

**INCOME DIVERSIFICATION AND POVERTY AMONG  
RURAL FARM HOUSEHOLDS IN SOUTHWEST  
NIGERIA**

**BY**

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## **DEDICATION**

This thesis is dedicated to the Almighty God – my Creator, the Lord Jesus Christ – my Redeemer and Saviour and the Holy Ghost – my Great Teacher.

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## ABSTRACT

Rural development has been erroneously equated to agricultural development. The former works to diversify income through non-farm activities to complement proceeds of the latter. However, the actual role of non-farm income in poverty alleviation is not yet known among rural households. There is therefore the need to critically explore the roles of non-farm income diversification in rural poverty alleviation. The patterns and contributions of non-farm income diversification to poverty reduction among rural farm households in Southwest Nigeria were investigated.

A multistage sampling technique was used to obtain data from rural farm households. Three states (Ekiti, Ogun and Osun) from the six south western states were randomly selected. Five agricultural zones were randomly selected from the three states based on probability proportionate to size. In each zone, four blocks and three cells per block were selected. Lastly, two farming communities per cell and four farming households per community were selected to make 480 farming households. Structured questionnaire was used to collect data on socio-economic characteristics, household assets, income generating activities, labour-use, income and expenditure. Descriptive statistics, Foster-Greer-Thorbecke poverty measures, Herfindal index, Tobit and Probit regression methods were employed for data analyses at  $p = 0.05$ .

Mean age of household heads, household size and dependency ratio were  $49.9 \pm 0.6$  years,  $6.8 \pm 0.1$  and  $0.7 \pm 0.1$ , respectively. The mean year of schooling of household heads was  $8.8 \pm 0.2$  and 83.7% of households were headed by male. The mean per capita income was  $\text{₦}206.7 \pm 160.3/\text{day}$  while the per capita cost of basic needs was  $\text{₦}253.4 \pm 28.6/\text{day}$ . The incidence, depth and severity of poverty were 76.4%, 32.9% and 17.3% respectively. Ninety four percent of the households derived their income from a diversified portfolio of livelihood activities, with non-farm activities accounting for 67.1% of the income. The non-farm activities included skilled (18.0%) and unskilled (22.9%) wage employment, self-employment (81.3%) and social and community service (8.8%). Self-employment was the largest non-farm income source contributing 42.1%. Involvement in non-farm labour activities was significantly higher among poor than non-poor farm households. The level of income diversification depicted by Herfindal index was  $2.8 \pm 0.04$  and it was significantly higher among poor than non-poor farm households. The implicit wage rate of household

labour use in farming activities (₦1,773.4/manday) was significantly higher than in non-farm activities (₦878.0/manday). Education (0.1) and electricity (0.5) significantly increased non-farm income diversification while distance to urban centre (-0.04), landholding (-0.6) and animal asset base (-0.2) significantly reduced non-farm income diversification. Participation in non-farm skilled (-0.1) and unskilled (-0.1) wage employments significantly reduced the probability of being poor. Other characters of respondents that significantly reduced the probability of being poor included education (-0.1), landholding (-0.4), investment asset base (-0.000005) and rural electricity (-0.1) while household size (0.1) increased the probability. Participation in skilled and unskilled wage employment significantly reduced poverty among rural farm households in Southwest Nigeria.

**Keywords:** Farming communities, Rural households, Income diversification, Poverty reduction

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Thank you.

Idowu, Adewunmi O.

October 2011

## CERTIFICATION

I hereby certify that Mr IDOWU Adewunmi Olubanjo carried out this work in the Department of Agricultural Economics, Faculty of Agriculture and Forestry, University of Ibadan, Ibadan, Nigeria and was supervised by me.

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## Abbreviations

ACGS	Agricultural Credit Guarantee Scheme
ADP	Agricultural Development Programme
CBN	Cost of Basic Need
CDD	Community Driven Development
CPRP	Community based Poverty Reduction Project
CSDP	Community and Social Development Project
DFID	Department for International Development of the United Kingdom
DFRRI	Directorate for Food, Roads and Rural infrastructure
FAO	Food and Agriculture Organization
FEAP	Family Economic Advancement Programme
FEI	Food Energy Intake
FGT	Foster-Greer-Thorbecke
FPSU	Federal Project Supporting Unit
GSM	Global System of Mobile telecommunication
HDI	Human Development Index
HDR	Human Development Report
IMF	International Monetary Fund
IMR	Inverse Mill Ratio
LEEMP	Local Empowerment and Environmental Management
LGAs	Local Government Areas
MDGR	Millennium Development Goals Report
MDGs	Millennium Development Goals
NACRDB	Nigerian Agricultural Cooperative and Rural Development Bank
NAPEP	National Poverty Eradication Programme
NBS	National Bureau of Statistics
NDE	National Directorate for Employment
NEEDS	National Economic Empowerment and Development Scheme
NFDP	National Fadama Development project
NFSE	Non-farm Self Employment
NFSL /NFSLWE	Non-Farm Skilled Labour Wage Employment



NFUL/ NFULWE	Non-farm Unskilled Labour Wage Employment
OFN	Operation Feed the Nation
OGADEP	Ogun State Agricultural Development Project
OSSADEP	Osun State Agricultural Development Project
RBDA	River Basin Development Authority
REFILS	Research Extension Farmer Input Linkage System
RNFE	Rural Non-Farm Employment
SAP	Structural Adjustment Programme
SCS	Social and Community Service
SSA	Sub-Saharan Africa
UN	United Nations
UNDP	United Nation Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
VEA	Village Extension Agent
wfarm	Total farm wage
wHHfarm	Household farm wage
WHO	World Health Organization
wNFSE	Wages from Non-farm Self Employment
wNFSL	Wages from Non-farm Skilled Wage Labour Employment
wNFUL	Wages from Non-farm Unskilled Wage Labour Employment
wSCS	Wages from Social and Community Service

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background Information

Poverty has been one of the most challenging problems facing mankind today (SIDA, 2006). Despite global efforts aimed at poverty reduction since the adoption of the Millennium Development Goals (MDGs) in 2000, available statistics show that as much as 1.4 billion people, out of the 6.5 billion people around the world in 2005 live on less than US\$1.25 a day and are thus classified as extremely poor with over 850 million people going to bed without sufficient food (HDR, 2007/2008; UNDP, 2008). Evidence in the latest Millennium Development Goals Report (MDGR, 2009) suggests that most of the major advances in the fight against extreme poverty since the adoption of the MDGs, which saw the number of people living in extreme poverty declining from 1.8 billion in 1990 to 1.4 billion in 2005, are most likely to have been stalled by the recent global food crisis with an estimated 55-90 million more people added to the World's extremely poor over what was anticipated in 2009. Likewise, the encouraging trend in the eradication of hunger since the early 1990s was reported to have been reversed in 2008, largely due to higher food prices, with the prevalence of hunger in the developing regions now on the rise, jumping from 16 per cent in 2006 to 17 per cent in 2008 (MDGR, 2009).

The situation in the sub-Saharan Africa (SSA) has been the most deplorable. Not only is the incidence of extreme poverty much higher in the region (50.7 per cent of the populace in 2005) than elsewhere, the region was reported to have recorded about 100 million more extremely poor people in 2005 than in 1990 unlike the experience in other regions where both the incidence of extreme poverty and the actual number of the extremely poor fell between 1990 and 2005 (MDGR, 2009). In essence, one can conclude that SSA contributed more to the extreme poverty in the World more than any region. In Nigeria, incidence of poverty has been on the increase, rising from 28.1 per cent in 1980 to 44.0 per cent in 1992, and 65.6 per cent in 1996 but reduced to 54.4 percent in 2004 (NBS, 2006), with 70.8 per cent of the populace reported to have lived on less than US\$1.25 a day (international extreme poverty line) in 2005 (UNDP, 2007)

Successive governments in Nigeria have repeatedly adopted policies and programmes on virtually every aspect of the national life that would reduce poverty. Programmes intended

to ensure food self-sufficiency and provide necessary infrastructure to stimulate economic activities, enhance incomes and improve living conditions of the poor like Operation Feed the Nation (OFN), the Green Revolution, National Directorate for Employment (NDE), the Directorate for Food, Roads and Rural infrastructure (DFRRI) and River Basin Development Authority (RBDA) were established. Also, successive governments have made tremendous efforts to improve agricultural production and living standards through public credit institutions like the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), state-owned small-scale finance agencies, Agricultural Credit Guarantee Scheme (ACGS), People's Bank, Community Banks, and the Family Economic Advancement Programme (FEAP) (Ogundipe, 1999; Ukpong, 1999), and programmes like the National Fadama Development Project (NFDP), Community based Poverty Reduction Project (CPRP), Local Empowerment and Environmental Management Project (LEEMP) and Community and Social Development Project (CSDP) which emerged from LEEMP and CPRP.

Despite all these efforts by government, the situation cannot be said to have improved because HDR 2006 and 2007/2008 revealed that the Human Development Index (HDI) value for Nigeria was 0.448 and 0.470 in 2004 and 2005 respectively, and this placed Nigeria within an HDI ranking of 159 and 158 out of 177 countries, with a real GDP per capita of US\$1,154 and US\$1,128 in 2004 and 2005 respectively. The poverty situation was thus highly deplorable in Nigeria compared to other African countries like Ghana, Congo, Cameroon, Egypt and Kenya where Nigeria was ranked 76 in 2006, and 80 in 2007 behind the aforementioned countries among the 102 developing countries of the world (HDR, 2006; 2007/2008). The obvious deduction from the above scenario is that Nigeria in general has become increasingly impoverished.

However, Olowononi (1997) reported that Nigeria's approaches to poverty alleviation were directed on the rural areas and this is because agriculture and rural development constitute an important factor in alleviating poverty in any economy where poverty is a rural phenomenon like in Nigeria. Barrett (2001) and Marter (2002) however believed that livelihood concept and diversification of income among rural households help in alleviating poverty. It is because these minimize household income variability, provide an additional source of income and employment to farming which have implications for rural poverty

reduction and contribute substantially towards improving households' welfare (Matshe and Young, 2004).

It is interesting to note that Reardon *et al.* (2001) and Awoyemi (2004) reported that the contribution of non-farm income sources to the rural economy has grown substantially during the last two decades and the share of non-farm income in total household income ranges between 30 and 50 percent while Jonasson (2005) and Kaija (2007) concluded that non-farm activities are pathway out of poverty and the impact of the non-farm sector on household welfare depends on the type of non-farm activity engaged in. In this respect, the behaviour of rural households in diversifying their sources of income and employment is considered to be important in determining the role of the rural non-farm sector in rural development.

## **1.2 Diversification of Livelihoods**

In many rural areas, agriculture alone does not provide sufficient livelihood opportunities; therefore, diversification into non-farm activities is seen as a form of self-insurance (Barrett *et al.*, 2001, Malek and Usami, 2010). Diversification does not seem to be a transient phenomenon or one just associated with survival. Rather, it may be associated with success at achieving livelihood security under improved economic conditions as well as with livelihood distress in deteriorating conditions (Ellis, 1998; Niehof, 2004; Haggblade *et al.*, 2007).

Diversification of income and assets is closely linked with livelihood strategy (Samanta and Lahiri-Dutt, 2005; Davis *et al.*, 2009; Reardon *et al.*, 2007; and Winters, 2007) as it offers people options for coping with crises. Household incomes are usually generated from different and varying sources depending on the income-earning opportunities open to each individual or household (Yaro, 2002). Diversification across income sources helps households to combat instability in income and thereby increases the probability of their maintaining livelihood security (Deb *et al.*, 2002; Sundaram-Stukel *et al.*, 2006).

Although, agriculture remains the main source of income for the majority of the rural households, diversified livelihood strategies are also common among these set of households (Samanta and Lahiri-Dutt, 2005; Sundaram-Stukel *et al.*, 2006). Livelihood diversification strategies identified among rural households include temporary labour migration, finding

casual work, and out-migration from rural areas (Malek and Usami, 2009) but the out-migration depends on economic opportunities for men and women in the area of origin, those in the place of sojourn, and culturally determined economic gender roles (Hetler, 1990).

Narrowing diversification to income diversification, studies found that non-farm accounts for a considerable share of farm household income in rural Africa and that most African farm households rely on non-farm income sources (Araujo, 2004; Hossain, 2005; Bezemer and Davis, 2005; De Janvry *et al.*, 2005; Nargis and Hossain, 2006; Lanjouw and Murgai, 2009). Barrett *et al.* (2001) as well as Malek and Usaim (2010) posited that farm household diversification into non-farm activities emerges naturally from diminishing or time-varying returns to labour. Also, it emerges from market failures (e.g. in the case of credit) or frictions (e.g. in the case of mobility or entry into high return niches), from ex ante risk management, and from ex post coping with adverse shocks. Omamo (1998) and Malek and Usaim (2010), on the contrary, emphasized that in remote areas where physical access to markets is costly, and causes factor and product market failures, households diversify production patterns partly to satisfy own demand for diversity in consumption.

Given the key role income diversification can play in stabilizing incomes and alleviating rural poverty, governments in developing countries have become increasingly interested in promoting increased output diversification (Haggblade *et al.*, 2009). Ellis (2000), Sundaram and Tendulkar (2007) and Haggblade, *et al.* (2009) argue that household-level income diversification has implications for rural poverty reduction policies since it means that conventional approaches aimed at increasing employment, incomes and productivity in single occupations, like farming, may be missing their targets. Several studies have thus made comprehensive efforts to identify the constraints to income diversification (Haggblade *et al.*, 2007; Reardon *et al.*, 2007; Hertz, 2009), with the objective of identifying measures that will help alleviate those constraints.

### **1.3 Statement of the Problem**

Despite the plethora of poverty reduction strategies adopted in Nigeria since 1986, available statistics show that poverty incidence in the country remains high (Awoyemi *et al.*, 2009). With as much as 54.4 per cent (over 75 million) of the Nigerian populace officially acknowledged as poor in 2004 (UNDP, 2010; UN 2010) even though international statistics

suggest the situation is much worse, the need to seek all ways and means to reverse the trend cannot be over-emphasised. It is worthy of note that the poor socio-economic conditions of Nigerians is a major cause of the rising incidence of malnutrition in the country.

In 2008, as much as nine per cent of the populace were found to be undernourished while 23.1 per cent of children under the age of 5-years were reported to be underweight (UNDP 2010; HDR 2010). Moreover, life expectancy at birth was estimated to be 47.3 years for women and 46.4 years for men while under-5 mortality rate was put at 157 per thousand live births in 2008 (UNDP 2010; HDR 2010; UN 2010). These statistics show that an average adult in Nigerian is more likely to die at his/her prime age while as much as 15.7 per cent of the children are also likely to die before attaining the age of 5-years. Thus, there exists an urgent need to critically assess the current poverty situation in Nigeria. This is with a view to identifying factors that keep the people in poverty, and suggest the appropriate strategies to pursue for significant poverty reduction among the populace.

Evidences in the literature (e.g. World Bank, 1995, 1996; FOS, 1996, 1999; Ajakaiye and Adeyeye, 2001, Oyekale *et al.*, 2006; Oni and Yusuf, 2006; Nwachukwu and Ezech, 2007; Babatunde, 2008 and UNDP, 2010) show clearly that poverty incidence in Nigeria is higher among the rural-folks, and among those households that rely mainly on agricultural income as well as among those with low paid work in the rural non-farm sector. While this may not be unconnected with the rather low productivity growths that have characterized Nigeria's agriculture over the past four decades (Fulginiti *et al.*, 2004), it suggests the need to critically examine the livelihood options available to the rural folks in Nigeria, most especially those of the rural farm households. This becomes quite imperative, since as noted by Tollens (2002) had noted that poverty is not an intrinsic attribute of people, but a product of the livelihood systems and the socio-political forces that shape their livelihoods.

More so, when halving world extreme poverty between 2000 and 2015 is the first Millennium Development Goal (Wan and Zhang, 2007), and for Nigeria to meet this goal she requires reducing poverty in the rural areas since poverty in the country is considered to be a rural phenomenon (Olowononi, 1997). Although, several poverty reduction strategies have been suggested from various levels and in different contexts (Babatunde, 2008; Malek and Usaim, 2010), but the best strategy for reducing rural poverty in Nigeria is however, still a subject of debate. Nevertheless, the rate of poverty reduction achieved from various poverty

reduction strategies adopted in the past is deemed to be far below what is required to achieve the poverty reduction goal of Millennium Development Goals (MDGs) (Nuhu, 2007; Obi, 2007).

Over the years, stakeholders in rural development have viewed rural development as synonymous with agricultural development. Therefore, rural development policies aimed at rural poverty alleviation in Nigeria have concentrated on increased production of crops and livestock but this thrust has not led to any appreciable poverty reduction among the rural populace. Recent evidence (Dollar and Kraay, 2002; Cai *et al.*, 2008; Islam and Choe, 2009; Lanjouw and Murgai, 2009) suggest that non-farm income can complement agricultural income in poverty reduction. Therefore, it is pertinent to identify whether the reduction in poverty incidence can be derived from the growth in the rural non-farm sources of income available to farm households, equally important to find out whether their involvement in non-farm activities and hence the multiple income sources would mitigate the farm income variability/ risk borne, as evidence from literature shows that agricultural income is characterized by variability/ risk.

Ellis (2000), Abdulahi and CroleRees (2001), Bezemer and Davis, (2005) and Malek and Usaim, (2010) have however, observed that besides the opportunity for income diversification and reduction of income variability / risks that participation in non-farm activities offers the predominantly peasant farmers in Africa, non-farm activities could be important means of raising financial capital among farming families (Awoyemi, 2004; Babatunde and Quaim, 2008). A number of recent studies too, albeit on Nigeria (e.g. Okali, *et al.*, 2001; DFID, 2004; Anyanwu, 2005; Babatunde and Quaim, 2008; Oluwatayo, 2009) also suggests that incomes from household members' participation in non-farm activities have contributed significantly to farm households' welfare in Nigeria. DFID (2004) has also reported that as much as 60 per cent of an average Nigerian farm household's cash income was derived from non-farm activities.

Despite the growing importance of non-farm activities, very little is known about its role in poverty reduction in Nigeria's rural areas. It is however worthy of note, that the rural non-farm sector in Nigeria, as it is in other parts of the world, is complex and characterized by diverse activities, in which labour and other resource requirements and returns are in no way homogenous (Lanjouw and Lanjouw, 2001). Thus, it is imperative that research



attention is focused at understanding the rural non-farm sector in Nigeria, and to examine in particular its roles in the socio-economic developments of farming communities in the country, and especially as it relates to poverty alleviation.

Relevant questions that need to be addressed for a meaningful overhaul of the poverty strategies / measures in Nigeria, therefore include:

- (i) What are the factors and/or processes that fuel poverty among the farming population in Nigeria?
- (ii) To what extent can access to non-farm incomes promote overall welfare of rural farm households, bearing in mind the possible conflict between household labour requirements in farm and non-farm activities?
- (iii) Which activity or set of activities in the rural non-farm sector exercise positive linkage with poverty reduction in the south-west Nigeria?
- (iv) What roles do socio-economic characteristics play in securing non-farm employment opportunities by farm household members in the study area?
- (v) Are rural farm households sufficiently endowed with human and physical capital as well as the social infrastructure necessary to explore the potential employment in the rural non-farm sector?
- (vi) What action(s) and/or investments are necessary in the rural sector to promote access to poverty-reducing non-farm employment, and to significantly alleviate poverty among the rural-folks?

Attempt in this study is to critically examine these questions with the aim of providing answers to them in relation to rural poverty alleviation and to the evolution and / or implementation of sustainable livelihood measures among the rural folks.

#### **1.4 Objectives of the Study**

The broad objective of the study is to examine the extent and contributions of non-farm income sources diversification to poverty reduction among rural farm households in Southwest Nigeria. The specific objectives are to:

- (i) analyse the level of diversification into non-farm activities by rural farm households in the study area;



- (ii) assess and compare the returns to various non-farm and farm activities undertaken by members of farm households in the study area;
- (iii) estimate the determinants of diversification into non-farm activities by rural farm households in the study area;
- (iv) estimate the extent of poverty across various socio-economic groups of rural farm households in the study area;
- (v) determine the influence of diversification into various non-farm activities on poverty level of the rural farm households.

### **1.5 Hypotheses of the Study**

In pursuit of the research objectives, the following hypotheses, which are stated in null forms, were tested:

Ho<sub>1</sub>: Contribution of non-farm incomes to the rural farm households' income is not significantly different from zero.

Ho<sub>2</sub>: Wage rates earned in non-farm activities in by rural farm households are not significantly different from what obtains in the farm sector

Ho<sub>3</sub>: Poverty among members of farm households in South West Nigeria is not influenced by socio-economic factors.

Ho<sub>4</sub>: Non-farm income sources diversification is not significantly different among poor and non-poor farm households.

Ho<sub>5</sub>: Socio-economic characteristics and diversification into non-farm income activities among rural farm households have no significant effect on their poverty status.

### **1.6 Justification of the study**

Against the background of a rising incidence of poverty in Nigeria that remains unabated despite various policy reforms undertaken in the country since 1986, this study seeks a deep understanding of the problem.

This study adds to the existing knowledge by examining various factors and to what extent they contribute to increasing the incidence and severity of poverty among rural farm households in southwest Nigeria. Specifically, it throws light on the various dimensions and causes of poverty among rural farm households in the south western part of Nigeria. It is

hoped that the information generated will enhance a deeper understanding of the poverty situation, and permit formulation and implementation of a much more effective poverty alleviation policies and programmes in the region. This study fills in knowledge gap in the poverty literature by providing useful insights on various income sources available to rural farm households from non-farm activities and their potentials to mitigate poverty and income variability. It also provides information on the outcomes of various livelihood options available to and/or undertaken by rural farm households and reveals those of them that have poverty-reducing potentials.

Furthermore, the study contributes to the on-going debate in the development literature on the possible linkage between poverty reduction and access to urban-type employment in the rural non-farm sector. Considering the diverse types of activities available in the rural non-farm sectors, many of which compete with farming activities for labour and other household resources, this study identifies the particular set of non-farm activities that compliments and/or supplements activities in the farm sector in such a way that farm household income is raised without sacrificing the broader goal of enhancing national food security. It also provided additional information concerning the influence of various socio-economic factors at the community, household and personal levels on access to poverty-reducing non-farm activities.

Considering the contributions of research work of Awoyemi (2004) and Oluwatayo (2009) among others to the national poverty eradication policy, this study, on the contrary, used primary data to assess the extent of poverty and the impact of non-farm income at reducing poverty at the regional level. The regional analysis adopted becomes justified because of the diversity and complexity of rural settings in Nigeria, and particularly from one geo-political region to another. This helps to give the widening dimension of impact of non-farm income on poverty at the regional level; thus permitting its application for policy formulation at the regional level. This study established the potentials of non-farm income in alleviating poverty, and the contributions of share of income from different non-farm sources in total household income. These were done by disaggregating or classifying the non-farm sector beyond the single homogenous sector due to the heterogeneous nature of the sector.

This study quantified the level of income diversification within rural households by adopting superior measure of income diversification that is based on a more complex

disaggregation or classification beyond the simple farm and non-farm income categorisation. The study used the inverse of the Herfindahl index that was employed by Kaija (2007). This is because the inverse of the Herfindahl index does not only measure the number of income sources or the level of income diversification but also the evenness of income shares, with the incorporated parameter determining the weight of the number of sources versus evenness in the distribution of shares.

Many empirical studies in rural Africa show that there is a strong positive relationship between non-farm income share and total household income (Eboh and Ocheoha, 2004; Araujo, 2004; Bezemer and Davis, 2005; Haggblade *et al.*, 2007; Wan and Zhang, 2007; Oseni and Winter, 2009; Ibekwe *et al.*, 2010; Stifel, 2010). This study examined the level of earnings from non-farm activities in rural southwest, Nigeria and the factors that determine household members' participation in such non-farm activities. Moreover, it is significant in revealing the wage obtainable from each non-farm income generating activity in the rural area, and in comparing it with what was obtained in agriculture, so as to establish the reasons for rural farm households' participation in non-farm income generating activities. This reveals the poverty state of the rural farm households and its essence for non-farm activities. Therefore, the study recommended likely policies that can make non-farm income opportunities available for broad reduction of rural poverty in south west Nigeria.

Overall, some critical components of rural development strategies in Nigeria were brought to the fore in the course of this study. Such knowledge can become useful in accelerating growth in rural economies of southwest Nigeria, and consequently, can be used to achieve considerable poverty reduction; in crafting efficient and pro-poor policies and institutions, in facilitating broad-based rural economic growth, and in improving access to the management of natural and human assets.

## **1.7 Plan of the Report**

This thesis is organized into six chapters. The rest of the report is followed by a review of relevant literature and theoretical framework in chapter two. Chapter three presents the methodology. Chapters four and five present descriptive and quantitative results on farm households' poverty and non-farm activities respectively, while the final chapter gives the summary, conclusions and recommendations.

## CHAPTER TWO

### 2.0 THEORETICAL FRAMEWORK AND LITERATURE REVIEW

#### 2.1 Theoretical/Conceptual Framework

##### 2.1.1 Basic Concepts and Definition of Terms

###### 2.1.1.1 Concepts of Ruralism

In common usage, rural implies the countryside. It refers to those parts of a country that have not known as much socio-economic development as the city. In traditional rural communities, we do not find as much commercial and neither industrial activities nor social infrastructure as is commonly provided in towns and cities. It almost always refers to farming settlements – that is, communities with extensive land for crops and livestock production, called farms.

In the economic development literature, Durojaiye (1997) observed that no universally accepted definition of rural area. Rather, there are at least four main views viz, infrastructure, population, dominant economic activity, and human capital views. He noted that the infrastructure view classifies an area as rural if it lacks most basic social amenities like electricity, pipe-borne water, telecommunication facilities, etc. The population view classifies communities as rural or urban based on the size of its human population, while the dominant economic activity view classifies an area rural if the people are predominantly involved in farming, fishing, and lumbering, etc. He observed further that the human capital view appears to be borne out of the recognition of the fact that what makes an area rural is perhaps not so much of the absence of infrastructure, but more of lack of ideas and management skills for harnessing its resources.

Lanjouw and Lanjouw (2001), in a review of definitions of rural areas adopted across various countries observed that different definitions are used in the collection of census and survey information. They noted however that rural area is most often defined to include settlements of about 5,000 or fewer inhabitants, while definitions based on other population size and/or function and presence of social facilities as well as being the seat of a government, do vary. While in countries like Mali and Zimbabwe, only settlements with no more than 3,000 and 2,000 respectively, inhabitants are designated rural, the population threshold could be as high as 10,000 for Mauritania and 250,000 in Taiwan (Lanjouw and Lanjouw, 2001).

In Nigeria, the population view of a rural area has been the most widely used, at least in the official quarters. Following the 1953 population census, government in Nigeria initially adopted a population threshold of 5,000 inhabitants as the basis for classifying communities as rural or urban (Okali *et al.*, 2001). By 1963 census, the population threshold was changed to 20,000; and all communities with 20,000 inhabitants or more including all seats of governments (local council, state and federal) were declared urban by administrative fiat (Durojaiye, 1997). Okali *et al.* (2001) observed that this change in definition by 1963 resulted in 2,350 erstwhile urban communities whose population fell between 5,000 and 20,000 being re-classified as rural. They noted further that the endless exercise of state creation, which started in 1963, and the creation of local government areas (LGAs), in an attempt to bring governance closer to the grassroots, has remained a major source of confusion in the rural/urban area definition in Nigeria.

#### **2.1.1.2 Concepts of Poverty**

Poverty is a multi-dimensional phenomenon defined and measured in a multitude of ways. In the 1980s and 1990s, it was seen as not having enough income to provide for the bare minimum of food, clothing and shelter needed for survival. This aspect is “income poverty”. Now, it is generally agreed that poverty has many dimensions. The central element is deprivation - deprivation of the opportunities and choices necessary to enable persons to achieve and enjoy a basic level of welfare in terms of human development. This deprivation is characterized by material shortage, inadequate education and health, weak social support networks, insecurity and vulnerability, low self confidence, and powerlessness. Clearly, deprivation is a matter of degree.

Bagachwa (1994) defined poverty as a condition of living below a defined poverty line or standard of living, and this poverty line is subject to variation by socio-politico-economic-cultural set up. Its measurement atimes is based on a possession index, a composite of household possessions, mainly that of the head, and quality of housing and sanitation (Kamuzora and Gwalema, 1998; Kamuzora and Mkanta, 2001). Dar es Salam (2003) defined poverty as the inability of individuals or households to command sufficient resources to satisfy an acceptable minimum standard of living. This inability brings about a lack of opportunities to live a life of quality.

Englama *et al.* (1997) noted that the measurement of poverty can be undertaken as a two-stage process, viz: identification of the poor, and the aggregation of their poverty characteristics into an overall measure. Three such overall measures are recognized by the World Bank (1993), viz: poverty lines, profiles and indicators. In general, the poverty lines provide the basis for measuring the poverty profiles of a region or country, while the poverty indicators serve as indirect measures when direct measures are not available. The poverty line is that level of welfare which distinguishes poor households from non-poor households (Mukherjee and Benson, 2003). Poverty lines are used to classify people into different levels of poverty.

### **2.1.1.3 The Poor**

The poor are the central focus in poverty studies. People are termed poor when their measured standard of living in terms of income or consumption is below the poverty line (Obadan, 1997). The poor people are usually unable to obtain adequate income, find a stable job, own property or maintain healthy living conditions. They lack an adequate level of education and cannot satisfy their basic health needs (Sancho, 1996). They are also not able to meet their social and economic obligations, lack access to basic necessities of life, lack skills and gainful employment and sometimes lack the capacity to escape from their situation by themselves. This characteristic causes the condition of extreme poverty to persist and to be transmitted from one generation to another (Obadan, 1997). It was also viewed that the poor people will want to have many children who will provide for their old age due to lack of material security on the part of parents (Repnik, 1994). This leads to the vicious cyclical process of poverty whereby there is either no savings or there is low level of savings leading to low level of investment, low profit and low standard of living.

Poor households are those which have high dependency ratios, minimal assets, and lack access to sources of income, and may suffer social disadvantage. These factors are simultaneous causes and consequences of poverty, which is manifested tangibly in illness, malnutrition, illiteracy, and the inability to access basic goods and services (Harriss-White, 2005).

#### ***2.1.1.4 Concepts of Diversification***

Diversification is a form of self-insurance in which people exchange some forgone expected earnings for reduced income variability achieved by selecting a portfolio of assets and activities that have low or negative correlation of income (Reardon *et al.*, 2000; Barrett *et al.*, 2001). Diversification focuses on different income sources and their relationship to income levels, income distribution, assets and other variables. This definition focuses on diversification as a source of income growth and a potential means for poverty reduction (Dollar and Kraay, 2002; Ersado, 2006).

Livelihood diversification is a process by which households construct a diverse portfolio of activities and social support capabilities in order to improve their living standards and manage risk. Income generation is one of the components of livelihood strategies (Ersado, 2006). A livelihood comprises the capabilities, assets including both material and social resources and activities required for a means of living. It also encompasses income, both cash and in-kind, as well as the social institutions (for example, kin, family, village and compound), gender relations and property rights required to support and sustain a living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Ellis, 1998; Niehof, 2004).

#### ***2.1.1.5 Operational Definitions of Terms Adopted in the Study***

The operational definitions adopted for this study are as follows:

##### ***Poverty line***

The poverty line is that level of welfare which distinguishes poor households from non poor households (Mukherjee and Benson, 2003). Poverty lines are used to classify people into different levels of poverty.

##### ***Diversification***

Diversification is considered as a source of income growth and a potential means for poverty reduction.

##### ***Livelihood***

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living (Niehof, 2004).



### ***Livelihood diversification***

Livelihood diversification is a process by which households construct a diverse portfolio of activities and social support capabilities in order to improve their living standards and manage risk (Ersado, 2006).

### ***Income***

Income is defined as the output of activities that measures both cash and in-kind contributions. It refers to the cash and kind earnings of the household plus payment in-kind that can be valued at market prices. The in-kind component of income refers to consumption of own farm produce, payment in kind (for example, in food), and transfers or exchanges of consumption items that occur between households. All the goods and services produced in activities are valued at market producer prices regardless of their use. Therefore, all own-farm products are valued at the same price as if they were sold. Household income is all receipts (cash and in-kind) in exchange for employment, and or in return for capital investment and or receipts obtained by other sources such as pension (Ellis, 2000; Schwarze, 2004; Kaija, 2007; Malek and Usaim, 2009).

### ***Farm Income***

Farm income is all net incomes accrue from involvement in household farm and farm based activities.

### ***Rural non-farm income***

Rural non-farm income is income received or earned from anywhere by rural households outside farm and agricultural wage employment (Kaija, 2007)

### ***Income diversification***

Income diversification is the adoption of a range of farm and non-farm income-generating activities by rural households.

### ***Non-farm Income Diversification***

Diversification of non-farm income sources is the non-farm shares components of the household income-generating activities.

### ***Farm and Non-farm Sector***

The term farm sector refers to all activities involved in crops and livestock production, aquaculture, agro-processing and natural resources collection. Involvement in crops and livestock production is referred to as involvement in household farm activities



while involvement in agro-processing and natural resources collection is referred to as involvement in farm-based activities. The non-farm sector refers to all other activities outside the highlighted activities under farm sector and agricultural wage employment. It does not matter where the activity takes place, at what scale, or with what technology.

### ***Off-farm employment***

Off-farm employment refers to activities undertaken in agricultural wage employment (i.e agricultural labouring on someone else's land) and non-farm employment.

### ***Household***

Household is the smallest group of persons – usually, but not exclusively kin- related, who form a more or less independent production and consumption unit (Matlon, 1998). Household is a unit of decision making.

### ***Farm Household***

Farm household is a household that involves in cultivating at least a small piece of land for arable and/or tree crops, and/or keeping of livestock, aquaculture and/or involving in agro-processing and natural resources collection.

## **2.1.2 Theoretical Underpinning of Household Choices and Resource Allocation**

### **2.1.2.1 Farm Household Modelling**

Basically there are two classes of household models: unitary and collective household models. The collective model includes the non-co-operative model (Lunderberg and Pollak, 1993), the efficient co-operative model (Chiappori, 1992) and the Nash bargained co-operative model (McElroy, 1990). The unitary household model includes separable and non-separable agricultural household models (Alderman *et al.*, 1995; Chiappori, 1992).

The unitary models in general represent a household, as though, it is a single individual and as a unit of decision making in the production and consumption decisions. The advantage of following this model is that it fits exactly into the familiar consumer choice framework and fulfils integrability so that it is possible to recover the preferences from market behaviour (reduced form equations). However, there are some serious difficulties with this type of models (Chiappori, 1992). The first problem is that it violates the basic rule of neo-classical microeconomics analysis which is based on the requirement that individuals have to be characterized by their own preferences (individualism) rather than being

aggregated within the decision unit, the household. The second problem is that it considers a household as a black box such that nothing can be said about the internal decision process (Alderman *et al.*, 1995). The collective model relaxes these assumptions and treats individuals as the unit of decision making rather than the household. Empirically, however, this requires a considerable amount of data to be collected for each member of a household and hence is not realistic given the data set available nowadays (Kapteyn and Kooreman, 1992). It is also difficult and costly to collect accurate information from survey on the distribution of resources within the household.

In separable unitary agricultural household models, the production and consumption decision of a farm household can be modelled as being separable (Singh *et al.*, 1986) under some restrictive assumptions. The assumptions are that there are perfectly competitive markets for labour and other inputs and outputs, the family and hired labour are perfect substitutes in production, and that there is no specific disutility associated with working non-farm. Under the separability assumption, the decision can be made in two stages (Benjamin, 1992; De Janvry *et al.*, 1992). First, a household decides how much total labour to use on its farm so as to maximize profits from production without any consideration of its consumption or leisure preferences. Second, based on its farm profits and the market prices and wages, it decides how much to consume, how much labour to supply, and how much labour to hire. Thus under separability, the market wage provides an exogenous measure of the value of family labour time, irrespective of whether they work on or non-farm. The production decision of the household influences family labour supply only, through the changes of income effect on farm profits.

In a non-separable unitary household model, production and consumption decisions are interrelated. The non-separability of production and consumption decisions might arise for several reasons. Binding constraints in non-farm employment may prevent complete adjustment in the agricultural labour market (Singh *et al.*, 1986; Ozane, 1992; Benjamin, 1992). Family and hired labour may be imperfect substitutes in agricultural production (Jacoby, 1993, Skoufias, 1994). Farmers may have preference towards working on or non-farm (Lopez, 1986). Farmers may also be rationed in the credit market (Stiglitz and Weiss, 1981) and the interest rate charged to the household may depend on how much they borrow as well as on household characteristics (Singh *et al.*, 1986). Farmers may be risk-averse

(Binswanger, 1980) so that the expected utility of profit is maximized (Roe and Graham-Tomasi, 1986). Moreover, markets may fail for some particular product, or for certain inputs and households (De Janvry *et al.*, 1991). Under any of the preceding circumstances, the production and the consumption decisions of farm households can be treated as non-separable in the sense that not only production decisions affect consumption decisions, but also consumption decisions (preference) affect the production decisions. Furthermore, labour supply choices cannot be considered independent of the labour used on the family farm and vice-versa (Singh *et al.*, 1986).

