21.	Mat/hat making	21	9.6	78	35.8	51	23.4	68	31.2	218	100.0
22.	Carpentry	26	48.2	-	-	16	29.6	12	22.2	54	100.0
23.	Thatching	45	64.3	-	-	15	21.4	10	14.3	70	100.0
24.	Soap making	10	9.3	54	50.0	13	12.0	31	28.7	108	100.0
25.	Carving	55	67.9	-	-	26	32.1	-	-	81	100.0
26.	Furniture making	33	68.8	-	-	15	31.2	-	-	48	100.0
	Marketing										
27.	Vending of FTPs	27	8.0	136	40.0	81	23.7	96	28.3	340	100.0
28.	Selling of firewood	66	19.3	107	31.6	74	21.8	93	27.3	340	100.0
29.	Selling of charcoal	12	15.0	41	51.2	15	18.8	12	15.0	80	100.0
30.	Fish selling	26	14.8	78	44.3	25	14.2	47	26.7	176	100.0

Source: **Field Survey 2010/2011**

Table 4.26 indicates that adult male members of the rural household engaged in FTP employment that were physically challenging. Such employments include lumbering (70.1%), cane collection and processing (57.5%), carpentry (48%), fishing (58.6%), hunting (78.3%), thatching (64.3%), tapping (60.1%), carving (67.9%) and furniture making (68.8%).

Females were mainly engaged in less physical FTP employments. Such employments include planting, tending and harvesting of FTPs (39.0%), non wood forest products (NWFPs) collection and processing (39.0%), vending of processed FTPs (40.0%), selling of firewood (31.6%), weaving (40%), broom making (39.3%), twine/rope making (35.8%), mat/hat making (35.8%), selling of charcoal (51.2%), selling of fish (44.3%), pottery (67.6%) and soap making (55.1%).

The common FTP employments between adult male and female members of the households include firewood collection, seedling production, basket making, charcoal production and brewing/wine making. However, even in all these common employments, the adult female was still more active than their male counterparts as can be observed from the ratings in Table 4.26.

It can also be observed from Table 4.26 that the male and female children were generally engaged in those employments that the adults were found. That is the male child helping the adult male while the female child is helping the adult female. However, further observation of Table 4.26 shows that the male child also tends more to help the adult female. Such can be found in employments like NWFPs collection, vending of processed FTPs, selling of firewood, broom making, twine/rope making and mat/hat making.

4.5.3 **Purpose for rural household engagement in FTP employment**

The results of the opinion of respondents on the purpose why members of rural households were involved in FTP employments are shown in Table 4.27 below.

Table 4.27 **Purpose for rural households engagement in FTP employment**

		Adult Male		Adult Female		Children Male		Children Female	
		Fre	%	Fre	%	Fre	%	Fre	%
Mainly subsistence	Yes	6	1.8	7	2.1	20	5/9	37	10.9
	No	334	99.1	333	97.9	320	94.1	303	89.1
	Total	**340**	**100.0**	**340**	**100.0**	**340**	**100.0**	**340**	**100.0**
Subsistence	Yes	55	16.2	270	79.4	268	78.8	317	93.2
	No	285	83.8	70	20.6	72	21.2	23	6.8
	Total	**340**	**100.0**	**340**	**100.0**	**340**	**100.0**	**340**	**100.0**
Commercial	Yes	277	81.5	60	17.6	49	14.4	3	0.9
	No	63	18.5	280	82.4	291	85.6	337	99.1
	Total	**340**	**100.0**	**340**	**100.0**	**340**	**100.0**	**340**	**100.0**
Mainly commercial	Yes	17	5.0	0	0.0	0	0.0	0	0.0
	No	323	95.0	340	100.0	340	100.0	340	100.0
	Total	**340**	**100.0**	**340**	**100.0**	**340**	**100.0**	**340**	**100.0**

Source: **Field Survey 2010/2011**

Table 2.27 above indicates that adult female with 79.4%, children male with 78.8% and children female with 92.3% engaged in FTP employments for subsistence purposes while adult male main purpose was commercial with 81.5% rating.

Table 4.27 further reveals that members of the rural households neither engage in FTP employment mainly for subsistence purpose nor mainly for commercial purposes.

4.5.4 **Hours spent on FTP employment**

The average hour spent by members of the rural households per week was analyzed. This was done based on gender of the members of the rural household. The results of the analysis are presented in Table 4.28 below.

Table 4.28 **Mean hours on FTP employment**

Gender of members of rural household	Total number in sample	Hours spent on FTPs employment	Mean hours
Adult male	240	3512	14.63
Children male	494	5308	10.74
Total male	**734**	**8820**	**12.02**
Adult female	308	4115	13.36
Children female	668	6938	10.39
Total female	**976**	**11053**	**11.32**
Adult members	548	7627	13.92
Children member	1162	12246	10.54
Total household members	**1710**	**19873**	**11.62**

Source: **Field Survey 2010/2011**

Table 4.28 shows that the mean hours spent by all household members was 11.62 per week. Further analysis shows that the adult males spent the highest mean hours of 14.63 per week. This finding conforms with *apriori* expectation since adult males carry out physical FTP activities such as hunting, lumbering, fishing, tapping among others which require long hours on the job. The adult males are followed by adult females with a mean hour of 13.36 per week. However, the children male and

children female had almost the same mean hour of 10.74 and 10.39 per week respectively.

On gender, table 4.28 shows that the males with mean hours of 12.2 per week spend longer hours in FTP activities than the females whose mean hour was 11.32 per week. Also, analysis revealed that adult members of the family spend longer hours with mean hour of 13.92 compared to the children with 10.54 per week. This was expected since children attend schools and apprentices training and merely participate by helping the parents.

4.6 Ascertain Measures Used to Conserve and Sustain FTPs Resource Base

Conservation and sustainability of FTPS are important measures that will benefit the rural households both in the short-run and in the long-run. This study therefore investigated the activities that are being carried out by the rural households to ensure conservation and sustainability of these primary sources of FTPs. The results of the opinion of respondents are given in this section.

4.6.1 Planting of Trees by Rural Households

The rural household respondents were asked if they have been planting trees in different locations. Their responses are shown in Table 4.29 below.

Table 4.29 **Tree planting by rural households**

		Frequency	Percentage (%)
Did you plant trees in the last 12 months?	Yes	93	27.8
	No	241	72.2
	Total	**334**	**100.0**
If no, have you planted trees in the last two years?	Yes	89	31.3
	No	195	68.7
	Total	**284**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.29 shows that 72.2% of the rural household respondents did not plant trees in the last 12 months. Only 27.8% planted trees. On the other hand, 68.7% did not plant tree in the last two years while 31.3% planted trees during the period under review.

4.6.2 **Location Where Rural Households Planted Trees**

Rural household respondents were asked to indicate the locations where they planted the trees. The results of their opinion are given in Table 4.30 below.

Table 4.30 **Location Where Rural Households Planted Trees**

Location	Frequency	Percentage (%)
Trees in home gardens/homestead	101	69.2
Trees in outer crop fields (arable farm)	13	8.9
Trees in farm boundaries	1	0.7
Trees in fallow fields	2	1.4
Plantations	28	19.2
Trees in privately owned woodland/forest	1	0.7
Total	**146**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.30 reveals that 69.2% of the rural household respondents planted trees in home gardens/homestead; 19.2% planted in plantations; 8.9% in arable farms; 1.4% in fallow fields and 0.7% in farm boundaries and privately owned woodland/forest respectively.

4.6.3 **Reasons for Planting Trees**

There is need to find out if the trees planted was for conservation and sustainability of FTPs by the rural households. The results of the opinion of the respondents are shown in Table 4.31 below.

Table 4.31 **Reasons for Rural Households Planting Trees**

Reasons	Frequency	Percentage (%)
To get tree products for consumption	82	55.4
To secure the land	30	20.3
Increase commercialization of tree products	30	20.3
Reduce low incidence of tree planting	4	2.7
Conserve the soil	2	1.4
Total	**148**	**100.0**

Source: **Field Survey 2010/2011**

Table 4.31 shows that 55.4% of the rural household respondents indicated that the trees were planted to get tree products for consumption. 20.3% said the trees were planted to secure the land and to increase commercialization of tree products

respectively. 2.7% said that the reason was to reduce incidence of tree planting while 1.4% said that they planted trees to conserve the soil.

4.6.4 **Measures Used to Conserve and Sustain FTPs Resource Base**

Results of the opinion of rural household on other measures adopted to conserve and sustain primary sources of FTPs are given in Table 4.32 below.

Table 4.32 **Measures used to conserve and sustain FTPs resource base**

S/N	Conservation Strategies	Yes		No		Total	
		Fre	%	Fre	%	Fre	%
1.	Use of local rules guiding conservation of FTPs	87	25.6	253	74.4	340	100.0
2.	Spirit-linked prohibitions	183	53.8	157	46.2	340	100.0
3.	National laws concerning conservation	132	38.8	208	61.2	340	100.0
4.	Involvement of locals in development of forest conservation strategies	21	06.2	319	93.8	340	100.0
5.	Promotion of participatory approach to forest conservation	34	10.0	306	90.0	340	100.0
6.	Training and organization of lectures for FTP users on conservation	22	06.5	318	93.5	340	100.0
7.	Controlled harvesting of FTPs	61	17.9	279	82.1	340	100.0
8.	Weeding around the FTPs	128	37.6	212	62.4	340	100.0
9.	Use of protective mechanisms	140	41.2	200	58.8	340	100.0
10.	Enrichment planting	96	28.2	244	71.8	340	100.0
11.	Enforcement of sanctions for erring individuals of the community on FTPs	45	13.2	295	86.8	340	100.0

Source: **Field Survey 2010/2011**

Table 4.32 shows that rural household respondents generally said that they do not use all the measures listed for the study for the conservation and sustainability of primary sources of FTPs except for the use of spirit-linked prohibitions which had a rating of 53.8%. However, closer observation of table 4.32 reveals that some measures had reasonable ratings as measures adopted. Such measures include use of protective mechanisms (41.2%); obeying national laws concerning conservation (38.8%); weeding around the FTPs (37.6%); enrichment planting (28.2%); use of local rules guiding conservation of FTPs (25.6%); and controlled harvesting (17.9%).

On the other hand, involvement of locals in development of forest conservation strategies (6.2%), training and organization of lectures for FTP users on FTP conservation (6.5%); promotion of participatory approach to forest conservation (10%) and enforcement of sanctions to erring members of the community on FTPs (13.2%), were hardly used.

4.7 Analysis of Income Distribution among Rural Household FTPs Dependent

Graphical plotting and analyses of income of rural household FTPs dependents using Lorenz curve techniques and Gini coefficients were carried out by the study. The presentations of the analyses were made in three categories. The first was the use of income of all the rural household FTP dependents for computation. This was followed by the income of owners of FTP resources and lastly that of non-owners of FTP resources. The results are as presented in this section.

4.7.1 Analysis of Income Distribution of all Rural Household FTPs Dependents

The plotting and analysis of the income of all rural households used for the study are presented in Figure 4.3 below.