### **2.1.2.2 Wage Determination Modelling**

Income at a given point in time is the most direct and measurable outcome of an activity (Ellis, 2000; Schwarze, 2004). Therefore, wage provides an exogenous measure of the value of labour time. Following Rosenzweig (1988), there are three basic approaches in the development literature concerning the wage determination and labour market in developing countries. The first approach raised by Chayanov (1966) and expressed by Sen (1966) is an autarkic model that assumes the non-existence of a labour market. If there is surplus labour in the household, family workers can be removed from the household without a loss in output. In the autarkic model, labour is in surplus only if the removal of a family member leaves the marginal rate of substitution between consumption and leisure unchanged. If family members, by increasing their labour supply, can fully compensate for the lost hours of work associated with a reduction in the number of family workers, labourers can be removed from the household (Agriculture) without any loss in output. Consequently, because labour supply is excessive in relation to the complementary factors, the wage will remain at a subsistence level.

The second model hypothesizes that there are agricultural agents willing to or seeking work, but they are unable to find employment. It focuses on the relation between nutrition and work efficiency. Employers try to capture the benefits of greater work efficiency by improving nutrition through higher wages. A positive relation between wage and the efficiency of labour may make it profitable for employers to pay labour more than the subsistence wage (Mazumdar, 1959). This theory led to several testable predictions about the wage payment system: labour-tying (the use of contracts of relatively long duration); an

inverse relationship between wage and the earner-dependency ratio, and payment in the form of meals for workers. In labour economics literature, this model is known as nutrition-based efficiency wage model. The other kinds of efficiency wage models are the shirking model (Shapiro and Stiglitz, 1984); the labour turnover model (Salop, 1979); the adverse selection model (Weiss, 1980); and the sociological model (Akerlof, 1982).

The main idea of the efficiency wage model is that labour productivity depends on the real wage paid by an employer. If wage cuts lower farm productivity, then cutting wages may actually result in higher labour cost. According to the efficiency wage model, a higher wage payment in general has five benefits (Akerlof and Yellen, 1986). Firstly, it improves the nutritional status of workers (from the nutrition based efficiency wage model). Secondly, it reduces shirking of work by employees due to the higher cost of job losses (from the shirking model). Thirdly, it lowers the turnover of workers (from the labour turnover model). Fourthly, it improves the average quality of job applicants (adverse selection model). Fifthly, it improves workers morale (from the sociological models). Rosenzweig (1988), however, argues that it is only the nutrition-based efficiency wage model (Mirrles, 1975; Stiglitz, 1976) which provides an important explanation for the downward rigidity of rural wages, although direct empirical tests of the relationship between nutritional level and effort are extremely rare and perhaps difficult. Binswanger and Rosenzweig (1984) also have reservations about the applicability of all types of efficiency wage models and suggest that it is less likely to be applied to explain rural daily-based wage employment.

The third approach assumes that farm households are partially or fully integrated in the market and that the labour market operates competitively (Rosenzweig, 1980; 1988). Then the wage that an individual or farm household receives depends on demand and supply forces. This model is called a competitive model in the labour market literature (Collier and Lal, 1986). It has four inherent assumptions: perfect information on the supply and demand side of the labour market, no uncertainty (or perfect future markets), no transaction costs in achieving competitive market equilibrium, and homogenous labour inputs. Given a convex preference structure of labour-leisure choices of individuals, profit maximization by the producers and utility maximization by the consumers, the competitive model leads to a general equilibrium condition in which wage equals the marginal value product of labour, which also equals the labourer's marginal rate of substitution between income and leisure.

However, modern neo-classical theorists have tried to relax the assumptions. The introduction of human capital into the neo-classical theory of the labour market helps to take account of some of the factors that lead to the heterogeneity of labour on the supply side of the labour market. Human capital consists of skills acquired through formal and informal education and on-the-job training. This gives rise to differentials in the productivity of different labourers. Since the acquisition of skills involves costs, the skills will be acquired if the skilled wage rate is higher than that the unskilled wage rate. The actual difference is determined by supply and demand considerations and the relative value marginal productivity of different skills.

### 2.1.3 Theoretical Framework

#### 2.1.3.1 Theoretical Framework on Income Diversification

The study is based on a household model in which production and consumption decisions are considered inter-related, that is, non-separable household unitary model. Following Woldehanna (2000), it is assumed that the farm households seek to maximize a utility function ( $U$ ) composed of a vector of consumption goods ( $C$ ), Leisure ( $H$ ) and taste shifter ( $a$ ) which includes, for example, age, education, and other characteristics:

$$U = U(H, C; a) \dots\dots\dots (2.1)$$

The utility function is assumed to be quasi-concave, continuous and non-decreasing in consumption goods and leisure. The level of utility attainable by the farm household is subject to the constraints imposed by: its resource endowments, cash (liquidity), the production technology, household time, rationing in the labour market, and the equilibrium condition for goods (commodity balance). The farm production technology is represented by a closed, bounded and convex production possibility set ( $Q$ ):

$$Q(q, X, L_h, A, K, L_f, Z) \geq 0 \dots\dots\dots (2.2)$$

where,  $q_i$  represents the  $i^{th}$  output;  $X$  represents farm variable capital farm inputs (such as seeds, fertilizer and pesticides),  $L_h$  is hired farm labour;  $L_{fi}$  is on-farm labour hours supplied by the household to output (crop)  $i$ ,  $K$  is the capital employed on the farm,  $A_i$  is the land allocated for crop  $i$ ,  $Z$  indicates farm characteristics such as soil type and location.

Land is assumed to be fixed for the household. The sum of land allocated for each crop ( $A_i$  ( $i=1, 2, 3, \dots, I$ )) is equal to the total area of land the farm household cultivates:

$$\sum_{i=1}^I A_i = A \quad \dots\dots\dots (2.3)$$

The farm household sells labour for non-farm work at the market wage rate ( $w_m$ ). The market wage rate depends on the marketable human capital (Woldehanna *et al.*, 2000) such as education ( $ED$ ), skill and experience ( $SK$ ); local labour market characteristics ( $LC$ ) and family characteristics ( $FC$ ), but is independent of the hours worked.

$$w_m = w(ED, SK, LC, FC) \quad \dots\dots\dots (2.4)$$

The farm household faces rationing and an entry barrier in the non-farm labour market such that the level of labour allocated for non-farm work is less than or equal to the level of non-farm labour the households are willing to be allocated,  $L_{mp}$ :

$$L_m \leq L_{mp} \quad \dots\dots\dots (2.5)$$

The household allocates its endowment of time ( $T$ ) among farm work, non-farm work, leisure, supervising hired farm labour, and transacting in the off-farm labour market:

$$\sum_{i=1}^I L_{fi} + L_m + H + L_n.sph + L_n.tch = T \quad \dots\dots\dots (2.6)$$

The household's endowment of time is dependent on family size (FS) and number of dependants (NDS). The farm household faces a cash constraint defined as follows:

$$\sum_{i=1}^I [P_i S_i - d_i S_i] + W_m L_m + v - \sum_{j=1}^J [P_j b_j + d_j b_j] - P_x X - w_h L_h - tcc.L_m - spc.L_h \geq 0 \quad (2.7)$$

where  $P_i$  is the price of the  $i$ th farm output;  $P_j$  is the price of the  $j$ th consumption good;  $v$  is non-labour income,  $d$  is marketing cost such as transport and information costs in the sale of farm output and purchase of consumption goods,  $s$  is the quantity of farm output sold,  $b$  is the quantity of consumption goods purchased; and  $P_x$  is the price of variable capital farm inputs.

The following equilibrium condition (commodity balance) must hold for all  $n$  goods for the combined set of  $I$  farm outputs ( $q_i$ ) and  $J$  consumer goods ( $C_j$ ).

$$C_n = q_n + b_n - s_n \quad \dots\dots\dots (2.8)$$

The non-negativity constraints are given by

$$C_j \geq 0; b_j \geq 0; q_i \geq 0; s_j \geq 0; A_i \geq 0; L_{fi} \geq 0; L_m \geq 0; H \geq 0; L_n > 0; X \geq 0 \quad \dots\dots (2.9)$$

Prices ( $P_i$ ,  $P_j$  and  $P_x$ ), non-farm wage rates  $w_h$ , and marketing costs ( $d_i$ ) are given. The household, therefore, chooses the level of consumption goods, farm and non-farm labour

hours and leisure as well as the quantity of inputs and outputs, sale of farm output in order to maximize utility (2.1) given the constraints (2.2)-(2.9).

The lagrangian expression associated with the constrained maximization problem is given by:

$$\begin{aligned}
L = & U(H, C; a) + \psi[Q(q, X, L_h, A, K, L_f, Z)] + \\
& \lambda \left[ \sum_{i=1}^I [P_i S_i - d_i S_i] + W_m L_m + v - \sum_{j=1}^J [P_j b_j + d_j b_j] - P_x X - w_h L_h - tcc \cdot L_m - spc \cdot L_h \right] \\
& + \delta \left[ A - \sum_{i=1}^I A_i \right] + \gamma \left[ \sum_{i=1}^I L_{fi} + L_m + H + L_h \cdot sph + L_m \cdot tch \right] + \mu [L_{mp} - \\
L_m] & + \sum_{n=1}^N \eta_n [q_n + b_n - s_n - c_n] \dots \dots \dots (2.10)
\end{aligned}$$

where  $\lambda$  and  $\gamma$  are the lagrangian multipliers for the marginal value of household's cash and time, respectively;  $\mu$  is the lagrangian multiplier for the rationing of labour i.e. the shadow value of additional non-farm jobs available;  $\eta_n$  is the shadow value of commodity balance for good  $n$ ;  $\psi$  is the marginal utility of the technology constraint, and  $\delta$  is the shadow value of one unit of land.

The Kuhn-Tucker conditions for the interior solutions (except for specific outputs, sales, purchases, crop specific land and labour, non-farm work, and hired farm labour) are:

$$\frac{\partial L}{\partial C_j} = \frac{\partial U(\cdot)}{\partial C_j} - \eta_j = 0 \quad (2.11)$$

$$\frac{\partial L}{\partial H} = \frac{\partial U}{\partial H} - \gamma = 0 \quad (2.12)$$

$$\left\{ \begin{array}{l} \frac{\partial L}{\partial L_{fi}} = \psi \frac{\partial Q}{\partial L_{fi}} - \gamma \leq 0 \\ L_{fi} \geq 0, \text{ and, } L_{fi}^* \left( \psi \frac{\partial Q(\cdot)}{\partial L_{fi}} - \gamma = 0 \right) \end{array} \right\} \quad (2.13)$$

$$\left\{ \begin{array}{l} \frac{\partial L}{\partial L_m} = \lambda(w_m - tcc) - \gamma(1 + tch) - \mu \leq 0 \\ L_m \geq 0, \text{ and, } L_m^* (\lambda(w_m - tcc) - \gamma(1 + tch) - \mu) = 0 \end{array} \right\} \quad (2.14)$$



$$\frac{\partial L}{\partial \lambda} = \sum_{i=1}^I [P_i s_i - d_i s_i] + w_m L_m + v - \sum_{j=1}^J [P_j b_j - d_j b_j] - P_x X - w_h L_h - tcc.L_m - spc.L_h = 0 \quad (2.15)$$

$$\frac{\partial L}{\partial \gamma} = T - \sum_{i=1}^I L_{fi} - L_m - H - L_h.sph - L_m.tch = 0 \quad (2.16)$$

$$\frac{\partial L}{\partial \psi} = Q(q_i, X, L_h, A, K, L_f, Z) = 0 \quad (2.17)$$

Given the assumptions of the utility function and production possibility set, and that the other inequality constraints are linear; the Kuhn-Tucker conditions are both necessary and sufficient conditions for the maximization of the objective function. Equation (2.12) is the condition that must be met for optimal allocation of the household's time while equation (2.13) and (2.14) are the Kuhn-Tucker conditions that show the optimality conditions for non-farm work. If the Kuhn-Tucker result is less than zero, the optimal hours of non-farm work is negative or zero, whereas if = 0 the optimal hours of non-farm work is positive. Equation 15, 16 and 17 indicate the restrictions on liquidity, household's time and farm production, respectively.

### 2.1.3.2 Theoretical Framework on Household Resource Allocation

This model examines the significance of factors other than household's behaviour towards risk in explaining the household's resource allocation over time. Decreasing absolute risk aversion requires that poorer households diversify their sources of income than their wealthier counterparts. However, poorer households facing various sources of risk but with little insurance mechanism to rely on are likely to devote substantial resources to food self-sufficiency compared to their wealthier counterparts who are more likely to emphasize non-farm employment (Fafchamps, 1992). Following from Bardhan and Udry (1999), the most important elements of the model are that:

- (i) households are assumed to have land (L) and Labour (H) as production inputs; labour can either be provided by the household or hired;
- (ii) the market for land is assumed to be missing;
- (iii) all households are involved in farm work, characterized by a constant returns to scale production function,  $Y = Y(L, H)$ ;



- (iv) entrance into a new activity is not cost-free and, in general requires either a minimum level of capital for investment or a specific skill; and
- (v) households might work in other activities rather than farming activities in order to diversify income risk.

Given these simplifying assumptions, each household can be assumed to maximize a time separable utility function of the form;

$$U_t = E_t \sum_{\tau=t}^T \beta^{\tau-t} u(C_\tau) \dots\dots\dots (2.18)$$

Where  $E_t$  is the expectations operator given the information set at age  $t$ ;  $\beta$  is the subjective discount factor;  $C$  represents the consumption of the household; and  $T$  is the number of periods.

In maximizing the above utility function, each household faces an inter-temporal budget constraint, an endowment constraint and a non-negativity constraint. The first – order conditions for labour allocation obtained from solving the above programming problem can be used to illustrate how households allocate resources across different activities. If the marginal utility of allocating labour to farm work is greater than the marginal utility derived from other activities outside farm work, the household would tend to specialize in farm work, without any investment in other activities such as non-farm activities; but if otherwise, the household would tend to engage in non-farm activities.

Now assuming the returns to the activities outside farm work is denoted as  $P_{tn}g(H_{tn}/M_n)$  where  $P_{tn}$  and  $M_n$  represent the wage and entry constraint – such as investment capital or skill - respectively, the relationship between the expected marginal utilities can be expressed as:

$$E \left[ U'(C_t) P_{tf} \frac{\delta h}{\delta H_{tf}} \right] > E \left[ U'(C_t) P_m \frac{\delta g}{\delta H_m} \right], \text{ with } H_{tf} > 0 \text{ and } H_{tn} = 0 \dots\dots(2.19)$$

Where  $U'(C_t)$  denotes marginal utility of consumption;  $H_{tf}$  and  $H_{tn}$  denote labour allocated to farm work and other activities, respectively; and  $P_{tf}$  represents output price of farm output. According to Eq. (2.19), the household does not need to undertake any other activity besides farm work ( $H_{tf} > 0$  and  $H_{tn} = 0$ ), since the marginal utility of allocating labour to farm work is larger than the marginal utility of engaging in non-farm work activities.

However, with the near absence of credit and insurance markets, and with severe farm work instability, households might invest in a diverse range of activities rather than specialize in a single activity in order to diversify some of the income risk. Such measures might reduce expected income, and also reduce the variance of income. In particular, poorer households will choose activities that reduce the variance of their incomes, even though this lowers expected income. Given that non-farm activities are normally considered less risky than farm work, a risk-averse household should engage in non-farm work relative to a less risk-averse household (Bardhan and Udry, 1999).

A household-level land constraint might also translate into limited farm output leading to a need for households to get involved in other income-generating activities (Reardon *et al.*, 1992). It is worth noting that only households with access to the capital for investment or specific skills for entrance into the non-farm work sector might do so. If households choose to allocate labour to other activities besides farm work, the first – order optimal conditions for labour allocation will equalize the marginal utility of allocating labour to farm work and the other activities.

This can be formally written as:

$$E \left[ U'(C_t) P_{tf} \frac{\delta Y}{\delta H_{tf}} \right] = E \left[ U'(C_t) P_m \frac{\delta g}{\delta H_m} \right], \text{ with } H_{tf} > 0 \text{ and } H_m = 0 \dots\dots (2.20)$$

Thus, household will allocate labour to farm work as well as other activities ( $H_{tf} > 0$  and  $H_m > 0$ ). Although, it is the poor who need diversification mostly to defend against entitlements failure and severe food insecurity, they are least able to diversify because of rationing at the non-farm markets that restrict their entry into more remunerative non-farm activities (Reardon *et al.*, 2000).

### 2.1.3.3 Theoretical Framework on Non-farm Activities Wage Rate

In modelling the market wage rate that a household receives from working in non-farm activities ( $w_m$ ), there is need to consider the truncated nature of household's participation in non-farm activities. Market wage rates are observed only for households who participate in non-farm activities. The participation decision of a household to work in non-farm ( $D_i$ ), can be modelled as

$$D_i = 1, \text{ if } w_{ri} \leq w_{mi}; D_i = 0, \text{ if } w_{ri} > w_{mi} \dots\dots\dots (2.21)$$

$$\Pr(D_i = 0) = \left\{ \begin{array}{l} \Pr(w_{ri} \leq w_{mi}) \\ \Pr(\alpha'X_i + \mu_{li} > 0); \mu_{li} \sim N(0, \sigma_{li}^2) \end{array} \right\} \dots\dots\dots (2.22)$$

Where  $w_r$  and  $w_m$  are the reservation wage rate and the market wage rate, respectively;  $X$  is a vector of variables that affects the market and the reservation wage rates;  $u_{li}$  is the error term.

The wage offer equation is given by:

$$w_{mi} = \beta'Z_i + e_i, e_i \sim N(0, \sigma_e) \dots\dots\dots (2.23)$$

$w_{mi}$  is observed if  $D_i = 1$

$$E(w_m) = \beta'ZF(z) + \rho\sigma_e f(z) \text{ and} \dots\dots\dots (2.24)$$

$$E(w_m / D_i = 1) = \beta'Z + \rho\sigma_e f(z) / F(z) \dots\dots\dots (2.25)$$

Where  $Z$  is a column vector of variables that affect the market wage;  $\beta'$  is a row vector of parameters;  $e_i$  is the error term of the wage offer equation. Furthermore, assumes that the error terms of the participation equation ( $u_{li}$ ) and the error terms of the wage offer equation ( $e_i$ ) have a bivariate normal distribution with zero mean and correlation  $\rho$ . Consequently, the expected market wage rate,  $E(w_m)$ , and the truncated market rate,  $E(w_m/D_i=1)$ , are given by (Amemiya, 1984; Maddala, 1983).  $z = \beta'Z / \sigma_{1\mu}$ ,  $\sigma$  is the standard error of  $u$ ,  $f(z)$  is the density function,  $F(z)$  is the cumulative distribution function and  $f(z)/F(z)$  is the hazard ratio or inverse mills ratio.

## 2.1.4 Conceptual Framework

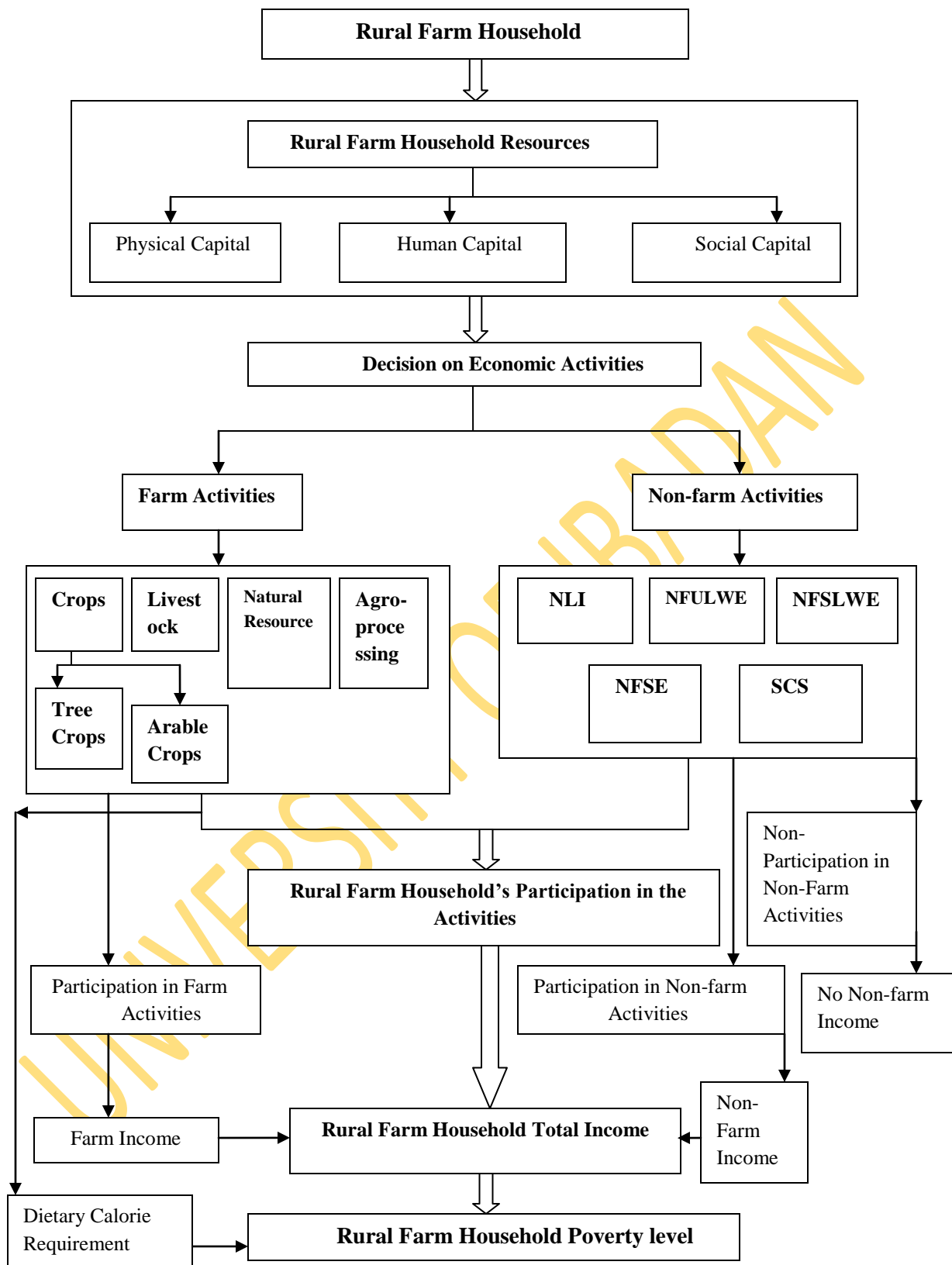
### 2.1.4.1 Conceptual Framework on Farm Households' Non-farm Income Diversification and Poverty

The conceptual framework establishes the foundation of the empirical analysis. This conceptual framework links the farm household assets, activity choice (between farm and non-farm activities) and incomes with poverty reduction.

In recent years, two approaches emerged in the literature linking income and activities: the livelihood approach and the assets-activities-incomes approach. As livelihood and income are not synonymous, they are nevertheless inseparably connected, because income at a given point in time is the most direct and measurable outcome of the livelihood process (Ellis, 2000; Schwarze, 2004).

The livelihood approach emphasizes the role of the household's resources as determinants of activities and highlights the link between assets, activities and incomes. Moreover, it stresses the multiplicity of activities households are engaged in (Ellis, 2000; Schwarze, 2004). The assets-activities-incomes approach is based on production function which emphasizes those assets correspond to the factors of production and incomes to the outputs of production. Activities are the ex-ante production flows of asset services (Barrett and Reardon, 2000). Schwarze 2004 summarized that in contrast to the livelihood approach, assets-activities-incomes approach highlights the role of prices (wages) in the income generating process. The goods and services produced by activities are priced at markets, in order to be the measured outcomes called incomes (Barrett and Reardon, 2000).

Following Schwarze (2004), the conceptual framework used in this work builds on the effect of farm household assets-activities-incomes on farm household poverty. However, more emphasis is given to non-farm activities and incomes. Pfeiffer *et al.* (2009) explained the household perspective as a useful basis for considering the impacts of non-farm income on rural farm household poverty, the concept is based on a household model in which production and consumption decisions are considered inter-related, that is, non-separable household unitary model (Woldehanna, 2000; Woldehanna and Oskam 2001). Figure 1 shows the poverty-nonfarm activities relationship of the farm household.



**Figure 1: Conceptual Framework on Rural Farm Household Poverty Reduction through Income Diversification**  
Adapted and Modified from Schwarze (2004).

Rural farm household is endowed with resources or assets which could be physical or and human or and social capital. Decisions on economic activities are made based on these household's assets and these economic activities could be farm activities (that is, crops, livestock, natural resources gathering and agro-processing) or and non-farm activities (non-labour investment, non-farm unskilled labour, non-farm skilled labour, non-farm self employment and social and community service).

Involvement of farm households in both activities (farm and non-farm activities) will affect the household total income either negatively or positively. If this effect is positive, there will be an increase in household total income due to increase in income sources, but it will be otherwise, if the effect is negative. Increase in the household income will eventually make the household to have higher purchasing power that can help the household to leave the poverty threshold. Rural farm household's participation in these activities will affect the household's daily dietary calorie requirement positively or negatively, which indirectly affect the rural farm household's poverty level.

Rural farm household's participation in farm activities results in the household having farm income while its participation in non-farm activities results in having non-farm income. The household may decide not to work non-farm due to some factors and such household will not expect any income from non-farm income generating activities. It is expected that increase in income generating sources has the potentials of mitigating poverty and income variability among farm households.

### **2.1.5 Methodological Issues in Poverty and Livelihood Analyses**

#### **2.1.5.1 Household Welfare Measurement**

The identification of households' well-being, which constitutes the first step in poverty analysis, is probably the most important and the most difficult to answer, in so far as the concept of well-being is not only multidimensional, but also subjective. Welfare is a multidimensional concept, for some of its components cannot be easily transformed into simple numeraire. The level of living of an individual or a household is a multidimensional concept which in principle encompasses each aspect of direct consumption, as well as none immediately consumable activities and services; it is subjective because of the usual problem concerned with interpersonal comparisons of utility levels. In spite of the problems, it is

usually recognized that money metric is the best way to measure welfare at the level of the individual (Fambon, 2006). Thus, in accordance with several works on poverty, analysis on poverty rests on monetary measure of utility and welfare. Household total expenditure is used as a measure of household welfare and as a basis for ordering (or ranking) households and determining the poverty line. Likewise, land-based and income-based measures also exist.

Expenditure is used instead of income, since the former is better reported in household consumption budget surveys. Moreover, there exists a theoretical consideration according to which expenditure reflects permanent income better. Also, at the conceptual level, permanent income theory permits argument that expenditures constitute a better approximation of income over the long run and of the level of living over time, as compared to current income such as gathered during household surveys. At the empirical level, it can be shown that expenditures are measured with greater accuracy than incomes especially in the case where a large part of these incomes originate from the informal sector. In other words, incomes were widely under-estimated everywhere, which explains the exclusion of income as a measure of welfare from most studies.

Further, to compare the standard of living of households with different compositions the statistician usually resorts to equivalence scales. This is in order to obtain the value of the level of living indicator in terms of adult equivalents. Adult equivalent scales help to specify the relationship between household consumption and the number of adults and children who are members of that household, for a given standard of living. An equivalence scale captures the scale economies realized by a household with several persons mainly through the sharing of goods that can be used collectively. Suffice to add that there exists a great variety of adult equivalence scales and distinct scales are used in different countries.

### **2.1.5.2 Poverty Measures and Indices**

#### **2.1.5.2(a) Poverty Measures**

Once the welfare measure is established, the poverty threshold must be determined. In fact, poverty analysis in any country requires the construction of a poverty line which distinguishes the poor from the non-poor, and which is then used in relation to welfare indicators. There exist two major approaches for constructing poverty thresholds: the relative approach and the absolute approach.

The relative poverty line is totally determined by the distribution of expenditure from which it is calculated. To arrive at this, a poverty threshold is decided on as being an arbitrary and pre-selected percentage of the population making these expenditures (Duclos and Araar, 2006). The poverty line constructed on the relative approach basis may therefore have several possible values, and may be unable to provide a set of coherent comparisons for measuring poverty under these conditions.

The absolute poverty line is often based on a minimum of nutritional need to be satisfied, which is converted into minima food expenditures to which is added a non-food goods basket judged to constitute a basic minimum (Mukherjee and Benson, 2003). The poverty threshold established on the absolute approach basis has a fixed value. This approach is widely accepted, easy to understand, and requires the classification or presentation of household according to income or consumption. In contemporary literature, there exist two principal commonly used methods to estimate the absolute poverty line, namely, the method based on the satisfaction of nutritional needs (calories) or Foods Energy Intakes (FEI) method, and the method of the Cost of Basic Needs (CBN), (Fambon, 2006; Duclos and Araar, 2006) . These two approaches rest on the determination of certain consumption basic needs, judged as being relevant in poverty comparisons. The most important basic need is obviously expressed as the necessary food expenditures to ensure the recommended nutritional energy consumption.

The Food Energy Intake (FEI) method, in particular, is applied by looking for the level of consumption expenditures or of income for which a person's typical consumption of food energy is just adequate to satisfy a pre-determined food energy need. This method has been largely used in the literature (Greer and Thorbecke, 1987; Deutsch and Silber, 2005). The Cost of Basic Need (CBN) approach consists of defining a basket of goods and services that an individual should be able to get in order to be considered as being non-poor. Such a basket encompasses not only food and basic nutrition, but also clothing and housing (Mukherjee and Benson, 2003). This would amount to calculating the minimum amount of expenditures necessary to purchase the consumer goods that guarantees pre-determined calorific level of survival.



### 2.1.5.2(b) Poverty Indices

Once the criterion and the poverty line are determined, the information gathered must be aggregated according to the poverty measure. In this regard, the incidence of poverty within a population or sub-groups related to it is usually evaluated by indicating the percentage of individuals involved. As a matter of fact, recent analyses give prominence to three principal measures of monetary (income) poverty or poverty in terms of consumption, which are generally used to evaluate poverty status. This concerns the incidence of poverty (or headcount ratio), the depth of poverty (or the poverty gap index), and the inequality of poverty (or the severity of poverty index). These three indices refer to a certain amount of income or expenditure, which is taken as a threshold separating the poor from the non-poor.

The first and most simple of the poverty measures is the incidence of poverty ( $P_0$ ). It is the ratio of the number of poor households or individuals ( $q$ ) to the total number of households or individuals ( $n$ ). This index yields the proportion of the population which lies below the poverty threshold. The interpretation of this index poses no problems. For instance, if  $P_0 = 0.70$ , this means that 70% of the population is poor. Nevertheless, certain specifications must be made while constructing poverty profile. Although this ratio is widely used, it has the defect of not capturing the gravity or extent of poverty, and it does not satisfy Sen's monotonicity and transfer axioms (Fambon, 2006).

The second poverty measure is the poverty gap measure ( $P_1$ ), which measures the magnitude of poverty. Unlike poverty incidence, the poverty gap measure allows the estimation of the proportional deficit of poverty; that is, the average distance between the income (expenditure) of the poor and the poverty threshold. Therefore, this is a poverty gap index which measures the depth of poverty. It takes into account not only the number of poor persons, but also the extent of poverty. In fact, with  $P_0$ , if a household or an individual is very poor, this will not be taken into account. The poverty gap index  $P_1$  is the product of the poverty ratio and the average extent of poverty among the poor. This index is sensitive only to the average poor's situation and does not take into consideration the situation of the poorest among the poor.

In the context of designing policy actions for poverty reduction, it is central to know not only the number of poor persons, but also the degree of their poverty. The poverty gap index ( $P_1$ ) is used in this respect, and thus allows the simultaneous measurement of the

incidence and degree of poverty. Consequently, the  $P_1$  index turns out to be a valuable instrument for comparing the relative poverty of various groups or geographic regions and thus permits the targeting of actions towards the most destitute. The expression  $P_1$  provides an estimation of the expected or desired transfer of resources from the non-poor to the poor to eradicate poverty if there are no negative incentive effects associated with money transfers and if targeting is perfect. Under these conditions  $P_1$  represents the minimum financial commitment required to eliminate poverty for a given poverty line. Despite the fact that  $P_1$  takes into account the number of poor persons and the depth of poverty, it is not sensitive to income distribution among the poor. If there is a transfer from a poor person to another less poor person who lies below the poverty threshold, the value of  $P_1$  is not affected. Hence  $P_1$  does not satisfy Sen's transfer axiom (Fambon, 2006).

The third poverty measure is the severity index of poverty ( $P_2$ ), which is not only sensitive to the incidence and depth of poverty, but also to the distribution of resources among the poor. If income is redistributed from the poorest to the less poor (without any of them emerging from below the poverty threshold) neither the poverty ratio nor the poverty gap index will change. However, the severity index of poverty will increase, thus indicating that the poverty of the poorest has become more severe. The index of the severity of poverty is more sensitive to changes in the incomes of the poorest, and less sensitive to changes in the incomes of those who live close to the poverty threshold.

The interest in the above poverty measures lies in the fact that they are additive and decomposable into sub-groups. In fact, if the population is divided into  $j = 1, 2, \dots, m$  mutually exclusive and exhaustive sub-groups, and  $P_{aj}$  is the measure calculated for the group  $j$ , and  $f_j$ , the proportion of the national population lying in group  $j$  such that ( $f_1+f_2+f_3+\dots+f_m$ ), the national measure  $P_\alpha$  is simply the sum of sectorial  $P_{aj}$  measures :

$$P_\alpha = \sum_{j=1}^m f_j P_{aj} \dots\dots\dots (2.26)$$

From the preceding equation, we can derive the contribution,  $c_j$  of each sector or sub-group of national poverty:

$$C_j = \frac{f_j P_{aj}}{P_\alpha} \dots\dots\dots (2.27)$$

These contributions provide us with a good idea of where packets of poverty are located in the country (i.e. which regions, professional groups, various sectorial groups, etc), and they can be used as a basis for dialogue on the decisions that need to be taken in order to reduce poverty.

Comparisons of poverty measures over time or between different groups require a test of robustness in the changes observed in poverty indexes (Duclos *et al.*, 2006). These changes may depend on the poverty line chosen, so that using two different poverty lines may lead to changes taking opposite directions. Stochastic dominance techniques in poverty analysis help ensure that poverty comparisons are necessarily valid for several classes of poverty indices, while they are also valid for a series of thresholds. Generally speaking, stochastic dominance as related to poverty consists in ranking income/expenditure distributions; that is, it checks whether a distribution clearly has more or less poverty than another for a series of poverty lines.

First order stochastic dominance implies a comparison between the cumulative distribution functions of the welfare indicator (in this case the total expenditure per adult equivalent) for each of the  $n$  survey years or for different household groups. A distribution “dominates” another if the expenditure distribution function for the year or household group considered, lies above the one corresponding to the other year or group at all expenditure levels. When first order dominance checks out for two different years or two groups, it may be concluded that FGT class of poverty measures, namely, the poverty ratio, poverty gap index and severity index of poverty of the first year or the first group, are higher than those of the other year or other group for all the poverty lines. If the distribution curves intersect, the analysis is ambiguous. In this case, some poverty lines and some poverty measures will rank the distribution in a different manner (Bourguignon and Chakravarty, 2003; Deutsch and Silber, 2005; Duclos *et al.*, 2006; Ataguba *et al.*, 2008).

## **2.2 LITERATURE REVIEW**

### **2.2.1 Empirical Evidences in Poverty and Livelihood Studies**

#### **2.2.1.1 Empirical Studies of Poverty Situations in Nigeria**

Poverty is a global phenomenon and a state which has generated a lot of interest in recent times. A chronological review of poverty situation in Nigeria shows that it has been a

long standing issue. In 1973, when the nation witnessed the first positive oil shock; there was a dramatic positive impact on most indicators. Real per capita income and per capita private consumption rose sharply between 1973 and 1974, and there was a dramatic increase in real wages and poverty declined during this period (World bank, 1996). The periods between 1975 and 1980 were characterized by mixed picture and mild progress in welfare and poverty improvement. Real wages in agriculture continued to rise until 1976, after which they remained relatively constant until 1980. There was however a sharp fall in real wages in the non-agricultural sector and the proportion of people in poverty did not decline over this period (Okojie, 1997) but since 1990 Nigeria has been classified as a “poor” nation and poverty has been persistent in Nigeria (Ajakaye and Adeyeye, 2001).

In Nigeria, poverty started with the onset of the oil boom when agricultural production started to decline leading to rural-urban migration. This was followed by downward trend in oil prices, continued reduction of subsidy on petroleum products and other subsidies on agricultural inputs, high level of unemployment, low capital for investment as well as low share of public expenditure on economic and social services (Olowononi, 1997; Omonona, 2001). World Bank reported that in absolute term the number of poor people in developing countries nearly doubled between 1981 and 2005, that is, the number of poor people rose from 200 million in 1981 to 390 million in 2005 (World Bank, 2010).

Every yardstick of poverty ranks Nigeria at the bottom list of nations. In 2007, Nigeria has HDI value of 0.511 which gives the country a rank of 158 out of 182 countries, estimated GDP per capita of \$1969 and life expectancy at birth of 47.7 years (HDR, 2009). In 2008, as much as nine per cent of the populace were found to be undernourished while 23.1 per cent of children under the age of 5-years were reported to be underweight (UNDP 2010; HDR 2010). Moreover, life expectancy at birth was estimated to be 47.3 years for women and 46.4 years for men while under-5 mortality rate was put at 157 per thousand live births in 2008 (UNDP 2010; HDR 2010; UN 2010). This shows that an average adult in Nigerian is more likely to die at his/her prime age while as much as 15.7 per cent of the children are also likely to die before attaining the age of 5-years (UNDP 2010; HDR 2010).

Evidence in literature (e.g. World Bank, 1995, 1996; FOS, 1996, 1999; Ajakaiye and Adeyeye, 2001, Omonona, 2001; Oyekale *et al.*, 2006; Oni and Yusuf, 2006; Nwachukwu

and Ezeh, 2007; Babatunde, 2008; UNDP, 2009 and UN 2010 among others) show clearly that poverty incidence in Nigeria is higher among the rural-folks, households that rely mainly on agricultural income and those with low paid work in the rural non-farm sector; though this may not be unconnected with the rather low productivity growths that have characterized Nigeria's agriculture over the past four decades (Fulginiti *et al.*, 2004).

In Nigeria, reports show that poverty is caused by the failure of government to draw the poor into the design of development programmes, destruction of natural resources that lead to environmental degradation as well as reduction in productivity (MDGR, 2009). Others, according to Odusola (1997), include inadequate social service, high population growth, low income growth as well as social and political instability. Yet, other causes of poverty in Nigeria include waste of resources, poor management, and misallocation of resources (World Bank, 2008). Corruption, low individual motivation, attitude and abilities, bad leadership and lack of revolutionary consciousness on the part of the followers are others (Tella, 1997; Sofu and Ali-Akpajiak, 2003; Ezigbo, 2009).

#### **2.2.1.2 Empirical Studies of Poverty Alleviation Programmes in Nigeria**

Poverty phenomenon in Nigeria since late 80s has attracted various attention for alleviation. The alleviation of poverty is an important development agenda for developing countries for the improvement of overall social and economic conditions. Without social and economic programmes to alleviate poverty, society will continue to be caught in a vicious cycle of underdevelopment. Possible poverty reduction strategies can be pursued through three forms viz income growth, income redistribution and safety net (Awoyemi and Adeoti, 2004; Oyekale *et al.*, 2006). The growth in income per capita is the main source of reduction in most countries (Datt and Ravallion, 2009) but in Nigeria both the income growth and safety net strategies had been implemented several times.

The search for poverty reduction strategies globally resulted in the Millennium Declaration in the year 2000 by the world leaders under the auspices of the United Nations which then set 2015 as the target date to achieve a number of Millennium Development Goals (MDGs) of which 50 percent reduction in the level of poverty is one of the goals (Wan and Zhang, 2007). In achieving these goals, the lowly developed countries are to design Poverty Reduction Strategy Programmes (PRSPs). As a result since the year 2000, numbers

of PRSPs have been initiated in Nigeria and these include National Economic Empowerment Development Strategies (NEEDS) with concomitant strategies at the states (SEED), local government areas (LEEDS) and at the community level (CEEDS). These strategies are aimed at addressing various manifestations of poverty like unemployment, lack of access to credit and functional rural and urban infrastructures as well as gender inequality among others.

Notwithstanding before the inception of MDGs, successive governments in Nigeria have repeatedly adopted policies and programmes on virtually every aspect of the national life that would reduce poverty. Programmes intended to ensure food self-sufficiency and provide necessary infrastructure to stimulate economic activities, enhance incomes and improve living conditions of the poor like Operation Feed the Nation (OFN), the Green Revolution, National Directorate for Employment (NDE), the Directorate for Food, Roads and Rural Infrastructure (DFRRI) and River Basin Development Authority (RBDA) were established. Also, successive government have made tremendous efforts to improve agricultural production and living standards through public credit institutions like Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB), state owned small scale finance agencies, Agricultural Credit Guarantee Scheme (ACGS), People's Bank, Community Banks and the Family Economic Advancement Programme (FEAP) (Ogundipe, 1999; Ukpong, 1999). As well, National Poverty Eradication Programme (NAPEP) and National Economic Empowerment and Development Scheme (NEEDS) were implemented (Nuhu, 2007; FMAW, 2008). In 1986, Structural Adjustment Programme (SAP) was adopted to address poverty and this programme witnessed reduction in poverty among the core poor (Oladunni, 1999).

Recently, there has been a reorientation of the government's focus towards developing Community-based poverty reduction approach. This Community Driven Development (CDD) has potential to develop projects and programmes that are sustainable, responsive to local priorities, empower local communities to manage and govern their own development programmes, and are better targeted toward poor and vulnerable groups (Dongier *et al.*, 2001; Gillespie, 2004). Several programmes have been implemented under this approach and these include Local Empowerment and Environmental Management Programme (LEEMP), Community-Based Poverty Reduction Project (CPRP), Community and Social Development Project (CSDP which upshot from LEEMP and CPRP) and National

Fadama Development Project, NFDP (FPSU, 2008). Federal Project Supporting Unit (FPSU) 2008 reported that other CDD projects' activities except NFDP centred on community level and invested mainly in social infrastructure while NFDP centred on common interest termed economic interest groups (EIG) to overcome problems faced by poor farmers in production and marketing (Ostrom, 2004).

Despite the plethora of these poverty reduction strategies adopted in Nigeria, IMF (2005) and United Nations Habitat (2010) still put the poverty rate at 70% and 76%, respectively; and Obi (2007) posited that the best strategy for reducing poverty (both at rural and urban) is still a subject of debate.

### **2.2.1.3 Empirical Studies of Livelihood Diversification and Poverty**

Livelihood diversifications are supported by a considerable number of literature and much empirical evidence (Jan *et al.*, 2009). Herani *et al.* (2009) reveal that livelihood diversification helps to lessen the vulnerability of the poor to food insecurity and livelihood collapse. It provides the basis for building assets that permit individuals and households to construct their own exit routes out of poverty. It also improves the quality and sustainability of natural resources that constitute key assets in rural livelihood. These effects occur because diversification widens the people's options, encourage diversified transactions, increases cash in circulation in that area. It also enhances human capital by providing it to those who could diversify towards new skills and experiences (D'Silva *et al.*, 2004; Sreedevi *et al.*, 2004 and Sudan, 2007).

Mandel (2006) and Oberhauser and Hanson (2007) in different studies found out that diversification opportunities help people to find out their own exit routes out of poverty and enable people to become more productive because they are able to use more inputs for the lands. They found that richer get more benefits than poor in livelihood diversification. Ellis and Freeman (2004) reveal that roughly 50 percent of rural household income in developing countries is generated through engagement in non-farm activities. Bryceson (2002) concluded that diversification among farm households is often as a result of failure of agriculture to produce sufficient livelihood for a substantial proportion of rural dwellers in Sub-Saharan Africa. In Nepal, Floyd *et al.* (2002) and Springate-Bajinsky *et al.* (2003)



reported that richer household supplement farming with incomes from local business or employment.

Sudan (2007) opined that livelihood diversification may also be developed as coping responses to the loss of capital assets, needed for undertaking conventional on-farm production. This study shows livelihood security between diverse non-farm and farm components, in which the farm component becomes more productive and diminishes in importance within a diverse livelihood portfolio. Households that are economically better diversify to livestock ownership, engagement in non-farm self employment, and diversity of on-farm and non-farm income sources. Ellis and Mdoe (2003) observed that moving poverty is a cumulative process, often achieved in tiny increments. For example, cash from non-farm incomes can be used to purchase farm inputs to earn higher farm incomes either from crop production and or livestock. Precisely, diversification plays the role of poverty reduction and overcoming financial constraint. Rakodi (2002) stated that it is important to keep people and household in which they live at the centre of the development process, starting with their capabilities and assets, rather than with their problems. Other recent literature (Rena, 2007; United Nations, 2007; Herani *et al.*, 2009) revealed that livelihood diversification is significant in the growth and development of developing countries as well as in providing pathway out of poverty in rural economy.

Malek and Usaim (2010) examined the comprehensive effects of non-farm incomes on poverty reduction in advanced villages of Bangladesh. The study found that the small households in advanced villages were in a stage that their non-farm incomes did not contribute significantly to their household production for either farm or non-farm and food consumption (calorie adequacy); and accordingly, these could be spent on non-food consumption. The overall non-farm income significantly mattered for reducing income poverty but could still be low to realize in reducing education poverty. However, among the non-farm income components, while out-country remittance and non-farm self-employment incomes were more income poverty (incidence and gap) reducing compared to non-farm wage and in-country remittance incomes, the remittance incomes (both in-country and out-country) were reducing the severity of education poverty. Thus, the qualitative diversification of the small household workers and productive use (preferably in farm/non-farm production and demand driven education) of non-farm incomes deserved special attention. Other



literature that assess the impacts of non-farm activities on poverty reduction include Araujo, 2004; Hossain, 2005; Bezemer and Davis, 2005; De Janvry *et al.*, 2005; Jonasson, 2005; Nargis and Hossain, 2006; Zhu *et al.*, 2009; and, Lanjouw and Murgai, 2009.

#### **2.2.1.4 Empirical Studies of Diversity in Income Sources**

Delgado and Siamwalla (1997) examined broad patterns of income diversification in Asia and Africa. They noted that African farmers often have highly diversified crop mixes as a strategy to reduce risks associated with weather. In contrast, crop diversity in Asia is associated with farmers diversifying away from rice into higher-value crops and activities, such as horticulture, livestock, and aquaculture.

In a study of Zimbabwe, Ersado (2003) examined the relationship between income diversification and household welfare. Using household surveys carried out in 1990–91 and 1995–96, the study measured income diversification by the number of income sources, the share of non-farm income, and the Simpson index of diversity. The study found that in rural areas, richer households had more diversified income sources, while in urban areas the reverse was true. Ersado (2003) also found that households living in rural areas with highly variable rainfall were more likely to have a large number of income sources, which is consistent with the idea of income diversity as a risk management strategy.

Woldehanna (2000) opined that farm households may also diversify their income sources via crops. According to Ibrahim *et al.* (2009), crop diversification involves growing of many crops at the same time. It is also concerned with the switch from subsistence food production to commercial agriculture, as well as, switch from low-value crop production to higher-value crops (high-value crops are crops that generate high economic returns per unit of labour or land. That is, crops with high value per unit of weight). De and Chattopadhyay (2010) observed that small and marginal farmers need diversification of crops for meeting their cost of living, but the flexibility of farmers in responding to diversification opportunities, is in most cases, constrained by the size of markets, price risks, soil suitability, quality of irrigation infrastructure, availability and cost of labour. De (2003) reported that farmers prefer the combination of crops from which they can derive maximum possible net revenue with least possible risk, when there is no dearth of essential factors of cultivation of those crops.

Minot (2003) and Joshi *et al.* (2006) in different studies on India agriculture showed that diversification emerged as the dominant sources of growth in agricultural income during the 1990s. While, Wehbe *et al.* (2006) studies on Mexico and Argentina agriculture revealed that diversification of agricultural practices was helpful in mitigating climate risk along with insurance, irrigation development and technologies that are sometimes hindered due to the limitation of financial access, poor information network and market failures. Ghosh (2010) referring to Sanyal *et al.* (1998) opined that the cropping pattern in most of the India districts has noticeably changed in favour of high-value non-food grain crops such as potato, oilseeds and other non-food grain. De (2003) and Sharma (2005) posited that a change in the cropping pattern of the state can go a long way to counter the deceleration trends in food production. More specifically, a shift in the crop diversification towards the high value crops can become a handy solution of the slowing down the pace of agricultural growth of the state.

Using area and production statistics, Joshi *et al.* (2004) examined the trends in diversification in South Asia over recent decades. They showed that the diversity of crop production has increased since 1980 in most South Asian countries. In India, the southern and western regions are diversifying away from grains toward pulses, oil seeds, fruits, and vegetables. In the northern region, farmers are turning from coarse grains to commercial production of rice, wheat, and (to a lesser degree) non-grain crops. The eastern region is poorer and less developed. Agriculture is dominated by rice, but the non-rice areas are quite diverse. Carrying out state-level time-series econometric analysis, they showed that income diversity is associated with road density, urbanization, average farm size, and per capita income. Rainfall is also a significant factor: low-rainfall areas have more diverse cropping patterns than high-rainfall areas. They concluded that diversification from coarse grains to high-yielding rice and wheat has had positive effects on food security, while diversification toward tree crops has boosted employment per hectare and agricultural exports.

Reardon *et al.* (1992) found that rural households in an arid village in Burkina Faso have very diverse income sources, relying on crop income, livestock income, local non-farm activities, and migrant labour in roughly equal proportions. In contrast, another village with better agro-climatic conditions earned about half of their income from crop production, but actually more vulnerable to droughts than households in the drier zone. Studies that focus on diversification in terms of the number and balance of income sources are relatively rare

compared to studies using other definitions, particularly diversification into non-farm activities.

Based on a review of more than 20 studies carried out in the 1960s and 1970s, Haggblade *et al.* (1989) found that nonfarm income accounts for 25 to 30 percent of rural income in Sub-Saharan Africa, somewhat less than the norm in Asia. Another study of global patterns suggests that nonfarm activities account for 30 to 45 percent of rural income (FAO, 1998). There is conflicting evidence on whether rich or poor rural households earn a higher share of their income from non-farm activities. Haggblade *et al.* (1989) found that the share of nonfarm income is usually greater among higher-income rural households in Africa.

Review by Reardon (1997), based on 27 studies of rural non-farm employment in Sub-Saharan Africa, and confirms that the share of income from non-farm activities is greater among higher-income rural households, presumably as a result of the capital and skill requirements of many types of nonfarm occupations. However, studies from Asia and Latin America often show a relationship between nonfarm income share and total income that is U-shaped, with poor households relying on agricultural labour income and relatively high-income households having formal-sector wage jobs and non-farm self-employment.

Lanjouw and Lanjouw (2001) and Escobal (2001) show that pattern of non-farm activities are common in countries with a large rural landless population. Rural infrastructure has an important effect on rural nonfarm income activities. Nonfarm income share is often greater in households and villages with electricity, because this reduces the cost of many types of nonfarm activities. The development of the road network, however, has mixed effects. Road improvements reduce the local cost of imported goods and goods made in urban areas, thus threatening some nonfarm enterprises such as basket weaving, roof thatching, and traditional brewing (Haggblade *et al.* 2002, 2005 and 2007). On the other hand, road improvements make it easier to purchase inputs from and sell products to urban markets and overseas. On net, the latter effect is probably larger, since nonfarm income activity is often positively related to road density and proximity to urban markets

Similarly, the existence of credit markets may have a mixed effect on non-farm activities. On the one hand, credit constraints may prevent many rural households from starting some types of nonfarm enterprises. On the other hand, non-farm activities may serve as a substitute source of cash when rural credit markets are not effective (FAO, 1998). In

Peru, nonfarm activities make up roughly half of all rural income, though the percentage varies widely across regions and households. The share of income from nonfarm enterprises correlates positively with education, electrification, proximity to market, and the value of crop output per hectare (Escobal, 2001).

In a study of rural households in Ethiopia, Block and Webb (2001) found that diversification out of crop production is associated with higher-income households, a higher dependency ratio, male-headed households, and location in the highlands (a region with good soils and higher rainfall). One of the motivations for diversifying out of crops, often into livestock activities is to provide insurance against drought. According to a survey, farmers believe that households with large herds are less vulnerable to drought. These results are difficult to interpret, however, because if insurance against drought were the main motive for diversification, then it should be more common in the marginal lands with low rainfall.

Another study compared diversification in Rwanda, Kenya, and Côte d'Ivoire. Diversification away from crop production is greatest in areas with low rainfall and poor soils. Although unskilled labour income is associated with poor households, most other forms of nonfarm income correlate positively with income. The fact that income diversity is greater among higher-income households contradicts the idea that diversification is a risk management strategy (since we would expect the poor to be more risk averse). On the other hand, it suggests that nonfarm activities involve some barriers to entry, such as education or capital that make it difficult for poor households to participate (Barrett *et al.* 2000).

#### **2.2.1.5 Empirical Studies of Non-farm Labour Supply**

Radam and Abdulatif (1995) examined the study of off-farm employment decisions in North-West Selangor and found out that the supply of off-farm labour constitutes an important aspect of resource use in the Malaysian agriculture. It was noted that off-farm labour supply should be analyzed as the outcome of the efficient resource allocation decision. It can also be viewed as another form of adjustments or an alternative to other more adjustment in the rural sector. The paper examined the off-farm employment decisions of farmers using household production theory. The empirical results are as expected theoretically and supported by past studies. It was observed that socio-economic variables like age, educational level have the largest impact on off-farm labour participation. The

numbers of underage (below 15 years) and the old (above 65years) family members also have a positive impact on the probability of household head participating in off-farm activities. However, the ratio of off-farm income to total household incomes and remittance income has negative effect on participation.

Several inferences and policy implications can be drawn from the study. One of this is that the general trend to the bimodal farm size distribution will likely continue in the location since it is the middle age cohort of farmers who are most likely to work off-farm, while the oldest farmers will not engage in off-farm work. In order to increase farm income levels, measures such as farm mechanization, better technologies, increasing capital investment and subsidies should be advocated as a means of increasing farm productivity. These measures may increase output and revenue in the short-run but farmers will be made worst off in the long run. This is because of the small size land holdings and limited farm resource, which prevent the efficient use of technology. Besides that, techniques of production are increasingly labour saving, as economies of size for larger operating unit are being exploited to the disadvantages of smaller operations. Therefore, non-farm employment provides an alternative way for some farmers to continue to be active in the labour force.

Mishra and Godwin (1997) in a study of farm income variability and the supply of non-farm labour' observed that farm earnings debt asset holdings were highly variable in the early 1980s, such changes brought about increased variability of farm income and thus have influenced non-farm labour supplies. Schultz (1990) pointed out that non-farm employment is an important means by which farmers and their spouse may attempt to reduce the variance of total income. Recent studies have shown that off-farm employment is influenced by a number of demographic and economic factors. However, limited attention has been given to the role of farm income variability in empirical studies.

Wagnertt and Suidinsky (2000) in estimating the non-farm labour supply in Canada found out that not all farmers participate in non-farm work. Therefore to estimate non-farm labour supply, it is necessary to have wage rates both for farmers who work non-farm and those that did not work non-farm, as well as, the participation level and extent of non-farm labour supply. Also, that this approach is preferred to a single-equation model, since participation and labour supply decisions are made differently.

Goodwin and Holt (2002) evaluated the non-farm labour market for a sample of agrarian households in transition Bulgaria. Particular attention was given to the distributional assumptions that underlie standard approaches to the evaluation of labour supply. They observed that the movement of labour away from the agricultural sector has long been considered to be an important element characterizing the development of an economy. That widespread migration of labour away from agriculture has been realized in nearly all countries, and that such migration is an important characteristic of rural decline in many developing economies.

Canagarajah *et al.* (2001) in non-farm income, gender, and inequality examines how the distribution of earnings in rural Ghana and Uganda differs by income type and by gender. They found out that non-farm earnings contribute to rising inequality, but that lower income groups also benefit due to strong overall growth in non-farm earnings. The inequality-inducing effect is driven by self-employment income; wage income, on the other hand, reduces inequality. The tendency of non-farm income to contribute to inequality is greater among female-headed households for whom self-employment is important and non-farm opportunities more constrained. Determinants of non-farm income are estimated and appear to be strongly related to location, education, age, and distance to market. Estimates of the linkages to agriculture in Ghana are weaker than expected, showing the non-farm sector to be functioning more as an alternative activity to agriculture than as a complement.

Lanjouw and Lanjouw (2001) in a review of the issues of non-farm employment and evidence from developing countries observed that these rural non-farm sectors have traditionally been viewed as a low-productivity sector, which produce low quality goods. That it is often expected to wither away as a country develops. Recent years have seen a shift away from this position towards recognition that the rural non-farm sector can, and often does, contribute to economic growth, rural employment, poverty reduction, and a more spatially balanced population distribution. The paper reviewed the literature on the conceptual and empirical underpinnings of this more recent perspective, focusing on the experience in developing countries. The paper documents the size and heterogeneity of the sector, pointing to evidence that in many countries the sector is expanding rather than declining. The issues associated with measuring the sector's economic contributions are discussed, followed by empirical assessments for several countries and regions. The

distributional impact of non-farm earnings is examined and it is found that a pro-poor impact, while by no means inevitable, can be considerable. The sector's trajectory over time, in different settings, is reviewed and the scope for, and experience of, various policy interventions is discussed.

Lanjouw (2001) in a study of non-farm employment and poverty in rural El Salvador analyzed two complementary data sets to study poverty and the non-farm sector in rural El Salvador. He found out that rural poverty in El Salvador remains acute and significantly higher than in urban areas. While the rural poor are mainly agricultural labourers and marginal farmers, some non-farm activities are also of importance to the poor. In fact, non-farm activities in El Salvador account for a significant share of rural employment and income for both the poor and the non-poor. The poor, on the one hand, were engaged in "last resort" non-farm activities that are not associated with high levels of labour productivity. The non-poor, on the other, were reported to be engaged in productive non-farm activities which are likely to present a potent force for upward mobility. He reported that significant correlates of these high-productivity occupations include education, infrastructure, location, and gender. The study also focused on small-scale rural enterprise activities, and reported that it appears that in El Salvador very few rural enterprises reported utilizing formal credit in setting up their activities. That, in addition, a significant proportion of enterprises is engaged in subcontracting arrangements with some larger, often urban-based firm.

Escobal (2001) while studying the determinants of non-farm income diversification in rural Peru discovered that in Peruvian rural areas, there has been substantial growth over the past decade in household employment outside of own farm. He noted that about 51% of the net income of rural households comes from these off-farm activities, and thus this certainly cannot be considered as "marginal." He noted further, that the reasons households diversify their incomes are several. Access to public assets such as roads and private assets (education and credit) is an important factor in diversification.

Wandschneider (2003) reviewed several studies on determinants of access to non-farm employment in developing countries of Africa and South Asia as well as the Transition Economies. He noted that access to rural non-farm employment (RNFE) is determined by a wide and complex range of factors. These were categorized into three different types:



1. ***Characteristics intrinsic to households and their members***, including the set of assets owned or available to them. He noted that these factors determine the relative ability of households and individuals to exploit existing opportunities in the RNFE; and that unequal asset endowments generate inequitable participation patterns, whereby some manage to engage in non-farm activities as part of an accumulation strategy whereas other remain trapped in low return activities.
2. ***Social institutions and cultural environment***. He noted that social and cultural institutions condition the way different households and individuals are able to benefit from available opportunities in the RNFE.
3. ***Wider environment in rural areas***. He stressed that the natural and economic environment influences the RNFE development potential; and that factors such as on-going processes of agricultural development, natural resource endowments, levels of public investment and service provision, rural town development, economic infrastructure, and the business environment, among others, determine opportunities available to rural economic agents through their impact on local demand levels and patterns and on the comparative and competitive advantage of rural areas and enterprises.

Wandschneider (2003) observed that a significant proportion of rural households and entrepreneurs in the studied regions do not only lack many of the required assets to successfully engage in non-farm employment, but also operate in a relatively adverse environment, characterized by limited opportunities both within and outside the farm economy. Consequently, he concluded that diversification into non-farm economic activities in all studied regions was largely out of necessity (distress-push) rather than as a response to remunerative wage employment and high return business opportunities (demand-pull). He also noted that temporary or permanent out-migration is common – and sometimes widespread – in most case study regions. He posited that migration remittances can constitute a significant source of household income, contributing to the development of the non-farm sector through its impact on local demand levels and available funds for business development. He also noted that skills acquired by migrant workers may also prove useful for the development of non-farm activities.

Matshe and Young (2004) in the study of off-farm labour allocation decisions in small scale rural household in Zimbabwe made use of the double hurdle model to analyze the



off-farm labour decisions of small-scale agricultural household members in the Shamva District of Zimbabwe. The approach permitted the joint modelling of the decision to participate in the labour market and the decision regarding the amount of time allocated to work. Their results indicate that a number of variables (notably, gender, education and assets) indeed have effects which are qualitatively and quantitatively different in terms of participation and hours worked. Overall, their empirical analysis confirmed the importance of individual characteristics (such as gender and education) and household/farm characteristics (e.g. land area accessible to the household, productive assets, remittances and the agricultural terms of trade) in influencing the labour market decisions of rural household members.

Correa *et al.* (2005) study on Paraguay found that female heads of households are more likely to participate in non-farm employment than their male counterpart. Belonging to a large household positively affects the probability of being employed in a non-farm sector, and has a positive and significant effect on the level of non-farm income. Education, measured by years of schooling, is positive and statistically significant both for the probability of access to rural non-farm employment and for level of income. An additional year of schooling increases non-farm income by 6%. The fact that rural non-farm employment constitutes a labour alternative for the younger residents is shown by the negative signs of the coefficients of the age variable. Speaking only Guarani (Paraguay dialect) reduces the probability of being employed in the non-farm sector, as well as reducing the income received in non-farm activities by 31%. Ownership of assets and access to electrical energy service, are not significant in the non-farm income equation, but are statistically significant in the probability of non-farm employment. The ownership of land and the ownership of machinery induce the owners to concentrate their activities on the farm sector rather than in non-farm labour market. Access to electricity increases the probability of non-farm labour participation.

Babatunde and Qaim (2008) analyzing the role of off-farm income diversification for households in rural Nigeria found that almost 90% of all households sampled have at least some off-farm income; on average, off-farm income accounts for 50% of total household income. Sixty-five percent of the households are involved in some type of off-farm employment – 44% in agricultural wage employment, 40% in non-agricultural wage employment, and 50% in self-employed non-farm activities. In fact, self-employed activities

are the dominant source of off-farm income, accounting for almost one-fourth of overall household income. The share of off-farm income is positively correlated with overall income, indicating that the relatively richer households benefit much more from the off-farm sector. Strikingly, the share of off-farm income also increases with farm size, suggesting that there are important complementarities between farm and off-farm income. The econometric analysis shows that households with little productive assets and those who are disadvantaged in terms of education and infrastructure are constrained in their ability to participate in more lucrative off-farm activities.

#### **2.2.1.6 Key Issues Distilled from Literature**

Evidence in literature revealed that livelihood diversification helps to lessen the vulnerability of the poor, provides the basis for building assets, improves the quality and sustainability of natural resources and provides exit routes out of poverty. In attempting to measure the income diversification, most literature, focus on using the number of income sources, share of non-farm income and the diversity indices like Simpson, Ogive, Shannon, and Herfindahl. Most literature on income generating activities of households revealed that the contribution of non-farm income sources has grown in the last two decades and its income share in the total household income ranges between 20 and 60 percent, while income share from agricultural activities is decreasing with time. Most literature put forward arguments in favour of the promotion of the rural non-farm sector due to its provision of employment for growing labour force, slowing the rural urban migration, promoting a more equitable distribution of income and its contribution to poverty alleviation.

Summarily, literature revealed that diversification of income sources into non-farm sector is positively influenced by the wealth status of the household, the education of the head of household, and the participation in formal credit markets. The number of livestock owned and the access to social capital have a positive effect on the overall degree of diversification. Accumulated evidence in literature provide that non-farm income significantly reduce poverty, and among the non-farm income components, non-labour incomes and non-farm self employment incomes were more poverty reducing compared to non-farm wage employment incomes in most developing countries.

Literature provided evidence that poverty incidence is high in Nigeria ranging from 54.4 to 76 percent (IMF, 2005; NBS, 2005; MDGR, 2009; UN Habitat, 2010; UNDP, 2010), fuelled by poor living conditions, inadequate infrastructure, poor management of resources, corruption, low individual motivation, and bad leadership among others. The various policy programmes that have been implemented since late 70s till date in reducing poverty incidence among the populace were broadly classified as income growth, income redistribution, and safety net strategies. Several poverty studies used relative poverty line method in estimating poverty line, while few studies used absolute poverty line method. Foster-Greer-Thorbecke (FGT) class of poverty measures was mostly used by researchers to determine poverty status due to its ability to estimate poverty gap and severity in reaching the poorest.

A neoclassical household model based on utility maximisation is the one most frequently employed in the literature. This basic model was adapted from Huffman (1991) and Lass *et al.* (1991) using the agricultural household model. Probit models were generally employed in most literature to estimate the non-farm labour force participation of the farm household, while Tobit models were used in determining quantity of off-farm labour supplied by farm households, and the level of households' level of income diversification.

Age, age-squared, gender, education and training, on-farm experience, transfer, asset and other incomes, demographic composition of the farm household (household size, dependency ratio), farm size or farm scale, as measured by sales, output, net farm income, farm assets or capital stock, farm type (tree crops, arable crop, livestock and others), on-farm diversification and location characteristics like the distance to town and city, were found to be the major variables included in participation and non-farm labour supply equations, as well as, being the important determinants of those models.

In general, it was observed in the literature that apart from aforementioned factors, the number of non-farm labour hours supplied also depends on the wage rate. This results in sample selection or incidental truncation problem (causing the sample to be non-random). In avoidance of sample selection bias, literature suggested that the estimation must take the sample selection phenomenon into account. This was achieved in most literature by estimating the wage equation using the least square equation, incorporating the inverse mill ratio (IMR) as regressor.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 The Study Area**

The empirical setting for the study consists of farming communities in the southwest geo-political region of Nigeria. The study area is the hometown of the Yorubas consisting of six states: Ekiti, Lagos, Ogun, Ondo, Osun and Oyo. The study through a simple random sampling process selected three states out of the six states, viz: Ogun, Osun and Ekiti.

Yoruba is the main ethnic group in the region, which comprises several dialects. Southwest lies within latitudes  $4^{\circ} - 14^{\circ}\text{N}$  and longitudes  $3^{\circ} - 14^{\circ}\text{E}$  and exhibits the typical tropical climate of averagely high temperature and high relative humidity. The geographical location of southwest Nigeria covers about  $114,271\text{km}^2$  (which is approximately 12 percent of Nigeria's total land mass) with the total human population of 28.61 million (approximately 20.44 percent of the Nigeria's total human population) (NBS, 2006; UN, 2006). Southwest Nigeria is bounded in the North by Kogi and Kwara states, in the East by Edo and Delta states, in the South by the Atlantic Ocean and in the West by Republic of Benin. There are two distinct seasons, namely, the rainy season, which lasts from March/April to October/November, and the dry season, which lasts from October/November of a particular year till March/April of the subsequent year. The temperature is relatively high during the dry season with the mean around  $33^{\circ}\text{C}$ . The harmattan brought in by the hot, dry, northeast trade wind from December - February, has ameliorating effects on the dry season high temperatures. Low temperatures are experienced during the rains, especially between July and August when the temperatures could be as low as  $24^{\circ}\text{C}$ . The distribution of the rainfall varies from about 1000 mm to about 2000 mm.

The south western part of Nigeria has three main types of vegetation, namely, mangrove forest, tropical rain forest and guinea savannah. The tropical rain forest is found mainly in Ogun, Ondo, Ekiti states and some part of Oyo state while the mangrove forest is found mainly in Lagos state and some part of Ogun and Ondo states. Guinea and derived savannah are found mostly in Osun and some part of Oyo and Ogun states.

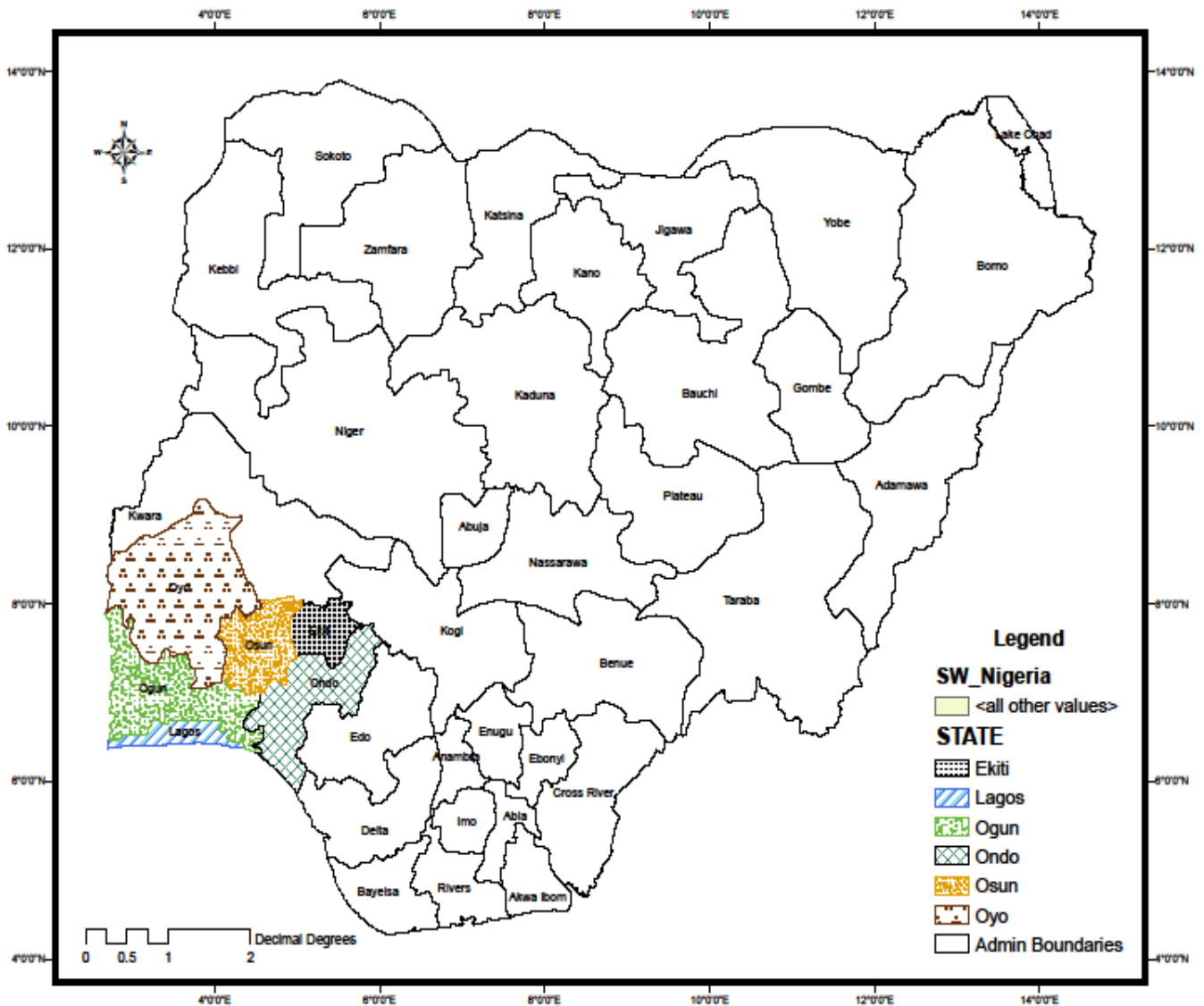
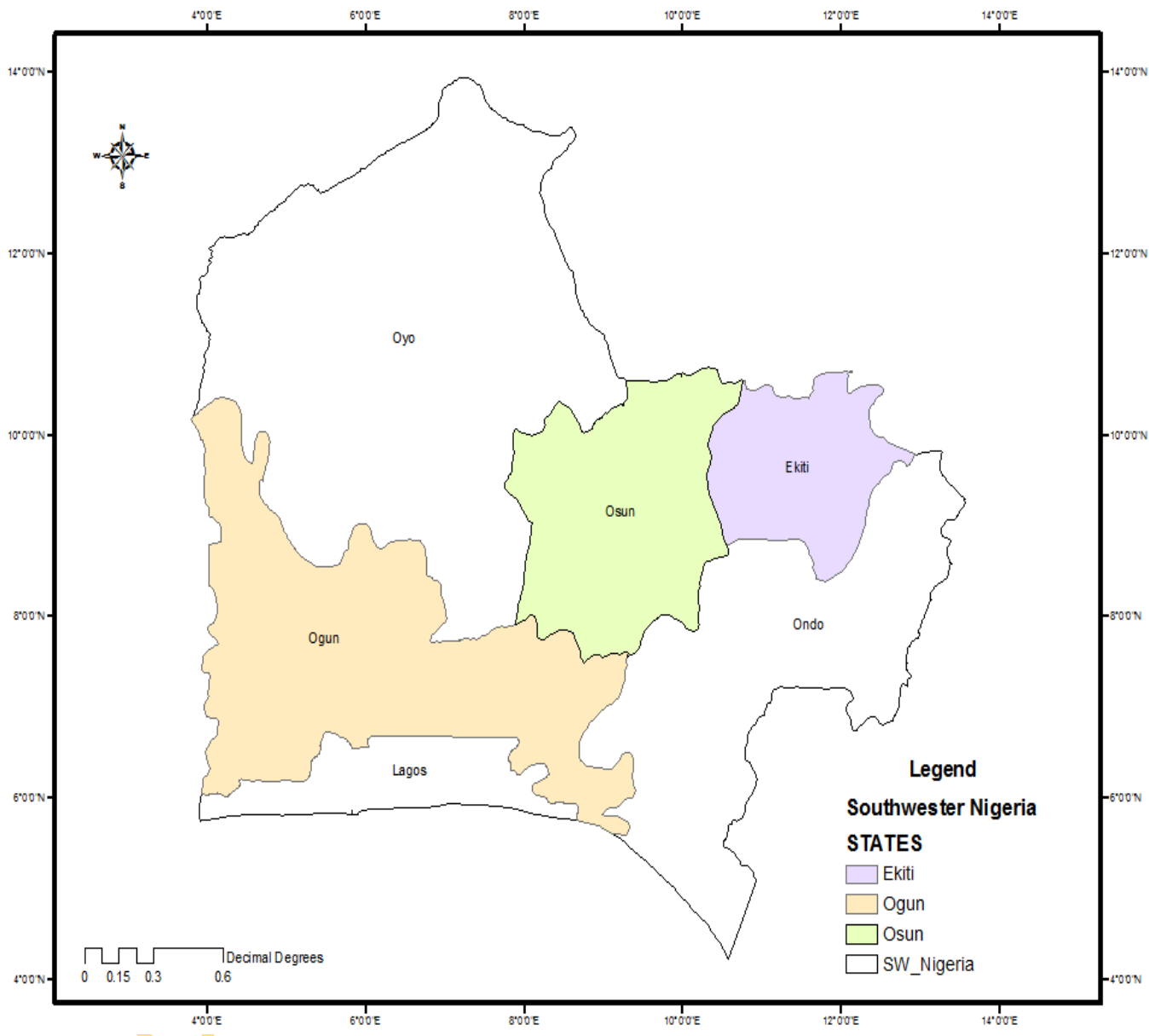


Figure 2: Map of Nigeria showing the Study Area (Southwest Geo-Political Zone) and other States in Nigeria



**Figure 3: Map of Southwest Nigeria Showing the Sampled States**

The natural resource endowment of the region includes land, water, minerals, forest and agricultural resources, through which a wide range of agricultural and forest products, are obtained. Important tree crops such as rubber, cocoa, kolanut, citrus fruits, and palm produce are available in the region. The savannah part of the region produces crops such as tubers, grains, and sugar cane while the coastal areas produce fish abundantly.