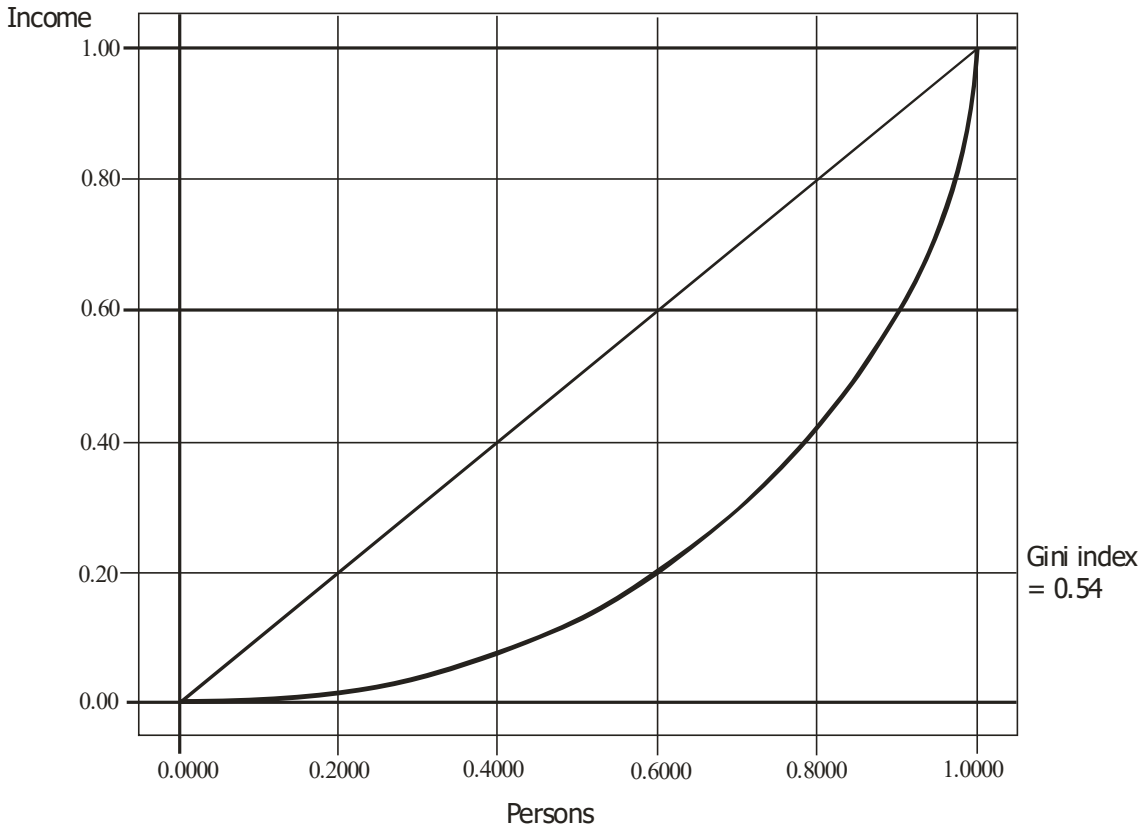

Figure 4.3 **Lorenz Curve of Income of all Rural Household FTP Dependents**

Figure 4.3 gave Gini index of 0.54 for the entire sample. That is income of all rural household FTPs dependents. The Gini index of 0.54 indicated that size distribution of rural household FTP dependents income was quite inequitable in pattern. This finding is in line with evidence of research which has shown that Gini indices for developing countries range from 0.5 to 0.7 and sometimes even more (Weisstein, 2004; Ravallion, 1991).

4.7.2 Analysis of Income Distribution of Owners and Non-Owners of FTP Resources

The inequality in income of the rural household were further examined by determining the income distribution of owners of FTPs resource and non-owners of FTP resources. This was done with the intention of finding out the main source of inequality among rural households FTP dependents. The results are as presented in figures 4.4 and 4.5 below.

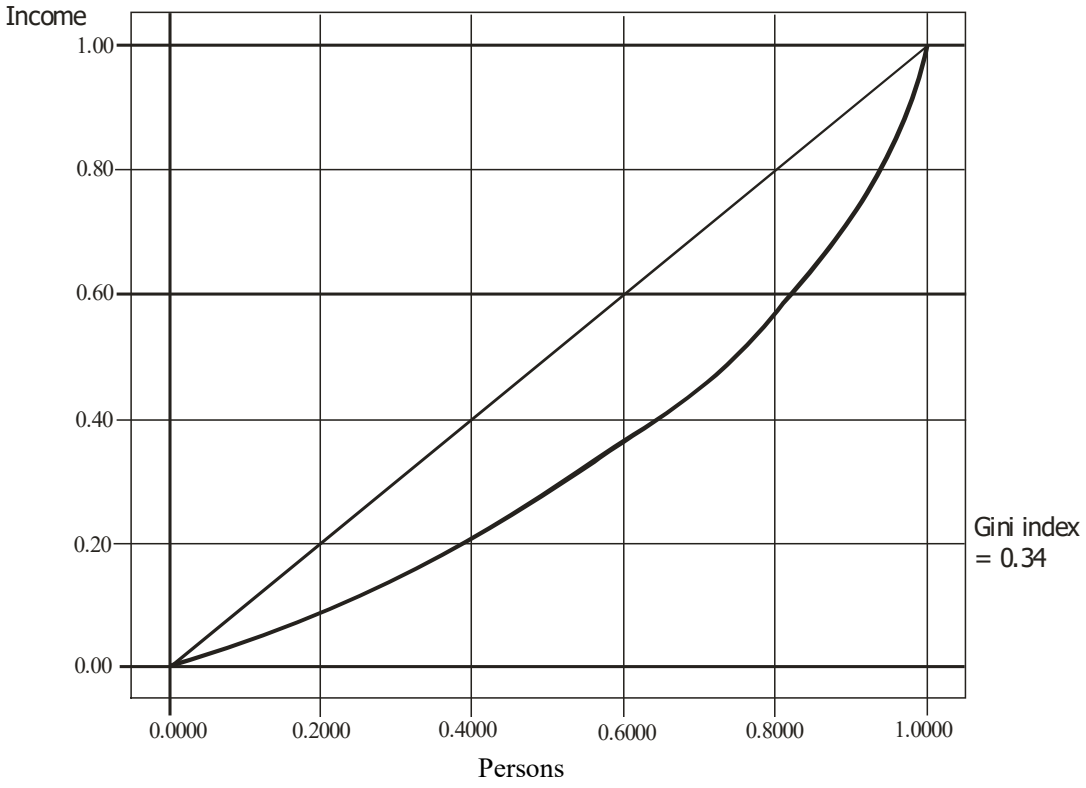

Figure 4.4 **Lorenz Curve of Income of Owners of FTP Resources**

Figure 4.4 shows the Lorenz curve and Gini index (coefficient) of FTP resource owners. The findings show that the income of FTP resource owners gave a Gini index of 0.34 indicating that there was little inequality in income distribution. This can also be read from the curve of figure 4.4 which reveals that 20% FTP resource owners earn about 10% of the income and 40% of them earn almost about 20% of the income.

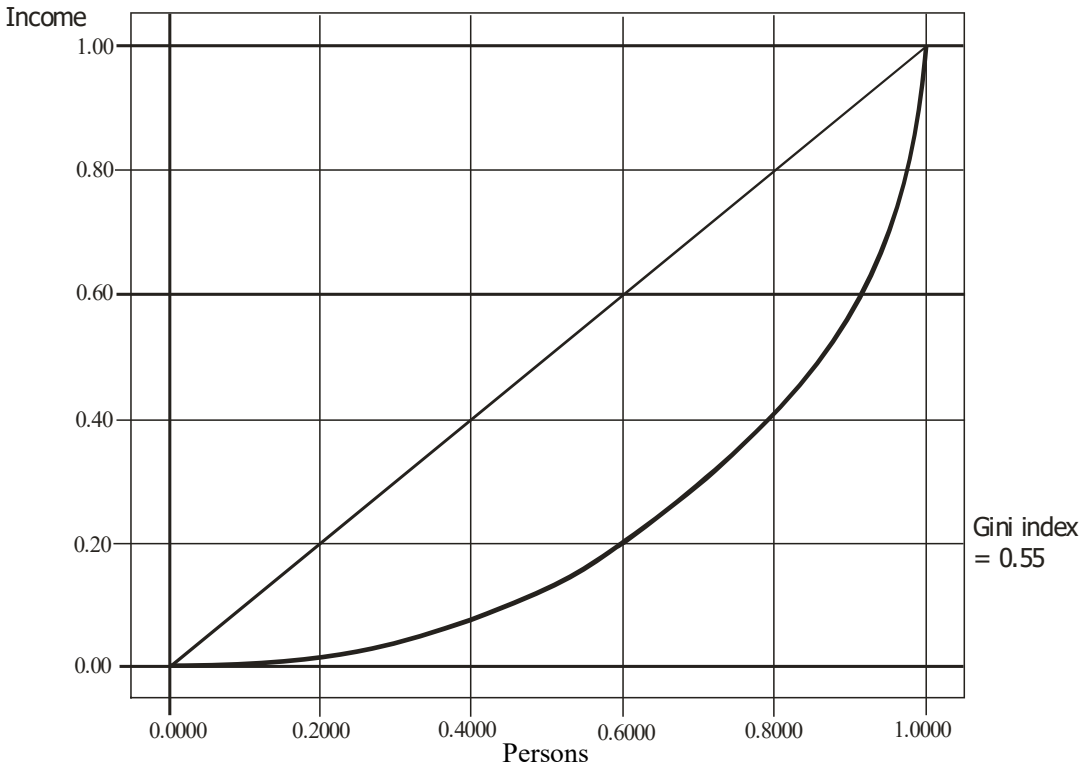

Figure 4.5 **Lorenz Curve of Income of Non-Owners of FTP Resources**

Figure 4.5 shows the Lorenz curve of income distribution of owners of FTP resources. The Gini index of 0.55 shows a great income inequality among non-owners of FTP resources. This finding contrasts sharply with the result of owners of FTP resources. Here, 20% of the population of non-owners of FTP resources earn less than 3% of the income while 60% of the population earn less than 20% of the income.

4.8 Measurement and Analysis of Poverty Among Rural Household FTPs Dependent

Relative poverty among rural household FTP dependents were measured using Foster, Greer and Thorbecke (FGT) model. Consumption figures were used and only data from 163 cooperating rural households with 1,850 individuals were used for the analyses. The study measured first the head count or incidence of poverty. Secondly, the income-gap ratio – that is the proportion that the average poor will require to at least get to the poverty line. Thirdly, the severity of poverty which

gives more weight to the poorest. That is the closer the value is to one, the higher the seriousness of poverty.

Two major analyses were carried out. The first include relative poverty analysis with FTP consumption income while the second was without FTP consumption income. This was done with a view to determining the effect of FTPs on poverty in rural households. The result is presented in Table 4.33 below.

Table 4.33 **Relative Poverty Indices With and Without FTP Consumption**

	H (α = 0)*	**I(α = 1)***	**FGT (α = 2)**
1.	Poverty indices with FTP consumption income		
	0.4870	0.1522	0.0476
2.	Poverty indices without FTP consumption income		
	0.7903	0.3202	0.0810

Source: **Field Survey 2010/2011**

*H(**α** = 0) = Head count ratio, I(**α** = 1) = Income – gap ratio, FGT (**α** = 2) = severity of poverty.

Table 4.33 shows that when relative poverty was measured with FTP consumption income inclusive, the head count index was 0.4870 depicting that 48.70% of rural household FTP dependants were poor. The income-gap ratio or intensity of poverty was 0.1522. That is the poor individuals income transfer require about 15.22% to bring them to poverty line. The severity of poverty was 0.0476 which shows that 4.76% of the individuals suffer severe poverty.

However, when relative poverty was measured without FTP consumption income poverty increased tremendously. The head count index increased to 0.7903 throwing about 30.3% more individuals into poverty. The income-gap ratio widened to 0.3202 while the severity of poverty also rose to 0.0810.

4.9 Rural Household Incomes Inequalities in FTP Resource Ownership and Access

The hypothesis that rural household incomes are not affected by inequalities in FTP incomes was examined. The results of the t-test analyses are presented in Tables 4.34 and 4.35 below.

Table 4.34 **Rural household incomes in relationship to inequalities in ownership of FTP resources**

	Does the household own any land?	N*	Mean	Std Deviation	Std Error Mean	df*	t cal	Sig (2) tailed	Remarks
Income earned by household from FTP activities	1. Yes	65	720279.06	570106.169	70712.967				
	2. No	113	198085.31	300439.31	28263.004	176	6.857	0.00	S*

Source: **Field Survey 2010/2011**

*** N = Number of respondents**
*** S = Significant**
***df = degree of freedom**

Table 4.34 shows the t-test result comparing incomes from owners of FTP resources and non-owners of FTP resources. A calculated t-value of 6.857 which was greater than a critical t-value of 1.96 at 0.05 level of significance and a significant value of 0.00 shows a significant difference between the incomes of owners of FTP resources and non-owners FTP resources. The null hypothesis which states that household incomes from FTPs are not affected by inequalities in ownership of FTP resources was therefore rejected. The alternative hypothesis that household incomes from FTPs are affected by ownership of resource was accepted. The owners of FTPs resources earn more income from FTP activities than non-owners of resources.

Table 4.35 **Rural household incomes in relation to inequalities in FTP resource access**

		N*	Mean	Std Deviation	Std Error Mean	df	t-cal	Sig (2) tailed	Remarks
Income earned by household from FTP activities	You are allowed access to cultivate arable land for FTP?								
	0 No	86	317302.65	539105.759	58133.269				
	1 Yes	93	455528.39	424893.382	44059.391	177	-1.912	0.057	NS*
	You are allowed access to non-cultivate arable land for FTP?								
	0 No	61	233489.25	356064.021	45589.326				
	1 Yes	118	469570.54	525574.49	48383.054	177	-3.551	0.001	S
	You are allowed access to privately own forest for FTPs?								
	0 No	123	223227.85	270584.07	24397.744				
	1 Yes	56	753484.68	638391.246	85308.619	177	-5.976	0	S

	N*	Mean	Std Deviation	Std Error Mean	df	t-cal	Sig (2) tailed	Remarks
You are allowed access to community forest for FTP?								
0 No	2	119450	40375.797	28550				
1 Yes	177	392165.36	488609.614	36726.148	177	-5.863	0.001	S
You are allowed access to Reserved forest for FTP?								
0 No	160	376590.74	447813.679	35402.78				
1 Yes	19	494613.16	747026.696	171379.678	177	0.999	0.319	NS
You are allowed access to free zones (common forest) for FTPs?								
0 No	3	103600	39316.154	22699.192				
1 Yes	176	393985.05	489402.083	36890.07	177	-6.704	0	S

	N*	Mean	Std Deviation	Std Error Mean	df	t-cal	Sig (2) tailed	Remarks
You are allowed access to plantations for FTPs?								
0 No	116	292684.74	431591.3	40072.246				
1 Yes	63	566678.38	534015.516	67279.631	177	-3.725	0	S
You are allowed access to trees outside forest for FTP?								
0 No	42	359559.24	435900.258	67260.87				
1 Yes	137	398180.15	502409.814	42923.767	177	0.449	0.654	NS

Source: **Field Survey 2010/2011**

Critical t-value = 1.96

Degree of freedom (df) = 177

Confidence level = 0.05

* N = Number of respondents

* S = Significant

* NS = Not significant

Table 4.35 reveals that incomes from access to FTPs in non-cultivated arable land with a calculated t-value of -3.551; privately owned forest with a t-calculated value of -5.976; community forest with t-cal value of -5.863; free zone (common forest) with t-cal values of -6.704 and plantations with t-cal value of 3.725 are all significant at a critical t-value of 1.96 and a 0.05 level of confidence. The null hypothesis in this case was therefore rejected and alternative hypothesis accepted. This depicts that the rural household incomes were affected by inequalities in access to FTPs in non-cultivated arable land, privately owned forest, community forest, free zones and plantations.

On the other hand, incomes from access to FTPs in the other remaining categories of forest which include: cultivated arable land with a t-cal value of 1.912; reserved forest with a t-cal value of 0.999 and in trees outside forests with a t-cal value of 0.654 were not significant at a 0.05 level of confidence and a critical t-value of 1.96. This also depicts that rural household incomes were not affected by inequalities in FTP resource access for cultivated arable; reserved forests and trees outside the forest.

4.10 **Employment in FTPs as Affected by Household Size and Gender**

This section examines two hypotheses using t-test analysis. The first hypothesis states that employment is not affected by household size.

The second hypothesis states that employment is not affected by gender. The analyses are presented in sections 4.10.1 and 4.10.2 below.

4.10.1 **Employment in FTPs as Affected by Household Size**

The result of the t-test analysis that states that employment in FTPs is not affected by household size is presented in Table 4.36 below.

Table 4.36 **Household size in relation to FTP employment**

Total Household Size	Mean	N	Std deviation	Std Error Mean	t-cal	df	Sig (2) tailed	Remark
Total household size	13.09	340	3.562	0.913				
Total number of household members engaged in FTP employment	10.30	340	2.617	0.142	18.750	339	0.00	S*

Source: **Field Survey 2010/2011**

* = Significant

The t-test analysis in table 4.36 shows a calculated t-value of 18.750 compared to a critical t-value of 1.96 and a significant value of 0.00 at 0.05 level of significance. This indicates that the difference was significant. That is, employment in FTPs was affected by household size. Therefore, we can conclude that FTP activities (employments) in the household was significant.

4.10.2 **Employment in FTPs as Affected by Gender**

The gender compared was the male and female members of household involved in FTP employment using the t-test analysis. The result is as presented in Table 4.37 below.

Table 4.37 **T-Tests of gender in relation to FTP employment**

	Mean	N	Std deviation	Std Error Mean	t-cal	df	Sig (2) tailed	Remark
Number of household members involved in FTPs employment – Male	4.37	339	1.479	0.080				
Number of household members involved in FTPs employment – Female	5.47	339	1.741	0.095	9.184	338	0.00	S*

Source: **Field Survey 2010/2011**

* = Significant

The t-test analysis in table 4.37 shows a calculated t-value of 9.184 as compared to critical t-value of 1.96 at 0.05 level of significance. This indicates that the difference was significant. That is, there was difference in the male and female members of the household engaged in FTP employment. We can further conclude that the females were more engaged in FTP employment than their male counterparts in the household. The hypothesis that gender was not affected by the total number of household members engaged in FTP employment was therefore rejected and the alternative accepted.

4.11 Socio-economic and institutional factors affecting commercialization of FTPS

To ascertain the socio-economic and institutional factors affecting commercialization of FTPs, a multiple regression analysis was carried out. The four functional forms – linear, double log, semi-log and exponential were used. The linear functional form was chosen since it provided higher number of variables with significant levels and also based on its records of having best R^2, F-ratios and also best coefficients when signs and significant are considered.

Table 4.38 **Regression estimates of socio-economic and institutional factors affecting FTPs commercialization**

S/N	Explanatory Variables	Coefficients	Std Error	t-ratio
1.	Educational qualification of hh head	0.537	0.188	(2.858)*
2.	Access to technology	2.596	0.964	(2.694)*
3.	Access to credit	5.514	1.146	(4.811)*
4.	Extension services received on FTPs	0.359	0.898	0.400
5.	Total hh size	2.166	0.574	(3.776)*
6.	Total number of hh members engaged in FTP employment	0.030	0.123	-0.243
7.	Hours spent on FTP employment	-0.242	0.039	(6.152)*
8.	Amount of FTP resources owned	2.83	0.000	(4.347)*

Source: **Field Survey 2010/2011**

Constant term	=	27.455	3.065
R^2	=	0.968	
Adjusted R^2	=	0.964	
F-Value	=	242.817	

* = Significant at 5% probability level

( ) Number in parenthesis is t-value

From the linear regression analysis result in Table 4.38, the R^2 value of 0.968 shows that 96.8% of the variations in dependent variable (commercialization of FTPs) was accounted for by variations in the independent variables put together. The adjusted R^2 also supported the claim with a value of 0.964 or 96.4%. This implies that the independent variables explained the behaviour of the dependent variables at 96% level of confidence. The calculated F-ratio of 242.817 which was greater than any critical F-ratio value implies that there was significant impact between the dependent variables and the independent variables.

On the explanatory variables in Table 4.38, the coefficients and t-values (values in parenthesis) of educational qualification of household head 0.537 (2.858); access to technology 2.596 (2.694) access to credit 5.514 (4.811); total household size 2.166 (3.776); amount of FTP resources owned 2.83 (4.34) were all positively signed and significant at 5% level of confidence. These variables conform with *apriori* expectations. That is, they were significant and positively affect commercialization of FTPs.

This shows that education as a human capital development makes an individual to be more informed which attracts better options and diversify sales. Access to technology was also significant and positive at 5% level of confidence. Technology aids commercialization because FTPs have to be produced and processed for marketing with technology. FTPs have to be transported to where they will be sold. Technology is also important in communications and information dissemination which are components of commercialization.

Access to credit was positive and significant at 5% level of confidence. Credit improves production, processing and marketing. Credit also influences the quantity that is eventually sold. Household size was also significant and positive at 5% level of confidence. Household size influences commercialization of FTPs since the more the number in the household the higher the chances of more members engaging in FTP commercialization. Amount of FTP resources owned was

significant and positive at 5% level of confidence. Generally the amount of resources owned influences the quantity supplied and available for sale.

However, the coefficient of hours spent on FTP employment was negatively signed with a value of -0.242 (6.152) but significant at 5% level of confidence. The number of hours spent on FTP employment negatively affect commercialization of FTPs since members of the rural households spent long hours on FTP commercialization that if quantified and valued will not give the rural households positive marginal returns.

From the explanatory variables analyzed thus far, the t-values were all significant and the probability of rejecting any of them was less than 1% confidence level. The standard errors for these explanatory variables were also very low.

On the other hand, coefficients and t-values of both extension services received on FTPs 0.359 and total number of household members engaged in FTP employment 0.030 were insignificant at 0.05 level of confidence. They were therefore ignored. Since both variables were not significant, it implies that they do not affect commercialization of FTPs.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATIONS

5.1 Summary

This study was conducted to investigate the effects of forest and tree products on poverty and income distribution in the rural areas of Delta State. It became necessary to carry out the study against the background of glaring rural poverty and income inequality in rural areas in spite of rural population in food production. There is need to explore and develop other sectors of the rural economy like FTPs. The expectation is to help broaden the choice of policy alternatives in solving food problems, reduction of poverty and income inequalities in the rural areas. The specific objectives of the study include: to measure and analyze relative poverty and income distribution among rural household FTP dependents; identify types of FTPs and their economic characteristics that contributes to rural household poverty reduction; value the contributions of FTPs to household income, consumption and employment; analyze household socio-economic and institutional factors affecting commercialization; ascertain measures rural households adopts to conserve the primary sources of FTPs; and make recommendations for improving the contributions of FTPs to rural household livelihood and poverty reduction.