### **3.2 Sources and Types of Data**

This study was based on both primary and secondary data. The primary data were obtained in a cross-section survey of rural farm households in the study area. Specifically, pre-tested structured questionnaires were used to elicit information on household characteristics, resource use, costs, outputs and income associated with various farm and non-farm activities as well as on the consumption expenditure and other information of the rural farm households. The data were collected with the help of trained enumerators. The secondary data were collected from various official publications and literature, such as bulletin, annual reports etc.

### **3.3 Sampling Techniques**

Multi-stage sampling technique was employed in selecting a target population of 480 rural farm households from the study area. The first stage entails a simple random selection of three states (Ekiti, Ogun and Osun states) from the six states in the southwest Nigeria.

The second stage of the sampling process involved a random selection of five agricultural zones from the three selected states in stage one (proportional to the number of agricultural zones in each of the selected states). This was followed by a simple random selection of four of the blocks in each selected zone, which allowed 20 agricultural blocks to be randomly selected. Then, three of the cells in each selected of the block in stage three, were randomly picked, thus giving chance for 60 agricultural cells to be randomly selected across the selected agricultural blocks in the fourth stage. The fifth stage entailed purposive selection of two farming communities under each cell. Therefore, four residential buildings were randomly drawn in each farming community but with no more than one farm household purposively interviewed from each residential building (figure 4).

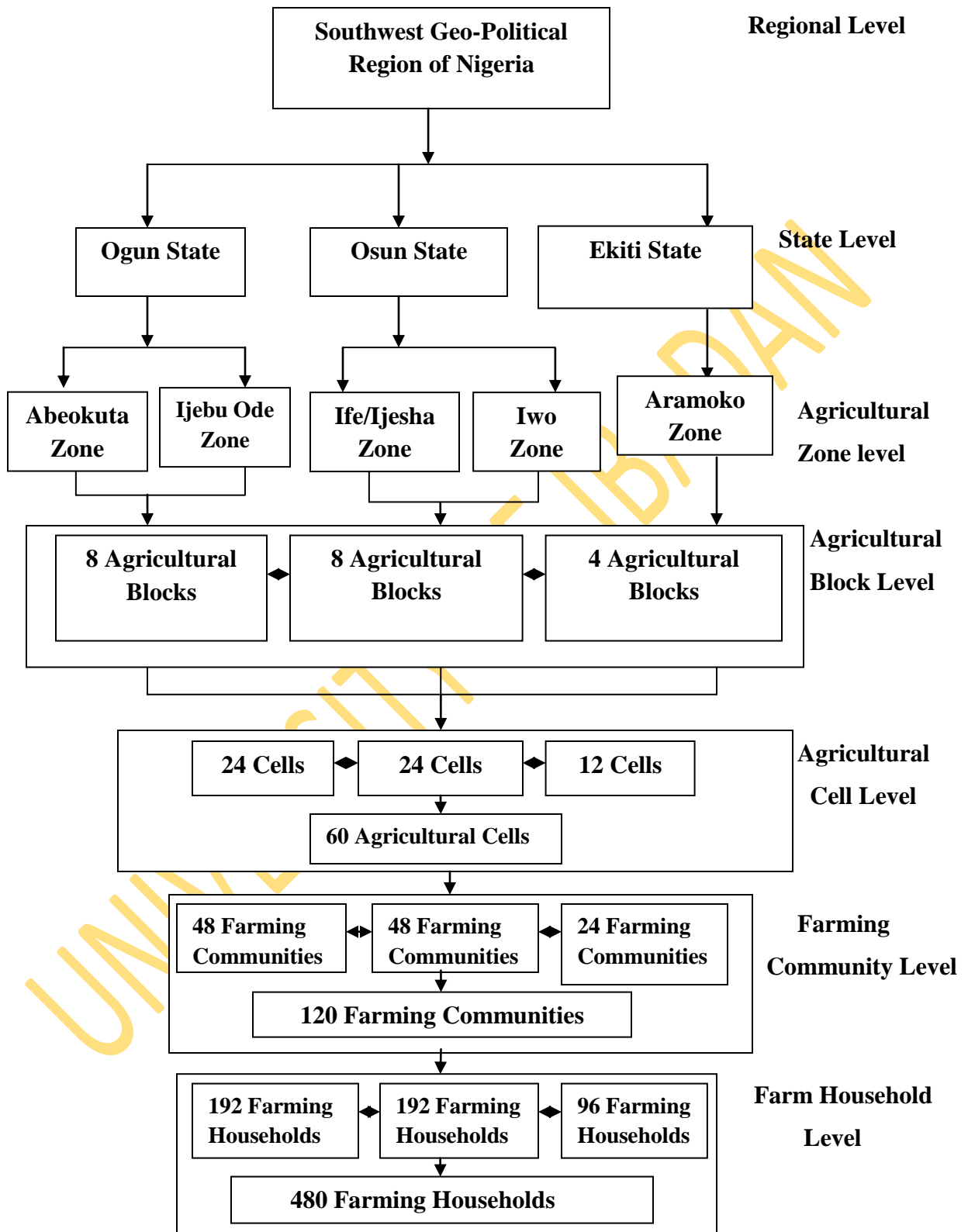


Figure 4: Sampling Techniques Framework for Data Collection



This process yielded 480 rural farm households spread across 120 farming communities in the three states. Out of the 480 questionnaires collected, 411 of them were found useful for subsequent analysis while 69 questionnaires were discarded because of incomplete information.

### 3.4 Methods of Data Analysis

The study employed both descriptive and econometric tools in the analysis of the study data. The descriptive tools used include the construction of simple frequency distributions in describing the socio-economic characteristics of the respondent rural farm households. Summary statistics (mean, standard error of means and percentages for relevant variables in the various econometric models specified) were computed and summarised in simple tables to facilitate a clear discussion of the data and study findings. The specific quantitative tool(s) used for achieving each of the study objectives are presented below.

#### 3.4.1 Level of Livelihood Diversification into Non-Farm Activities by Farm Households

The level of non-farm income diversification strategies adopted by the farm households were tracked by a descriptive analysis of the shares of the respective farm household's income derived from various sources and by the estimation of indices of income diversification based on the Herfindahl index measure, used by Ersado (2006) and Kaija (2007). The diversification index is given as:

$$D = \left[ \sum_{j=1}^n S_j^\alpha \right]^{1/(1-\alpha)} \dots\dots\dots (3.1)$$

Where: D is the diversity index

$S_j$  is the share of income source j

$Y_j$  is total income from source j

$$Y_j = \sum_{j=1}^n Y_j \text{ is total household income per year from all sources; } j = 1,2,3,\dots n.$$

$\alpha$  is the diversity parameter, such that  $\alpha \geq 0$  and  $\alpha \neq 1$

For  $\alpha = 2$ , the index D becomes the inverse of the Herfindahl index which is commonly used as income diversification index. The income diversification index used in the study was defined as the inverse of the Herfindahl index as follows;

$$D = \frac{1}{\sum_{j=1}^n S_j^2} \dots\dots\dots (3.2)$$

For the analysis of income diversification and other purposes, non-farm livelihood options available to the rural farm households were categorised as follows:

- a) **Non-farm investment activities** include investments such as land prospecting (buying and selling), investment in shares, equipment leasing, hire purchase and rental services, remittances, pension etc.). It is also referred to as non-labour investment activities and the income accruing from engagement in such activities are non-labour income.
- b) **Non-farm wage employment** includes full-time or part-time employment in daily, weekly or monthly paid jobs in the public or private sector. This was categorised into skilled and unskilled labour activities as follows:
  - (i) **Unskilled labour employment** includes activities such as employment as night guards, messengers, cleaners, and as casual workers in loading and off-loading, transport conducting, etc; and
  - (ii) **Skilled labour employment** includes activities such as teaching, health services, construction work (i.e. masonry, carpentry, bricklaying) and other skilled work in public and private sector, for as long as the reward to efforts of the referenced participant is by payment of wages.
- c) **Non-farm self employment** comprises non-wage activities such as trading, transport services (vehicles or motorcycles), artisanship or craft work such as mat weaving, handicrafts, pottery, etc.
- d) **Social and Community Services** encompass participation in such social and community services as priesthood, community leadership, cooperative leadership, herbal and spiritual consulting, and other social services, which although are not strictly remunerated by payment of wages / salaries but are often associated with receipts of transfer payments (cash and non-cash income).

The study also analysed the reasons / motivations for farm households' participation in the various livelihood activities. This was done with a view to identifying those that were embarked upon as a coping strategy or for poverty alleviation.

### 3.4.2 Returns to Farm Household Labour Use in Farm and Non-Farm activities

Returns to farm households' labour employed in the various farm and non-farm activities undertaken were analysed by computing and comparing the average wage rates obtained as follows:

- (a) Implicit wage rate in agriculture  
 = 
$$\frac{\text{Farm revenue less cost of materials and hired labour}}{\text{Total household labour (mandays) supplied to farm activities}}$$
- (b) Wage rates in non-farm wage employments  
 = 
$$\frac{\text{Total income from non-farm wage employment}}{\text{Total household labour (mandays) supplied for non-farm wage employment}}$$
- (c) Implicit wage rate in non-farm self employments  
 = 
$$\frac{\text{Net income from non-farm self employment}}{\text{Total household labour (mandays) supplied for non-farm self employment}}$$
- (d) Implicit wage rate in social and community services  
 = 
$$\frac{\text{Total value of cash and non cash receipts from social services}}{\text{Total household labour (mandays) supplied for social services}}$$

The rates of returns (or wage rates) in various farm and non-farm activities undertaken by the poor and the non-poor farm households were compared by conducting t-tests of differences between two means. Similar tests were also conducted to compare wage rates received from farming activities with what obtains in various non-farm activities. For the purpose of illustration, the null and alternative hypotheses in such tests are as follows:

$$H_0: \mu_1 = \mu_2$$

$$H_a: \mu_1 \neq \mu_2$$

The test statistic is student t-distribution. The critical value is  $t_{1-\alpha/2; n_1+n_2-2}$ , while the calculated t-value was computed as follows:

$$t_c = \frac{\bar{W}_j - \bar{W}_0}{\sqrt{\frac{s_j^2}{n_j} + \frac{s_0^2}{n_0}}} \dots\dots\dots (3.3)$$

Where:

$\bar{W}_j$  = is the mean wage rate (₦/manday) in the  $j^{\text{th}}$  non-farm activity ( $j = 1, 2, \dots, 5$ );

$\bar{W}_0$  = is the mean implicit wage rate in (₦/manday) farm activities;

$s_j^2$  = variance of wage rate in the  $j^{\text{th}}$  non-farm activity;

$s_0^2$  = variance of implicit wage rate in farm activities;

$n_j^2$  = number of households involved in the  $j^{\text{th}}$  non-farm activity.

$n_0^2$  = number of households involved in farm activity.

The null hypothesis of no significant difference between the two means is rejected if  $|t_c| > t_{1-\alpha/2; n-1}$ ; otherwise we fail to reject  $H_0$ .

### 3.4.3 Determinants of Income Diversification into Non-Farm Activities

Determinants of non-farm income diversification was analysed from two perceptive: viz, Non-farm resource allocation and overall household income diversification both estimated at the household level. The study analysed the determinants of non-farm resource allocation to various categories of non-farm activities by the individual farm household. This is essentially a two-stage decision process: (1) decision to participate, and (2) decision as to what amount of resources to be allocated (extent or level of participation). The overall household income diversification was also targeted via a two-stage decision process, which aimed at assessing the influence of various socio-economic factors on the extent of non-farm income diversification adopted by each household and the income share of various non-farm activities.

#### 3.4.3.1 Non-farm Resource Allocation Model

Following the standard practice in related studies (e.g. Corral and Reardon, 2001; Lanjouw, 2001; Serra *et al.*, 2005; and Babatunde and Qaim, 2008), the participation issue was addressed by fitting a probit model (equation 3.4) to the relevant data for the entire sample, while the problem relating to the amount of household resources allocated to the specific activity (or the extent of participation) was addressed by fitting a set of Tobit regression model (equation 3.6) separately to the data for only those households that claimed that they normally participate in each of the identified activities (Woldenhanna and Oskam, 2001; Matshe and Young, 2004). The Tobit model was considered the most appropriate,

because some households that are active participants in specified activity may not participate during the period covered by the survey because of the prevailing relative wage rates, pressure from farm work and many other possible factors. The specification of the models is as below.

**(a) Probit model of Participation in Non-farm Activities**

$$\{P_{ij}^* = \alpha X_i + \varepsilon_i, P_{ij} = 1(P_{ij}^* > 0)\} \dots\dots\dots (3.4)$$

where  $P_{ij}^*$  is a non-observed continuous latent variable and  $P_{ij}$  is an observed binary variable, equal to 1 if the household participates in the non-farm activity;  $X_i$  is a vector of the independent variables affecting participation; and  $\varepsilon_i$  is unobserved term following a bivariate normal distribution. Following Matshe and Young (2004), the Probit model is defined as:

$$\Pr(p_i \neq 0/x_i) = \varepsilon(x_i\alpha), \dots\dots\dots (3.5)$$

Where  $x_i$  is the vector of the explanatory variables,  $\varepsilon_i$  is the standard cumulative normal with mean of zero and variance 1 while  $(x_i\alpha)$  is the probit index.

**(b) Tobit model of Extent of Resource Allocated to Non-farm Activities**

$$L_{ij} = \beta' X_i + \varepsilon_i; \quad \varepsilon_i \sim N(0, \sigma^2) \dots\dots\dots (3.6)$$

Where:

$P_{ij}$  is the vector of variables indicating the  $i^{th}$  household's participation or otherwise in the  $j^{th}$  non-farm activity ( $P_{ij} = 1$ , if household participates in any of the following non-farm activities: non-farm unskilled labour wage employment, non-farm skilled labour wage employment, non-farm self employment, and social / community service; and  $P_{ij} = 0$  if otherwise.

$L_{ij}$  is the vector of variables indicating the amount of resources devoted to the  $j^{th}$  non-farm activity by the  $i^{th}$  household. This is labour supply share (mandays per month) for each non-farm activity equation.

- $X_i =$  is the vector of explanatory variables, including:
- $X_1 =$  Age of the Household head (years)
- $X_2 =$  Age of the Household head squared
- $X_3 =$  Gender of the Household head (1 if female; 0 otherwise)

- $X_4$  = Education level of the Household head (Number of years spent in school)
- $X_5$  = Marital status of the household head (Single =1; 0 otherwise)
- $X_6$  = Single parenthood by the household head (Yes = 1; 0 otherwise)
- $X_7$  = Nativity of the household head (native = 1; 0 otherwise)
- $X_8$  = Household size (Number of person)
- $X_9$  = Dependency Ratio (Number of non-working members/ total household size)
- $X_{10}$  = Poverty Status of the household (Poor = 1; 0 otherwise)
- $X_{11}$  = Per capita landholding of the household, measured as the total area of land per economically active member of the farm household (Ha / worker).
- $X_{12}$  = Per capita investment, measured as the total household asset income per economically active member of the farm household (₦/ worker)
- $X_{13}$  = Per capita animal wealth, measured as the total household worth of animal income per economically active member of the farm household (₦/ worker)
- $X_{14}$  = Farm Labour supply (manday)
- $X_{15}$  = Amount of credit accessed during the production season (₦)
- $X_{16j}$  = Wage rate in the  $j^{\text{th}}$  non-farm activity relative to the implicit wage rate in agriculture ( $W_j/W_0$ ).
- $X_{17}$  = Connection to National Electricity Grid (1 if connected and 0 if otherwise)
- $X_{18}$  = Access road to the nearest urban centre (1 if there is good access road; 0 if otherwise)
- $X_{19}$  = Availability of public source of water within the residence community (1 if available; 0 if otherwise)
- $X_{20}$  = Availability of public health services within the residence community (1 if available; 0 if otherwise)
- $X_{21}$  = Location dummy for farm household head being from Ekiti state (1 if from Ekiti state; 0 if otherwise).
- $X_{22}$  = Location dummy for farm household head being from Osun state (1 if from Osun state; 0 if otherwise).

Note that the dummy variable for Ogun state was dropped in the estimation to avoid singularity of the design matrix; therefore, Ogun state is used as the referenced state

$\epsilon_j$  = stochastic residual term in the  $j^{\text{th}}$  participation equation

*A priori*, it is expected that coefficients associated with the relative wage rate, education and access to social infrastructure will be positive, given that evidence in literature suggests that these variables enhance access to non-farm activities and/or compel poor farm households to seek employment outside agriculture. On the contrary, however, parameters of other variables (with the exception of gender and location dummies, which may take on any signs) are expected to be negative.

Considering the fact that some of the right hand side variables in equation (3.6) above, in particular wage rates, might be endogenous (Lass *et al.*, 1991), their observed values were not included directly in the participation and resource allocation equations. Following Woldenhanna and Oskam (2001), the observed non-farm wage rates will be replaced with predicted values obtained from wage equation as specified in equations (3.7) below.

**(c) Wage Equation**

The following linear stochastic relation is posited for the wage equation following Melmed-Sanjak and Santiago (1996) and Woldenhanna and Oskam (2001).

$$W_i = \gamma_0 + \gamma_i Z_i + U_i, \quad U_i \sim N(0, \sigma_e) \quad \dots\dots\dots (3.7)$$

$W_i$  is observed if  $P_i = 1$

Where:

$W_{ij}$  = Wage rate in the  $j^{th}$  non-farm activity: - non-farm unskilled labour wage employment, non-farm skilled labour wage employment, non-farm self employment, and social/community service

$Z_i$  is the vector of the explanatory variables in the wage equation, including

$Z_1$  = Age of the household member that involved in the  $j^{th}$  non-farm activity (years)

$Z_2$  = Age of the household member that involved in the  $j^{th}$  non-farm activity squared

$Z_3$  = Gender of the household member that involved in the  $j^{th}$  non-farm activity (1 if female; 0 otherwise)

$Z_4$  = Education level of the household member that involved in the  $j^{th}$  non-farm activity (Number of years spent in school)

$Z_5$  = Household size (Number of persons)

- $Z_6$  = Per capita investment, measured as the total household asset income per economically active member of the farm household (₦/ worker)
- $Z_7$  = Labour supply to the  $j^{\text{th}}$  non-farm activity (Hours of labour)
- $Z_8$  = Income Diversification index using Herfindahl index (equation 3.2)
- $Z_9$  = Connection to National Electricity Grid (1 if connected; and 0 if otherwise)
- $Z_{10}$  = Distance to the nearest urban town, measured in kilometre (Km)
- $Z_{11}$  = Availability of public source of water within the residence community (1 if available; 0 if otherwise)
- $Z_{12}$  = Availability of public health services within the residence community (1 if available; 0 if otherwise)
- $Z_{13}$  = Location dummy for farm household being from Ekiti state (1 if from Ekiti state; 0 if otherwise).
- $Z_{14}$  = Location dummy for farm household being from Osun state (1 if from Osun state; 0 if otherwise)
- $U_i$  = stochastic residual term in the wage equation

These equations were estimated using the SHAZAM and LIMDEP econometric software.

#### **3.4.3.2 Overall Household Income Diversification Model**

The overall household income diversification was analysed at two stages. The two-stage analysis was done mainly to quantify the level of income diversification at the household level. Specifically, the determinants of income share derived from each non-farm activity were analysed at the first stage while the determinants of the level of household income diversification (i.e. overall diversity) were analysed at the second stage. Following from Ersado (2006) and Kaija (2007), both equations were estimated using the Tobit models. Tobit model assumes that all zeros are attributable to standard corner solutions. As such, zero observations are accounted for and the censored regression provides a more accurate estimation (Wooldridge, 2002).

##### **(a) Determinants of Income Share**

The Tobit model for the analysis of the determinants of income share takes the following specifications:



$$y_i^* = \beta L_i + \mu_i \quad \mu_i \sim N(0, \sigma^2) \quad \dots\dots\dots (3.8)$$

$$y_i = \max(0, y_i^*), \quad y_i = y_i^* \quad \text{if } y_i^* > 0$$

$$y_i = 0$$

**(b) Determinants of Households' Income Diversification**

The Tobit model for the analysis of the determinants of households' income diversification takes the following specifications:

$$D_i^* = \beta L_i + \mu_i \quad \mu_i \sim N(0, \sigma^2) \quad \dots\dots\dots (3.9)$$

$$D_i = \max(1, D_i^*), \quad D_i = D_i^* \quad \text{if } D_i^* > 1$$

$$D_i = 1$$

Where  $L_i$  is the explanatory variable,  $\mu_i$  is the standard cumulative normal with mean of zero and variance  $\sigma^2$ . Where  $D_i$  = Income Diversification (Inverse of the Herfindahl index values, representing the income diversification index, where  $D_i$  is  $\geq 1$ ; as provided in equation 3.2),

$y_i^*$  = Income share of the  $j^{\text{th}}$  non-farm activity in total income

$L_i$  = Vector of exogenous explanatory variables, including:

$L_1$  = Age of the household head (years)

$L_2$  = Gender of the household head (1 if female; 0 otherwise)

$L_3$  = Education level of the household head, (the number of years of formal schooling)

$L_4$  = Dummy variable for a Single person household head (1 if Single, and 0 if otherwise)

$L_5$  = Dummy variable for Single parenthood (1 if only one parent is present and 0 if otherwise)

$L_6$  = Experience of the Household Head in the specific activity (years)

$L_7$  = Nativity of the household head (1 if a native of the community, 0 if otherwise)

$L_8$  = Household size (Number of persons)

$L_9$  = Dependency Ratio (Number of non-working members/ total household size)

$L_{10}$  = Amount of credit accessed during the production season (₦)

$L_{11}$  = Household owns a House (yes =1; 0 otherwise)

$L_{12}$  = Per capita landholding of the household, measured as the total area of land per economically active member of the farm household (Ha / worker).

- L<sub>13</sub> = Per capita investment, measured as the total household asset income per economically active member of the farm household (₦/ worker)
- L<sub>14</sub> = Per capita animal wealth, measured as the total household worth of animal income per economically active member of the farm household (₦/ worker)
- L<sub>15</sub> = Proportion of land devoted to tree crops (Ha)
- L<sub>16</sub> = Connection to National Electricity Grid (1 if connected and 0 if otherwise)
- L<sub>17</sub> = Availability of public source of water within the residence community (1 if available; 0 if otherwise)
- L<sub>18</sub> = Availability of public health services within the residence community (1 if available; 0 if otherwise)
- L<sub>19</sub> = Distance to the nearest urban centre, measured in kilometre (km)
- L<sub>20</sub> = Location dummy for farm household being from Ekiti state (1 if from Ekiti state; 0 if otherwise).
- L<sub>21</sub> = Location dummy for farm household being from Osun state (1 if from Osun state; 0 if otherwise).
- μ<sub>i</sub> = stochastic residual term

#### 3.4.4 Poverty level among rural farm households

The level of poverty among the sampled farm households and its variation across various socio-economic groups were determined by computing the Foster *et al.* (1984) FGT weighted poverty measures and comparing these across socio-economic groups following the standard methodology used in Greeley (1994), Foday-Lamin (1996), Gibson (2001) and Mukherjee and Benson (2003). The FGT measure is defined as:

$$P_{\alpha}(y, z) = \frac{1}{n} \sum_{i=1}^q \left( \frac{Z - y_i}{Z} \right)^{\alpha} \dots\dots\dots (3.10)$$

Where; n = total number of households in the population

q = the number of poor households

Z = an absolute poverty line, defined as an estimated per caput cost of a basket of food and non-food consumption, required to supply an average member of the farm household the daily dietary calorie requirement necessary to live an healthy life (at

Adult equivalent) as defined by FAO/WHO/UNU (2008); and a 20% mark-up for non-dietary food expenditure.

$y_i$  = Household per capita expenditure

$\alpha$  = Poverty aversion parameter and takes on value 0, 1, 2

When  $\alpha = 0$  in FGT, the expression reduces to

$$P_0 = \left(\frac{1}{n}\right)q = \left(\frac{q}{n}\right) \dots\dots\dots (3.11)$$

This is called the Headcount Ratio (or Poverty incidence) describing the proportion of the population that falls below the poverty line.

When  $\alpha = 1$  in FGT, the expression reduces to

$$P_1 = \frac{1}{n} \sum_{i=1}^q \left( \frac{Z - y_i}{Z} \right) \dots\dots\dots (3.12)$$

and this is called the Poverty Gap (or depth of poverty)

When  $\alpha = 2$  in FGT, the expression becomes

$$P_2 = \frac{1}{n} \sum_{i=1}^q \left( \frac{Z - y_i}{Z} \right)^2 \dots\dots\dots (3.13)$$

This is called Poverty Severity Index. This index weighs the poverty of the poorest individual more heavily than those just slightly below the poverty line. It adds to the Poverty Gap ratio an element of unequal distribution of the poorest household's income below the poverty line.

### 3.4.5 Effects of Diversification into Non-Farm activities on Household Poverty

The influence of diversification of household resources into various non-farm activities on households' poverty status was estimated, so as to establish the linkage between household income diversification and household poverty status. Similar analysis was carried out by Datt *et al.* (2000), Mukherjee and Benson (2003) and Malek and Usaim (2010). Probit model was used to establish the linkage between household diversification into non-farm activities and poverty. Probit model was considered appropriate because the dependent variable is a qualitative one indicating an outcome in one of two categories, that is, whether the rural farm household is poor or non-poor (the dependent variable is a 0-1 dummy).

### 3.4.5.1 Probit Model of Household Poverty

$$Pov_i = P_0 = Q_i\beta + e_i \quad \dots\dots\dots (3.14)$$

Where

$$\{P_0^* = Q_i\beta + e_i\} \quad P_0 = 1(P_0^* > 0) \quad \dots\dots\dots (3.15)$$

Where  $P_0^*$  is a non-observed continuous latent variable and  $P_0$  is an observed binary variable, equal to 1 if the household is poor (fall below the poverty line);  $Q_i$  is a vector of the independent variables affecting household poverty; and  $e_i$  is unobserved term following a bivariate normal distribution. The Probit model is defined as:

$$\Pr(p_i \neq 0/q_i) = e(q_i b), \quad \dots\dots\dots (3.16)$$

Where  $Q_i$  is the vector of the explanatory variables (i.e.  $Q_1$  to  $Q_{26}$ ),  $e_i$  is the standard cumulative normal with mean zero and variance 1 while  $(q_i b)$  is the probit index.

Where;

- $P_0$  = Poverty status of the  $i^{\text{th}}$  household (1 if poor, 0 otherwise)
- $Q_i$  = Set of explanatory variables that include:
  - $Q_1$  = Age of the household head (years)
  - $Q_2$  = Gender of the household head (1 if female; 0 otherwise)
  - $Q_3$  = Educational level of household head (Number of years spent in school)
  - $Q_4$  = Marital status of the household head (Single =1; 0 otherwise)
  - $Q_5$  = Single parenthood by the household head (Yes = 1; 0 otherwise)
  - $Q_6$  = Nativity of the household head (1 if a native of the community, 0 if otherwise)
  - $Q_7$  = Household size (Number of person)
  - $Q_8$  = Dependency Ratio (Number of non-working members/ total Household size)
  - $Q_9$  = Amount of credit accessed during the production season (₦)
  - $Q_{10}$  = Per capita landholding of the household, measured as the total area of land per economically active member of the farm household (Ha/ worker).
  - $Q_{11}$  = Per capita investment, measured as the total household asset income per economically active member of the farm household (₦/ worker)
  - $Q_{12}$  = Per capita animal wealth, measured as the total household worth of animal income per economically active member of the farm household (₦/ worker)
  - $Q_{13}$  = Proportion of land devoted to tree crops (Ha)

- Q<sub>14</sub> = Household owns a House (yes =1; 0 otherwise)
- Q<sub>15</sub> = Diversification within the Farm (Farm Diversification index)
- Q<sub>16</sub> = Diversification within the Non-Farm (Non-farm Diversification index)
- Q<sub>17</sub> = Participation in Non-farm Unskilled Labour Wage Employment (yes =1; 0 otherwise)
- Q<sub>18</sub> = Participation in Non-farm Skilled Labour Wage Employment (yes =1; 0 otherwise)
- Q<sub>19</sub> = Participation in Non-farm Self-Employment (yes =1; 0 otherwise)
- Q<sub>20</sub> = Participation in Social and Community Services (yes =1; 0 otherwise)
- Q<sub>21</sub> = Connection to National Electricity Grid (1 if connected; 0 if otherwise)
- Q<sub>22</sub> = Access road to the nearest urban centre (1 if there is good access road; 0 if otherwise)
- Q<sub>23</sub> = Availability of public source of water within the residence community (1 if available; 0 if otherwise)
- Q<sub>24</sub> = Availability of public health services within the residence community (1 if available; 0 if otherwise)
- Q<sub>25</sub> = Location dummy for farm household being from Ekiti state (1 if from Ekiti state; 0 if otherwise).
- Q<sub>26</sub> = Location dummy for farm household being from Osun state (1 if from Osun state; 0 if otherwise).
- e<sub>j</sub> = The stochastic residual terms

## CHAPTER FOUR

### 4.0 DESCRIPTIVE RESULTS ON FARM HOUSEHOLDS NON-FARM ACTIVITIES AND POVERTY

This chapter presents the results of the descriptive analyses carried out in the study. The data analyzed were obtained from south western region of Nigeria. Results revealed the state of farm households in relation to income diversification and poverty.

#### 4.1 Socio – Economic Characteristics of the Sampled Farm Households.

This section presents the description of the socio-economic characteristics of the selected farm households in southwest Nigeria.

##### 4.1.1 Socio-Demographic Characteristics of the Heads of Farm Households.

The head of a household is expected to influence the lives, well-being and choice of decisions made by the members of the household. Consequently, livelihood outcomes, household's choice and well-being depend mostly on the personal characteristics of the household head.

Table 1 shows the personal characteristics of the household heads in the study area. The Table revealed that 61.1 percent of the sampled farm households' heads in the study area were between 41 and 60 years of age. It further revealed that 83.7 percent were males and 89.3 percent of household heads were married.

In the study area, 87.3 percent of the household heads had at least primary school education with as much as 13.6 percent having some form of tertiary education. Also, majority (57.9%) had farming as their main occupation but as much as 42.1% of the heads of rural farm households were involved in non-farm activities as their major occupation.

This confirms evidence in Okali *et al.* (2001), Awoyemi (2004), Babatunde and Quaim (2008) among others that shows that involvement in non-farm activities is growing in importance among farm households in Nigeria. Also, majority (84.2%) of the household heads have been involved in farming occupation for over 10 years.

**Table 1: Distribution of Sampled Households by Personal Characteristics of Household Heads**

Description	Data of Sampled Farm Households in Southwest	
	Frequency	Percentage (%)
<b>Age of Household Heads (years)</b>		
30 or less	14	3.4
31-40	77	18.7
41-50	119	29
51-60	132	32.1
Above 60	69	16.8
Total	411	100
<b>Mean Age</b>	<b>49.9</b>	
<b>Gender of Household Heads</b>		
Male	344	83.7
Female	67	16.3
Total	411	100
<b>Educational Level of Household Heads</b>		
No formal	52	12.7
Primary	141	34.3
Secondary	162	39.4
Tertiary	56	13.6
Total	411	100
<b>Mean year of formal schooling</b>	<b>8.8</b>	
<b>Main Occupation of Household Heads</b>		
Farming	238	57.9
Trading	54	13.1
Artisan	27	6.6
Paid employment	52	12.7
Transportation	35	8.5
Others	5	1.2
Total	411	100
<b>Farming Experience of Household Heads</b>		
1 – 10	65	15.8
11 – 20	132	32.1
21-30	121	29.4
31-40	78	19
Above 40	15	3.7
Total	411	100
<b>Mean Years of Farming Experience</b>	<b>21.4</b>	
<b>Marital Status of Household Head</b>		
Single	19	4.6
Married	367	89.3
Widow	14	3.4
Separated	11	2.7
Total	411	100

*Source: Field Survey, 2009.*

The results also revealed that the mean age, education and farming experience of household heads across the whole study area are 49.9 years, 8.8 years and 21.4 years respectively. These indicate that they are still within the active labour force age bracket but with low level of education (in line with UNESCO, 2007) and high average length of farming experience.

#### **4.1.2 Socio-Economic Characteristics of the Sampled Farm Households**

Households' composition is an important factor to consider in the analyses of rural farm households pursuit of economic activities, most especially as this factor determines the availability of labour for household's economic pursuit (Enete *et al.*, 2005).

Table 2 revealed that 45.7 percent of the households were non-native of the farming communities surveyed. Majority (87.9 percent) of the rural farm households in the sample were made up of 4-9 members with an average of seven persons per household. A typical farm household in the sample was dominated by dependants, with the dependency ratio being 0.69. However, an average household in the sample had two members who participate, either on full-time or part-time basis in the income generation activities of the farm households. Generally, this implies that on average 31 percent (average of 2.10 income-earner members out of mean household size of 6.78) of the farm household members contributed economically to the household income.

Considering the type of residential building, ownership of residential building and the type of toilet facility in the building as welfare indicators for the household, evidence in Table 2 shows that 56 percent of the households lived in brick and mud type houses with 59.4 percent of such houses owned by the household heads or their spouses. Moreover, 14.6 percent of the houses had no toilet facility while 74 percent had the pit latrine toilet facility.



**Table 2: Distribution of Sampled Farm Households by Household Characteristics**

<b>Description</b>	<b>Data of Sampled Farm Households in Southwest</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Nativity of Household Heads</b>		
Non-native (of the community)	188	45.7
Native (of the community)	223	54.3
Total	411	100.0
<b>Household Size in Number</b>		
1-3	26	6.3
4-6	188	45.7
7-9	153	37.2
10 or more	44	10.7
Total	411	100
<b>Mean Household size</b>	<b>6.78</b>	
<b>Number of Income-Earner Members of the Household</b>		
Only one	79	19.2
Two members	213	51.8
Three or more members	119	29.0
Total	411	100
<b>Mean Number of Workers</b>	<b>2.10</b>	
<b>Mean Dependency ratio</b>	<b>0.69</b>	
<b>Type of Residential Building</b>		
Block house	181	44.0
Brick	57	13.9
Mud	173	42.1
Total	411	100.0
<b>Owner of Residential Building</b>		
Head and/or spouse	244	59.4
Extended Family	60	14.6
Rented Apartment	100	24.3
Others	7	1.7
Total	411	100.0
<b>Available Toilet Facility in the Household</b>		
None	60	14.6
Pit Latrine	304	74.0
Water Closet	47	11.4
Total	411	100.0

*Source: Field Survey, 2009.*

#### 4.1.3 Community Infrastructure for the Sampled Rural Farm Households

Access to social amenities like electricity, pipe-borne water and health services are not only important to improve the livelihood status of the rural people, they also play crucial roles particularly in determining economic opportunities and productivity (Davis *et al.*, 2007). Table 3 summarized the access of the rural farm households to various social amenities in their communities.

In terms of the access roads, results in Table 3 showed that majority (98.3 percent) of the sampled farm households in the study area have their communities linked up to other communities in the Local Government Area (LGA) by one type of road or another. However, most of these roads were either not tarred (60.6 percent) or were not in good state (12.2 percent). Considering the importance of access roads to smooth transportation of farm produce from farming communities to urban markets, this rather poor state of access roads to majority of farm households in the study area may have implications on their production and marketing costs. With reference to electricity, portable water and postal facility, the results revealed that 86.4 percent of the sampled farming communities were connected to the national electricity grid, implying that there is opportunity for value-adding non-farm activities or agro-processing that needed electric power.

The results further revealed that 7.3 percent of the sampled farming communities depend on pipe borne water for drinking purpose while the remaining 92.7 percent had their water source from stream, borehole or both sources of water. Postal facilities were however lacking in most of the sampled farming communities. About 39 percent of the respondents that affirmed the presence of postal agency or post office, however, reported their non-functional state thus limiting speedy communication.

Communication is an important (integral) part of social welfare which when available usually complementary the postal service. The results in Table 3 revealed that 97.3 percent of the sampled farming communities had access to at least one Global System of Mobile telecommunication (GSM) network coverage. Suffice to add that most of the communities with access to GSM service enjoy positive externalities (i.e. coverage) from the nearby telecom masts located in semi-urban communities.

**Table 3: Community Infrastructure Available for the Sampled Farm Households**

Description	Data of Sampled Farm Households in Southwest	
	Frequency	Percentage (%)
<b>Access road to the Community</b>		
Non motorable	7	1.7
Un-tarred but motorable	249	60.6
Tarred but not in good state	50	12.2
Tarred and in good state	105	25.5
Total	411	100.0
<b>Available source of electricity</b>		
Not linked to national Grid	56	13.6
Link to national Grid	355	86.4
Total	411	100.0
<b>Source of Drinking Water to the Household</b>		
Stream	99	24.1
Borehole	161	39.2
Borehole & stream	121	29.4
Pipe-borne water	30	7.3
Total	411	100
<b>Available Postal Facility in the Community</b>		
None	252	61.3
Postal Office	21	5.1
Post Agency	138	33.6
Total	411	100.0
<b>Available GSM Network Coverage</b>		
None	11	2.7
One network	42	10.2
At least two networks	358	87.1
Total	411	100.0
<b>Highest Level of health facilities within 4km radius</b>		
None	52	12.7
Govt. Health Centre	64	15.6
Govt. Maternity Centre	118	28.7
General Hospital	177	43.1
Total	411	100.0
<b>Highest Level of Education facilities within 5km radius</b>		
None	25	6.1
Nursery /Primary	123	29.9
Secondary	227	55.2
Tertiary	31	7.5
Others	5	1.2
Total	411	100.0

*Source: Field Survey, 2009.*

Furthermore, 87.3 percent of the sampled rural farm households enjoy access to health facilities, viz; public health / maternity centre or general hospital, which are within 4km radius of their residence/ communities. About 13 percent of the residence/ communities, however, have no access to any health facility.