The study area was Delta State. It was purposively chosen because of the above-average forest resources. Multistage sampling techniques was used to select the samples for the study. On the whole, 360 rural household respondents from 24 villages in 6 local government areas of the 3 agricultural zones were used for the study. Data was sourced from primary and secondary sources. The primary data was sourced through a structured questionnaire and open-ended questionnaires which include general information on FTPs, income and consumption data. On the whole, 340 rural households completed the general information questionnaire while 179 and 163 cooperating households completed the sets of questionnaires on daily income and consumption of the rural households respectively. Data was analyzed using descriptive statistics such as frequency distributions, percentages, means and standard deviations. Other analytical techniques used include Economic Valuation

of FTP prices using Benefit Transfer (BT) approach, Gini coefficient, Foster, Greer and Thorbecke (FGT) model of poverty analysis, regression analysis and t-test analysis.

Results show that on socio-economic factors, the age group of head of households that were active in FTP activities were between ages 31 -60 years with 41 – 50 years being the most active. This finding was further confirmed by the fact that young families (11 – 40 years) were more actively engaged in FTP activities. Majority of the rural household heads received no formal education while relatively average number of household heads received primary and secondary education. Findings also revealed that all the rural households were mainly engaged in farming and FTP activities. Other occupations engaged in by rural households were mainly business, artisan and agricultural labour. The mean rural household size was 11 persons per household which portray large families.

On the household institutional factors, results show that apart from mobile phone, petrol/diesel, kerosene, vehicle and motorcycle which are modern technologies, the rural household used mainly ancient/old technologies for FTP activities. Results also show that rural households do not have access to credit for FTP activities. The very few (4%) that had access were granted mainly between N20,000 to N50,000 and just once. All credits granted were repaid. Only two financial institutions granted credit to the rural households.

These institutions include cooperative society and non-governmental organization. On access to extension services, there was 100% negative response that the rural households do not receive any extension services for FTP activities. On access to market, results show that rural household sell their FTPs at the village market and not at the nearest commercial town market. Results also indicated that they sell at this location mainly to avoid problem of transportation.

The findings also indicated that the distance where most FTPs were produced was nearer to the village market than the nearest town market which was far away. The road network that exist from the production site to the markets which were majorly

earthen roads also increased the reason why rural households sell at the village market.

The results on land ownership shows that majority of the rural households do not own land. Only about 38.9% owns land. However, on access to land for FTP activities, findings show that rural households have access to many land resources for FTP activities. These land resources include community forests, free zones/common forests, trees outside forest, non-cultivated arable land and cultivated arable land. Rural households do not have access to reserved forest, plantations and privately owned forest.

Results also show that rural households use a wide range of FTPs. These include wild foods and fruits, wild medicines, livestock fodder and browse, wood products such as firewood, charcoal, construction and building materials, furniture, agricultural implements, thatches, mats, cane products, household utensils, fishing and hunting implements. Results also show that there are three remarkable periods that these FTPs are available. These include during dry season (December – April), period when most agricultural crops have been planted but yet to be harvested (May – August) and those that were available all season. On the financial values of the FTPs, findings show that the values of most FTPs were more expensive than the cultivated tree crops. Further analysis revealed that most of the FTPs were consumption goods. However, some were durables, a significant number was used as production inputs and virtually all FTPs were sold by the rural households to generate income.

On the valuation of the contribution of FTPs to rural household income and consumption, results show that agriculture was the greatest contributor to total household income. This was followed by income from FTPs. There was huge gap between income contributed by other economic activities. However, in rural household consumption, FTPs contributed the highest followed by consumption contribution from agriculture. There was also a huge margin between contributions from FTPs and agriculture to total consumption than the consumption from other economic activities which contributed less. The huge margin between incomes

from agriculture and FTPs and other economic activities of the rural household could be observed in most national accounts data and literature where agriculture and FTPs incomes are often combined as one income under agriculture.

As regards FTP employment to members of the rural households, results show that a significant number of the rural household size were involved in FTP employment. Further analysis shows that females living in rural households were engaged more in FTP employment than their male counterparts. On the type of FTP employments engaged in by members of the rural households findings show that adult males engage in FTP employments that are physically challenging such as lumbering, cane collection and processing, bamboo collection and processing, carpentry, fishing, hunting, thatching, tapping, carving and furniture making. The females were mainly engaged in less physical FTP employments such as planting, tending and harvesting of FTPs, NWFPs collection and processing, vending of processed FTPs, selling of firewood, weaving, broom making, twine/rope and mat/hat making, selling of charcoal, selling of fish, pottery and soap making. Some FTP employments were common between adult male and female members of the household. These include firewood collection, seedling production, basket making charcoal production, brewing/wine making among others. However, even in all these common FTP employments, the adult female is still more active than their male counterparts. Results also show that male and female children were generally engaged in FTP employments that the adults were found. That is the male child helping the adult male while the female child was helping the adult female. However, generally, the male child also tend to help the adult female in FTP employments like NWFPs collection, vending of processed FTPs, selling of firewood and broom making among others.

On the main purpose why members of the rural household engage in FTP employment, findings reveal that adult female, children male and children female engage in FTP employments for subsistence purposes while the adult male main purpose was commercial. However, further findings revealed that members of the rural households neither engage in FTP employment mainly for subsistence nor

mainly for commercial purposes. Results also revealed that generally rural households spent long hours per week in FTP employments. Further finding show that adult males spent more hours per week in FTP activities than any other member of the family. This may be attributed to the physical nature of the FTP activities they undertake. The adult females also spent long hours per week, almost like the adult males. This conforms with *apriori* expectation since women are involved in so many FTP productions, processing and marketing activities.

The children involvement in FTP employments were less than that of the adults because they have to attend school or engage in apprenticeship training and only help their parents when the need arises.

On conservations and sustainability of primary sources of FTPs results shows that majority of the rural households do not plant trees in the different locations where they collected FTPs. Further, results indicated that few rural households that planted trees did so in home gardens/homestead and plantations. Their reasons for planting the trees were mainly to get tree products for consumption and increased commercialization of FTPs. The results on other measures adopted by rural households to conserve and sustain primary sources of FTPs also show that generally rural households do not participate actively in the conservation of forest. Apart from the use of spirit-linked prohibitions, other measures such as use of local rules guiding conservation of FTPs, controlled harvesting, enrichment planting, weeding around the FTPs, sanctioning erring individuals of the community on FTPs, promotion of participatory approach to FTP conservation and involvement of locals in development of forest conservation strategies among others were not actively used as FTP conservation measures.

Results of income distribution among rural household FTP dependents show an overall Gini coefficient of 0.54 indicating an income inequality. Further findings between owners of FTP resources and non-owners of FTP resources show a Gini-coefficient of 0.34 for owners of FTP resources indicating little inequitable income distribution while non-owners of FTP resources gave a Gini co-efficient of 0.55 indicating large inequality in income distribution.

On measurement of relative poverty among rural household FTP dependents results show that when poverty was measured with FTP income inclusive, 0.4870 or 48.70% was poor. The income-gap ratio was 0.1522 and severity of poverty was 0.0476. However, when relative poverty was measured excluding FTP income poverty index increased. Head count index increased to 0.7903 or 79.03% throwing about 30.3% more individuals into poverty. The income gap ratio increased to 0.3202 while the severity of poverty rose to 0.0810.

Results of the t-test analysis shows that rural household incomes were affected by ownership of FTP resources. The owners of FTP resources earn more from FTPs activities. Results also show that incomes from FTPs are affected by inequalities in access to FTP resources in non-cultivated arable land, privately owned forest, community forest, free zones (common forest) and plantation. However, incomes from FTPs are not affected by inequalities in access to FTP resources in cultivated arable land, reserved forest and trees outside forest.

On whether socio-economic and institutional factors affect commercialization of FTPs, findings show that the number of years spent on formal education, access to technology, access to credit, total household size and amount of FTP resources owned were all significant and affect commercialization of FTPs positively while hours spent on FTP employment and income earned from FTP activities were significant but negatively affect commercialization of FTPS.

5.2 **Conclusion**

This study investigated the contributions of FTPs to the rural economy. This was done with a view to attracting the attention of policy makers and stakeholders that aside from agriculture (farming) there are other sectors of the rural economy that can help in addressing the inequalities in rural income and poverty when given attention. The study specifically chose to determine the effect of forest and tree products on income distribution and poverty in rural areas of Delta State. Hypotheses were used to test and authenticate data collected. Data was collected by structured and open-ended questionnaires from rural households FTP

dependents. Data was further analyzed using descriptive statistics such as frequency distributions, percentages, means and standard deviations. Other techniques used include Benefit Transfer(BT) method, t-test, regression analysis, Gini coefficient and Foster, Greer and Thorbecke (FGT) model of poverty analysis.

Results confirmed that inequalities in income and poverty generally pervade in the rural areas. However, income from FTPs were found to help reduce income inequalities and poverty in the rural areas. FTPs also provide employments to many rural households especially the female members of the households. On the other hand, conservation of the FTPs was a major challenge in the study area. There was little evidence of FTP conservation activities among rural households FTP dependents. This was a problem that if allowed to continue without being checked will have adverse consequences on rural household livelihood and the environment. The findings and policy implications of this study if considered will go a long way in boosting the rural economy and in ameliorating poverty.

5.3 **Policy Implications**

- Integration of FTPs into National Accounting Systems. Findings of this study have shown that FTPs play an important role in rural economy and in alleviating rural poverty. Such avenue cannot be neglected since it will help to portray the true status of rural household budget (income and expenditure) and how to intervene in the rural economy. FTPs just like other food crops and livestocks could be properly valued and used to provide good estimates of the rural economy. Improvement in the data base of FTPs will aid valuation in this regard.

- Improvement in technology used for FTP production, processing and marketing. This will help add values to the finished products to attract fair product prices and more income. Developing appropriate small-scale technology will maximize value added at the local level and will not strain the resource base. The technology will be able to maximize product extraction and avoid waste of resources. Considering the large

household size that participate in FTP activities as revealed by this study which shows availability of abundance of labour in rural areas, the labour-intensive rather than capital-intensive technology should be used since increased employment is a social priority in Nigeria.

- Exploring the value chain of major FTPs will help improve their production, generate employment and increase income thereby reducing poverty. Value chain analysis will reveal the various products that could be produced and processed from the FTPs, their values and value added at each further step in processing or transformation. Value chain will help identify for the rural households those FTPs that can be produced and processed efficiently with low cost and more value added to give them the advantage of better utility of product which attracts better living and generates more income thereby reducing income disparities and poverty.