Given the importance of education to household welfare and rural development, availability of functional educational facilities within the rural areas can help to satisfy the aspiration of the people, while absence of such facilities may encourage rural-urban migration. The results in Table 3 revealed that 6.1 percent of the sampled farming communities did not have any form of school (education facility) within 5km radius while 55.2 had secondary schools as the highest educational facility available within 5km radius of the resident communities. This finding lends credence to the earlier finding of low level of education (8.8 years, on the average) among sampled households' heads.

#### **4.1.4 Farm and Non-Farm Assets Endowments of the Sampled Rural Farm Households**

Activities undertaken by people depend, to a large extent, on ownership of assets. Table 4 shows the size and structure of the household farms in terms of ownership of (and/or access to) physical and social capital.

The Table 4 revealed that 70.1 percent of sampled farm households have access to at least one hectare of land. The mean farm size per household in the whole study area was found to be 2.14 Ha  $\pm$  0.09. About two-thirds (66.9 percent) of the sampled farm households had some portions of their farm lands devoted to tree crops production while 78.1 percent of the sampled farm households did not diversify into livestock husbandry.

The mean share of the tree crops holding per household and the mean flock size per household were 0.41 Ha  $\pm$  0.01 and 0.04  $\pm$  0.01, respectively. This suggests that less than 50 percent of farm size for a typical rural farm household is devoted to tree crops production, while the size of livestock ownership per household was meagre. These findings have strong implications for rural farm households' incomes and well-being. In term of shares of non-farm labour activities and asset-based income in the total income of the household, 30.7 percent of the sampled rural farm households had less than 40 percent of their income from non-farm activities while 25.5 percent had 60 percent of their income from this income source.

**Table 4: Distribution of Farm Households by Social and Physical Capital Endowment**

Description	Data of Sampled Farm Households in Southwest	
	Frequency	Percentage (%)
<b>Farm Size (Ha)</b>		
Below 1.0	123	29.9
1.0 - < 3.0	192	46.7
≥ 3.0	96	23.4
Total	411	100.0
<b>Mean</b>		<b>2.14 (0.09)</b>
<b>Availability of Tree Crop Farm</b>		
None	136	33.1
Owned	275	66.9
Total	411	100.0
<b>Mean Share</b>		<b>0.41 (0.01)</b>
<b>Raised Livestock</b>		
No livestock	321	78.1
Raised livestock	90	21.9
Total	411	100.0
<b>Mean Share</b>		<b>0.04 (0.006)</b>
<b>Share of Non-Farm Labour Sources in Income</b>		
Negligible	39	9.5
Below 40%	126	30.7
40-60%	141	34.3
Above 60%	105	25.5
Total	411	100.0
<b>Mean Share</b>		<b>0.45 (0.012)</b>
<b>Share of Asset-Based Sources in Income</b>		
Negligible	125	30.4
Below 25%	123	29.9
25 - < 50%	124	30.2
≥50%	39	9.5
Total	411	100.0
<b>Mean Share</b>		<b>0.22 (0.009)</b>

*Source: Field Survey, 2009.*

*Figures in parentheses are mean errors.*

However, 39.7 percent of the sampled farm households had investment assets that provided at least 25 percent of their income while 30.4 percent received little or no income from ownership of investment assets. The implication here is that, the more of these supplementing income sources, the more the probability of having higher income in the household (and hence, the less the probability of being poor).

The mean share of non-farm labour activities of the household and the mean asset-based income in the total income of the household were  $0.45 \pm 0.012$  and  $0.22 \pm 0.009$ , respectively. This suggests that non-farm labour activities constituted about 45 percent of the labour activities of the household while asset-based income made-up to 22 percent of the household total income on average.

#### **4.2 Level of Diversification into Non-farm Livelihood Activities by Farm Households**

This section presents the various livelihoods opportunities available to rural farm households outside farming. The livelihood opportunities were evaluated in terms of the income shares of various farm and non-farm sources, and the overall income diversification index. Supplemental economic activities have the potentials of guaranteeing households' access to additional incomes, smoothing of consumption and improving risk management, particularly where farm production is not sufficient to safeguard food security. Suffice to add that incomes from these various livelihood activities often constitute important sources for financing land acquisition, and the purchase of farm inputs and food (Ruben and Van den Berg, 2001).

Evidence in literature reveals that personal characteristics of the household heads (like level of education and gender), household characteristics (like household size and landholding) and social infrastructures (like electricity) play significant roles in the choice of livelihood activities undertaken by households and its members, most especially for non-farm employment (Wandschneider, 2003; Araujo, 2004; Hossain, 2004; Davis *et al.*, 2009; Malek and Usami, 2009; Stifel, 2010). Thus, this study examined the influence of these characteristics in the household's choice or involvement in non-farm livelihood activities, with a view to establishing its conformity or divergence from other evidence in literature.

In the study area (i.e. Southwest Nigeria), various income-generating livelihoods activities were identified among the members of the rural farm households apart from their involvement in various farming activities. Due to the long list of these activities, the identified livelihood activities were categorized into two broad groups, viz; the farm and non-farm sectors. The sectors were further categorised and defined as in sections 2.1.1.5 and 3.4.2.

#### 4.2.1 Non-farm Livelihood Activities and Personal Characteristics of the Household Heads

Table 5 summarized the mean percentages of rural farm households' involvement in non-farm livelihood activities available within the farming communities surveyed.

The Table 5 below revealed that 94.89 percent of the rural farm households in Southwest Nigeria had their members engaged in non-farm livelihood activities, with most farm households (81.27%) having their members involved in non-farm self employment activities while only 18 percent of the farm households had their members involved in skilled labour wage employment activities. Table 5 further presents the distribution of rural farm households' participation in non-farm livelihood activities by the household heads' personal characteristics.

The results revealed that non-farm unskilled labour livelihood activities' involvement was most noticed among the rural farm households whose heads were male (18.25%), between the age brackets of 51-60 years (7.30%), had primary school education (10.46%), married head (20.92%) and had farming as the main occupation (13.87%). Non-farm skilled labour livelihood activities' involvement was most noticed among the rural farm households whose heads were male (15.09%), between the age brackets of 51-60 years (7.06%), had primary school education (6.81%), married head (15.57%) and had farming as the main occupation (10.22%).

Further evidence in Table 5 revealed that non-farm self employment activities involvement was most noticed among the rural farm households whose heads were male (68.61%), between the age brackets of 51-60 years (26.76%), had secondary school education (32.36%), married head (73.72%) and had farming as main occupation (46.72%).

The same result was obtained for social and community service livelihood activity except in the case of age, where this activity (social and community service livelihood activities) was most noticed among the rural farm households whose heads were between the age brackets of 31-40 years (2.92%). Generally, farm households' involvement in non-farm livelihood activities was most noticed among households whose heads were male (79.32%), between the age brackets of 51-60 years (30.90%), had secondary school education (36.50%), married head (85.16%) and had farming as the main occupation (55.72%).

**Table 5: Distribution Patterns of Rural Farm Households' Participation in Non-farm Activities by Households Heads Personal characteristics**

Characteristics	Non-farm Livelihood activities available to the rural farm households				
	NFUL	NFSL	NFSE	SCS	Total
Variables	%	%	%	%	%
<b>Sample Average</b>	<b>22.87</b>	<b>18.00</b>	<b>81.27</b>	<b>8.76</b>	<b>94.89</b>
<b>Age of the Household Head (Years)</b>					
≤ 30	0.24	0.73	3.16	0.00	3.16
31 – 40	4.62	2.43	14.60	2.92	17.52
41 – 50	4.87	5.84	23.11	2.43	27.01
51 – 60	7.30	7.06	26.76	2.43	30.90
> 60	5.84	1.95	13.63	0.97	16.30
<b>F value</b>	<b>2.57**</b>	<b>1.28</b>	<b>0.58</b>	<b>1.72</b>	<b>0.70</b>
<b>Gender of the Household Head</b>					
Male	18.25	15.09	68.61	7.06	79.32
Female	4.62	2.92	12.65	1.70	15.57
<b>F value</b>	<b>1.36</b>	<b>0.00</b>	<b>0.70</b>	<b>0.28</b>	<b>0.07</b>
<b>Educational Status of the Household Head</b>					
No formal	3.89	1.46	10.95	0.24	12.65
Primary	10.46	6.81	26.52	2.43	32.60
Secondary	6.57	6.08	32.36	4.38	36.50
Tertiary	1.95	3.65	11.44	1.70	13.14
<b>F value</b>	<b>4.21***</b>	<b>1.82</b>	<b>0.91</b>	<b>1.89</b>	<b>1.62</b>
<b>Marital Status of the Household Head</b>					
Single	0.49	1.46	3.16	0.97	4.14
Married	20.92	15.57	73.72	7.06	85.16
Widowed	0.97	0.49	2.92	0.00	3.16
Exmarried(separated)	0.49	0.49	1.46	0.73	2.43
<b>F value</b>	<b>0.70</b>	<b>0.86</b>	<b>2.63*</b>	<b>3.38**</b>	<b>0.60</b>
<b>Farming Experience of the Household Head (Years)</b>					
1 – 10	2.43	3.65	12.17	2.68	15.09
11 – 20	5.84	6.08	26.52	2.68	29.93
21 – 30	7.79	4.87	24.57	1.95	28.22
31 – 40	5.35	2.43	15.33	1.46	18.25
> 40	1.46	0.97	2.68	0.00	3.41
<b>F value</b>	<b>2.10*</b>	<b>0.89</b>	<b>0.49</b>	<b>1.94</b>	<b>0.35</b>
<b>Main Occupation of the Household Head</b>					
Farming	13.87	10.22	46.72	3.89	55.72
Trading	2.68	2.68	10.22	1.46	12.17
Artisanship	2.19	0.49	5.35	0.97	6.08
Paid Workers	2.19	3.65	10.46	1.95	11.68
Transporters	1.95	0.97	7.30	0.49	8.03
Other Occupation	0.00	0.00	1.22	0.00	1.22
<b>F value</b>	<b>0.88</b>	<b>1.72</b>	<b>0.43</b>	<b>1.32</b>	<b>0.55</b>

*\*, \*\*, \*\*\* indicate significant level at 10, 5, and 1 % respectively.*

**Source: Author's computation from field survey, 2009**



The F-test results revealed that household heads personal characteristics like age, educational level and farming experience were significantly associated with the households' involvement in non-farm unskilled labour activities, while marital status of the farm household heads was significantly associated with the farm households' involvement in both non-farm self employment, and social and community service livelihood activities.

#### **4.2.2 Analysis of Non-farm Livelihood Activities by Farm Household Characteristics and Communal Infrastructures**

This subsection examined the rural farm households' involvement in non-farm livelihood activities based on the household characteristics like ethnicity and household size as well as on the basis of the social infrastructure like electricity. The results are summarized in Table 6.

The results revealed that engagement in non-farm unskilled labour livelihood activities was most noticed among each of the rural farm household categories who were poor (17.76%), natives to the farming communities (13.38%), had landholding size between one and three hectares (10.71%), had two of its members working (10.46%) and had between four and six household members (10.95%). The same non-farm (i.e. unskilled labour) livelihood activities was most noticed among farm households whose communities were linked to electricity grid (18.49%), untarred but with motorable roads (13.14%), had borehole as the water source (11.68%), and had secondary school as the highest available educational institution in the community (11.92%). Similar patterns were noticed for non-farm skilled labour and non-farm self employment livelihood activities involvement by farm households. The only exception was in the area of ethnicity, where involvement in non-farm skilled labour livelihood activities was most noticed among the rural farm households who were non-natives. Thus, when all the non-farm livelihood activities are considered, the same picture of engagement was observed.

Evidence in Table 6 further revealed that involvement in social and community service activities was most noticed among the rural farm households who were poor (6.57%), non-natives of the farm communities (4.62%), had landholding size less than one hectare (4.62%), had two of its members working (4.14%), and had a household size between four and six members (4.38%). This non-farm livelihood activity (i.e. social and community service) was also most noticed among farm households whose communities were linked to electricity grid (7.79%), tarred with and good state roads (3.89%), with borehole and stream water sources (3.16%), and had secondary school as the highest available educational institution in the community (6.57%).

**Table 6: Distribution Patterns of Rural Farm Households' Participation in Non-farm Activities by Household characteristics and Communal Infrastructure**

Characteristics	Non-farm Livelihood activities available to the rural farm households				
	NFUL	NFSL	NFSE	SCS	Total
Variables	%	%	%	%	%
<b>Nativity of the Household</b>					
Non Natives	9.49	10.46	35.52	4.62	42.58
Natives	13.38	7.54	45.74	4.14	52.31
<b>F value</b>	<b>0.89</b>	<b>5.61**</b>	<b>2.97**</b>	<b>0.79</b>	<b>2.33</b>
<b>Size of Household Landholding (Ha)</b>					
≤ 1.0	7.54	5.84	22.14	4.62	27.74
1 – 3	10.71	7.79	39.66	1.95	44.53
> 3	4.62	4.38	19.46	2.19	22.63
<b>F value</b>	<b>0.45</b>	<b>0.23</b>	<b>3.13**</b>	<b>6.13***</b>	<b>1.04</b>
<b>Poverty Status of Household</b>					
Non-Poor	5.11	5.84	18.49	2.19	22.63
Poor	17.76	12.17	62.77	6.57	72.26
<b>F value</b>	<b>0.11</b>	<b>3.92**</b>	<b>0.71</b>	<b>0.04</b>	<b>0.25</b>
<b>Number of Income Earners in the Household</b>					
Only one member	4.87	6.33	15.82	3.65	20.19
Two members	10.46	9.00	43.80	4.14	49.15
≥ 3 members	7.54	2.68	21.65	0.97	25.55
<b>F value</b>	<b>1.40</b>	<b>6.27***</b>	<b>2.74*</b>	<b>5.61***</b>	<b>0.48</b>
<b>Size of the Household</b>					
1- 3	0.97	1.22	5.35	0.00	5.60
4 – 6	10.95	9.49	46.23	4.38	52.31
7 – 9	7.54	6.08	25.30	3.41	30.17
10 – 12	2.68	0.73	3.65	0.49	5.35
≥ 13	0.73	0.49	0.73	0.49	1.46
<b>F value</b>	<b>3.49***</b>	<b>0.36</b>	<b>2.01*</b>	<b>1.97*</b>	<b>0.44</b>
<b>Electricity Facility in the Community</b>					
Not linked	4.38	2.43	11.68	0.97	13.63
Linked	18.49	15.57	69.59	7.79	81.27
<b>F value</b>	<b>3.17*</b>	<b>0.01</b>	<b>0.84</b>	<b>0.21</b>	<b>3.50*</b>
<b>Access Road to the Community</b>					
Non-motorable	0.24	0.00	1.70	0.00	1.70
Un-tarred but motorable	13.14	9.49	53.77	2.43	58.39
Tarred but not in good state	3.65	1.70	9.00	2.43	11.92
Tarred and in good state	5.84	6.81	16.79	3.89	22.87
<b>F value</b>	<b>0.64</b>	<b>2.81**</b>	<b>10.38***</b>	<b>7.34***</b>	<b>2.95**</b>
<b>Water Source in the Community</b>					
Stream	1.46	2.43	6.33	1.22	7.30
Borehole	11.68	5.60	33.09	1.70	37.97
Borehole & stream	3.16	4.62	19.71	3.16	23.60
Pipe-borne water	6.57	5.35	22.14	2.68	26.03
<b>F value</b>	<b>3.34**</b>	<b>2.14*</b>	<b>1.54</b>	<b>2.92**</b>	<b>5.25***</b>
<b>Health facilities within 4km radius of the Community</b>					
None	4.38	2.19	9.25	1.22	12.41
Govt. Health Centre	4.38	2.19	10.46	2.43	14.11
Govt. Maternity Centre	7.06	4.14	24.33	0.97	27.01
General Hospital	7.06	9.49	37.23	4.14	41.36
<b>F value</b>	<b>3.21**</b>	<b>1.22</b>	<b>5.02***</b>	<b>2.78**</b>	<b>1.38</b>
<b>Available Education facilities (schools) within 5Km radius of the Community</b>					
No School	1.22	2.19	4.87	1.22	6.08
Nursery/Primary	8.52	3.41	24.57	0.24	28.47
Secondary	11.92	10.71	44.04	6.57	51.58
Tertiary	0.49	1.70	6.57	0.73	7.54
Others	0.73	0.00	1.22	0.00	1.22
<b>F value</b>	<b>2.83**</b>	<b>2.78**</b>	<b>0.57</b>	<b>4.37***</b>	<b>1.09</b>

Source: Field survey, 2009\*, \*\*, \*\*\* indicate significant level at 10, 5, and 1 % respectively.

The F-test results further revealed that farm households' involvement in non-farm unskilled labour activities were significantly associated with household size, electricity, water source and available health and educational facilities in the community while farm households' involvement in non-farm skilled labour activities were significantly associated with ethnicity, poverty status, number of household income earners, access road, water source and available educational institution in the community. The farm households' involvement in non-farm self employment activities were significantly associated with ethnicity, household landholding size, number of household income earners, household size, access road and available health facilities in the community; while farm households' involvement in social and community service non-farm skilled labour activities were significantly associated with household landholding size, number of household income earners, household size, access road, water source and available health and educational institutions in the community.

#### **4.2.3 Non-farm Livelihood Activities and Rural Farm Households Poverty Outcomes**

The importance of examining the various livelihood activities available to rural farm-households within their immediate abodes in relation to poverty outcomes is to know the relationship between involvement in different non-farm livelihood activities and household poverty status as well as the contribution of these activities to household total income, and hence, well-being. This knowledge is crucial for a better targeting of programmes particularly in alleviating rural poverty.

Table 7 shows the involvement of rural farm households in various non-farm labour activities. The results revealed that 61.81 percent of the rural farm households in the study area were involved in only one non-farm labour activity in addition to farming. Those engaged in non-farm self employment however constituted the largest proportion (52.31%) and they were closely followed by those involved in non-farm unskilled labour activity.

Table 7 further revealed that 30.41 percent of the households combined two different non-farm labour activities to their farming occupation while only 2.67 percent of the households combined three different non-farm labour activities to their farm work. Combination of non-farm unskilled labour activities and non-farm self employment (NFUL and NFSE) was profound (13.87%) among the rural farm households that involved in additional two non-farm activities while the rural farm households that involved in additional three non-farm activities (NFSL, NFSE and SCS), constituted mere 1.70% of the sample.

**Table 7: Distribution of Rural Farm Households by Involvement in Non-farm Labour Activities**

Non-farm Labour Activities	Statistics		Poverty Estimates		
	Freq	%	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
Non-farm Unskilled Labour (NFUL)	26	6.33	0.6923	0.3629	0.2127
Non-farm Skilled Labour (NFSL)	8	1.95	0.7500	0.3921	0.2174
Non-farm Self Employment (NFSE)	215	52.31	0.7814	0.3355	0.1750
Social and Community Service (SCS)	5	1.22	0.8000	0.4075	0.2206
NFUL and NFSL	1	0.24	0.0000	0.0000	0.0000
NFUL and NFSE	57	13.87	0.8246	0.3634	0.1983
NFUL and SCS	7	1.70	0.7143	0.3367	0.1796
NFSL and NFSE	47	11.44	0.6596	0.2503	0.1226
NFSL and SCS	9	2.19	0.6667	0.2388	0.1223
NFSE and SCS	4	0.97	0.7500	0.3501	0.1656
NFUL, NFSL and NFSE	1	0.24	1.0000	0.5564	0.3095
NFUL, NFSL and SCS	3	0.73	1.0000	0.2359	0.0744
NFSL, NFSE and SCS	7	1.70	0.7143	0.4334	0.2941
Non-involvement in Non-farm	21	5.11	0.8095	0.2703	0.1222
Total	411	100.00	0.7640	0.3287	0.1733

Source: Author's computation from field survey, 2009

In term of the poverty estimates, poverty incidence was profound among the households that combined NFUL, NFSL and NFSE activities as well as those that combined NFUL, NFSL and SCS activities along with farming. Households that were involved in NFUL and NFSL had the least poverty incidences. Poverty depths and severity were more profound among households that additionally were involved in SCS only, and NFUL, NFSL and NFSE activities as well as those engaged in NFSL, NFSE and SCS activities in addition to farming but least for households that were additionally involved in NFUL and NFSL activities besides their farm work.

#### **4.2.4 Livelihood Activities Undertaken by Poor and Non-Poor Rural Farm Households**

The rural farm households involved in diverse non-farm livelihood activities, and the level of participation in these activities varied among poor and non-poor households. Based on the poverty status of the rural farm households, participation in farming and non-farm livelihood activities were discussed. Table 8 summarizes the percentage involvement of rural farm households in farming and non-farm livelihood activities by poverty status.

On involvement in farm activities, results show that majority (94.89%) of the rural farm households had their members involved in arable cropping, followed by involvement in tree cropping (61.56%), while involvement in natural resources collection was least (12.41%) among the households. This finding supports Fall and Magnac (2004) in confirming the importance of farming in rural areas. Considering the poor and non-poor farm households', the involvement in farm livelihood activities results revealed that 96.12 percent of the poor rural farm households had their members involved in arable cropping, followed by involvement in tree cropping (59.55%) while involvement in natural resources collection was least (10.51%). Similar pattern was observed for non-poor rural farm households in the study area.

Comparison of the farm livelihood activities between the poor and non-poor farm households revealed that involvements of non-poor farm households' members in all the farm activities were significantly higher than the participation of poor farm households' members, with the exception of arable cropping, where the participation of the poor farm households was significantly higher than the participation of the non-poor farm households ( $p < 0.05$ ).

The results in Table 8 further revealed that as much as 94.9 percent of the rural farm households in Southwest Nigeria had their members engaged in at least one non-farm livelihood activity or the other, with 91.97 percent also engaging in non-labour investment based income sources.

**Table 8: Distribution of Livelihood Activities Undertaken by Poor and Non-Poor Rural Farm Households**

Activities/Employment	Households engaged in Non-farm Activities (%)			t-values
	All Households	Non-poor	Poor	
<b>Farm Activities</b>				
a) Arable cropping	94.89	90.72	96.18	-2.140**
b) Tree Cropping	61.56	68.04	59.55	1.502*
c) Raising Livestock	21.90	30.93	19.11	2.4726***
d) Natural Resources	12.41	18.56	10.51	2.1075***
e) Agro-processing	34.78	41.24	32.80	1.5250*
<b>Non-farm Activities Livelihood Option</b>				
Non-farm unskilled labour (NFUL)	22.87	21.69	23.25	-0.3270
Non-farm skilled labour (NFSL)	18.00	24.74	15.92	1.9804**
Non-farm Self Employment (NFSE)	81.27	78.35	82.17	-0.8404
Social & Community service (SCS)	8.76	9.28	8.60	0.2065
NFUL and NFSL	0.24	1.03	0.00	1.8041*
NFUL and NFSE	13.87	10.31	14.97	-1.1595
NFUL and SCS	1.70	2.06	1.59	0.3116
NFSL and NFSE	11.44	16.49	9.87	1.7940*
NFSL and SCS	2.19	3.09	1.91	0.6940
NFSE and SCS	0.97	1.03	0.96	0.0661
NFUL, NFSL and NFSE	0.24	0.00	0.32	-0.5553
NFUL, NFSL and SCS	0.97	0.00	0.97	-
NFSL, NFSE and SCS	1.70	2.06	1.59	0.3116
Non-Labour Investment	91.97	90.72	92.36	-0.5169
Non-Involvement in Non-farm	5.11	4.12	5.41	-0.5034
Non-farm Involvement (Total)	94.89	95.88	94.59	0.5034

\*, \*\*, \*\*\* indicate that the difference between the means of the two measures (non-poor and poor) is significant at 10, 5, and 1% level respectively.

**Source: Author's computation based on data from field survey, 2009**

The non-farm self employment activities (81.27%) was the dominant non-farm labour income activity among the poor and non-poor households' members, while only 18 percent of the farm households had their members involved in skilled labour wage employment. In terms of the non-farm labour activities, the non-poor rural farm households' members participated more in each of the non-farm self employment, NFSE (78.35%), non-farm skilled labour, NFSL (24.74%), non-farm unskilled labour, NFUL (21.69%), as well as, combined non-farm skilled labour and non-farm self employment, NFSL and NFSE activities (16.49%).

The pattern reflected by the poor rural farm households was quite different from that of the non-poor rural farm households. Poor rural farm household members participated more in non-farm self employment (82.17%), non-farm unskilled labour (23.25%), non-farm skilled labour (15.92%), as well as, combined non-farm unskilled labour and non-farm self employment, NFUL and NFSE activities (14.97%). Interestingly, the proportion of poor farm households participating in non-farm skilled labour (NFSL) was lower than the proportion that participated in non-farm unskilled labour (NFUL) while the reverse was the case with non-poor households. This may be attributed to the need for skill acquisition before entry and rationing in skilled labour wage employment in the labour market.

The comparison of involvement in non-farm livelihood activities by poor and non-poor farm households revealed that level of engagement in NFUL, NFUL and NFSL, and NFSL and NFSE activities were significantly different and higher among the non-poor farm households' members. The significant difference in involvement NFSL activities between the non-poor and poor households may be due to the relative ability of the non-poor households' members to raise fund to acquire the needed skills for participation in NFSL activities. However, the results revealed no significant difference in non-labour investment between poor and non-poor farm households.

#### **4.2.5 Income Share and Diversification among Poor and Non-Poor Rural Farm Households**

Assets, activities and incomes are complementary measures in the study of diversification behaviours. Income, however, constitutes a measure of unique interest because of its clear interpretation as a welfare outcome. Most households do not restrict themselves to a single activity but receive incomes from various sources (Croppenstedt, 2006). Specifically, Table 9 summarized the income level and share of total income derived from various sources by an average rural farm household in the sample.



**Table 9: Income Shares and Diversification level among Poor and Non-poor Rural Farm Households**

Income Sources	Income (₦)	Households Income Share in Total Income			t-values
		All Households	Non-poor	Poor	
<b>Farm livelihood Activities</b>					
Arable Cropping	78321.36	0.1531	0.1148	0.1650	-0.3975
Tree Cropping	55454.19	0.1084	0.1388	0.0991	2.4116***
Livestock Production	1995.12	0.0039	0.0054	0.0034	1.6678*
<b>Household Farm activities</b>	<b>135770.67</b>	<b>0.2654</b>	<b>0.2590</b>	<b>0.2675</b>	<b>1.1962</b>
Natural resource collection	5166.86	0.0101	0.0133	0.0091	0.8697
Agro-processing	27471.31	0.0537	0.0593	0.0519	0.6004
<b>Farm-based activities</b>	<b>32638.17</b>	<b>0.0638</b>	<b>0.0726</b>	<b>0.0610</b>	<b>2.0044**</b>
<b>Total Farm activities</b>	<b>168408.84</b>	<b>0.3292</b>	<b>0.3316</b>	<b>0.3285</b>	<b>1.6775*</b>
<b>Non-Farm Livelihood Activities</b>					
Non-farm Unskilled Labour	35707.58	0.0698	0.0848	0.0652	0.9834
Non-farm Skilled Labour	33456.68	0.0654	0.0516	0.0696	-0.9348
Non-farm Self Employment	144467.36	0.2824	0.2337	0.2974	-2.4360**
Social & Community Service	17239.91	0.0337	0.0497	0.0288	1.6831*
<b>Non-farm labour Activities</b>	<b>230871.53</b>	<b>0.4513</b>	<b>0.4198</b>	<b>0.4610</b>	<b>-2.066**</b>
Non-farm Non-labour Income	112289.61	0.2195	0.2486	0.2105	3.439***
<b>Total Non-farm activities</b>	<b>343161.14</b>	<b>0.6708</b>	<b>0.6684</b>	<b>0.6715</b>	<b>-0.2904</b>
All Income Sources	511569.98	1.0000	1.0000	1.0000	
<b>Income Diversification Level into Farm and Non-farm Sectors</b>					
Farm		1.80	1.86	1.78	1.31
Non-farm		1.17	1.27	1.14	2.35**
<b>Total</b>		<b>2.82</b>	<b>2.76</b>	<b>2.83</b>	<b>2.24**</b>

\*, \*\*, \*\*\* indicate that the difference between the means of the two measures (non-poor and poor) is significant at 10, 5, and 1% level respectively.

Source: Computation from Field Survey, 2009



Results revealed that mean annual gross incomes in the farm and non-farm sectors were ₦168, 408.84 and ₦343, 161.14, respectively, while the total farm household gross (farm and non-farm) income was ₦511, 569.98 per annum. An average farm household in the study area did not restrict itself to a single activity but received incomes from a wide range of sources, with non-farm sources contributing an average of 67 percent of the total income. The income share derived from farm activities summed up to 32.92 percent of the total income with arable cropping producing the largest share of 15.31 percent.

Also, the share of non-farm labour employment in the total non-farm share was 45.13 percent while the non-labour share was 21.95 percent. It is also noteworthy that 42.1 percent (or a sizeable chunk) of the income from non-farm sources (i.e. an average of 28% of total income) were derived from non-farm self employment activities, including artisanship, crafts and trading, among others, while only seven percent of the total rural farm households' income was obtained from urban-type employment or in skilled labour.

In providing preliminary evidence on the likely linkage between patterns of non-farm income diversification and poverty outcomes among rural farm households in the study area, the share of the household income derived from various sources by poor and non-poor farm households were compared. This was achieved by conducting t-tests of difference between means (Table 9). Evidence revealed that the non-poor rural farm households derived the largest proportion of their farm income from tree cropping (0.1388) and this was significantly ( $p < 0.01$ ) higher and different from what was obtained for the poor rural farm households. The poor rural farm households derived the largest proportion of their farm income from arable cropping (0.1650). Likewise, the proportions of income generated from livestock production, farm-based activities and all farm activities in general were significantly ( $p < 0.10$ ) higher for the non-poor farm households than for the poor farm households.

The poor rural farm households derived the largest proportions (i.e. 29.74%) of the total income and 44.29% of the total non-farm income from non-farm self-employment, while only 6.96 percent of the total rural farm households' income, and 10.36% of the non-farm income share were obtained from urban-type employment or in skilled labour.

Further, the poor rural farm households significantly ( $p < 0.05$ ) derived more income share in labour-oriented non-farm income diversification activities than the non-poor farm households. The income shares (29.74% and 46.10%) derived from the non-farm self employment and the non-farm labour activities respectively, among the poor farm households were significantly ( $p < 0.05$ ) higher than what were obtained among the non-poor rural farm households (Table 9).

Furthermore, the non-poor rural farm households derived a significantly ( $p < 0.01$ ) larger share (24.86%) of income from non-labour investment than the poor farm households (21.05%). The result shows that non-farm activities contributed substantially to the rural farm households' income in Southwest Nigeria; and this is in agreement with the findings of Babatunde and Qaim (2008). The results further confirmed that no significant difference in the mean income share from all non-farm income generating activities by poor and non-poor farm households ( $p < 0.05$ ).

Income diversification is the allocation of production assets among different income-generating activities, both farm and non-farm (Abdulai and Crotts, 2001), and it is one of the strategies households employ to minimize household income variability (Niehof, 2004). Table 9 further revealed the income diversification level among poor and non-poor households in both farm and non-farm activities. Income diversification was measured by the inverse of the Herfindahl index. The results revealed that the mean income diversification level across rural households was 2.82. This implies that an average rural farm household in southwest Nigeria was involved in almost three types of income generating activities simultaneously. These activities were however distributed between two sectors, viz; the farm and non-farm sectors. Specifically, on average, a typical rural household was involved in at least two farming activities and one non-farm job.

The diversification indices varied among the non-poor and poor rural farm households, and across the farm and non-farm sectors. The non-poor farm households, on average, had income diversification estimate of 1.86 within the farm sector and 1.27 in the non-farm sector while the poor farm households, on average, had income diversification estimate of 1.78 within the farm sector and 1.14 in the non-farm sector. This implies that both categories of households were involved in two different types of income generating activities within the farm sector and additional to the farm work, at least one type of income generating activity in non-farm sector, simultaneously.

Comparing the income diversification level across the poverty status of households, the results revealed that there was no significant difference between the income diversification level of poor and non-poor rural households in the farm sector, whereas, the income diversification level of non-poor rural households was significantly higher than the income diversification level of poor rural households in the non-farm sector (Table 9). It is however worthy of note that the overall level of income diversification was significantly much higher among the sampled poor households (2.83) than for the non-poor households (2.76) at  $p < 0.05$ .

This suggests that the observed pattern of non-farm diversification is most likely a coping strategy against poverty among the predominantly poor rural-folks in Southwest Nigeria.

#### **4.2.6 Income-Participation Ratios in Rural Farm and Non-farm Activities**

Increased participation in any activity is spurred by income received from such activity. Income-participation ratio of an activity or job depicts or reflects the rate of participation in such activity; that is, whether more or less of such activity will be undertaken. Table 10 summarizes the analysis of income-participation ratios in households' activities by poverty status.

The results revealed that among the farm activities that the rural farm households engaged in, tree cropping brought the highest income share per participation (0.176), followed by arable cropping (0.161) while livestock husbandry reflected the lowest income share per participation. This implies that, the tendency to participate in farm activities is most with tree cropping followed by arable cropping and least with livestock production. The results further revealed that among the non-farm labour activities, social and community service yielded the highest estimate (0.385) of income share/participation ratio, followed by non-farm skilled labour (0.363); while non-farm unskilled labour had the least income share/participation ratio (0.305).

The result further revealed that the income share/participation ratio was higher in non-farm labour, than in the non-labour, activities; thus, suggesting that farm households would be more encouraged participating in the non-farm labour activities than the non-farm non-labour activities because of the relatively higher returns to participation accruable to rural farm households from such activities. Comparing the income share/participation ratio in the farm sector to that of the non-farm sector, results indicate that all the activities in the non-farm sector had more income share/participation estimates than all activities in the farm sector. This implies that, all things being equal (*ceteris paribus*), both poor and non-poor rural farm households would participate given the higher returns in all non-farm activities than any farm activity.

Table 10 further presents the analysis of the income share/participation ratio by poverty outcomes. Evidence revealed that for the non-poor rural households, the income share/participation ratios in farm activities were lesser than those for in non-farm activities; though, this estimate was highest for household involvement in tree cropping (0.204) in the farm sector and also highest for household engagement in social and community service in the non-farm sector.

**Table 10: Income-Participation Ratio in Farm and Non-farm Activities by Poverty Status**

Activities	All Households			Non-Poor Households			Poor Households			t-value (Non-poor & poor)
	Participation %	Income share %	Income share/Participation	Participation %	Income share %	Income share/Participation	Participation %	Income share %	Income share/Participation	
<b>Farm livelihood Activities</b>										
Arable Cropping	94.89	15.31	0.161	90.72	11.48	0.127	96.18	16.50	0.172	-1.913**
Tree Cropping	61.56	10.84	0.176	68.04	13.88	0.204	59.55	9.91	0.166	-1.682*
Livestock Production	21.90	0.39	0.018	30.93	0.54	0.017	19.11	0.34	0.018	-0.996
Natural Resources Collection	12.41	1.01	0.081	18.56	1.33	0.072	10.51	0.91	0.087	-2.091**
Agro-processing	34.78	5.37	0.154	41.24	5.93	0.144	32.80	5.19	0.158	-1.767*
<b>All Farm Activities</b>	<b>100.00</b>	<b>32.92</b>	<b>0.329</b>	<b>100.00</b>	<b>33.16</b>	<b>0.332</b>	<b>100.00</b>	<b>32.85</b>	<b>0.329</b>	<b>0.931</b>
<b>Non-Farm Livelihood Activities</b>										
Non-farm Unskilled Labour	22.87	6.98	0.305	21.69	8.48	0.391	23.25	6.52	0.280	0.242
Non-farm Skilled Labour	18.00	6.54	0.363	24.74	5.16	0.209	15.92	6.96	0.437	-1.715*
Non-farm Self Employment	81.27	28.24	0.347	78.35	23.37	0.298	82.17	29.74	0.362	0.473
Social & Community Service	8.76	3.37	0.385	9.28	4.97	0.536	8.60	2.88	0.335	1.671*
<b>Non-farm labour Activities</b>	<b>94.89</b>	<b>45.13</b>	<b>0.476</b>	<b>95.88</b>	<b>41.98</b>	<b>0.439</b>	<b>94.59</b>	<b>46.10</b>	<b>0.487</b>	<b>0.832</b>
Non-farm Non-labour Income	91.97	21.95	0.239	89.69	24.86	0.277	92.68	21.05	0.227	0.091
<b>All Non-farm activities</b>	<b>94.89</b>	<b>67.08</b>	<b>0.707</b>	<b>95.88</b>	<b>66.84</b>	<b>0.697</b>	<b>94.59</b>	<b>67.15</b>	<b>0.710</b>	<b>1.426</b>

\*, \*\*, \*\*\* indicate that the difference between the means of the two measures (non-poor and poor) is significant at 10, 5, and 1% level respectively.

Source: Computation from Field Survey, 2009

Similar pattern was among the poor rural farm households. The exceptions were that the highest income share/participation ratios were estimated for involvement in arable cropping (0.172) in the farm sector and non-farm skilled labour (0.437) in the non-farm sector.