- Policies should shift towards participatory approach to FTPs conservation. The present "top to bottom" approach where policies and regulations about conservation of FTPs are passed from government agencies to the rural households usually alienate the rural households who are the end users. The result is a disconnect between the policy makers, policy implementers and end users. The rural household should be involved in any policy or regulation formulation and implementation. This will help them see such policies or regulations as their own and work hand in hand with government agencies to enforce and defend the policies.

Similarly, at the local levels giving females chance to fully participate in formulation and implementation matters concerning FTPS will improve FTP conservation, extraction and utilization. As revealed by the findings of the study, females constitute majority of the rural household members engaged in FTP employment. Their views are needed to guide the formulation and implementation of FTP policies and regulations. In

addition, the FTP policies and regulations on conservation should recognize local rules and sanctions guiding FTP and its conservation. This will create awareness among the rural households that government is aware of their efforts and increase enforcement of such rules and sanctions.

- Education and enlightenment of the rural households especially the women who constitute majority in FTP activities will go a long way in improving the quality and value of their products and understand the need for FTP conservation. It will also help them adopt new technology or innovations easily. The enlightenment can be on issues of production, processing, marketing and conservation among others. Methods can be through demonstrations, discussions, meetings, exhibitions, television and radio programmes, posters and film shows among others. The present Unified Agricultural Extension Services (UAES) which has forestry as one of the components should be made to include FTP as a whole. The UAES will be of tremendous benefit in disseminating information if effectively utilized. Presently, as revealed by the findings of this study, extension agents are hardly found nor pay regular visit to the rural areas.

- Given the considerable potentials of FTPs to contribute to rural livelihoods, there is need for research into ways of improving the values of FTPs. Many areas require attention. For instance, seeds and seedlings production and cultivation of those FTPs which are frequently used and some that are going into extinction. Now that the FTPs are being removed at an alarming rate without replacement and deforestation is not abating, more research on the in-situ breeding, propagation and production of these FTPs are necessary. This will help to sustain the availability of these FTPs. FTPs which are ex-situ but their products compete favourably in value and sometimes surpass the value of domesticated tree crops should have their potentials explored. Other

areas of value addition include impacts of changes in processing patterns, the possibility of creating new marketing, role of marketing cooperatives, government forest agencies and role of voluntary agencies. There should also be research in quality control of various FTPs, their preservation and storage.

- Encouraging formation of cooperative societies by rural household FTPs dependents has policy implications. Findings of this study have revealed that only cooperative societies and non-governmental organizations gave credit to rural household for FTP activities. Cooperative societies will help rural households access credit from financial institutions and help them to improve their products. Cooperative societies will also be a better avenue for government and its agencies to reach out to the rural households engaged in FTP activities. Through cooperatives new research findings in the sector can quickly get to the FTP dependants. There will be better quality control and fair valuation of the prices of their products. The cooperative societies will help them to look for new avenues to market their products and ways of developing new products.

- Above all, government should strive to create an enabling environment in the rural areas through the provision of basic amenities like potable water, electricity, health services, market and transportation among others. This will improve rural livelihood and help relieve pressure on FTP primary base.

REFERENCES

Abosede, A. O. and Akesode, O. (1986). "Self-medication with Agbo-Jedi in Lagos, Nigeria". *Journal Research on Ethnomedicine*.1(1)

Adams Jr, R. H. (1995). *Sources of Income Inequality and Poverty in Rural Parkinstan*. Research Report 102. Washington D.C.: International Food Policy Research Institute.

Adams Jr, H. R. and Alderman, H. (1993). "Sources of Income Inequality in Rural Pakistan: A Decomposition Analysis. Policy Research Working Papers Agricultural and Rural Development Department: World Bank

Adegbehin, J. O. and Omijeh, J. E. (1990). "Meeting the Challenges of Forestry Extension in Nigeria". In *Development and Management of Forest Resources of the Arid Zone of Nigeria*. Proceedings of the 20th Annual Conference of the Forestry Association of Nigeria held in Katsina, Katsina State, Nigeria 25 - 30 November. PP 184 - 191

Adeoye, G. O. and Nwosu, A. U. (1998). "Poverty, Measurement and Monitoring". In *Measuring and Monitoring Poverty in Nigeria*. Proceedings of the 7th Annual Conference of Zonal Research Units of the CBN held in Markurdi, Benue State 8th – 12th June.

Agarwal, B. (1986). *Cold Hearths and Barren Slops: The Woodfuel Crisis in the Third World*. London; Zed Books Ltd.

Ahmed, I. (2000). "The Development of Forest and Tree Products." Paper presented at National Agricultural Development Seminar, Zaria, 26th July – 5th August.

A.I.A.E. – African Institute for Applied Economics (2006). "Renewable Natural Resources, Sustainable Economic Growth and Poverty Reduction in Nigeria". *A.I.A.E. Research Paper I,* Enugu: A.I.A.E.

A.I.A.E. (2005). *Promoting Nigeria's Non-Oil Sector: Evidence and Recommendations*. Eboh, E. C., (ed) Enugu: Published by African Institute for Applied Economics.

A.I.A.E. (2005b). "Poverty Reduction Strategies Towards the Millennium Development Goals: Africa's experiences and lessons for Nigeria". *Enugu Forum Policy Paper 1.* Enugu Forum.

A.I.A.E. (2005c). "Unlocking the Potentials of Agriculture and Forestry for Growth and Poverty Reduction". *A.I.A.E. Policy Brief 1***.** Enugu: A.I.A.E.

Ajakaiye, D. O. and Olomola, A. S. (2003). "Overview of Poverty and Poverty Reduction in Nigeria". *Poverty in Nigeria: A Multi-Dimensional Perspective*. Ibadan: NISER

Anon (1988). "Linking Nutrition and Forestry, Soil saving for better Food Production – A Perspective in Nepal." Paper prepared for the FAO/Khon Kaen University Workshop on Nutrition in Forestry. Khon Kaen, Thailand. 18 - 21 October 1988 (Unpublished).

Ardayfio, E. (1986). The Rural Energy Crisis in Ghana: Its Implications for Women's work and Household Survival. ILO World Employment Programme Research Working Paper 19, Geneva

Arnold, J. E. M. (1990). "Tree Components in Farming System." In *Unasylva* 41(160)

Arnold, J. E. M. (1995). "Socio-economic Benefits and Issues in Non-wood Forest Products Use." In *Report of the Expert Consultation on Non-wood Forest Products Use*. Yogyakarta, Indonesia, 17 – 27. January 1995. Non-wood Forest Products 3 FAO, Rome

Arnold, J. E. M. (1998). "Forestry and sustainable Rural Livelihoods," In *Sustainable Rural Livelihoods: What Contributions can we make*? Papers presented at Department of International Development's Natural Resources Advisers Conference. July. DFID.

Aruofor, R. O. (1986). "An Economic Appraisal of Pricing Policy and Tariff Systems for Gmelina arborea Pulpwood and Sawlog in Nigeria." M.Sc. Thesis, Department of Forest Resources Management, University of Ibadan.

Atkinson, A. B. (1970). "On the Measurement of Inequality, *Journal of Economic Theory* 2, pp 244 – 263.

Banez, G. (1992). "NGOs supporting each other: the upland NGO Assistance Committee. In *NGO and tree-growing Programmes: Working between Farmers and Governments*. Bagkok: Winrock International – FAO

Bateman, I. J.; Langford, I. H.; Willis, K. G.; Turner, K. G. and Garrod, G. D. (1993). *The Impacts of Changing Willingness to Pay Question Format in Contingent Valuation Studies. An Analysis of Open-ended Iterative Bidding Dichotomous Choice Format, CSSERGE Working Paper.*

Becker, S. (1986). "Socio-economic aspects of agroforestry in rural Haiti." University of Maine Agroforestry Outreach Project Port-au-Prince

Becker, S. (1986b). "Wild Plants for Human Nutrition in the Sahellian Zone." *Journal of Arid Environments*. 11(1) pp 61 – 64.

Bienen, H. and Diejomoah, V. P. (1981). *The Political Economy of Income Distribution in Nigeria*. Lagos; Holmes and Meier Publishers Inc.

Blank, L. and Grosh, M. (1999). "Using Household Survey to build analytic capacity." *World Bank Research Observer*. 14(2)

Boateng, E. O.; Ewusi, K.; Kanbu, R.; and Mckay, A. (1972). "A Poverty Profile of Ghana, 1987 – 1988", In *Journal of African Economics, 1(1) pp. 25 – 57*.

Brokensha, D. and Rilley, B. W. (1986). "Changes in uses of plants in Mbeere, Kenya. *Journal of Arid Environments*. 11. pp 75 - 80

Browder, J. O. (1992). "The Limits of Extractivism: Tropical Forest Strategies Beyond Extractive Reserves." *Bioscience* 42(3) pp 174 - 182

Burkhill, H. (1985). *Useful Plants of the Tropical West Africa*. London; Royal Botanic Gardens, Kew.

Campbell, B. M. (1986). "The importance of wild fruits for peasant households in Zimbabwe." *Food and Nutrition*. 12(1) pp 38 - 44

Campbell, J. G. (1987). "Socio-economic factors in traditional forest use and management in Nepal. Banko Janakart. 1(4) pp 45 - 54.

Campbell, J. Y. (1988). *Putting people's products first: Multiple-use management for non-wood forest products in India*. New Delhi – India: L.B.H. Publishing Company.

Campbell – Platt, C. (1980). "African locust bean (*parkia sp.)* and its fermented food product Dawadawa." *Ecology of Food and Nutrition*. 9(2) pp 123 - 132

Carpenter, C.; Vosti, S and Witcover, J. (1999). "Impacts of soil quality, differences on deforestation, use of cleared land and farm income." Unpublished manuscript OED. Brasilia.

CBN (2010). *Annual Report and Statement of Accounts for the Year Ended 31st December, 2010*. Lagos: CBN

Central Bank of Nigeria (1998). "Measuring and Monitoring Poverty in Nigeria." Proceedings of the 7th Annual Conference of Zonal Research Units of the CBN held in Markurdi, Benue State, 8th - 12th June.

Cecelski, E. (1984). *The rural energy crisis, women's work and family welfare perspectives and approaches to action* Geneva; ILO.

Chambers, R. and Longhurst, R. (1986). "Trees, seasons and the poor." *IDS Bulletin* 17(3) pp 44 - 50

Chandrasekharan, C. (1994). "Non-wood forest products; a global view of potentials and challenges." Paper presented at International Seminar on Management of Minor Forest Products, Dehra-Dun, India, 13 - 15 November. FAO.

Chandrasekharan, C. (1993). "Non-wood forest products in forestry education." Paper presented to the FAO Advisory Committee on forestry Education, Bagkok, Thailand 13 – 15 December 1993. FAO, Rome.

Clark, S.; Humming, R.; and Ulph, D. (1981). "On Indices for the Measurement of Poverty", *Economic Journal 91 (362), pp. 515 – 526*.

CSE – Centre for Science and the Environment (1985). *The state of India's environment 1984 - 1985*. New Delhi, India: Centre for Science and the Environment

Dada, G. O. B. (1992). "The place of extension activities in the stabilization of the fragile ecosystems of the rainforest zone of Nigeria. In *Role of Forestry in stabilizing fragile ecosystems of the rainforest zone of Nigeria*. Proceedings of the 21st Annual Conference of the Forestry Association of Nigeria Uyo, Akwa Ibom State. 7 - 12 April.

de Beer, J. and M. McDermott (1989). "*The Economic Value of Non-timber Forest Products in Southeast Asia*. Amsterdam: Netherlands Committee for IUCN.

de Janvry, A and Sadoulet, E. (2000). "Growth, Poverty and Inequality in Latin America; A Causal Analysis, 1970 - 1994." In Nora Lusting, ed, *Shielding the poor*; *social protection in the developing world*. Washington, DC; Brookings Institution.

Delta State Ministry of Agriculture and Natural Resources – MANR (2001). *Delta State at a Glance*. Asaba; DSTMANR

DFID – Department for International Development (2004). *Non-Farm Income in Rural Area*. London: DFID

Eboh, E. C. (1995). "Poverty, population growth and environmental degradation; The vicious cycle of human misery." In *Rural Development in Nigeria; Concepts, Processes and Prospects*. Enugu; Auto-Century Publishing Company

Eboh, E. C. (1997). "Forest and tree products potential for enhancing food security and economic welfare among rural households: case study from Eastern Nigeria", *Plant Products Research Journal*. 1(2).

Eboh, E. C. and Obiechina, C. O. B. (1993). "Farm level technologies for cropping with shortening fallows, their application and impact in small holder agriculture: A case study of Enugu State." *Productivity* – a quarterly journal. 34, January - March, No. 4, pp. 704 - 707.

Elliot, C. (1996). "Paradigms of Forest Conservation" *Unasylva*. 47(187) pp 3 - 9.

Ellis F. (1998). "Household strategies and Rural livelihood Diversification", *Journal of Development Studies* 3 (October)

Enabor, E. E. (1981). "Problems of forest management in Nigeria." *Agricultural Resource Bulletin*. 2(2). Faculty of Agriculture and Forestry, University of Ibadan. pp. 15

Enabor, E. E. (1986). "Socio-economic factors of deforestation in Nigeria." In proceedings of Annual Conference of Forestry Association of Nigeria

Engel, A. (1985). "Promoting smallholder cropping systems in Sierra Leone: An assessment of traditional cropping systems and recommendations for the Bo-Pujehum rural development project." *Schriftenrelhedes Fachberelchs Internationale Agarentwicklung, Technische Universitat Berlin*. 86(IV) Berlin

Ero, I. I. and Oguntala, A. B. (1997). "Forestry." In *The Nigerian Agricultural research strategy plant and extension delivery: Policy, Concepts and Concensus to the year 2010*. Proceedings of the workshop on The National Agricultural Research Strategy Plan and Extension Services/Input delivery. Organized by National Agricultural Research Project, Agricultural Sciences Department, Federal Ministry of Agriculture and Natural Resources, Abuja. 25 - 29 November, 1996.

Falconer, J. (1989). "Agro-forestry and household food security." Paper presented to Commonwealth Science Council's Workshop on Agro-forestry for Sustainable Development, Switzerland, April.

FAO – Food and Agricultural Organization (1984). *India, Malaysia and Thailand: a study of forests as a source of food*. Bangkok, Thailand: FAO.

FAO (1987). "Small scale forest-based processing enterprises." *FAO Forestry Paper 79.* Rome: FAO.

FAO (1987b). "Review of forest-based small-scale processing enterprises." In *small-scale forest-based processing enterprises*. FAO Forestry paper No. 79. Rome.

FAO (1988). FAO/Khon Kaen University Workshop on *Nutrition in Forestry*, Khon Kaen, Thailand, 18 - 21 October, 1988. ESN/NIF/88/27. Rome: FAO.

FAO (1988b). "Forestland for the people." *A forest village project in Northeast Thailand,* Bangkok. Bangkok, Thailand, FAO Regional Office for Asia and the Pacific.

FAO (1989). "The major significance of 'minor' forest products: local people's uses and values of forests in the West African humid forest zone." In *Household food security and forestry*. Rome: FAO.

FAO (1990). "Learning to see forest through the trees." *Unasylva*. 42(165).

FAO (1991). *Household food security and forestry: An analysis of socio-economic issues*. Rome: FAO.

FAO (1991b). "Forestry and food security." *Unasylva*. 14(160).

FAO – Food and Agricultural Organisation (1995). *Non-Wood forest products for rural income and sustainable forestry*. Rome: FAO.

FAO (1995b). "Summary of recommendations." In report on the expert consultation on non-wood forest products, Yogyakarta, Indonesia, 17 - 27 January 1995. Non-Wood Forest Products 3. Rome: FAO.

FAO (1996). "Forest conservation and utilization" *Unasylva.* 47(187).

FAO (1999). "*State of the World's Forest 1999*. Rome: FAO pp 200

FAO (2001). "No forest convention but then tree treaties." *Unasylva.* 52(206) pp 3 - 13.

FAO (2005). "Mobilizing Resources to Halve World Hunger". Paper prepared for the 2005 World Summit in Rome.

Fernandes, W. and Geeta, M. (1988). *Deforestation; forest dweller economy and women*. New Delhi: Indian Social Institute.

FGN – NPC – Federal Government of Nigeria – National Population Commission (2007). *2006 National Census Figures (Draft Copy)*. Abuja: National Population Commission.

FGN – NPC – Federal Government of Nigeria – National Programme on Immunization (2004). "National Immunization Coverage Survey – NICS (2003) Report". September 2004.

Fisseha, Y. (1987). "Basic features of rural small-scale forest-based processing enterprise." In Fap 1987, Small-scale Forest-Based Processing Enterprise.

Fisseha, Y. and Milino, J. (1986). "Rural small-scale forest-based processing enterprise in Zambia. Report of a 1985 Pilot Study. Rome: FAO.

FMOH – Federal Ministry of Health (1999). Health Profile Figures 1999. Abuja: FMOH.

FORMECU – Forestry Monitoring, Evaluation and Coordinating Unit (1996). *Nigeria Forestry Action Programme.* Abuja: Federal Ministry of Environment.

Foster, J. (1985). "Inequality Measurement", In *Fair Allocation* ed. H. Peyton Young, 33. Proceedings of Symposia in Applied Mathematics, American Mathematical Society, Providence, RI.

Foster, J.; Greer, J. and Thorbecke, E. (1984). "A Class of Decomposable Poverty Measures". *Econometrica52(3), 976 -766.*

Fox, F. W. and Young, M. E. (1982). *Food from the veld: edible wild plants of Southern Africa botanically identified and described*. Cape Town, Delta.

FRS – Forest Resource Study (2000). *Priority Forest Management Projects*. Abuja: FORMECU.

Furuberge, A. M. (1999) "Bringing women into forestry." In *Women in Forestry*. Sweden: Tema Nord.

Furuberge, A. M. (2005). "Gender and Forestry". Proceedings of 2nd Worldwide Symposium on Gender and Forestry. Held in Tanzania, August 2001 and submitted to United Nations Forum on Forests V, in 2005.

Geomatics International Inc., Beak International Inc. and Unilag Consult (1998). "Assessment of vegetation and land use changes in Nigeria between 1976/78 and 1992/93." Unpublished report prepared for FORMECU, Federal Department of Forestry, Abuja, Nigeria. pp 221.

Glewwe, P. (1986). "The Distribution of Income in Sri Lanka in 1969 – 70 and 1980 – 81: A Decomposition Analysis", *Journal of Development Economics,* 24 pp. 255 – 274.

Gregersen, H. M., Arnold, J. E. M., Lundgren, A. L., and Contreras – Hermosillia, A. (1995). "Valuing forests: context, issues and guidelines." *FAO Forestry Paper* No. 127. Rome: FAO.

Gregersen, H. (2000). *People and Trees: Role of Social Forestry in Sustainable Development*. Washington, D.C.: World Bank.

Grivetti, L. E. (1976). "Dietary resources and social aspects of food use in a Tswana tribe." Ph.D. Dissertation Department of Geography, University of California at Davis.

Grosh, M. E. (1997). "The Policy making uses of multitopic household survey data: A primer." *The World Bank Research Observer.* 12(2).

GTA and FOEI – Friends of the Earth International (1998). *Cohorent Public Policies for Sustainable Amazon: The challenge of innovation and the pilot programme* Published by GTA.

Haeruman, H. (1995). Environmental dimensions of non-wood forest products. In Report of expert consultation on non-wood forest products, Yogyakarta, Indonesia, 17 - 27 January. Non-Wood Forest Products 3. Rome: FAO.

Hammer, T. (1982). Reforestation and community development in Sudan: Resources for the future. Washington, D. C.

Hazell, P. and Haggblade (2000). *Farm – Non-farm Growth Linkages and the Welfare of the poor*. Washington, D. C.: World Bank.

Hobley, M. (1996). *Forestry Management in South Asia: The process of change in India and Nepal Rural Development – Forestry Study Guide*. London: Overseas Development Institute.

Hobley, M. (1996). *Participatory Forestry the Process of Change in India and Nepal.* London: Rural Development Forestry Network, Overseas Development Institute.

Hoffmann, V. and Lewark S. (1999). "The working situation of female forest workers: a study in the German State forestry enterprises" *For starch,* 69(5).

Hopkins, B. (1980). "What kind of science for Africa? The conservation of African vegetation." A contribution to economic development ASUAK symposium of conservation of African vegetation, Kew Gardens, UK. pp. 1 - 3.

Hoskins, M. (1990). "The contribution of forestry to food security." *Unasylva.* 41(160).

Houghton, R. A. (1990). "Tropical deforestation and emissions of greenhouse gases." A paper presented to the Tropical Forestry Response Options Workshops of Intergovernmental Group on climate change, Sao Paulo, Brazil, January.

Ifebueme, S. C. (1993). "The role of some forest industries in the social and economic development of Nigeria." in *Forestry for urban and rural*

development in Nigeria. Proceedings of the 23rd Annual Conference of the Forestry Association of Nigeria. Held 29 November - 3 December, 1993, Ikeja, Lagos, Nigeria.

Igugu, G. O. (1987). "Forestry and rural development." In *The role of forestry in a depressed economy*. Proceedings of the Annual Conference of the Forestry Association of Nigeria. Ibadan: Lovable Printing Press.

Immink, M. D. C. (1981). "Home gardens and the energy and nutrient intakes of women and preschoolers in rural Puerto Rico." *Ecology of Food and Nutrition*.11(3) pp 191 - 199.

ILO – International Labour Organization (1988). "Employment and income generation through social forestry in India: Review of issues and evidence." ILO, Asian employment programme (ARTEP), New Delhi.

IUCN – World Conservation Union (1988). *Nigeria: Conservation of biodiversity*. Cambridge; World Conservation Monitoring Centre. pp. 54.

Iwu, M. M. (1987). "Evaluation of the antihepato-toxic activity of the bflavonoids of *Garcinia kola* seeds." *J. Ethnopharmacology*. 21.

Jahn, S. A. A. A. (1986). "The tree that purifies water: cultivating multipurpose Moringaeae in the Sudan." *Unasylva.* 38(152). pp. 23.

Jha, L. K. and Tha, K. N. (1985). "Teaser culture and its impact on generation of income and employment." *My forest*. 21(4) pp 289 - 294.

Job, S. (1998). "Framework for monitoring poverty" in measuring and monitoring poverty in Nigeria. Proceedings of the 7th Annual Conference of Zonal Research Units of the Central Bank of Nigeria held in Markurdi, Benue State. 8th - 12th June.