Comparing the ratio estimates across the farm and non-farm sectors and between the poor and non-poor farm households, the results further revealed that, in the farm sector, income share/participation ratio estimates for poor rural farm households in arable cropping, natural resources gathering, and agro-processing were significantly ( $p < 0.05$ ) higher than those for non-poor rural farm households in similar activities. However, the income share/participation ratio was significantly ( $p < 0.01$ ) higher in tree cropping activity for the non-poor rural farm households than for the poor rural farm households. This suggests that the poor rural farm households significantly received more incomes per participation in arable cropping, natural resources gathering and agro-processing than their non-poor rural farm households' counterpart; thus further signifying higher motivation for participation in these activities by poor rural farm households.

In the non-farm sector, income share/participation ratio in non-farm skilled labour activities was significantly higher for the poor rural farm households than for the non-poor households while the income share/participation ratio in social and community service activities was significantly higher for the non-poor rural farm households than for the poor households ( $p < 0.10$ ).

#### **4.2.7 Rural Farm Households' Labour Allocation Patterns.**

Labour allocation to non-farm income activities depends on the level of participation. Decision to participate and the amount of time allocated to an activity are determined by the same factors. Consequently, those factors that increase the probability of participation also increase the number of periods (i.e. hour/Manday/workday) worked (Matshe and Young, 2004). Table 11 empirical the evidence on participation, and average number of workdays devoted per year to farm and non-farm activities among the economically active members of the sampled farm households.

The participation level of rural farm households in various farm and non-farm income generating activities have been examined in sub sections 4.3.2 and 4.3.6. The households in the study sample were farm households who spent most of their time (workdays) on household farms supplying basically family labour, and these workdays were allocated among arable, tree crop and livestock production.

**Table 11: Rural Farm Households' Labour Supply and Returns**

DESCRIPTION	Households whose members were involved		Household Labour Supplied (Workdays/year)			Household Income from Activity (₦/year)			
	No	%	Mean	SEM	%	Mean	SEM	%LABOUR	%ALL
<b>FARM ACTIVITIES</b>									
Arable crop production	390	94.9				78,321.36	4,024.03	16.39	12.9
Tree crop production	253	61.6				55,454.19	6,399.08	15.87	12.5
Livestock production	90	21.9				1,995.12	291.30	0.38	0.3
<b>Sub-total: Household Farm</b>	<b>411</b>	<b>100</b>	<b>128.14</b>	<b>6.07</b>	<b>27.0</b>	<b>135,770.67</b>	<b>8,765.51</b>	<b>32.64</b>	<b>25.8</b>
Natural resource exploration	51	12.4	4.67	0.94	1.0	5,166.86	1,497.04	1.30	1.0
Agro-processing	143	34.8	12.33	2.10	2.6	27,471.31	3,532.34	8.33	6.6
<b>Total, Farm Activities</b>	<b>411</b>	<b>100</b>	<b>145.14</b>	<b>6.58</b>	<b>30.6</b>	<b>168,408.84</b>	<b>11,776.60</b>	<b>42.27</b>	<b>33.4</b>
<b>Non-Farm Activities</b>									
Non-farm Unskilled Labour Wage Employment	94	22.9	45.76	5.18	9.6	35,707.58	5,455.81	11.58	9.1
Non-farm Skilled Labour Wage Employment	74	18.0	40.97	4.72	8.6	33,456.68	4,479.96	9.79	7.7
Non-farm Self Employment	334	81.3	235.74	9.46	49.7	144,467.36	7,896.21	30.25	23.9
Social & Community Services	36	8.8	7.08	1.64	1.5	17,239.91	3,414.23	6.11	4.8
<b>Total, Non-Farm Labour Activities</b>	<b>390</b>	<b>94.9</b>	<b>329.55</b>	<b>9.61</b>	<b>69.4</b>	<b>230,871.53</b>	<b>11,714.17</b>	<b>57.73</b>	<b>45.6</b>
Total, Labour Based Activities (farm & Non-farm)	411	100	474.69	10.39	100.0	399,280.37	17,042.25	100.00	78.9
<b>Non Labour Investment</b>	<b>378</b>	<b>92.0</b>				<b>112,289.61</b>	<b>6,885.37</b>		<b>21.1</b>
<b>Grand Total, All Income Sources</b>	<b>411</b>	<b>100</b>				<b>511,569.98</b>	<b>18,675.58</b>		<b>100.0</b>

**Economically active members for the sample = 855**

*Source: Computation from Field Survey, 2009*

Note: one workday is defined as eight hours of labour efforts devoted to income generating activity (Shittu, 2008)

Besides the mixed labour allocation pattern among various farm enterprises, an average of 474.69 workdays/per year were supplied by all economically active members of rural farm households on all (farm and non-farm) labour-based activities (Table 11).

About 27 percent (or 128.14 workdays of the total workdays per year) were allotted to the performance of household farm activities (arable, tree and livestock productions), while 3.6 percent (or 17 workdays) per year, on average were allotted to other farm based activities (Table 11). In all, farm activities consumed 145.14 workdays/year of the family labour, which formed 30.6 percent of the family labour shared among all (farm and non-farm) labour-based activities.

In the non-farm sector, self employment got the highest share of total workdays/year (i.e. 49.7 percent or 235.74 workdays/year) followed by unskilled labour wage employment (9.6 percent of total share) while the social and community service had the least (7.08 workday/year or 1.5 percent of the total share). Overall, 329.55 workdays/year were supplied by the economically active members of the rural households. This constituted 69.4 percent of the available workdays/year by a typical farm household. Alternatively put thus, 94.9 percent of the households had their members participating in non-farm activities, supplying 69.4 percent share of the total workday/year available for use in labour-based activities.

Table 11 further provides information on the percentage of the economically active members of the rural farm households that supplied their labour to various activities. Evidence revealed that 57.73 percent (i.e. 494 out of 855 economically active households' members) participated in one non-farm activity or the other, with households' involvement in non-farm self employment showing the highest share (30.25 percent), followed by households' engagement in non-farm unskilled labour wage employment (11.58 percent).

Also, 361 (i.e. 42.27%) economically active members of the sampled rural farm households participated in farming activities with arable cropping having the highest share (16.39%), followed by tree crop production (15.87%) and livestock production indicating the least share (0.83%). This result suggests that economically active members of rural farm households took advantage of non-farm employment, particularly as supplemental income sources.

#### **4.2.8 Motivations for Households' Participation in various Livelihood Activities**

In a farm household economy with perfect markets, individual/household is willing to participate in non-farm work as long as the marginal value of farm labour (or reservation wage) is less than the non-farm wage rate (Woldenhanna and Oskan, 2001).



**Table 12: Reason for Participating in non-farm work as livelihood Options**

Reasons	Households		Individual	
	Frequency	Percentage	Frequency	Percentage
To augment farm income	293	67.72	251	29.36
Farming cannot absorb all the available labour time	126	29.03	402	47.02
Employment and Job opportunity arises	253	58.45	664	77.66
Less work to do on farm	81	18.62	132	15.44
Little land to cultivate	184	42.47	482	56.37
Labour needed non-farm	91	21.01	153	17.89
Wage attractive	137	31.70	314	36.73
Money is needed urgently/Quick way of making money, credit constraint	185	42.65	521	60.94
Required skilled/capital/license /certificate	61	14.18	186	21.75
Non-farm have lucrative incentives	72	16.72	243	28.42
Just do not want to work non-farm	18	4.21	43	5.02
Others	198	45.64	683	79.88

**Source: Computation from Field Survey, 2009**

*Note: Numbers do not add up to 100% because more than one answer was allowed.*



Table 12 summarizes the reasons for participating in non-farm activities either as farm household or as an individual member of the household. The result shows that farm households and individual members have different reasons for participating in non-farm work. Most households (67.72 percent) were involved in non-farm work in order to augment their farm income while 42.65 percent perceived non-farm work as a quick avenue for making money particularly when money is needed. About 58.45 percent of the households got involved in non-farm job when opportunities were noticed in the sector while 42.47 percent of households whose members were involved in non-farm work adduced the reason of little land that cannot go round the economically active members of the household. About 46 percent of households whose members were involved in non-farm work, however, said that they had other reasons for working non-farm.

At the individual level, 77.66 percent of the economically active members perceived non-farm work as a form of job opportunity for them. Further, 60.94 percent of them were involved in non-farm work because it was a quick source of employment especially the unskilled non-farm employment type; while 21.75 percent were involved due to in-built job protection in terms of skill, capital and license requirements for entry. Furthermore, 47.02 percent of the individuals that were involved did so because farming could not absorb all the available labour time; yet 29.36 percent were involved in non-farm work in order to augment their farm income; while 56.37 percent of them were involved because of land constraint (Table 12).

### **4.3 Returns to Farm Households Labour Use in Farm and Non-Farm Activities**

This section considers the returns to farm households' labour employed in various farm and non-farm activities. This is to indirectly establish the reasons for participation in such non-farm activities as members or households in rural farm communities.

#### **4.3.1 Returns to Farm and Non-farm Activities by Poverty Status of Rural Farm Households.**

Level of labour supply is a function of the incentives the household faces, in particular, the relative returns and risks of farm and non-farm activities (Corral and Reardon, 2001). Similarly, the decision whether or not to participate in non-farm an employment as a farm household depends on a comparison of the market wage rate and the reservation wage. Table 13 summarizes the various wage rates associated with farm and non-farm activities in the study area.

**Table 13: Wage Rates Received by Poor and Non-poor households in Farm and Non-farm Activities**

<b>Activities</b>	<b>All Households</b>	<b>Non-poor Households</b>	<b>Poor Households</b>	<b>t-values</b>
<b>Farm Activities</b>				
Household farming	1378.39	1582.40	1315.37	1.818*
Natural Resources	1428.02	1242.99	1530.11	-0.7204
Agro processing	4553.15	4675.37	4523.89	0.5973
All farm activities	1773.35	2182.58	1646.93	2.3197**
<b>Non-Farm Activities</b>				
Non-farm unskilled labour	1045.34	1033.60	1050.07	0.9815
Non-farm skilled labour wage employment	993.65	1018.56	987.84	0.7952
Non-farm self Employment	789.27	884.86	759.74	1.1926
Social and community service	1464.62	1623.54	1341.01	1.845*
All Non-Farm Activities	877.98	944.75	856.78	1.027
All labour Activities (Both Farm and Non-farm sectors)	1164.95	1646.48	1016.20	4.132**

*\*, \*\*, \*\*\* indicate that the difference between the means of the two measures (non-poor and poor) is significant at 10, 5, and 1% level respectively.*

**Source: Author's Computation from Survey Data, 2009**

Considering the rural farm households' farm activities, wage rate associated with agro-processing indicated the highest value (₦4, 553.15), followed by return to labour in natural resources (₦1, 428.02), while the return to labour on the household farm was the lowest (₦1, 378.39), among all farm activities. The average return to farm activities in the study area was ₦1, 773.35.

The return to labour in non-farm activities as a whole for the entire sample was ₦877.98. Decomposing the non-farm activities into specific categories, return to labour in social and community service was highest (₦1464.62), followed by non-farm unskilled labour wage employment (₦1045.34) while return to non-farm self employment was the lowest (₦789.27) among all the non-farm activities.

The results revealed that the wage rates received by poor households in household farming, and all farm activities were significantly lower in values ( $p < 0.10$ ) than those received by the non-poor households in the same activities. The only exception was wage rates received in natural resources by poor households (₦1530.11), which was higher than that got by non-poor households; although but the difference in wage rates was not significantly different from zero at  $p < 0.10$ .

The results further revealed that the average return to non-farm activities engaged in by poor households was ₦856.78 while for non-poor households was ₦944.75. Decomposing further, the wage rates received by the poor households in the non-farm activities were lower in value than those for the non-poor households with the exception of non-farm unskilled labour.

Also, the wage rates were not significantly different between the poor and non-poor rural farm households, with the exception of the wage rates received in social and community service by non-poor households (₦1623.54), which was significantly higher in value than the wage rates for poor households. The results further revealed that wage rate received in all labour activities by non-poor rural farm households was significantly higher than what was obtained by the poor households in the same activity at  $p < 0.01$ .

In order to compare whether the wage rates in non-farm activities are different from what obtains in the farm sector, the tests of difference of means were computed. Table 14 summarizes the results of the statistical tests of the difference in means of these wage rates across farm and non-farm sector for the southwest Nigeria.

**Table 14: Test of Difference of means for wage rates in Farm and Non-Farm Activities by Poverty Status**

Comparison Activities	Difference of means tests between Farm and Non-farm Wage Rates			Difference of means tests between Poor and Non-poor Households Farm and Non-farm Wage Rates		
	Means Diff.	Std. Error Diff.	t-values	Mean Diff. among Non-poor Households	Mean Diff. among Poor Households	t-values
<b>Household farm wage versus wages from various non-farm activities</b>						
wHHfarm VS wNFUL	1139.31	68.34	16.670***	1294.69	1091.31	1.272
wHHfarm VS wNFSL	1199.48	66.41	18.063***	1435.39	1126.61	2.087**
wHHfarm VS wNFSE	589.12	76.81	7.670***	697.53	555.63	0.935
wHHfarm VS wSCS	1321.37	65.14	20.285***	1465.23	1276.93	1.244
wHHfarm VS wNon-farm	545.27	76.83	7.097***	666.87	507.71	1.069
<b>Total farm wage versus wages from various non-farm activities</b>						
wfarm VS wNFUL	1534.27	102.35	14.991***	1894.88	1422.87	1.990**
wfarm VS wNFSL	1594.45	101.06	15.777***	2035.58	1458.17	2.539***
wfarm VS wNFSE	984.08	108.18	9.0964***	1297.72	887.19	1.878*
wfarm VS wSCS	1716.33	100.24	17.123***	2065.42	1608.49	1.962**
wfarm VS wNon-farm	940.23	108.20	8.690***	1267.06	839.27	1.961**

\*, \*\*, \*\*\* indicate that the difference between the means of the two measures (non-poor and poor) is significant at 10, 5, and 1% level respectively.

Source: Author's computation from survey data, 2009.

The results revealed that the wage rate received from household farm was significantly different and higher than that obtained in any of the non-farm activities at  $p < 0.01$ . Also, when household farm wage was compared with the wage rate received from the combination of all non-farm activities, the results revealed that household farm wage rate was significantly different and higher than the wage rate obtained from all non-farm activities.

Furthermore, wage rates received from farm activities were statistically different from those obtained in any non-farm activities, as well as, the wage rate received from the non-farm activities in general at  $p < 0.01$ . Based on these results, the null hypothesis (i.e. wage rates in non-farm activities engaged in by rural farm households are not significantly different from what obtains in the farm sector) was rejected. Thus, the results confirmed that wage rates in farm activities were significantly higher and different from what obtained in the non-farm activities among the rural farm households.

Empirical evidence in the study thus suggests that rural farm households worked in non-farm sector, while holding to farm work, to supplement the household incomes from the farm. This further supports the position that the wage rate that determines households' participation in non-farm activities depends on several factors (Woldenhanna and Oskam, 2001).

Statistical tests were conducted too to know whether the wage rates received by the poor and non-poor rural farm households in non-farm activities were different from what were obtained in the farm sector. Table 14 summarizes the results of the difference of means tests. The results revealed that the wage rates received in household farm activities were not significantly different from what were obtained in all other non-farm activities among the poor and non-poor rural farm households. The exception was for non-farm skilled labour, where the wage rate received in household farm was significantly higher than what was obtained in non-farm skilled labour among the rural poor and non-poor farm households at  $p < 0.05$ .

The results further revealed that the wage rates received by the non-poor rural farm households in all farm activities were higher and significantly different from what were obtained by the poor rural farm households in all other non-farm activities at  $p < 0.05$ . The results confirmed that the wage rate received on farm activities as a whole was significantly higher than what was obtained on non-farm activities as a whole.

## CHAPTER FIVE

### 5.0 QUANTITATIVE RESULTS ON FARM HOUSEHOLDS NON-FARM ACTIVITIES AND POVERTY

This chapter presents the results of various quantitative analyses carried out in pursuit of the study objectives. Results revealed the state of farm households in relation to income diversification, poverty and synergy between non-farm income diversification and households' poverty.

#### 5.1 Determinants of Diversification into Non-Farm Activities

Determinants of non-farm income diversification were analysed from two perspectives: viz; non-farm resource allocation and overall household income diversification with both analysed at the household level. The determinants of non-farm resource allocation to various categories of non-farm activities by the individual farm household were analysed via a two-stage decision process: (1) decision to participate, and (2) decision as to what amount of resources to be allocated (extent or level of participation).

Also, the overall household income diversification was analysed via a two-stage decision process, viz; (1) determinants of income shares, and (2) determinants of income diversification using the result of the inverse of Herfindahl index provided in details in sub-section 3.4.2.

##### 5.1.1 Rural Farm Households' Participation in Non-Farm Activities

Analysis of the determinants of non-farm resource allocation by the rural farm households started with the examination of the factors necessitating households' participation in non-farm activities. The regression specification for this general model is the probit regression.

Probit regressions explaining individual household participation in non-farm activities were expressed and the marginal effects were reported (Lanjouw, 2001; Coral and Reardon, 2001; Babatunde and Qaim (2008). Separate equations were estimated for each category of non-farm activities. Also, each equation incorporated proxies for incentives and capacity variables represented in individual household characteristics, access to public infrastructure and state or location (taking Ogun State as benchmark or reference state). Table 15 summarizes the probit results.

The results revealed that age, age squared, gender, single-parent, and educational level of the household heads were the socio-economic characteristics that significantly determined the probability of the households participating in non-farm unskilled labour activities.

**Table 15: Determinants (Probability) of Participation in Non-Farm Activities**

<b>Probit Model</b>	<b>Non-Farm Unskilled Labour (NFUL)</b>	<b>Non-farm Skilled Labour (NFSL)</b>	<b>Non-farm Self Employment (NFSE)</b>	<b>Social and Community Service (SCS)</b>
<b>Variables</b>	<b>Marginal Effect</b>	<b>Marginal Effect</b>	<b>Marginal Effect</b>	<b>Marginal Effect</b>
Age	-0.0047** (0.0023)	-0.0029 (0.0021)	-0.0018 (0.0022)	-0.0009 (0.0008)
Age squared	0.71E-04*** (0.17E-04)	-0.57E-05*** (0.18E-04)	-0.01E-03 (0.15E-04)	-0.78E-05 (0.59E-05)
Gender (female=1)	-0.1032** (0.0451)	0.0312 (0.0551)	-0.0138*** (0.0065)	-0.5008* (0.0272)
Years of formal Education	-0.0137* (0.0080)	0.1134*** (0.0367)	0.01802** (0.0090)	-0.0068** (0.0034)
Marital Status (Single=1)	-0.0314 (0.0832)	0.0567 (0.0833)	-0.0511 (0.0924)	0.0393 (0.0293)
Single Parent(Yes=1)	0.1034** (0.0441)	0.1556** (0.0742)	-0.0204 (0.0860)	0.0671** (0.0327)
Nativity (Native=1)	-0.0343 (0.0389)	0.0348 (0.0389)	0.0067 (0.0391)	-0.0081 (0.0141)
Household size	-0.0036 (0.0117)	0.0038 (0.0117)	0.0049 (0.0117)	0.0055 (0.0044)
Poverty status (Poor=1)	-0.1086** (0.0464)	-0.0573 (0.0464)	0.0905** (0.0446)	0.0101 (0.0189)
Per capita land	-0.0461 (0.0561)	0.0463 (0.0561)	0.0462 (0.0674)	-0.0208 (0.028)
Per capita investment	-0.27E-05** (0.57E-06)	-0.14E-05** (0.64E-06)	0.20E-06 (0.88E-06)	-0.20E-07 (0.29E-06)
Volume of credit	0.79E-07 (0.13E-06)	-0.80E-07 (0.24E-06)	-0.19E-07 (0.12E-06)	0.72E-08 (0.35E-07)
Wage rate in specific Non-farm labour	0.54E-04 ** (0.21E-04)	0.3808** (0.1797)	0.48E-04 (0.37E-04)	-0.32E-04** (0.15E-04)
Electricity Connection	-0.0063 (0.0949)	0.0145 (0.1027)	-0.1880* (0.1040)	0.1125** (0.0571)
Access to road	0.0451 (0.0548)	0.0529 (0.0496)	-0.0150 (0.0496)	-0.0242 (0.0212)
Hook to Public water	-0.0331 (0.1083)	-0.0868 (0.1008)	-0.0234 (0.1113)	-0.0947* (0.0553)
Health Centre Availability	-0.0061 (0.0861)	0.0998 (0.0727)	0.1647*** (0.0740)	-0.0313 (0.0238)
Ekiti	-0.0086 (0.0663)	0.1250** (0.0532)	-0.3008*** (0.0604)	0.1209*** (0.0377)
Osun	0.2155*** (0.0578)	-0.0443 (0.0519)	-0.1372** (0.0544)	-0.0072 (0.0237)
Constant	-0.6535*** (0.2083)	0.0135 (0.1757)	0.4092** (0.1828)	-0.0794 (0.0623)
Log likelihood function	-198.60	-167.08	-174.61	-77.40
Restricted log likelihood	-221.00	-193.39	-198.25	-122.03
Chi-squared	44.80***	53.39***	47.28***	89.27***

\*, \*\*, \*\*\* indicate significant level at 10, 5, 1 % respectively. Figure in Parentheses are standard errors

The household's poverty status, the per capita asset base of the household, and the wage rate received in non-farm unskilled labour activities were the other factors that significantly determined the probability of the households participating in non-farm unskilled labour activities.

It was deduced from the results in Table 15 that, at  $p < 0.05$ , the older a household head, the less likely that he/she would be employed or participating in non-farm unskilled wage employment. Specifically, age (age squared) showed differential impacts on participation for unskilled labour activities, which could be adduced to the different physical fitness requirements for the job; thus placing older people at a disadvantage. The result further revealed that male-headed households were more likely to participate in non-farm unskilled wage employment ( $p < 0.05$ ) than their female counterpart while education significantly reduced the probability of participating in non-farm unskilled wage employment and this was in agreement with Corral and Reardon, (2001) and Zhu and Luo, (2006).

Poverty status of households indicated negative likelihood effect on engagement in non-farm unskilled wage employment. That is, being less poor significantly increased the probability of participating in non-farm unskilled wage employment. The results also revealed that less per capita investment significantly increased the probability of participating in non-farm unskilled labour activities. Also, wage rate received in non-farm unskilled labour activities significantly increased the probability of participating in that job. Considering the location variables, the results revealed that the probability of non-farm unskilled wage employment participation given the location was significantly higher in Osun state as compared to Ogun state.

The results further revealed that age squared, single-parenting, educational level, per capita asset base of the household and wage rate received in the job were the factors that significantly determined the probability of the rural farm households participating in non-farm skilled labour activities. Education and wage received appeared to be the strengthening factors concerning the probability of participating in non-farm skilled labour activities. The results in Table 15 revealed that education and wage rate received significantly increased the probability of participating in non-farm skilled wage employment. It was also confirmed from the results that less per capita investment significantly increased the probability of participating in non-farm skilled wage employment.

The results in Table 15 revealed that gender, educational level, poverty status, electricity, health facilities and location dummies were the significant determinants of non-farm self employment in rural farm households. The result revealed that at  $p < 0.05$ , the male-headed households were more likely to participate in non-farm self employment than their female counterpart while education significantly increased the probability of participating in non-farm



self employment. Also, poverty status of households indicated positive likelihood effect on households' engagement in non-farm self employment. That is, being poor significantly increased the probability of participating in non-farm self employment.

Non-connection to the national electricity grid significantly increased the likelihood of participation in non-farm self-employment. This implies that lack of electricity supply could push rural farm households into petty trading, pottery, carving, crafts mats and weaving. Proximity of a household to health facilities significantly improved the chances that a family member would engage in self-employment. Considering the location variables, the results revealed that the probability of non-farm self-employment participation was significantly lower in Osun and Ekiti states relative to Ogun state.

Gender, educational level, poverty status, single-parenting, wage received, electricity, water sources and location variables were the significant determinants of social and community service provision in rural farm households. Table 15 revealed that male-headed households were more likely to participate in social and community service ( $p < 0.10$ ) than their female counterpart; while education significantly reduced the probability of participating in this kind of non-farm job. At  $p < 0.05$ , the wage rate received in social and community service significantly reduced the probability of participating in this job.

Connection to the national electricity grid and non-connection to public water supply significantly increased the likelihood of rural farm households' participation in social and community service. The results further revealed that the probability of participation in social and community service participation was significantly higher in Ekiti state relative to Ogun state.

### **5.1.2 Resource Allocation to Non-Farm Activities in Rural Farm Households**

Besides the estimation of the determinants of participation in non-farm activities in the study area, a separate model was formulated and used to determine the level of participation or extent of labour supply to non-farm activities by rural farm households. The reasons for separating these decisions are two folds. First, due to social or psychological drives, a household member may prefer not to engage in non-farm work, notwithstanding the values of the exogenous variables. Second, a household member may be a potential participant in the non-farm labour market but for the influence or magnitude of influence of relevant variables, decide not to work non-farm. Tobit model was used for the estimation of the determinants of the extent of labour supply. Table 16 summarizes the results of the estimation of the determinants of non-farm labour supply of rural farm households.

**Table 16: Tobit Model Analysis of the Determinants of labour Supplied to Non-farm Activities**

<b>Tobit Model</b>	<b>Non-Farm Unskilled Labour (NFUL)</b>	<b>Non-farm Skilled Labour (NFSL)</b>	<b>Non-farm Self Employment (NFSE)</b>	<b>Social and Community Service (SCS)</b>
Variables	<b>Marginal Effect</b>	<b>Marginal Effect</b>	<b>Marginal Effect</b>	<b>Marginal Effect</b>
Age	0.0016 (0.0033)	-0.60E-03 (0.62E-03)	0.17E-04 (0.0018)	0.0018 (0.0042)
Age squared	0.11E-04*** (0.38E-05)	-0.78E-05* (0.45E-05)	-0.65E-05 (0.14E-04)	0.43E-04* (0.25E-04)
Gender (female=1)	-0.0370 (0.0927)	-0.0218 (0.0165)	0.0186 (0.0467)	-0.1930* (0.1032)
Years of formal Education	-0.40E-03 (0.0011)	0.0021* (0.0012)	0.0017 (0.0037)	-0.0024 (0.0072)
Marital Status (Single=1)	-0.0245 (0.0335)	0.0368* (0.0207)	-0.1542* (0.0839)	0.2937** (0.1382)
Single Parent(Yes=1)	0.01389 (0.0207)	0.0123 (0.0201)	-0.0731 (0.0708)	-0.1725 (0.1811)
Nativity (Native=1)	-0.0035 (0.0094)	0.0029 (0.0103)	-0.0049 (0.0319)	0.0162 (0.0661)
Household size	0.0044 (0.0032)	-0.12E-03 (0.0037)	-0.0031 (0.0114)	-0.0535* (0.0281)
Dependency Ratio	0.0751** (0.0357)	0.0912** (0.0417)	-0.0140 (0.1193)	0.5637** (0.2662)
Poverty status (Poor=1)	0.0065 (0.0117)	-0.0050 (0.0121)	0.0915** (0.0410)	-0.1181* (0.0641)
Per capita landholding	0.0097 (0.0188)	0.0158 (0.0142)	0.0544 (0.0547)	-0.2949* (0.1739)
Per Capita animal holding	-0.1165 (0.2698)	0.1081 (0.1671)	1.1935** (0.5516)	0.0623 (1.0862)
Per capita investment	-0.61E-06* (0.31E-06)	-0.41E-06** (0.18E-06)	0.52E-06 (0.77E-06)	0.12E-05 (0.13E-05)
Volume of credit	0.56E-08 (0.25E-07)	-0.69E-09 (0.37E-07)	0.57E-07 (0.91E-07)	-0.64E-06 (0.55E-06)
Wage rate in specific Non-farm Activities	0.92E-04 *** (0.12E-04)	0.93E-04*** (0.19E-04)	-0.81E-06 (0.19E-04)	0.41E-03*** (0.62E-04)
Farm Labour Supply	-0.13E-03** (0.63E-04)	-0.12E-03** (0.57E-04)	-0.92E-03*** (0.13E-03)	-0.39E-04 (0.28E-03)
Electricity Connection	-0.0157 (0.0359)	0.0140 (0.0250)	0.1544** (0.0750)	0.0025 (0.0051)
Access to road	0.0282 (0.0193)	0.0253** (0.0124)	-0.0442 (0.0399)	-0.0031 (0.0029)
Hook to Public water	-0.0021 (0.0389)	-0.0426* (0.0232)	-0.0512 (0.0806)	0.0046 (0.0052)
Health Centre Availability	-0.0212 (0.0184)	-0.0043 (0.0179)	0.1589** (0.0646)	-0.0068* (0.0040)
Ekiti	0.0098 (0.0160)	0.0429*** (0.0161)	-0.3041*** (0.0524)	0.0100** (0.0041)
Osun	0.0342*** (0.0129)	-0.0037 (0.0143)	-0.1096*** (0.0414)	-0.0079 (0.0036)
Constant	-0.5888** (0.285)	-0.0415 (0.0511)	0.6449*** (0.1576)	-0.6481* (0.3526)
Log likelihood function	-103.28	-118.60	-179.97	-52.72
Sigma	12.373***	11.030***	24.51***	7.209***

\*, \*\*, \*\*\* indicate significant level at 10, 5, 1 % respectively. Figure in Parentheses are standard errors

**Source: Data Analysis, 2009**

The results revealed that dependency ratio, per capita investment, wage rate in non-farm unskilled labour activities, amount of labour supplied to farm activities, and location variable were the main, albeit significant, factors that determined labour allocation to non-farm unskilled labour wage employment.

Households' level of participation in non-farm unskilled labour wage employment (NFULWE) significantly increased with the number of dependants, and this implies that farm households' labour allocation to NFULWE was due to push factors (i.e. insufficient farm and non-farm incomes, and surplus labour). The impact of per capita investment on the supply of labour for NFULWE was negative but statistically different from zero; implying that farm households who have smaller investment base depend on NFULWE to escape from poverty by supplementing farm income.

The response of the farm households' labour supply for NFULWE to wage rate in non-farm unskilled labour was significantly positive; thus, confirming that households' labour supply to NFULWE was driven by the implicit wage rate so as to augment low farm income. Also, the response of the farm households' labour supply for NFULWE to the amount of labour supply to farm activities was significantly negative; thus, signifying that households' labour supply to NFULWE was significantly determined by the amount of labour supply to farm activities. The more the workdays supplied to farm activities, the lesser the amount of labour that could be supplied to non-farm unskilled labour activities (Table 16).

Concerning non-farm skilled labour wage employment (NFSLWE), the results in Table 16 revealed that education, marital status, dependency ratio, per capita investment base, non-farm skilled labour wage rate, labour supply to farm activities, access to good road, access to good public water and location variables significantly determined the households' level of participation (or labour supply). The results thus confirmed that labour supply by farm households was driven significantly by level of education of the household head, the wage rate received in participating in non-farm skilled labour and access to good roads, all of which encouraged households to allocate more workdays to NFSLWE. These findings concurred with theoretical expectations, and were in line with Corral and Reardon (2001).

Higher dependency ratio, being single (or not married) and low per capita investment base significantly encouraged more workdays of labour to be supplied to NFSLWE. Also, the response of the farm households' labour supply for NFULWE to the amount of labour supplied to farm activities was significantly negative; thus, signifying that households' labour supply to NFSLWE was significantly determined by the amount of labour supply to farm activities: though the more the workdays supplied to farm activities, the lesser the amount of labour available for

non-farm skilled labour activities (Table 16). Further, labour supply by farm households in Ekiti state was significantly higher relative to that of Ogun state, the comparative of reference base state.

The labour supply and extent of work in non-farm self employment was significantly influenced by marital status, poverty status, per capita animal holding, availability of electricity, labour supply to farm activities, and availability of health centre. Poorer households significantly tend to supply more labour to non-farm self employment (NFSE) while an increase in per capita animal asset base also significantly increased the supply of labour. This means that, more capital for investment are made readily available by ownership of animal asset. Being married as a household head, and availability of electricity and health facilities encouraged rural farm households to supply more workdays to non-farm self employment.

Also, the response of the farm households' labour supply for non-farm self employment to the amount of household labour supplied to farm activities was negative and significant; thus, signifying that households' labour supply to NFSE was significantly influenced by the amount of labour supplied to farming activities. Thus, the more the workdays supplied to farm activities, the lesser the amount of labour available for non-farm self employment. Finally, labour supply to NFSE in the two states (Ekiti and Osun) was significantly lower relative to Ogun State at  $p < 0.01$ .

The results in Table 16 further confirmed that gender, marital status, household size, dependency ratio, poverty status, per capita land holding, wage rate in social and service community, availability of health facilities, and location dummies were the major factors that determined labour allocation to Social and Community Service (SCS). Specifically, male-headed households allocated more time to SCS than their female counterparts. This was in line with the findings by Matshe and Young (2004). The results in Table 16 also confirmed that non-poor farm households allocated more workdays to social and community service than their poor rural farm counterparts ( $p < 0.10$ ). The response of the farm households' labour supply for social and community service to per capita landholding was significantly negative; thus, signifying that households with lower per capita land size would supply more workdays to SCS farm activities.

The supply of labour for SCS responded significantly and positively to its own wage rate, implying that the remuneration from the activity was an attraction to SCS. Thus, labour was allocated to SCS by farm households due to push factors. Labour allocation to SCS significantly decreased with household size but increased with dependency ratio, implying that, labour supply to SCS by rural farm household members was a response geared towards meeting the needs of household members.

### 5.1.3 Determinants of Wage Rates Received in Non-Farm Activities

A farm household's choice of participation in non-farm activities depends on the reservation wage rate and the market wage rate. If the reservation wage rate is less than the prevailing market wage rate net of the commuting cost, a farm household will choose among the available non-farm activities depending on the relative wage rates. The explanatory variables used for the estimation of wage equations were listed in subsection 3.4.4.1(c), and the estimated inverse Mills ratios which were derived from the probit equations for participating in each non-farm activity were used as additional regressors in the wage offer equations (Maddala, 1983; Greene, 2003; Matshe and Young, 2004) to correct for selectivity bias. The approach in this context is Heckman's sample selection model (Heckman, 1979), which is designed to account for the fact that the observed sample may be non-random (Matshe and Young, 2004). Table 17 summarizes the results of the estimation of the wage offer equation for each non-farm activity.

Generally, all the hypothesized and fitted variables significantly determined the models as revealed by the significant of F-test values. The implicit wage rates received for combined or all non-farm activities was significantly determined by gender, education, household size, level of income diversification, labour supply to all non-farm activities, availability of public assets/infrastructures (like availability of electricity), and location dummies. Male participants in all non-farm activities significantly received higher wage rates than their female counterparts. Higher education for the participating members of the farm households significantly attracted higher wage rates in all non-farm activities. An increase in the level of income diversification significantly reduced the wage rates for all non-farm activities; thus, implying that as income sources increased, less time would be devoted to each source and the return to labour would decrease.

An increase in the household size of the farm households' members participating in the all non-farm activities significantly had positive effect on the wage rate received in such activities; thus, implying that increase in household size would bring more members of the household into such activities, which would in effect, bring more return to household labour. The response of wage rate to the labour supply by the members of the farm households participating in all non-farm activities was significantly negative; thus, signifying that as more hours of labour were supplied to all non-farm activities together, less wage rates would be attracted from each source of the activity that formed the combination.

**Table 17: OLS Estimates of wage offer equations for the Non-farm Activities**

<b>Dependent Variable: Wage rates</b>	<b>All Non-farm Activities</b>	<b>Non-farm Unskilled Labour Activities</b>	<b>Non-farm Skilled Labour Activities</b>	<b>Non-farm Self Employment</b>	<b>Social and Community Service</b>
	<b>Coefficient</b>	<b>Coefficient</b>	<b>Coefficient</b>	<b>Coefficient</b>	<b>Coefficient</b>
Age	1.154 (3.853)	5.582*** (1.777)	-0.847 (1.236)	2.303 (4.207)	-0.811 (1.677)
Age squared	-0.026 (0.033)	0.080*** (0.015)	-0.047*** (0.011)	-0.032 (0.036)	-0.021 (0.014)
Gender (female=1)	-215.412** (104.858)	-62.520 (48.347)	127.131*** (33.630)	-328.837*** (114.468)	79.428* (45.641)
Education	33.3548* (18.380)	2.8166 (8.475)	-9.9307** (3.895)	41.7518** (20.064)	-12.5266* (7.262)
Household Size	79.291*** (22.206)	13.365 (12.023)	-9.133 (7.982)	81.379*** (22.446)	8.038 (8.012)
Per Capita Investment	0.7E-04 (0.002)	-0.3E-04 (0.8E-04)	-0.8E-05 (0.5E-04)	-0.003 (0.002)	0.9E-04 (0.7E-04)
Diversification Index	-220.615*** (51.571)	-43.713** (20.783)	-11.156 (16.548)	-86.518 (56.302)	-51.355** (22.449)
Labour Supply to specific NF link to National Electric grid	-0.6987*** (0.205)	3.438*** (0.210)	3.686*** (0.147)	-0.416* (0.221)	6.864*** (0.439)
Distance to urban centre	-431.873** (174.577)	34.753 (80.474)	30.908 (55.990)	-327.580* (190.577)	188.942** (75.988)
Availability of public water	323.064*** (84.807)	66.582* (39.305)	84.038** (29.942)	305.614*** (89.615)	-103.127** (40.636)
Availability of Health Centre	319.127* (189.111)	-35.927 (89.659)	-67.222 (62.366)	111.434 (212.278)	134.777* (76.059)
IMR(Inverse mill ratio)	-437.055*** (150.702)	-60.501 (69.485)	107.139** (48.333)	-358.608** (164.514)	-193.847*** (65.596)
Ekiti State		632.88*** (25.003)	584.920*** (18.472)	-1.174 (62.235)	316.867*** (42.108)
Osun State	893.451*** (112.557)	50.289 (51.897)	72.434** (36.099)	492.690*** (122.872)	242.056*** (48.992)
Constant	-124.387 (96.742)	77.490* (44.605)	-45.617 (31.027)	-247.990** (105.607)	-22.534 (42.108)
Adjusted R <sup>2</sup>	1721.162***	-132.438	319.178***	1283.00***	180.92
F-values	0.661	0.624	0.723	0.496	0.231
	55.25***	49.66***	77.26***	8.16***	9.82***

\*, \*\*, \*\*\* indicate significant level at 10, 5, 1 % respectively. Figure in Parentheses are standard errors

**Source: Data Analysis, 2009**

Availability of electricity and health facilities significantly reduced the wage rates in all non-farm activities. These imply that competition (and hence, constraints) for non-farm activities would be higher, and reduced return to labour would be evident (Table 17). Further, the implicit wage rates received in Ekiti state for all non-farm activities were significantly higher relative to the base state (Ogun state).

Also, the implicit wage rate received for the performance of the individual non-farm activities was significantly influenced by diverse factors, depending on the particular non-farm activity. Specifically, the wage rates received for non-farm unskilled labour wage employment (NFULWE) were significantly affected by age, age squared, level of income diversification, labour supply to non-farm unskilled labour activities, nearness to urban centre, inverse mill ratio (IMR) and location dummies. The age of the participating member of the farm household showed a quadratic pattern in consistence with the life-cycle hypothesis (Sumner, 1982; Woldehanna and Oskam, 2001) for non-farm unskilled labour activities. Age of the participating member of the farm household significantly determined the wage rates for NFULWE, and as the person got older, more wage rates were received for NFULWE. This could be as a result of the physical strength needed for the NFULWE. Increase in the number of the income diversification sources significantly had negative effect on wage rates for NFULWE while nearness to the urban centre showed positive and significant effect on the wage rates received for NFULWE.

The labour supply by the members of the farm households participating in non-farm unskilled labour activities had significant positive relation with the wage rate; signifying that as more hours of labour were supplied to NFULWE, higher wage rates would be received. The positive and significant effect of the IMR implied that members of those farm households who participated in NFULWE received higher wages than those who did not participate, while the result in Table 17 further confirms, albeit significantly, that the wage rates received in Osun state for NFULWE was relatively higher as compared to Ogun State.

Further evidence in Table 17 revealed that the wage rates received by farm households' members that participated in non-farm skilled labour wage employment (NFSLWE) were significantly determined by gender, education, labour supply to non-farm skilled labour activities, nearness to urban centre, availability of health centre, IMR and location dummies. Female participants in NFSLWE significantly would receive higher wage rates relative to their female counterparts. The results further revealed that educational attainment had negative relationship with the wage rates received in NFSLWE ( $p < 0.05$ ). This was against a priori expectation; though this may also imply that the nature of NFSLWE in the study area was predominantly manual.



The labour supply by the members of the farm households participating in non-farm skilled labour activities had significant positive, relationship with wage rate; signifying that the supply of more hours of labour to NFSLWE would attract higher wage rates. Nearness to urban centres and availability of health centre indicated positive, significant effects on the wage rate received in NFSLWE. The positive and significant effect of the IMR in non-farm skilled labour activities' wage equation implied that members of those farm households who participated in NFSLWE received higher wages than those who did not participate.

The wage rates received by farm households' members involved in non-farm self employment were significantly affected by gender, education, household size, labour supply to NFSE, availability of electricity, health facilities, and location dummies. Male participation in NFSE significantly attracted higher wage rates than female involvement. The results in Table 17 revealed that educational attainment showed positive relationship with wage rates received in NFSE ( $p < 0.05$ ), implying that higher educational attainment would attract higher wage rates. An increase in the household size of farm households participating in NFSE significantly resulted in an increase in the wage rate received, thus, implying that increase in household size would increase the level of participation in NFSE, and bring more return to labour in NFSE.

The labour supply by the members of the farm households participating in NFSE had negative but significant effect on wage rates received in such activities. This signifies that as more hours of labour were supplied to NFSE, less wage rates would be received by participating households. Also, availability of electricity significantly reduced the wage rate received in NFSE. This implies that electricity could encourage involvement in non-farm self employment with attendant reduced wage compensation in such activities. Nearness to urban centres also had positive and significant effect on the wage rate received in NFSE. The results in Table 17 further confirmed that the wage rates received in Ekiti state for NFSE was relatively higher as compared to Ogun State while the wage rates received in Osun state for NFSE was significantly lower as compared to the base state (Ogun State) at  $p < 0.05$ .

The wage rates received for social and community service (SCS) by farm households' members were significantly affected by gender, education, level of income diversification, nearness to urban centre, all the communal infrastructures considered, IMR and location dummies (Table 17). Female participation in SCS significantly attracted higher wage rates than male involvement. The result in Table 17 further revealed that educational attainment had negative relationship with wage rates received in SCS ( $p < 0.05$ ), implying that higher educational attainment discouraged higher wage rates in SCS; hence, revealing that most activities performed in SCS were manual works, which do not require higher educational attainment. An increase in



the level of income diversification significantly attracted lower wage rates for involvement in SCS, implying that as income sources increased less time would be devoted to SCS and the return to labour in this activity would decrease. This tends to confirm that involvement in SCS by households' members was a consequence of the push factors.

The labour supply by the members of the farm households participating in SCS had positive significant effect on wage rates received in such activities. This signifies that as more hours of labour supplied by participation would attract better wage rates in this activity. Also, availability of electricity significantly increased the wage rate received in SCS. This implies that electricity could encourage involvement in social and community service with increased return to labour. Nearness to urban centres had negative and significant effects on wage rate received in SCS, showing that there was pecuniary attraction for participating farm households' members to leave for urban centres in search for alternative income generating activities rather than getting involved in SCS. This further confirms that farm households' members got involved in SCS when there was no alternative of means of survival (i.e. as a result of push factors).

Availability of health facilities significantly reduced the wage rates received in SCS (Table 17). The positive and significant effect of the IMR in social and community service' wage equation implied that members of those farm households who participated in SCS received higher wages than those who did not participate. Finally, significantly higher wage rates were attracted for involvement in SCS in Ekiti state relative to Ogun State.

#### **5.1.4 Factors Influencing the Choice of Income Sources by Rural Farm Households**

The analysis in this section was done primarily to understand the factors influencing whether or not a household will obtain income from one livelihood source or another. The equations estimated were those representing, one, the share of each of the six income sources in the total rural farm households' annual income (i.e. farm income, non-labour income, non-farm unskilled wage employment income, non-farm skilled wage employment income, non-farm self-employment income, and income from provision of social and community service) and, two, the income diversification (total, farm and non-farm sectors), proxy by inverse of Herfindahl index values as provided in equation 3.6. This subsection was divided into two, viz, (a) Determinants of income shares from different sources and (b) Determinants of income diversification measured by the inverse of the Herfindahl index. Subsection 3.4.4.2 has provided details on the independent variables used in the model. Location dummies were however incorporated into the estimated models in order to control for location price variations.

#### **5.1.4.1 Factors Affecting Rural Farm Households Income Shares**

Diversification of income sources may be due to pull or push factors. Some households are “pushed” to diversify their activities into non-farm if only to cope with external shocks to their farming activities or to ensure survival (Lay and Schuler, 2007) while households may be “pulled” into non-farm activity because it often pays more than farming and generates cash (Escobal, 2001). This subsection thus turns to an analysis of the determinants of income at the household level both in farm and non-farm sectors, in particular to understand why some households are better able to derive income from specific non-farm activities than other households. Since some households do not derive income from some of the non-farm activities except the farm activities, these income equations are estimated as Tobits. Table 18 shows the regression results summarizing factors influencing the choice of household income sources. Several salient points emerged from the Tobit results. Besides, all the equations fitted the data reasonably well.

Evidence in Table 18 revealed that age, education, marital status, farming experience, household size, landholding, distance to the nearest urban towns and location dummies were the significant determinants of rural farm households’ farm share in total income. Older household heads significantly earned less farm income. A decrease in farm income share as the household head grew older implies that subsistent farming is more likely to replace commercial farming as the household heads grow older, and as a consequence of the drudgery in farming. This is what should be expected as life cycle matures (de Janvry and Sadoulet, 2001). Years of education significantly decreased farm income. This shows that farming in the rural communities of south western region of Nigeria tends more towards subsistence than mechanized, and requires less formal education.

Marital status of the household heads significantly increased income from farm source. This finding underscores the importance of marriage in the performance of farm activities. Farming experience of households significantly increased income share from farm source, implying that as the households grow in farming experience, they would derive more income from the farm. This may be as a result of investment of their time in the past, in the planting of tree crops that later yield more income. Household size significantly influenced the share of total income received from farming, showing that larger households added to the share of total income received from farming. This finding was consistent with that of Kaija (2007) who observed that family size helps the households to supply labour to the farm.

**Table 18: Tobit Analysis of the Determinants of Income Shares in Rural Farm Households**

	Farm Share	Non-labour Share	Non-farm Unskilled Labour	Non-farm Skilled Labour	Non-farm Self Employment	Social and Community Service
<b>Variables</b>	<b>Coefficient</b>	<b>Coefficient</b>	<b>Coefficient</b>	<b>Coefficient</b>	<b>Coefficient</b>	<b>Coefficient</b>
Age	-0.0015* (0.0008)	0.0048*** (0.0009)	-0.0102** (0.0046)	-0.11E-03 (0.92E-03)	-0.0024* (0.0013)	-0.0052 (0.0067)
Gender (Female=1)	-0.0143 (0.0274)	0.0348* (0.0211)	-0.0293** (0.0139)	0.0038 (0.0220)	0.0029 (0.0394)	-0.1134* (0.0061)
Education	-0.0036* (0.0022)	0.0026* (0.0015)	0.0055 (0.0050)	-0.0190* (0.0107)	0.0021 (0.0031)	-0.0163* (0.0063)
Marital Status	0.1256** (0.0488)	-0.1800 (0.2934)	-0.1815 (0.1658)	0.0284 (0.0326)	-0.0115 (0.0714)	-0.6582** (0.3178)
SingleParent (Yes=1)	-0.0560 (0.0407)	-0.5790** (0.2416)	0.1089 (0.0864)	0.3909** (0.1778)	0.0552 (0.0583)	0.5490** (0.0249)
Experience in specific Activity	0.0039*** (0.0011)	0.0082** (0.0041)	0.0047*** (0.0015)	0.0014*** (0.0003)	0.0019*** (0.0006)	0.0009 (0.0069)
Nativity (Native=1)	-0.0085 (0.0184)	0.0367** (0.0157)	0.0778 (0.0789)	0.0159 (0.0150)	-0.0017 (0.0265)	0.0181 (0.1031)
Household Size	0.0208*** (0.0085)	0.0351 (0.0497)	0.0417* (0.0212)	-0.05518*** (0.0258)	0.0043 (0.0124)	0.0111 (0.0523)
Dependency Ratio	0.0857 (0.1191)	-1.8031*** (0.6969)	-0.1590 (0.3007)	0.0789 (0.0568)	-0.0625 (0.1705)	-0.9787* (0.5282)
Volume of Credit Owned	-0.16E-06 (0.14E-06)	0.24E-07 (0.74E-07)	-0.88E-07 (0.20E-06)	-0.18E-07 (0.48E-07)	0.11E-06 (0.77E-07)	-0.67E-06 (0.50E-06)
house (Yes=1)	-0.0472** (0.02171)	0.2415* (0.1285)	-0.0949 (0.0862)	-0.0053 (0.0175)	0.0416 (0.0315)	0.0338** (0.0121)
Per Capita landholding	0.2267*** (0.0326)	-0.4590** (0.1899)	-0.3557* (0.2134)	-0.3510*** (0.1166)	-0.0247 (0.0463)	-0.5487* (0.3049)
Per Capita Animal wealth	0.2631 (0.3187)	-0.9234 (1.8450)	1.4894 (2.4319)	0.0309 (0.0259)	1.2688*** (0.4520)	0.8574* (0.4331)
Per Capita Investment	-0.48E-07 (0.50E-06)	0.6E-06*** (0.41E-07)	0.6E-05** (0.27E-05)	-0.42E-06 (0.35E-06)	-0.57E-06** (0.22E-06)	-0.32E-06* (0.17E-06)
Prop. of land Devoted to Tree	0.0092 (0.0324)	-0.0859*** (0.0278)	0.2508* (0.1367)	0.0044 (0.0267)	0.0589 (0.0469)	0.1618 (0.2104)
Hooked to Electricity	-0.0544 (0.0427)	-0.0531 (0.2517)	-0.0104 (0.0143)	0.0269 (0.0360)	0.1192* (0.0638)	0.7048** (0.3249)
Hooked to Public Water	-0.0439 (0.0457)	-0.2776 (0.2727)	0.3162 (0.2136)	-0.0402 (0.0382)	0.0801 (0.0680)	-0.4880* (0.2837)
Govt Health Facility	-0.01295 (0.0359)	0.0892 (0.2140)	-0.0138 (0.0137)	0.0194 (0.0277)	0.1306** (0.0531)	-0.1547 (0.1701)
Distance to Urban centre	-0.0012*** (0.0034)	0.6211*** (0.3126)	0.0241** (0.0108)	-0.0024*** (0.0007)	-0.0019*** (0.0007)	-0.0124 (0.0079)
Ekiti	0.1138*** (0.0293)	-2.3150*** (0.1906)	-0.5134*** (0.0367)	0.1133*** (0.0367)	-0.1983*** (0.0428)	0.9277*** (0.1920)
Osun	0.0023 (0.0236)	-0.4381*** (0.1380)	-0.3175*** (0.1027)	-0.0123 (0.0199)	-0.1218*** (0.0343)	-0.0977 (0.1867)
Constant	0.2113* (0.1117)	3.0640*** (0.6656)	0.1586 (0.3668)	0.4165*** (0.1536)	0.1914** (0.0718)	-3.3147** (1.4461)
Log likelihood	136.85	169.46	-184.92	-170.39	-75.34	-75.24
Chi-Squared	28.67***	27.29***	11.59***	10.01***	24.75***	7.18***

\*, \*\*, \*\*\* indicate significant level at 10, 5, 1 % respectively. Figure in Parentheses are standard errors

Source: Data Analysis, 2009

An increase in per capita landholding was significantly associated with increase in farm income, suggesting that farm activities have positive relationship with the land size available for farming. Nearness to urban centre had negative and significant effects on farm share in total income, showing that there was higher tendency for farm households' members to leave farming for urban centre in search for alternative income generating activities. Higher farm share in total income was significantly evident in Ekiti state relative to Ogun State.

Evidence in Table 18 revealed that age, gender, education, single-parenting, experience in non-labour activities, nativity, dependency ratio, household ownership of permanent house, landholding, investment asset base, proportion of land devoted to tree cropping, distance to the nearest urban towns and location dummies were the significant factors affecting non-labour income share in total income of rural farm households. The results revealed that older household heads significantly earned more non-labour income; that is, in-line with Kaija (2007). An increase in non-labour income share as the household head grew older implies that they were more likely to concentrate on non-labour productive assets, and this is what should be expected as life cycle matures (de Janvry and Sadoulet, 2001).

Female headed households derived significantly more income from non-labour than their male counterpart. This could be as a result of more remittances from working siblings or spouses or even parents in urban areas, who tend to support female heads than households headed by men because siblings and spouses tend to believe that female heads were more vulnerable. The educational attainment of household heads positively affected the non-labour income share that accrued to rural farm households. This result implies that households' expansion opportunity in non-labour activities depend more on higher education. Thus higher education can stimulate entrepreneurial activities.

Also, results in Table 18 revealed that being a single-parent household significantly reduced income share from non-labour source while experience in non-labour activities (length of involvement) and being an indigenous household significantly showed positive effect on non-labour income share in total income of the farm households.

Being an owner of a permanent house significantly increased income from non-labour; this finding was in-line with a priori expectation because incomes from property rents were integral part of non-labour income. An increase in per capita landholding and the proportion of land size devoted to tree crops significantly decreased non-labour income while an increase in per capita investment of the households significantly enhanced the chance of having more non-labour income. Nearness to the urban centre significantly increased the incentive to obtain more non-labour income. This may be because nearness to urban area reduced the transaction cost of

involving in non-labour activities like land prospecting (buying and selling). Lower non-labour income share in total income was significantly evident in Ekiti and Osun states relative to Ogun State, this may be due to the nearness of Ogun state to Lagos state.

Results in Table 18 revealed that age, gender, experience in non-farm unskilled labour activities, household size, landholding, investment asset base, proportion of land devoted to tree cropping, distance to the nearest urban town and location dummies were the significant factors affecting non-farm unskilled labour income share in total income of rural farm households. The results revealed that older household heads significantly earned less non-farm unskilled labour income. A decrease in non-farm unskilled labour income share as the household head grew older implies that more strength was needed in performing most non-farm unskilled labour activities in the study area. Besides, male headed households derived significantly more income from non-farm unskilled labour activities than their female counterpart.

Experience in non-farm unskilled labour activities significantly had positive effect on non-farm unskilled labour income share in total income of the farm households. This implies that as the households' heads grow in terms of the experience acquired in non-farm unskilled labour activities, they established cordial relationship with their clients, which provided them with more jobs and in turns bring in more income from such activities. Further, household size significantly influenced the share of total income received from non-farm unskilled labour activities. An increase in per capita landholding significantly reduced non-farm unskilled labour income. This suggests that non-farm unskilled labour activity is a compensation for land constraint. This finding was in-line with Corral and Reardon (2001) and Kaija (2007).

The proportion of farm land devoted to tree crops, and households' investment asset base significantly enhanced the chance of having more non-farm unskilled labour income. Nearness to the urban centre significantly increased the incentive to obtain more non-farm unskilled labour income. This may be because nearness to urban area reduced the transaction cost of the involvement in non-farm unskilled labour activities. Lower non-farm unskilled labour income share in total income was significantly evident in Ekiti and Osun states relative to Ogun State.

Evidence in Table 18 revealed that education, single-parenting, experience in non-farm skilled labour activities, household size, landholding, distance to the nearest urban towns and location dummies were the significant factors affecting non-farm skilled labour income share in total income of rural farm households. Years of education significantly decreased non-farm skilled labour income. This shows that the non-farm skilled labour activities are low-paying income sources or activities that require less education but more manual works. Experience in non-farm skilled labour activities significantly increased the non-farm skilled labour income

share in total income of the farm households. This implies that as the years spent in non-farm skilled labour activities increase, the income from such activities also increase. Household size significantly reduced the share of total income received from non-farm skilled labour activities. Also, an increase in per capita landholding significantly reduced non-farm skilled labour income; this suggests that non-farm skilled labour activity is a compensation for land constraint and it is in-line with Corral and Reardon (2001) and Kaija (2007). Nearness to the urban centre significantly increased the incentive to obtain more non-farm skilled labour income. Higher non-farm skilled labour income share in total income was significantly evident in Ekiti state relative to Ogun state.

Evidence in Table 18 further revealed that age, experience in non-farm self-employment activities, per capita animal asset, per capita investment asset, availability of electricity and health facilities, distance to the nearest urban town and location dummies were the significant factors affecting non-farm self-employment income share in the total income of rural farm households. Specifically, the results in Table 18 revealed that older households' heads significantly earned less non-farm self-employment income. A decrease in non-farm self-employment income share as the household head grew older implies that more strength was needed for most non-farm self-employment activities in the study area. Experience in non-farm self-employment significantly increased the non-farm self-employment income share in total income of the farm households. This implies that as the years spent in non-farm self-employment activities increase, the income from such activities also increase.

An increase in per capita animal asset was significantly associated with increase in non-farm self-employment income. This could be because income from livestock production may be used to increase household capacity to overcome capital barriers for starting non-farm self employment businesses. Per capita investment assets of the rural farm households significantly reduced the chance of having more non-farm self-employment income. The finding was against a priori expectation because investment asset of the households is expected to increase household capacity to boost involvement in non-farm businesses. Availability of electricity showed positive and significant influence on self-employment income, implying that this public asset could raise the profitability of non-farm businesses. Nearness to urban centre had negative and significant effect on non-farm self-employment share in total income, showing that there was higher tendency for farm households' members to leave for urban area in search of income generating activities as alternatives to non-farm self-employment. Lower non-farm self-employment income share in total income was significantly evident in Ekiti and Osun states relative to Ogun State.

Results in Table 18 further revealed that gender, education, marital status, dependency ratio, household ownership of permanent residence, per capita landholding, animal asset base, investment asset base, availability of electricity and public water, and location dummies were the significant factors affecting social and community service income share in total income of rural farm households. Specifically, male headed households derived significantly more income from social and community service than their female counterpart. Education significantly decreased social and community service income. This shows that the social and community services available in the study area are low-paying income activities that require less education. Marital status of the household heads significantly increased income from social and community service source. This finding underscores the importance of marriage or matrimony in the performance of social and community services.

Household dependency ratio significantly reduced the share of total income received from social and community service. This finding reveals that as the number of dependant increases in a household, the household head has higher tendency of searching for an alternative income generating activity to augment household income from farming rather than becoming involved in social and community service. Being an owner of a permanent house significantly increased income from social and community service while an increase in per capita landholding and per capita investment asset significantly decreased social and community service income. On the contrary, however, but an increase in per capita animal asset of the households significantly enhanced the chance of having more income from social and community service provision. Availability of electricity showed positive and significant influence on social and community service income. Higher social and community service income share in total income was significantly evident in Ekiti state relative to Ogun State (Table 18).

#### **5.1.4.2 Factors Affecting Diversification into Farm and Non-Farm Sectors**

The Tobit model was specified and used for the analysis of the determinants of income diversification with the inverse of Herfindahl index a proxy for income diversification specified as the dependent variable. As such, the determinants of diversifications within the farm, non-farm and all sectors were determined for the farm households in the study sample. The upper limit value of the index for any  $\alpha$  value is the number of income sources, while the lowest limit is one.

Table 19 shows the results of the Tobit analysis of the determinants of income sources within the farm, non-farm and all sectors together with the likelihood ratio test as the goodness-of-fit indicator. The results show that all equations fit the data reasonably well at  $p < 0.01$ .



**Table 19: Tobit Analysis of the Determinants of Diversification into Farm and Non-Farm Activities.**

Variables	Income Diversification All Sectors – Overall		Diversification within the Farm sector		Diversification within the Non-Farm sector	
	Regression Coefficient	Marginal Effect	Regression Coefficient	Marginal Effect	Regression Coefficient	Marginal Effect
Age of household head	0.001 (0.005)	0.001	0.004 (0.003)	0.004	-0.3E-03 (0.0029)	0.1E-03
Gender (Female =1)	0.0408 (0.111)	0.041	-0.033 (0.082)	-0.031	0.046 (0.0699)	0.014
Education of household head	0.001 (0.008)	0.001	0.006 (0.006)	0.006	0.094*** (0.031)	0.093***
Marital Status (Single=1)	0.018 (0.197)	0.018	-0.088 (0.147)	-0.082	-0.167 (0.125)	-0.154
Single-Parent (Yes=1)	-0.071 (0.164)	-0.071	0.199* (0.111)	0.185*	0.067 (0.104)	0.008
Experience in specific activity	0.003 (0.004)	0.003	0.004 (0.003)	0.004	0.002 (0.003)	0.9E-03
Nativity (Native=1)	-0.083 (0.072)	-0.083	-0.059 (0.055)	-0.055	-0.038 (0.047)	-0.024
Household Size	0.070** (0.033)	0.070**	-0.6E-03 (0.025)	-0.6E-03	-0.016 (0.022)	0.021
Dependency ratio	-0.819* (0.467)	-0.816*	0.651* (0.360)	0.606*	-0.282 (0.304)	-0.135
Volume of Credits available	0.7E-06 (0.6E-06)	0.7E-06	-0.4E-05 (0.5E-05)	-0.4E-05	0.6E-07 (0.7E-07)	0.6E-07
Household owns House	0.044 (0.085)	0.044	0.105* (0.063)	0.097*	0.051 (0.055)	0.005
Per capita land Holding	0.351*** (0.128)	0.350***	0.320*** (0.098)	0.298***	-0.627*** (0.230)	-0.123***
Per capita animal Asset	3.606*** (1.251)	3.592***	5.246*** (0.950)	4.488***	-0.212*** (0.081)	-0.275***
Per capita investment asset	-0.3E-05** (0.1E-05)	-0.3E-05**	-0.5E-06 (0.8E-06)	-0.5E-06	0.4E-05 (0.6E-05)	-0.4E-05
Prop. of land to tree crops	0.104 (0.127)	0.104	0.119 (0.099)	0.112	0.097* (0.053)	0.090*
Link to Electricity	0.130 (0.167)	0.130	-0.044 (0.128)	-0.041	0.466** (0.214)	0.158**
Hook to Public Water	-0.001 (0.180)	-0.013	0.094 (0.137)	0.088	-0.539** (0.268)	-0.183**
Govt Health Facility	-0.025 (0.141)	-0.025	-0.247** (0.107)	-0.230**	-0.069 (0.092)	-0.6E-03
Distance to Urban centre	-0.018* (0.011)	-0.018*	0.019*** (0.007)	0.019***	-0.039*** (0.009)	-0.026***
Ekiti State	-0.114 (0.115)	-0.114	0.125 (0.087)	0.116	0.601*** (0.168)	0.204**
Osun State	-0.262*** (0.093)	-0.26***	-0.002 (0.071)	-0.002	-0.320** (0.139)	-0.109**
Constant term	2.802*** (0.438)	2.792***	0.686** (0.338)	0.639**	1.206*** (0.285)	0.379**
Log Likelihood	-425.15		-330.91		-303.76	
Chi-Squared	28.671***		25.109***		14.148***	

\*, \*\*, \*\*\* indicate significant level at 10, 5, 1 % respectively. Figure in Parentheses are standard errors

Source: Data Analysis, 2009



The result in Table 19 revealed that household size, dependency ratio, per capita land holding, per capita animal asset base, per capita investment asset base, distance to the urban area and location dummies were the significant factors determining the level of income diversification from all sectors among rural farm households.

An increase in household size significantly increased the tendency of rural farm households to diversify their income into all household income sources. This finding implies that larger households significantly diversified into all sectors of the rural economy for more income. An increase in the number of dependants within the household significantly caused the household to decrease their level of income diversification to all income sources but this variable indicated positive, significant relationship with diversification into farm sector; thus, implying that households with more dependants were able to supply more labour on the farm to meet the labour needs for farming.

Per capita land holding and animal asset base showed positive, significant effect on the overall household income diversification level and this was consistent with the finding of Escobal (2001) and Kaija (2007). The finding implies that landholding and animal asset relax the constraint on the non-farm activities, therefore allowing more diversification. Moreover, increase in investment asset significantly reduced the level of household income diversification. This implies that committing these assets into commercial purposes has the tendency of bringing more income to the households than searching for additional income generating activities.

Nearness to urban centre had negative, significant effect on overall household income diversification to all sectors; thus showing that there is a higher possibility for farm households' members to leave for urban area in search of income generating activities. Further, households' income diversification level was significantly lower in Osun state relative to Ogun state.

Evidence in Table 19 revealed that single-parenting, dependency ratio, per capita land holding, per capita animal asset base, availability of health facility and distance to the urban area were the significant factors determining the level of farm income diversification among rural farm households. The single-parent households indicated higher chance of diversifying household income sources into farm. This may be true in the case of widows and separated couples in the rural setting, where they make recourse to various farm activities while searching for extra household income to meet childcare responsibilities and other social expectations. Also, an increase in the number of dependants within the household significantly caused the households to increase their level of income diversification within the farm sector. This implies that households with more dependants were able to supply more labour on the farm to meet labour needs on the farm.

Per capita land holding and per capita animal asset base had positive and significant effect on the household income diversification level within the farm sector. This is expected given that rural communities in southwest Nigeria are mainly agrarian and land is a key input in farming. Also, livestock production is an important aspect of farming which generate additional income and may also lead to higher land productivity. The finding in this study implies that landholding and animal assets holding relax the constraint on the non-farm activities; therefore, allowing more diversification into different farm activities. Nearness to urban centre significantly favoured increase in household income diversification into various farm activities within the farm sector. The finding implies that nearness to urban area may facilitate the marketing of the agricultural products from the various farm activities, which in turns should encourage more involvement in farming.

The results in Table 19 further revealed that education, per capita land holding, per capita animal asset base, proportion of land devoted to tree crops, availability of electricity and public water, distance to the urban area and location dummies were the significant factors determining the level of income diversification among rural farm households into the non-farm sector. The level of education of household heads indicated a positive and significant influence on income diversification into the non-farm sector, implying that household heads with higher educational attainment were more likely to diversify income opportunities into non-farm sector compared with those that had low or poor education. It is evident from Table 19 that less per capita land and animal asset base significantly encouraged more diversification into non-farm activities. It can be appreciated thus that diversification into non-farm activities in the southwest Nigeria was necessitated largely by small landholding and poor animal asset base.

Proportion of land devoted to tree crops showed a positive influence on household diversification into non-farm sector. That is, it significantly increased the tendency of rural farm households to diversify income sources into the non-farm sector. This is consistent with a priori expectation because the more the proportion of land devoted to tree crops, the less the proportion of land available for arable crops, and since tree crops are perennial, there will be more work time to devote to other activities in the non-farm sector. As for electricity, its availability significantly enhanced diversification into non-farm activities, implying that this public asset could raise the profitability of non-farm businesses.

Long distance to urban centre reduced the incentive to diversify into non-farm sector. The farther the farm communities to the urban centres, the less the level of diversification into non-farm activities. This may be as a result of higher transaction cost that will involve in searching for non-farm activities in cities or towns far from rural farm communities. Household income

diversification level into non-farm sector was significantly lower in Osun state but higher in Ekiti state relative to Ogun State.

## **5.2. Extent of Poverty across Socio-economic Groups of the Rural Farm Households.**

This section presents the FGT poverty indices computed for the purpose of drawing comparison across the various socio-economic categories of rural farm households included in the sample. Besides providing a wealth of information on household living conditions, empirical evidence in this section allow an objective technical assessment to be carried out by policy planners, particularly in relation to diverse political considerations and debates that typically guide and dominate government policy formulation.

### **5.2.1 The Consumption Pattern and Poverty Line**

A major requirement in cost of basic needs-based poverty analysis is the choice of an appropriate poverty line. In this study, it was opined that an appropriate poverty line should be cost or expenditure borne that is sufficient to purchase a basket of food and non-food items needed for an household to meet the minimum per caput daily dietary energy requirement for an healthy life as defined by FAO/WHO/UNU (FAO, 2008), while also making provision for mark-up for non-dietary food expenditure. Thus, the per capita consumption level of an average household in the sample was assessed and the dietary energy contents evaluated as well as compared with the requirement of an average household in the sample so as to estimate the poverty line. The results are summarized in Tables 20, 21 and 22.

As shown in Table 20, the mean per caput consumption of food and non-food items by an average farm household in the entire sample was found to be ₦3, 567.31 per person per month or ₦118.91 per person per day. The bulk of the per caput expenditure (i.e. worth of goods consumed) was devoted to food consumption (77.6 percent); while less than a quarter (22.3 percent) was devoted to non-food consumption items like education, health services, etc.

**Table 20: Descriptive statistics of the average monthly food and non-food consumption by the sampled farm households**

Description	Data of Sampled Farm Households in Southwest	
	Mean	Std. Error
Beverages	486.82	64.71
Bread and Baked Products	722.98	54.58
Cassava granules & flour	1,863.20	224.07
Cowpea & Other Beans	1,169.27	216.01
Eggs	224.22	36.68
Fish	2,440.89	239.32
Fruit Vegetables & Spices	1,648.91	164.38
Leafy Vegetables	328.40	23.54
Maize & Other Cereals	795.49	81.22
Meats	3,138.12	307.52
Milk and Dairies	312.06	53.43
Rice	2,952.05	368.46
Vegetable Oil & Others	1,322.85	88.56
Yams and cocoyam	1,378.80	242.94
<b>Sub-Total Food</b>	<b>18,784.06</b>	
Body care	236.88	23.19
Clothing	973.88	68.29
Education	1,494.24	169.01
Energy	531.08	151.00
Health Services	372.17	29.28
House Rent	612.67	94.87
Telecommunication	364.57	110.46
Transportation	597.71	91.61
Utilities & Others	219.13	32.27
<b>Sub-Total, Non-Food</b>	<b>5,402.33</b>	
<b>Total Consumption</b>	<b>24,186.39</b>	
Average Household Size	6.78	
Per Caput Consumption/month	3,567.31	

Source: Computed from Survey Data, 2009

Considering the cost of living (i.e. average prices of food commodities at the time of the study) and the dietary energy contents of the consumed food items, results on Table 21 show that the average dietary energy intake per household per day was 10,169.68 kcal at a cost of ₦806.21, while the per caput daily dietary energy intake was 1,499.95 Kcal/day at a cost of ₦118.91. This falls far below the estimated minimum per caput daily dietary energy requirement of 2,557 Kcal/person/day (see: Table 22). However, it is worthy of note that the minimum dietary energy requirements recommended by FAO/WHO/UNU varies with age, sex and the body mass index (BMI) of the reference person (FAO, 2008). Thus, the per caput dietary energy requirement estimate (2,557 Kcal/person/day) used in the study was an average calculations based on the sample mean household size of 6.78 (i.e. seven persons) that is composed of infant (mean=0.24), children (mean = 1.18), adolescents (mean=1.45), youths (1.38), middle age adults (mean = 2.05), and the aged (mean = 0.49).

On the basis of the observed cost of living and dietary energy content of the existing pattern of household consumption using the method of Cost of Basic Needs (Mukherjee and Benson, 2003; Fambon, 2006), the study estimated that an average household in the sample would require a daily per caput consumption of at least ₦202.71 per person per day to enable its members meet the dietary energy requirement for an healthy life.

By making a 20% provision for mark-up non-dietary food expenditure, therefore, it was determined that an appropriate poverty line for rural farm household in the study area should not be less than ₦253.39 at 2009 prices, if the objective of poverty alleviation must encompass ensuring that rural farm households have sufficient income to enable them purchase the food and non-food items that can supply the recommended dietary energy requirement for living an healthy life, among other objectives. Thus, computation of the FGT poverty indices for an average rural farm household in southwest Nigeria, and analysis of the variations of the measures across households' socio-economic groups, was based on an absolute poverty line of ₦253.39.

**Table 21: Dietary energy content of an average farm household's consumption**

Consumption Items	Dietary Energy Content (Kcal/Kg)	Actual Consumption		
		Expense (N)	Avg. Price (N/Kg)	Dietary Energy Intake (Kcal)
<b>Household Consumption per month (Mean Household Size = 6.78)</b>				
Beverages	4,000.00	486.82	1,100.00	1,770.24
Bread and Baked Products	2,389.00	722.98	145.00	11,911.75
Cassava granules & flour	1,100.00	1,863.20	95.00	21,573.94
Cowpea & Other Beans	3,364.78	1,169.27	156.00	25,220.09
Eggs	1,228.89	224.22	295.00	934.04
Fish	709.46	2,440.89	300.00	5,772.38
Fruit Vegetables & Spices	488.02	1,648.91	116.00	6,937.13
Leafy Vegetables	263.89	328.40	82.00	1,056.90
Maize & Other Cereals	3,176.88	795.49	68.00	37,164.53
Meats	1,687.47	3,138.12	450.00	11,767.74
Milk and Dairies	1,840.00	312.06	650.00	883.36
Rice	3,701.80	2,952.05	164.00	66,633.69
Vegetable Oil & Others	8,729.27	1,322.85	120.00	96,229.52
Yams and cocoyam	1,000.00	1,378.80	80.00	17,234.96
<b>Total Food Consumption/month</b>		<b>18,784.06</b>		<b>305,090.30</b>
Add: Non-Food Expenses		5,402.33		
<b>Total Household Consumption/month</b>		<b>24,186.39</b>		<b>305,090.30</b>
<b>Average Daily Consumption</b>				
Consumption Per Household /day		806.21		10,169.68
<b>Consumption Per Person /day</b>		<b>118.91</b>		<b>1,499.95</b>

Source: Computed from Survey Data, 2009

Table 22 further summarized the mean per capita income as well as the associated incidence, depth and severity of poverty among rural farm households in the sample. The per capita income in an average rural farm household in the sample was ₦ 206.72 per day. The associated incidence of poverty was 0.7640, implying that 76.40 percent of the farm households drawn from rural communities in southwest Nigeria earned income that was not sufficient for procuring the food and non-food consumption items that can guarantee that an average member of the household lived an healthy life in 2008/2009, and these households were thus classified as poor. This finding was in line with the findings of HDR, 2007/2008 (70.8%) and Oluwatayo, 2009 (76.3%). The poverty depth was estimated to be 0.3287, implying that the poor rural farm households require 32.87 per cent of the poverty line (₦ 83.29 per person per day or ₦17, 091/month) to get out of poverty. The poverty severity ( $P_2$ ) was also estimated to be 0.1733 suggesting 17.33 percent of the rural farm households suffer severe poverty (Table 22).