Job, S. (1998). "Framework for Measuring and Monitoring Poverty" *In Measuring and Monitoring Poverty in Nigeria*. Proceedings of the 7th Annual Conference of Zonal Research Units of the CBN held in Markurdi, Benue State. 8th - 12th June.

Jodha, N. S. (1992). "Common Property Resources: A Missing Dimension of Development Strategies". Discussion Paper 169, World Bank, Washington, D.C.

Kalu, C. and Ishikhueme, E. M. (2007). "Future of Biodiversity Conservation in Nigeria: An Assessment of the Uses and Sustainable Management of NTFPs in Edo State, Nigeria". In *ROAN the Journal of Conservation,* 4, (1) pp 8 – 18.

Kamara, J. N. (1986). "Firewood energy in Sierra Leone; production, marketing and household use pattern." *Verlag Weltarchiv Studies No. 9*.

Keller, M., Jacob, D. J., Woesy, S. C. and Harress, R. C. (1991). "Effect of tropical deforestation on global and regional atmosphere chemistry." *Climatic change*. 19(1) pp 139 - 158.

KIO, P. R. O. (2000). "Forestry and sustainable agricultural development." A paper presented at National Workshop on Enhancing Research and Development in Agriculture and Forestry towards Poverty Alleviation and Rural Development in Nigeria. Held at Forestry Research Institute of Nigeria (FRIN), Ibadan 14th - 18th February, 2000.

Koutsoyiannis, A. (1977). *Theory of Econometrics* London: Macmillian Press Ltd.

Krishnamurthy, K. (1984). "Humans' impact on the Pichavaram mangrove ecosystem: a case study from Southern India." Proc Asian Symposium on Mangrove Environment, Research and Management, Kuala Lumpur 25 - 29 August, 1980. pp 624 - 632.

Kruijk, H. (1987). "Sources of Income Inequality in Pakistan", *Pakistan Development Review,* 26 pp 659 – 672.

Kuznet, S. (1955). "Economic Growth and Income Inequality", *American Economic Review*. 45 pp. 1 – 28.

Laarman, J. and Sedjo, R. (1992). *Global forests: Issues for six billion people*. New York: McGraw Hill.

Lagemann, J. (1977). "Traditional African farming systems in Eastern Nigeria: An analysis of reaction to increasing population pressure." *African Studies*. Munich: Weltforum Verlag.

Liedholm, C. and Mead D. (1986). *Small scale industries in developing countries: Empirical evidence and policy implications*. Michigan State University: Lensing – Michigan.

Lintu, L. (1995). "Trade and marketing of non-wood forest products." In Report of the expert consultation on non-wood forest products, Yogyakarta, Indonesia, 17 - 27 January 1995. Non-wood Forest Products 3, FAO, Rome.

Longhurst, R. (1985). Cropping systems and household food security: Evidence from three West African countries. *Food and Nutrition.* 21(2).

Mahar, D. J. (1998). Land Use Zoning on Tropical Frontiers: Emerging lessons from the Brazilian Amazon. Development Institute of the World bank, EDI Case Studies. Washington, D. C.: World Bank.

Malaisse, F. and Parent, G. (1985). "Edible wild vegetable products in the Zambezian woodland area; nutritional and ecological approach." *Ecology of Food and Nutrition*. 18 pp. 43 - 82.

Malhotra, K. C., Deb, D., Dutta, M., Vasula, T. S., Yadav, G. and Adhikari, M. (1991). *Role of non-timber forest products in village economy: A household survey in Jamboni Range, Midnapore, West Bengal.* India, Indian Institute of Bio-social Research and Development.

Malingreau, J. P. and Tucker, C. J. (1988). "Large-scale deforestation in the southeastern Amazon basin of Brazil." *Ambio* 17

Mankoto ma Mbaelele, M. (1987). "Data on small and medium-scale game utilization in the rainforest of Zaire." Paper presented at the International Symposium on Wildlife Management in sub-Saharan Africa. Harare, Zimbabwe. July.

Manuel M. (2001). "From HIPC Debt Relief to Poverty Reduction: Getting the PRSP Process to work." DFID.

Marks, S. and Robbins, R. (1984). *People in forestry in Zambia*. Forestry Department. FAO. Rome.

Matlon, P. (1979). "Income Distribution Among Farmers in Northern Nigeria: Empirical Results and Policy Implications." African Rural Economy paper No. 18 Michigan State University, Langing MJ.

Martin, G. (1983). "Bush meat in Nigeria as a natural resource with environmental implications." *Environmental Conservation* 102(2). pp 125 - 132.

Matson, P. A. and Vitousek, P. M. (1990). "Ecosystem approach to global nitrousoxide budget." *Bioscience*. 40. pp 667 - 672.

May, P. H. (1985). "Babassu palm in the agro-forestry systems in Brazil's Mid North region." *Agroforestry Systems*. 3(39) pp 275 - 299.

Maydell, H. J. (1986). "Trees and Shrubs in the Sahel: Their characteristics and uses."

Mbakwe, R. C. (1986). "The process of deforestation in Nigeria and its ecological consequences." In *challenges of deforestation*. Proceedings of Forestry Association of Nigeria Conference 1986 pp. 101 - 110.

McNally, R. and Othman, M. S. H. (2002). *Environmental Economics: A Practical Guide*. Malaysia: WWF – UK.

McNeedy, J. A. (1988). *Economics and biological diversity: Developing and using economic incentives to conserve biological resources*. Gland: IUCN.

Mellor, J. (1976). *The New Economic Growth*: New York: Cornell University Press.

Molion, L. C. B. (1989). "The Amazonian forests and climatic stability." *The Ecologist*. 19(6).

Montalembert, M. R. (1991). "Key forestry issues in the early 1990s." *Unasylva*. 42(166).

Moris, J. R. (1985). "Indigenous vs. introduced solutions to food stress." Paper presented at the Workshop on seasonal causes of household food insecurity, policy implementations and research needs. IFPRI September 1985, Washington, D.C.

Myers, N. (1993). "Tropical forests: The main deforestation fronts." *Environmental Conservation*. 20. pp 9 - 16.

Myers, N. (1992). "Tropical forests: The policy challenge. *Environmental Conservation*. 12. pp. 15 - 27.

Myers, N. (1992b). *Tropical forest and our future*. New York: W. W. Norton & Co.

Nair, P. K. R. (1988). "Production systems and production aspects." Paper presented at the FAO Expert Consultation on Forestry and Food Production, India. 8th – 20th February.

National Policy on Poverty Alleviation (2000). Abuja: FGN Press.

NBS – Nigeria Bureau of Statistics (2010). *Poverty Profile for Nigeria 1980 - 2010*. Lagos: FGN/NPC.

NBS – Nigeria Bureau of Statistics (2004). *Nigeria Living Standard Survey 2003/2004*. Abuja: FGN/NPC.

NBS – Nigeria Bureau of Statistics (1999). *Poverty Profile for Nigeria 1980 - 1996*. Lagos: FGN/NPC.

NBS (1999b). *Poverty and Agricultural Sector in Nigeria.* Lagos: FGN/NBS

NBS/World Bank (2000). *Poverty and Welfare in Nigeria*. Washington D.C.: World Bank.

NFAP – Nigerian Forestry Action Programme (1995). *Nigerian Forestry Action Programme 1995 Reports*. Abuja: FORMECU.

Ngambeki, D. S. (1985). Economic evaluation of alley cropping leucaena with maize – maize and maize-cowpea in Southern Nigeria, Agricultural Systems. 17. pp 243 - 258.

Niamir, M. (1989). *Herder decision-making in natural resources management in arid and semi-arid Africa*. Rome: FAO, Forestry Department.

Nilsson, S., Sallnas, O. and Duinker, P. (1990). *Forest decline in Europe – forest potentials and policy implications*. Laxenburg, Austria: IIASA.

NPC – NEEDS – National Planning Commission (2004). *National Economic Empowerment and Development Strategy*. Abuja: National Planning Commission.

Ntiamoa Baidu, Y. (1987). "West African wildlife; A resource in jeopardy." *Unasylva.* 30(156) pp 27 - 35.

Nugent, J. and Walter, R. (1982). "Short-Run Changes in Rural Income Inequality: A Decomposition Analysis", *Journal of Development Studies* 18(2) pp. 239 – 269.

Nweke, F. (1985). *Compound farming in Southeastern Nigeria.* Ibadan, Nigeria, IITA.

Obasi, P. C. and Onyenweaku, C. E. (2002) "Income Distribution among Households in Owerri Agricultural Area of Imo State." *International Journal of Agriculture and Rural Development (IJARD)* 3 Kenya.

OECD – Organization for Economic Cooperation and Development (1996). *Saving Biological Diversity: Economic Incentives*, Paris: OECD.

Ogle, B. M. and L. E. Grivetti (1985). "Legacy of the chameleon edible wild plants in the kingdom of Swaziland, South Africa. A cultural ecological, nutritional study. Part I. Introduction, objectives, methods, culture, landscape and diet." *Ecology of Food and Nutrition*. 16(3) pp 193 - 208.

Oguntala, A. B. (1987). "The role of forestry in a depressed economy." Proceedings of the 17th Annual Conference of the Forestry Association of Nigeria. Ibadan: Lovable Printing Press.

Ojo, G. O. A. (1999). "Survey of Non-Timber Forest Products (NTFPs) in the Omo Forest Reserve including their uses and values." A consultant report for FORMECU, Federal Ministry of Environment, Abuja, Nigeria.

Okafor, J. C. (1980). "Edible indigenous woody plants in the rural economy of the Nigerian forest zone." *Forest Ecology and Management*. 3(1).

Okafor, J. C. (1987). "Identification and conservation of plants used in traditional medicines." Lead lecture presented at the International Workshop on Evaluation of Traditional Medicine. University of Nigeria, Nsukka, Nigeria

Okafor, J. C. (1989). "Compound farms of South-Eastern Nigeria." *Agroforestry systems*. 5.

Okafor, J. C. (1992). "Improving edible species of forest products." *Unasylva* 42(165).

Okali, D. U. U. (1985). "Planning a strategy for conservation of natural resources in Nigeria." In proceedings of seminar on National Conservation for Nigeria held in Kano 1985. pp 12 - 30.

Okali, D. U. U. (1990). *Forestry and Forest Resources Conservation in Nigeria*. Forestry Review Workshop for TFAP. FORMECU, Ibadan, 3rd – 4th May

Okumadewa F. (2001). "Poverty reduction in Nigeria: A four-point demand." Annual Guest Lecture of the House. University of Ibadan.

Okunlola, O. A. (1992). "The need to conserve the forest resources of the Nigerian high forest zone." In *Role of forestry in stabilizing fragile ecosystems of the rainforest zone of Nigeria*. Proceedings of the 21st Annual Conference of the Forestry Association of Nigeria, Uyo, Akwa Ibom State, 7 - 12 April, 1992.

Ola-Adams, B. A. (1986). "Germplasm conservation in forestry." A contribution to the Annual Conference of Genetic Society of Nigeria at Forestry Research Institute of Nigeria 1986. pp. 28.

Olekah, J. K. A. (2007). "Monetary Policy: Experiences and Challenges of the Central Bank of Nigeria". Being an invited Paper Presented at the 2007 Annual Fellow Conference/Retreat of the African Institute for Applied Economics, Enugu, held on 4th January, 2007.

Olsson, G. (1992). "The socio-economic importance of non-timber forest products in South Pacific: Focus on Vanuatu." *Unasylva*. 42(165).

Osemeobo, G. J. 1997. "Policy issues on in situ conservation of forest resources in Nigeria." In *Environment and Resource Development*. Proceedings of the 25th Annual Conference of the Forestry Association of Nigeria held in Ibadan, Oyo State, Nigeria, 22 - 26 September.

Oyun, M. B. (1997). "Conservation progress and problems in Nigeria." In *Environment and resource development*. Proceedings of the 25th Annual

Conference of the Forestry Association of Nigeria. Held 22 - 26 September at Ibadan, Oyo State, Nigeria.

Parent, G. (1977). "Food value of edible mushrooms from Upper Shaba." *Economic Botany*. 31. pp 436 - 445.

Parkinson, S. (1982). "Nutrition in the South Pacific: Past and Present." *Food and Nutrition*. 39(3) pp 121 - 125.

Papka, P. M. (1996). "Community Participation in Forestry Development in Nigeria: Forestry and the small scale farmer". Proceedings of the 24th Annual Conference of the Forestry Association of Nigeria, held in Kaduna, 30th October - 4th November, 1996

Posey, D. A. (1985). "Indigenous management of tropical forest ecosystems; the case of the Kayapo Indians from the Brazilian Amazon." *Agroforestry systems*. 3(2) pp 139 - 158.

Prance, G. T. (1986). "The conservation and utilization of the Amazon rainforest." *Revista de la Amazon Colombiana de Ciencias Exactas, Fisicas y Naturales, Bogota, November.*

Prance, G. T., Balee, W., Boom, B. M. and Carneiro, R. L. (1987). "Quantitative ethnobotany and the case of conservation in Amazonia." *Conservation Biology,* December.

Prescott - Allen, R. (1982). *What's wildlife worth? Economic contributions of wild plants, animals to developing countries*. United kingdom: Earthscan.

Pyatt, G.; Chen, C. and Fei, J. (1980). "The Distribution of Income by Factor Components", *Quarterly Journal of Economics,* 95(3) pp. 451 – 473.

Pye, E. A. (1988). *Artisans in economic development*. Ottawa, International Development Research Centre.

Quibria, M. G. (1996). "Poverty: Conceptual and Measurement Issues", *Poverty Alleviation through Agricultural Projects*. An EDI (Economic Development Institute of the World Bank) Policy Seminar Report, November 30, 1996.

Raintree, J.B., and Warmer, K. (1986). "Agroforestry pathways for intensification of shifting cultivation." *Agroforestry Systems*. 4(1) pp 39 - 54.

Ravallion, M. and Datt, G. (1996). "How important to India's poor is the Sectoral Composition of Economic Growth?" World Bank Economic Review 10(1).

Ravallion, M. (1992). "Poverty comparisons: A Guide to Concepts and Methods." *Living Standards Measurements Study Working Paper 88*. Washington D.C.: World Bank.

Reddy S. R. C. and Chakravarty, S. P. (1999). "Forestry dependence and income distribution in a subsistence economy: Evidence from India." *World Development Journal*. 27(7).

Repetto, R. (1988). *The forest for the trees: Government policies and misuse of forest resources*. Washington D. C.: World Resources Institute. pp. 105.

Ribot, J. (1997). "Participation without Representation: Chiefs, Councils and Forestry Law in West African Sahel." Voluntary paper prepared for the 11th World Forestry Congress. Antalya Turkey 13 - 22 October.

Rosenhouse, S. (1989). "Identifying the Poor." LSMS Working Paper No. 58. Washington D. C. World Bank.

Schneider, R. (1992). *Brazil: An analysis of environmental problems in the Amazon.* Report 9104 - BR. Washington, D. C.: World Bank.

Schwartzman, S. (1989). "Extractive reserves: The rubber - tappers strategy for sustainable use of Amazon rainforest." In Browder, J. (ed), *Fragile Lands of Latin America; strategies for sustainable development*. Boulder Colorade: Western Press.

Sene, el Hadji M. (1995). "Non-wood forest products: the institutional aspects." In Report of the expert consultation on non-wood forest products, Yogyakarta, Indonesia, 17 - 27 January. Non-wood Forest Products 3. FAO, Rome.

Sen, A. K. (1976). Poverty: An Ordinal Approach to Measurement". *Econometrica.* 44(2), 219 – 231.

Sen Gupta, D. N. (1980). "Food consumption and nutrition of regional tribes of India." *Ecology of Food and Nutrition*. 9. pp 93 - 108.

Shiembo, P. (1986). "Development and utilization of minor forest products in Cameroon with particular reference to Raphia and Rattan Palms." M.Phil. Thesis presented to Department of Forest Resource Management, University of Ibadan, Nigeria.

Shiva, V., Sharatchandra, H. C. and Bandyopadhyay, J. (1982). "Social Foresty – no solution within the market. *The Ecologist*. 12(4).

Shrestha, N. J. (1993). "A common-sense framework for developing non-formal training curricula." In *Developing curricular for agroforestry and community forestry in Asia Pacific*. APAN Report No. 8. Asia-Pacific Agroforestry Network, Bogor, Indonesia.

Siebert S. and Belsky, J. M. (1985). "Forest product trade in a lowland Filipino village." *Economic Botany*. 39(4) pp522 - 533.

Slatter, C. (1984). *Traditional, transitional and modern roles of women in South Pacific agriculture with specific focus on Papau New Guinea, Fiji, Western Samoa and Tonga*. Honolulu, Hawai, Institute of Culture and Communication, East-West Centre.

Stark, O., Taylor, J. E. and Yitzhaki, S. (1987). "Remittance and inequality." *Economic Journal*. 96. pp. 722 - 740.

Surin, V. and Badhuri, T. (1980). "Forest produce and forest dwellers." In proceedings of the seminar: Role of women in community forestry, 6 - 9 December. Debra Dun, India

Tella, S. A. (1997). "A schema for monitoring poverty alleviation," in Poverty Alleviation in Nigeria. Proceedings of Nigerian Economic Society (NES) annual conference.

Terry, M. E. (1984). "Botwuwanacraft and Hanthikudiu Bakery: The effects of a major marketing operation on a Group of African people, their traditional craft and the natural resources". Report to the Botswanacraft Marketing Company, Estha, Botswana.

Tewari, D. D. and Campbell, J. Y. (1996). "Increased development of non-timber forest products in India: some issues and concerns." *Unasylva*. 47(187) pp 26 - 31.

Thaman, R. R. (1982). "Deterioration of traditional food systems, increasing malnutrition and food dependency in the Pacific Islands." *Food and Nutrition.* 39(3) pp 109 - 121.

Theophile, K. (1996). "Forests and employment." *Unasylva*. 47(187) pp 44 - 49.

Truscott, E. (1986). "Socio-economic factors in food production and consumption." *Food and Nutrition*. 12(1)

Umeh, L. I. and Okoye, I. G. (1992). "Enhancing People's participation in tree planting: The search for adequate extension support." In *Role of forestry in stabilizing fragile ecosystems of the rainforest zone of Nigeria*. Proceedings of the 21st Annual Conference of the Forestry Association of Nigeria. Held in Uyo, Akwa Ibom State 7 - 12 April.

Umeokafor, E. A. U. (1987). "Deforestation and rural development: A case study of Isuofia rural electrification project." In *Role of forestry in a depressed economy*. Proceedings of the 17th Annual Conference of the Forestry Association of Nigeria. Ibadan; Lovable Printing Press.

UNDP – United Nation Development Program (1996). *Human Development Report 1996.* New York: Oxford University Press.

UNDP – United Nation Development Program (2000). *Human Development Report 2000*. New York: Oxford University Press.

Verheij Ed (2004). Propagating and Planting trees. *Agrodok-Series* No. 19. pp. 9 – 11.

Weidelt, H. (1993). "Agroforestry systems in the tropics: Recent developments and results of research." In *Applied Geography and Development*. A biennial collection of recent German contributions. 41.

Weinstock, J. A. (1983). Rattan: Ecological balance in a Borneo rainforest Swidden. *Economic Botany*. 37(1) pp 58 - 68.

Weisstein, E. W. 92004). "Lorenz Curves and Gini Coefficients", *Math World*. A Wolfram Web Resource http: mathworld.wolfram.com.

West African magazine (1991). "Deforestation plagues Africa" 2 - 8 September, pp 1462.

Wickens, G. E. (1986). "Alternative uses of browse species". In *Browse in Africa: The current state of knowledge*. IBPGR and Royal Botani Gardens, Kev, London. pp. 155 - 185.

Winpenny, J. T. (1991). *Values for the Environment: A Guide to Economics Appraisal*. London: Overseas Development Institute.

Wisconsin Week (2003). "Forest Management may mitigate global warming." *University Communications News Releases*. The University of Wisconsin, Madison. June, 2003.

World Bank (1986). "Economic issues and farm forestry." Working paper prepared for the
Kenya Forestry Sector. Washington, D.C.: World Bank.

World Bank (1991). *World Development Report – Environment*. Washington, D.C.: World Bank.

World Bank (1992). *Poverty reduction handbook*. Washington, D.C.: World Bank.

World Bank (1993). "Nigeria proposed third forestry project pre-appraisal mission." *Aide Memoire,* 14 March - 18 April, 1993.

World Bank (1994). "Making Development Sustainable." In *The World Bank Group and the Environment*. Washington, D.C.: World Bank.

World Bank (1995). "Distribution of Growth Compliments not Compromises." Policy Research Bulletin 63, May - July.

World Bank (1997). *Human Development Report*. Washington, D.C.: World Bank.

World Bank (1998). *World Bank Involvement in Sector Adjustments for forests in Indonesia*: The Issues. Washington D.C.: World Bank.

World Bank (2000). *India-Alleviating Poverty through Forest Development – Evaluation country case study series*. Washington, D. C.: World Bank.

World Bank (2000b). Indonesia – *The Challenges of World Bank Involvement in Forests – Evaluation Country Case Study Series*. Washington, D. C.: World Bank.

World Bank (2000c). *Brazil – Forests in the Balance: Challenges of Conservation with Development – Evaluation Country Case Study Series*. Washington, D. C.: World Bank.

World Bank (2001). World *Development Report 2001 – Attacking Poverty*. New York: Oxford University Press.

WRI (1994). *World Resources 1994 - 1995: A guide to the global environment*. Washington, D.C.: World Resource Institute pp. 400.

WRI (1990). "The World Bank in the forest sector: a global policy paper." *Wasteland News*. 8(2) pp 6 - 12.

WRI (1987). World Resources 1987: An Assessment of Resource Base that supports the Global Economy. International Institute for Environment and Development. World Resources Institute, New York.

WRI/IIED - World Resources Institute/International Institute for Environment and Development (1988). *World Resources 1988 - 89.* UNEP - United Nation Environment Programme - New York: Basic Books Inc.

WWF – World Wide Fund for Nature (2002). *Forest for Life-working to Protect, Manage and Restore the World's Forests*. Switzland; WWF.

Zuvekas, C. (1979). *Economic Development: An Introduction*. London: Macmillan.