**Table 22: Estimates of daily dietary energy requirements and Poverty in an average farm household**

Category	Mean of Number In the sampled Farm Households	Recommended Dietary Energy Intake (Kcal/person/day)			Dietary Energy Requirement (Kcal/day)
		Min	Max	Mid Poin	
Infants (<1year)	0.24	464	775	620	146
Children 1-<10	1.18	865	1978	1422	1,677
Adolescent 10-<18	1.45	2006	3410	2708	3,915
Youths (18 – <30)	1.38	1650	4500	3075	4,244
Adults (30 – <60)	2.05	1750	4200	2975	6,095
Aged 60+	0.49	1550	3600	2575	1,264
<b>TOTAL</b>	<b>6.78</b>				<b>17,341</b>
<b>Estimated Per Caput Dietary Energy Requirement (Kcal/person/day)</b>					<b>2,557</b>

**Estimated Cost of Per Caput Dietary Energy requirement**

$$= \frac{118.91}{1499.95} \times 2557 = N202.71/ person/ day$$

**Add: Mark-up for other non-dietary consumption expenditure items (20%) = N50.68**

**Absolute Poverty line = N253.39**

**Calculated Mean per Capita Income (N/day) = N206.72**

**Poverty Estimates (from the Poverty line of N253.39) for the Rural Farm Households in Southwest Nigeria Using FGT Poverty measure**

**Poverty Incidence  $P_0$  = 0.7640**

**Poverty Depth  $P_1$  = 0.3287**

**Poverty Severity  $P_2$  = 0.1733**

Source: Author's computations based on Survey Data and FAO (2008), Human Energy Requirement: Report of a Joint FAO/WHO/UNU Expert Consultation, FAO Food and Nutrition Technical Report Series 1, FAO Rome.



### 5.2.2 Farm Household Poverty Status by the Profiles of the Household Heads

Here, the profiles of rural farm households are analysed in terms of their poverty status by the socio-economic characteristics of the households' heads which are hypothesized to influence the lives and well-being of household members. Table 23 presents the distribution of rural farm households' poverty status by the socio-economic characteristics of the household heads.

Evidence in Table 23 revealed that poverty incidence was most noticed among the rural farm households whose heads were between the age bracket of 31 and 60 years. The size of the poverty incidence however varied though not significantly different between the group represented in the 31-60 years age bracket at  $p < 0.05$ . However, at a higher age bracket of 60 years and above, the poverty incidence declined though marginally. This can be attributed to the possibility of private income transfers or remittances from wards residing outside the rural communities. In terms of the gender of household heads, poverty incidence was more pronounced among the female-headed households; although, this was not significantly different at 5 percent test level.

Also, the poverty incidence tends to be consistently increasing in levels, as the marital status of the household heads is getting more demanding (i.e. from married to separated). Non-married (single) household heads, however, had the least poverty incidence; thus implying that, the single or non-married household heads have more time for both farm and non-farm jobs. This is probably because of their smaller household size, which manifested as higher per capita income.

Education is an important determinant of poverty (Cai *et al.*, 2008). For instance, evidence in this study revealed that poverty incidence is most prominent (81%) among households whose heads had primary school education, and the incidence decreased as level of education attainment increased. There were also significant difference in the incidence of poverty ( $p < 0.05$ ) across the formal education categories (Table 23). Households whose main occupation was paid employments had the least poverty incidence (69.23%). This was closely followed by households whose heads main occupation was farming while those households whose heads were involved in transportation service had the highest level of poverty incidence, but with no significant difference revealed across the different occupational groups.

**Table 23: Distribution of Rural Farm Households Poverty by Personal Characteristics of Household Heads**

Description	Mean per Capita Income ₦/day	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
<b>Age group of Household Heads</b>				
≤30	317.18 <sup>b</sup>	0.5000 <sup>a</sup>	0.1895 <sup>a</sup>	0.0883 <sup>a</sup>
31-40	196.53 <sup>a</sup>	0.8182 <sup>b</sup>	0.3853 <sup>b</sup>	0.2114 <sup>b</sup>
41-50	208.14 <sup>a</sup>	0.7899 <sup>b</sup>	0.3223 <sup>b</sup>	0.1713 <sup>b</sup>
51-60	197.40 <sup>a</sup>	0.7955 <sup>b</sup>	0.3235 <sup>b</sup>	0.1622 <sup>a</sup>
Above 60	211.06 <sup>a</sup>	0.6522 <sup>a</sup>	0.3148 <sup>b</sup>	0.1730 <sup>b</sup>
F	1.881	3.215 <sup>**</sup>	2.084 <sup>*</sup>	1.748
<b>Gender of Household Heads</b>				
Male	212.55	0.7558	0.3161	0.1632
Female	176.80	0.8060	0.3937	0.2252
F	2.801 <sup>*</sup>	0.780	5.216 <sup>**</sup>	6.601 <sup>**</sup>
<b>Marital Status of Household Heads</b>				
Single	315.74 <sup>b</sup>	0.4211 <sup>a</sup>	0.2218	0.1255
Married	199.45 <sup>a</sup>	0.7793	0.3365	0.1780
Widowed	227.01 <sup>a</sup>	0.7857	0.2242	0.0877
Seperated	235.29 <sup>a</sup>	0.8182	0.3861	0.2111
F	3.431 <sup>**</sup>	4.461 <sup>***</sup>	2.203 <sup>*</sup>	1.717
<b>Educational Level of Household Heads</b>				
No Formal	189.84 <sup>a</sup>	0.7308	0.3115 <sup>b</sup>	0.1527 <sup>b</sup>
Primary	169.28 <sup>a</sup>	0.8085 <sup>b</sup>	0.3978 <sup>c</sup>	0.2270 <sup>c</sup>
Secondary	213.08 <sup>a</sup>	0.7778 <sup>b</sup>	0.3119 <sup>b</sup>	0.1607 <sup>b</sup>
Tertiary	298.27 <sup>b</sup>	0.6429 <sup>a</sup>	0.2193 <sup>a</sup>	0.0940 <sup>a</sup>
F	9.480 <sup>***</sup>	2.213 <sup>*</sup>	7.498 <sup>***</sup>	8.575 <sup>***</sup>
<b>Main Occupation of Household Heads</b>				
Farming	205.60	0.7395	0.3268	0.1728
Trading	170.82	0.8519	0.4246 <sup>b</sup>	0.2495 <sup>b</sup>
Artisan	175.26	0.8148	0.3626	0.1849
Paid Employment	265.77	0.6923	0.2363	0.1004
Transporter	198.65	0.8571	0.2929	0.1475
Others	260.09	0.8000	0.4140 <sup>b</sup>	0.2554 <sup>b</sup>
F	2.328 <sup>**</sup>	1.341	3.308 <sup>***</sup>	4.076 <sup>***</sup>
<b>Farming Experience of Household Heads</b>				
1-10	226.14	0.7538	0.2998	0.1435
11-20	205.23	0.7955	0.3425	0.1818
21-30	213.45	0.7190	0.3017	0.1575
31-40	191.02	0.7821	0.3645	0.2035
Above 40	163.03	0.8000	0.3642	0.1991
F	0.758	0.588	1.095	1.353

\*, \*\*, \*\*\* indicate significant level at 10, 5, and 1 % respectively. Different superscripts are significantly different at  $p < 0.05$

Source: Author's computation from field survey, 2009.

Evidence further showed that there was no significant difference in the poverty incidence of households whose heads had different lengths of farming experience. Poverty incidence was, however, most noticed among households whose heads had over 40 years' farming experience. This may be attributed to age-related reduction in strength both to cultivate large hectares of farmland and in particular to withstand farming drudgery.

In terms of the poverty depth ( $P_1$ ), evidences suggest that there are significant differences in the poverty depths within and between age, as well as for those computed on the basis of educational attainment, and the main occupation of the household heads at  $p < 0.05$ . Similar patterns were mirrored by poverty severity estimates for the sampled household heads across the sampled states with the exception of those for the gender, marital status and farming experience. Specifically, rural farm households whose head were within the age bracket 31-40 years, female, separated (from earlier marriages), had primary school education, engaged in trading, and have 31-40 years farming experience had the highest poverty depth across the whole sample.

Poverty severity was even most expressed by households whose heads were within 31-40 age brackets (21.14%), female (22.52%), had primary school education (22.70%), and engaged in other jobs (25.54%). On the contrary, the households whose heads were less than 30 years of age (8.83%), had tertiary level education (9.42%), and widowed (8.77%) had the least poverty severity.

The F-tests of the distributions of the poverty status of the household heads by personal characteristics indicated that age, gender, marital status, educational attainment, and the main occupation of the household heads are significantly associated with the poverty estimates computed with data sourced from the rural farm households in southwest Nigeria.

### **5.2.3 Rural Farm Households Poverty Status by Household Characteristics.**

Household composition and other characteristics are considered to be important factors in determining households' poverty status (Shorrocks and Wan, 2005; Wan and Zhang, 2007) due to their multiplier effect on the poverty outcomes. Table 24 presents the distribution of household characteristics by poverty outcomes of the households.

The results revealed that poverty incidence was relatively higher among non-native households (78.72%). However, the estimation for non-native households was not significantly different ( $p < 0.05$ ) from that of native households, which was 74.44 percent. Results also indicated that there was a positive correlation between the poverty incidence and household size (Table 24).

**Table 24: Distribution of Rural Farm Household Poverty by Household Characteristics.**

Description	Mean per Capita Income ₦/day	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
<b>Nativity of Household Head</b>				
Non-native	209.23	0.7872	0.3418	0.1785
Native	204.61	0.7444	0.3177	0.1690
F	0.085	1.036	0.904	0.280
<b>Household Size</b>				
1-3	434.82 <sup>b</sup>	0.3462 <sup>a</sup>	0.0482 <sup>a</sup>	0.0141 <sup>a</sup>
4-6	212.94	0.7699	0.2893 <sup>b</sup>	0.1329 <sup>b</sup>
7-9	165.80	0.8168	0.4157 <sup>b</sup>	0.2423 <sup>b</sup>
10-12	134.44	0.8182	0.5194 <sup>c</sup>	0.3504 <sup>c</sup>
13 or more	142.52	1.0000	0.4299 <sup>b</sup>	0.2325 <sup>b</sup>
F	19.801 <sup>***</sup>	7.836 <sup>***</sup>	19.098 <sup>***</sup>	21.388 <sup>***</sup>
<b>Economically Active Household Members (Number of Income Earners)</b>				
Only one	201.89	0.7753	0.3459	0.1949
Two members	219.78	0.7418	0.3097	0.1582
Three or more members	185.15	0.7982	0.3518	0.1854
F	1.740	0.673	1.234	1.611
<b>Farm size(Ha)</b>				
Below 1 Ha	214.03	0.7561	0.3333	0.1766
1.0- <3Ha	205.67	0.7813	0.3283	0.1735
3.0 or more	199.46	0.7396	0.3237	0.1689
F	0.229	0.337	0.038	0.048
<b>Type of Residential Building</b>				
Block house	223.34	0.7348 <sup>a</sup>	0.2915 <sup>a</sup>	0.1412 <sup>a</sup>
Brick	207.00	0.6842 <sup>a</sup>	0.3087 <sup>a</sup>	0.1734 <sup>a</sup>
Mud	189.24	0.8208 <sup>b</sup>	0.3742 <sup>b</sup>	0.2070 <sup>b</sup>
F	2.010	3.004 <sup>*</sup>	4.912 <sup>***</sup>	5.919 <sup>***</sup>
<b>Owner of Residential Building</b>				
Head and/or Spouse	205.31	0.7377	0.3201	0.1672
Extended Family	184.96	0.8333	0.3722	0.2168
Rented Apartment	221.54	0.7900	0.3170	0.1559
Others	230.66	0.7143	0.4233	0.2627
F	0.710	1.000	1.060	2.117 <sup>*</sup>
<b>Available Toilet Facility within Household</b>				
None	183.65	0.7500	0.3884	0.2310
Water closet	285.32	0.6596	0.1993	0.0815
Pit Latrine	199.13	0.7829	0.3369	0.1762
F	6.797 <sup>***</sup>	1.757	8.074 <sup>***</sup>	9.410 <sup>***</sup>

*\*, \*\*, \*\*\* indicate significant level at 10, 5, and 1 % respectively. Different superscripts are significantly different at  $p < 0.05$*

*Source: Author's computation from field survey, 2009.*

Thus, the larger the higher the household size, the higher the incidence of poverty. Household size of 1-3 persons had the least poverty incidence and this increased with higher household size categories. Households with 13 or more people, however, had the highest poverty incidence (100 percent). Also, there was a significant difference between the poverty incidence estimate for the 1-3 household size bracket and other household size categories at  $p < 0.05$ .

Households with two economically active members (or income earners) had the least poverty incidence of 0.7418 while households with three or more working members had the highest value of poverty incidence of 0.7982. Nonetheless, no significant difference (at 5 percent) was observed, irrespective of the number of economically active members among the rural households (Table 24). Access to shelter and accompanying facilities is also important in assessing poverty status of rural farm households.

Results further revealed that households living in mud buildings that were owned by extended family and with pit latrines recorded most incidence of poverty while households living in brick houses owned by either the head of households or spouses, and with water closet type toilet facilities had the least incidence of poverty. Furthermore, poverty incidence was highest among farm households that owned less than three hectares of farmlands, but there was no significant difference across the farm size categories (Table 24).

In terms of the poverty depth ( $P_1$ ), results suggest that there were significant differences in the poverty depths of households distributed by household size, and by the type of residential building. Similar outcomes were observed for poverty severity ( $P_2$ ) distributed by household composition, and type of residence. Further, rural farm households that were non-native, with household size of 10-12 people, with three or more economically active members, and living in mud houses that were owned by extended family and with no toilet facility had the highest value of poverty depth across the study sample. Furthermore, poverty severity was least expressed by rural farm households with size composition of 1-3 members (1.41%), and water closet type of toilet facility (8.15%).

Results in Table 24 also indicated that households with water closet type of toilet facility, and those households with the least size of 1-3 people had the highest average daily per capita income of ₦285.32 and ₦ 434.82, respectively. The findings thus suggest that the lower is the household size, the better is the per capita income outcome of the rural farm household. Hence, the relatively low poverty severity (1.41%) recorded for 1-3 person households in the sample. Household size was a significant variable particularly in distributing poverty outcomes among rural farm households at  $p < 0.01$ . This finding is consistent with a priori expectations.

Likewise, types of residential building and toilets facility within the households yielded significant distributions of rural farm households' poverty outcomes in the study area.

#### **5.2.4 Rural Farm Households' Poverty Status and Households' Access to Social Amenities.**

Access to social amenities is not only important to the quality of life being lived by people but to a large extent, activities in the non-farm sector. They depend more on availability of basic social amenities. Thus, this study analysed poverty outcomes by households' access to basic social amenities available in the community. The results are summarized in Table 25.

Analysis of the sampled rural farm households' access to social amenities in relation to their poverty outcomes showed that the incidence of poverty was highest among rural farm households that were living in communities with non-motorable roads (100%), followed by those living in community with tarred roads, while communities that have access to good tarred roads had the least poverty incidence (Table 25).

Also, significant difference was found for the poverty incidence estimated in relation to the various types of access road to the community at  $p < 0.05$ . Overall, the poverty incidence estimates were not significantly associated with the different types of road found across the communities (F-test value). Poverty incidence was, however, high among households whose communities were linked or to national electric grid. Besides, the estimates were highly comparable, though non-significant within and between groups. The high poverty incidence may be attributed to the epileptic electric power supply in the country, which is likely to paralyse income generating activities, thereby limiting income-earning possibilities within households.

Access to drinking water can promote the health status of the households. Results revealed that poverty incidence was highest among households that sourced their drinking water from boreholes, followed by those that sourced water from both borehole and stream sources, while those that got water from the pipe borne were the least poor (Table 25). Evidence also suggested that the poverty incidence in relation to sourcing pipe borne water by rural farm households was significantly different from the poverty outcomes obtained for other sources at  $P < 0.05$ .

**Table 25: Analysis of the Extent of Poverty by Farm Households' Access to Community Infrastructure**

Description	Mean per Capita Income ₦/day	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>
<b>Access Road to Community</b>				
Non motorable	136.14	1.0000 <sup>c</sup>	0.4554	0.2469
Untarred but motorable	208.96	0.7590 <sup>b</sup>	0.3188	0.1654
Tarred but not in good state	188.12	0.8400 <sup>b</sup>	0.4101	0.2309
Tarred but in good state	214.98	0.7238 <sup>a</sup>	0.3050	0.1598
F	0.784	1.582	2.718 <sup>**</sup>	2.425 <sup>*</sup>
<b>Available Source of Electricity</b>				
Not Linked to national grid	228.35	0.7143	0.3643	0.2183
Linked to national grid	203.31	0.7718	0.3231	0.1663
F	1.180	0.886	1.255	3.978 <sup>**</sup>
<b>Source of Drinking Water</b>				
Stream	206.65 <sup>a</sup>	0.7475 <sup>b</sup>	0.3128 <sup>a</sup>	0.1594 <sup>a</sup>
Borehole	176.62 <sup>a</sup>	0.8385 <sup>b</sup>	0.3971 <sup>b</sup>	0.2233 <sup>b</sup>
Borehole & Stream	219.11 <sup>a</sup>	0.7521 <sup>b</sup>	0.2707 <sup>a</sup>	0.1228 <sup>a</sup>
Pipeborne	318.53 <sup>a</sup>	0.4667 <sup>a</sup>	0.2481 <sup>a</sup>	0.1547 <sup>a</sup>
F	7.318 <sup>***</sup>	6.907 <sup>***</sup>	7.361 <sup>***</sup>	7.832 <sup>***</sup>
<b>Available Postal Facility</b>				
None	207.59	0.7540	0.3508	0.1925
Postal Office	236.60	0.7143	0.2722	0.1337
Post Agency	200.58	0.7899	0.2970	0.1445
F	0.468	0.468	2.527 <sup>*</sup>	3.675 <sup>**</sup>
<b>Available GSM Network</b>				
None	329.82 <sup>b</sup>	0.4545 <sup>a</sup>	0.2512	0.1593
One network	244.90	0.6667 <sup>b</sup>	0.3469	0.2049
At least two networks	198.46	0.7849 <sup>b</sup>	0.3290	0.1701
F	5.003 <sup>***</sup>	4.524 <sup>**</sup>	0.610	0.719
<b>Highest level of Health Facilities within 5km radius</b>				
None	253.07 <sup>b</sup>	0.6538	0.3045	0.1713
Govt. Health centre	204.54	0.6563	0.3109	0.1743
Govt. Maternity centre	213.17	0.7966 <sup>b</sup>	0.3312	0.1719
General Hospital	189.60	0.8136 <sup>b</sup>	0.3406	0.1746
F	2.208 <sup>*</sup>	3.636 <sup>**</sup>	0.387	0.008
<b>Highest Level of Education Facility within 5km radius</b>				
None	306.37	0.5600 <sup>a</sup>	0.2636	0.1482
Nur/Pry	192.24	0.8049 <sup>b</sup>	0.3512	0.1856
Secondary	203.92	0.7665 <sup>b</sup>	0.3243	0.1714
Tertiary	219.48	0.7097 <sup>b</sup>	0.2884	0.1339
Others	112.94 <sup>a</sup>	1.0000 <sup>c</sup>	0.5482 <sup>b</sup>	0.3280 <sup>b</sup>
F	3.228 <sup>***</sup>	2.265 <sup>*</sup>	1.785	1.541

*\*, \*\*, \*\*\* indicate significant level at 10, 5, and 1 % respectively. Different superscripts are significantly different at  $p < 0.05$*

*Source: Author's computation from field survey, 2009.*



Further, evidences abound of households being poor notwithstanding their access to diverse communication facilities like postal agencies, although, there was a significant difference in the estimated poverty incidence for households whose communities have access to GSM network coverage (Table 25). In addition, poverty incidence was higher for households whose communities host general hospital (0.8136) and primary school (0.8049) within 5km radius, and it was least for households whose communities do not have health or educational facilities within 5km radius. Also, there were significant differences in poverty incidence estimates across the public amenities at  $p < 0.05$ .

In terms of poverty depth and severity, evidences suggest that there were significant differences in the poverty depths and severity for households' analysis done with to drinking water, and in relation to education facility as social amenities. Considering the entire social amenities available to the rural farm households in the community of residence, evidences suggest that households living within the communities where the roads are non-motorable, and where other forms of educational facilities were available within 5km radius experienced the highest poverty depth and severity. These households required 45.54 percent and 54.82 percent, respectively, of the poverty line to get out of poverty.

The result revealed that poverty outcomes have significant association ( $p < 0.01$ ) with the source of drinking water in rural farm households included in the final sample.

### **5.2.5 Rural Farm Households' Poverty Outcomes on Farming/ Non-farm Activities**

The level of household activities indirectly affects the well-being of the members more particularly in area of income generation. Therefore, the households' activities within the farm were critically examined along with their poverty level. Table 26 summarizes the results.

The results revealed that the daily mean per capita incomes of households members participating in various farming activities except with the arable cropping were higher than the daily mean per capita incomes of non-participating households members in various farming activities. In the non-farm sector, the daily mean per capita incomes of households' members non-participating in various non-farm activities were higher than the daily mean per capita incomes of households' members participating in various non-farm activities except with the social and community service.



**Table 26: Poverty Outcomes among Rural Farm Households within Farm and Non-farm Sectors**

<b>Description</b>	<b>Mean per capita Income ₦/day</b>	<b>P<sub>0</sub></b>	<b>P<sub>1</sub></b>	<b>P<sub>2</sub></b>
<b>Farming Activities</b>				
<b>Participating in Arable Cropping</b>				
Non-Participant	231.77	0.5714	0.2606	0.1260
Participant	205.37	0.7744	0.3324	0.1759
<b>Participating in Tree Cropping</b>				
Non-Participant	202.42	0.8038	0.3585	0.1943
Participant	209.41	0.7391	0.3101	0.1603
<b>Participating in Raising Livestock</b>				
Non-Participant	200.51	0.7913	0.3330	0.1719
Participant	228.87	0.6667	0.3134	0.1786
<b>Participation in Natural Resources gathering</b>				
Non-Participant	201.07	0.7806	0.3289	0.1709
Participant	246.59	0.6471	0.3275	0.1905
<b>Participation in Agro-processing</b>				
Non-Participant	198.64	0.7873	0.3317	0.1712
Participant	221.88	0.7203	0.3231	0.1774
<b>Non-Farm Activities</b>				
<b>Participation in Non-farm Unskilled Labour Wage Employment</b>				
Non-Participant	209.64	0.7792	0.3297	0.1723
Participant	196.86	0.7128	0.3252	0.1768
<b>Participation in Non-farm Skilled Labour Wage Employment</b>				
Non-Participant	206.95	0.7537	0.3295	0.1771
Participant	205.70	0.8108	0.3252	0.1564
<b>Participation in Non-farm Self Employment</b>				
Non-Participant	192.24	0.7403	0.3562	0.2022
Participant	210.06	0.7695	0.3224	0.1667
<b>Participation in Social and Community Service</b>				
Non-Participant	202.14	0.7760	0.3339	0.1757
Participant	254.43	0.6389	0.2747	0.1485
<b>Participation in Non-Labour Investment</b>				
Non-Participant	224.81	0.7273	0.3434	0.1902
Participant	205.14	0.7672	0.3274	0.1719

**Source: Author's computation from field survey, 2009**

In term of the poverty estimates, poverty incidences were higher among the non-participating households in all identified farming activities in the farm sector than the participating households. The only exception is for the arable cropping, where poverty incidence was higher among the participating households than the non-participating households. Considering the non-farm sector, the poverty incidence estimates were higher among the non-participating households in non-farm unskilled labour wage employment, as well as the social and community service than the participating households. The participating households in other non-farm activities experienced higher poverty incidence than the non-participating households.

The results in Table 26 further revealed that poverty depths were higher among the non-participating households in all farming and non-farm activities than the non-participating households. The only exception is for the arable cropping, where poverty depth was higher among the participating households than the non-participating households.

Considering the farm sector, the poverty severity estimates were higher among the participating households in arable cropping, raising livestock, natural resources gathering, and agro-processing than the non-participating households. The non-participating households in most non-farm activities experienced higher poverty severity than the participating households. The exception was found for the non-farm unskilled labour wage employment in the non-farm sector, where poverty severity was higher among the participating households than the non-participating households.

### **5.3 Effects of Diversification into Non-Farm Activities on Household Poverty Outcome**

This section analysed the influence of the diversification of household resources into non-farm activities on their poverty status. This was done in order to establish the linkage between household income diversification and household poverty. In examining the effects of diversification into non-farm activities by the rural farm households on their poverty status, the Probit model was specified. This provides justification for the worthwhileness of the farm households investing time and resources on non-farm activities. Specifically, following from Sundaram and Tendulkar (2007) as well as Malek and Usaim (2010), an estimation of the Probit model analysing the probability of being poor was carried out. The results are summarized in table 27.

**Table 27: Probit Analysis of the Effects of Diversification into Non-Farm Activities on Household Poverty Status**

(Poverty Status = Dependent Variable)	Marginal Effect		P[ z >z]
Variables	Coefficient		Probability
Age of Household head	-0.0058**	(0.0028)	0.0353
Gender of Household head(Female = 1)	0.0851	(0.0758)	0.2616
Educational level of Household head	-0.0721**	(0.0353)	0.0364
Marital status of the head (Single =1)	-0.1373	(0.1145)	0.2305
Single Parent (Yes = 1)	0.1490	(0.1134)	0.1888
Nativity of the household (Native = 1)	-0.0663	(0.0455)	0.1450
Household size	0.0710***	(0.0184)	0.0000
Dependency ratio	0.1474	(0.1729)	0.3941
Volume of Credit	-0.32E-09	(0.16E-06)	0.9984
Per capita landholding	-0.4349***	(0.1133)	0.0000
Per capita animal	-1.7856	(1.1196)	0.1107
Per capita Investment	-0.47E-05 ***	(0.14E-05)	0.0007
Proportion of land devoted to Tree crop	-0.1591**	(0.0703)	0.0236
House Owned by household	-0.0910*	(0.0497)	0.0782
Diversification within the Farm	-0.0354*	(0.0196)	0.0723
Diversification within the Non-Farm	- 0.0083*	(0.0048)	0.0819
Participation in NFULWE	-0.1068**	(0.0527)	0.0425
Participation in NFSLWE	-0.1102**	(0.0557)	0.0465
Participation in NFSE	0.0802	(0.0551)	0.1461
Participation in SCS	0.1281	(0.0908)	0.1584
Linked to National Electricity Grid	-0.1216**	(0.0317)	0.0101
Access Road	-0.0242	(0.0586)	0.6789
Linked to Public Water	0.3786***	(0.1190)	0.0015
Government Health Facility	0.0157	(0.0873)	0.8575
Ekiti state	-0.0848	(0.0762)	0.2660
Osun state	0.2360***	(0.0597)	0.0001
Constant	-0.0699	(0.2443)	0.7747
Log Likelihood function	-162.6314		
Chi-squared (L.R statistics)	123.90***		0.0000
Restricted log likelihood	-224.5854		

\*, \*\*, \*\*\* indicate significant level at 10, 5, 1 % respectively. Figure in parentheses are standard errors

**Source: Data Analysis, 2009**

The results in table 27 revealed that age, education, per capita landholding, per capita investment, proportion of land devoted to tree crops, household ownership a permanent house, diversification into farm sector, diversification into non-farm sector, participation in non-farm unskilled and skilled labour wage employments (NFULWE and NFSLWE), and availability of electricity were the factors that significantly reduced the probability of being poor by the rural farm households. Hence, revealing their poverty reducing potentials.

Household size increased the probability of being poor by the rural farm households. The marginal analysis revealed that a unit increase in human capital or private assets variables like age and education level of the household head would reduced the probability of rural farm households being poor by 1.98 and 2.52 percent, respectively, while a unit increase in household size had the probability of significantly worsen the poverty situation of the households by 18.53 percent. The more per capita land and investment assets the household owned, the higher the probability of not being poor. Owning a permanent house by the household thus offer a significant way out of poverty.

The marginal analysis revealed that an increase in farm and non-farm diversification levels of the farm households had the probability ( $p < 0.10$ ) of reducing the poverty situation of the rural farm households by 3.54% and 0.83%, respectively. The results further revealed that households' participation in skilled and unskilled wage employment were the main non-farm activities that significantly reduced the poverty level of the households ( $p < 0.05$ ). Increase in the participation in skilled and unskilled wage employment by the rural farm household members will reduce their poverty level by 11.02% and 10.68%, respectively. The finding implies that poverty reduction can be achieved to a greater extent when farm households augment their farm incomes with incomes from non-farm unskilled and skilled wage employment. Access to electricity or rural electrification significantly reduced household poverty by 12.16 percent ( $p < 0.05$ ). This finding indicates that, getting rural farm households out of poverty would require investing on rural electrification, which would likely promote equitable non-farm sector development in rural southwest Nigeria.

Conclusively, for rural farm households to escape poverty, private acquisition like educational attainment should be improved upon. Household productive assets like land, investment assets and permanent residency should be secured. Also, diversification into non-farm activities particularly unskilled and skilled wage employment with involvement in farm activities should be encouraged and promoted. Likewise, rural development effort should be centred on rural electrification.

## CHAPTER SIX

### 6.0 SUMMARY, CONCLUSION AND RECOMMENDATION

#### 6.1 Summary of Major Findings

Given the background that poverty is a worldwide phenomenon and in most sub-Saharan African countries especially Nigeria, it is a rural phenomenon, this study investigated the extent and contributions of non-farm income diversification to poverty reduction among rural farm households in Southwest Nigeria. The study was based on primary data obtained in a cross-section survey of 411 rural farm households drawn by multi-stage sampling across 120 farming communities in three out of six states of the south western region of Nigeria viz Ekiti, Ogun and Osun states. The study data was analyzed by both descriptive and quantitative techniques.

Average age of head of household, household size and dependency ratio in the rural farm households were  $49.9 \pm 0.6$  years,  $6.8 \pm 0.1$  and  $0.7 \pm 0.1$ , respectively. The mean years of formal education was  $8.8 \pm 0.2$  with 83.7 percent being headed by male. In southwest, Nigeria, 45.7 percent of the rural farm households were non-native of the sampled farming communities, 56 percent of the households lived in brick and mud type houses and 59.4 percent of such houses were owned by the household heads or their spouses. In term of access to social amenities by the rural farm households, it was found that 60.6 percent of the sampled rural farm households lived in communities linked by untarred roads while 86.4 percent had their communities connected to the national electricity grid. About 55.2 percent of the rural farm households accessed public secondary schools as the highest level of education facility within 5km radius of their resident communities. Average rural farm household in the sample had access to  $2.14 \pm 0.09$  hectares of land (out of which 41 percent was devoted to tree crops production) and mean flock size of  $0.04 \pm 0.01$  while on average two members of the farm households contributed economically to the household income.

Rural farm households' nature of diversification into non-farm activities resulted in categorizing the non-farm livelihood options into five viz non-labour investment, non-farm unskilled labour wage employment (NFULWE), non-farm skilled labour wage employment (NFSLWE), non-farm self employment (NFSE), and social and community services (SCS). It was found that 94.9 percent of the rural farm households derived their income from a diversified portfolio of livelihood activities, with 61.81 percent of the households involved in only one non-farm labour activity (in which, the non-farm self employment had 52.31 percent), 30.41 percent of the households combined two different non-farm labour activities and 2.67 percent of the households combined three different non-farm labour activities to their farming

occupation. Poverty estimates (poverty incidence, depth and severity) were most profound among rural farm households that had their members involved in social and community service (SCS), combination of NFUL, NFSL and NFSE as well as combination of NFSL, NFSE and SCS activities. Involvements of non-poor farm households in all the farm activities were significantly higher than that of the poor farm households, except in arable cropping, where the participation of the poor farm households was significantly higher than the participation of the non-poor counterpart ( $p < 0.05$ ). The non-farm self employment activities (81.27%) was the prevalent non-farm labour income activity among the poor and non-poor households in southwest Nigeria, but involvements of the non-poor farm households in non-farm unskilled labour (NFUL), combination of non-farm unskilled labour and non-farm skilled labour (NFUL and NFSL), and combination of non-farm skilled labour and non-farm self-employment (NFSL and NFSE) were significantly higher than that of the poor farm households.

The income diversification level measured by the inverse of the Herfindahl index revealed that the mean income diversification level among rural farm households was 2.82. It revealed that an average rural farm household in southwest Nigeria got involved in almost three types of income generating activities distributed within the two sectors (that is the farm and non-farm sectors), with at least two farming activities and one non-farm job. The overall level of income diversification was significantly much higher among the sampled poor households (2.83) than the non-poor households (2.76) at  $p < 0.05$ . The average gross income per annum of the rural farm households was ₦511, 569.98. The share of farm income in total income was 32.92 percent while the share of non-farm income was 67.08 percent, out of which the non-labour income source was 21.95 percent, making the total non-farm labour income sources to be 45.13 percent. Non-farm self-employment contributed the highest share of 42.1 percent of the income from non-farm sources (average of 28.24% of total income) while social and community service contributed the least share of 3.38 percent.

The non-poor rural farm households derived the largest proportion of their farm income from tree cropping (0.1388) while the poor rural farm households derived the largest proportion of their farm income from arable cropping (0.1650). The proportion of income from livestock production, farm based activities and the whole farm activities in general were significantly ( $p < 0.10$ ) higher among the non-poor farm households than the poor farm households. The poor rural farm households significantly ( $p < 0.05$ ) derived more in labour oriented non-farm income diversification activities than the non-poor farm households. The income share derived from the non-farm self employment and the non-farm labour activities (46.10%) among the poor farm households were significantly ( $p < 0.05$ ) higher and different from what was obtained

among the non-poor rural farm households. All the activities in non-farm sector had more income share/participation estimates than all activities in farm sector. It was found that in the farm sector, income share/participation received by poor rural farm households in arable cropping, natural resources gathering and agro-processing were significantly ( $p < 0.05$ ) higher than that of non-poor rural farm households in such activities; also, income share/participation in non-farm skilled labour was significantly higher among the poor rural farm households than the non-poor households.

In assessing the returns to various non-farm activities undertaken by the members of rural farm households and compare the returns with what obtained on the farm; the study found that the average return to overall farm activities was ₦1773.35 with agro-processing having the highest value of ₦4553.15 while the average return to labour in all non-farm activities was ₦877.98 with return to labour in SCS having the highest value of ₦1464.62. The wage rate in farm activities was significantly higher and different from what obtained in the non-farm activities among the rural farm households at  $p < 0.01$ . The wage rate received in all labour activities by non-poor rural farm households was significantly higher than what was obtained by the poor households in the same activity at  $p < 0.01$ . The wage rates received by the non-poor rural farm households in all farm activities were significantly higher and different from what were obtained by the poor rural farm households in all other non-farm activities at  $p < 0.05$ .

The determinants of non-farm income diversification were analyzed from two perceptive: viz, non-farm resource allocation and overall household income diversification both at household levels. The determinants of non-farm resource allocation to various categories of non-farm activities by the individual farm household were analyzed via a two-stage decision process: (1) decision to participate, and (2) decision as to what amount of resources to be allocated (extent or level of participation). Also, the overall household income diversification was analyzed via a two-stage decision process, viz, (1) determinants of income shares, and (2) determinants of income diversification using the result of the inverse of Herfindahl index. For household decision to participate in any non-farm income activity, separate probit regression was posited for each category of non-farm activity.

The results revealed that each of age, gender, single-parent, educational level of the household heads, households' poverty status, the per capital asset base of the household and the wage rate received in non-farm unskilled labour activities were the factors that significantly determined the probability of the households participating in non-farm unskilled labour activities, while single-parent, educational level, per capita asset base of the household and wage rate received in the job were the factors that significantly determined the probability of



the rural farm households participating in non-farm skilled labour activities. Participation in non-farm self-employment was significantly determined by gender, educational level, poverty status, electricity, health facilities and location dummies, while the probability of the rural farm households' involvement in social and community service was significantly determined by gender, educational level, poverty status, single-parenthood, wage received, electricity, water sources and location variables.

Concerning extent of labour supply by rural farm households to non-farm activities, Tobit regression was posited for each non-farm activity. The results revealed that dependency ratio, per capita investment, wage rate in non-farm unskilled labour activities, amount of labour supplied to farm activities and location variable were the main albeit significant factors that determine labour allocation to non-farm unskilled labour wage employment, while education, marital status, dependency ratio, per capita investment base, non-farm skilled labour wage rate, amount of labour supply to farm activities, access to good road, good public water and location variable significantly determined the extent of labour supply by rural farm households to non-farm skilled labour. The extent of labour supply in non-farm self employment was significantly influenced by marital status, poverty status, per capita animal holding, availability of electricity, amount of labour supply to farm activities and availability of health centre, while the results confirmed that gender, marital status, household size, dependency ratio, poverty status, per capita land holding, wage rate in social and service community, availability of health facilities and location dummies were the major significant factors that determined labour allocation to Social and Community Service (SCS).

The determinants of wage rates received in non-farm activities were investigated. The estimated inverse Mills ratios derived from the probit equations for participating in each non-farm activity were used as additional regressors along with other explanatory variables for the wage offer equations to correct for selectivity bias. The approach was Heckman's sample selection model (Heckman, 1979), which was designed to account for the fact that the observed sample may be non-random. The results revealed that the wage rates received for combined non-farm activities (all together) were significantly determined by gender, education, household size, level of income diversification, labour supply to all non-farm activities, some public assets/ infrastructure (like availability of electricity), and location dummies.

The wage rates received for non-farm unskilled labour wage employment (NFULWE) were significantly affected by age, age squared, level of income diversification, labour supply to non-farm unskilled labour activities, nearness to urban centre, IMR and location dummies, while gender, education, labour supply to non-farm skilled labour activities, nearness to urban



centre, availability of health centre, IMR and location dummies were significant factors determining wage rates received by farm households' members that worked in non-farm skilled labour wage employment (NFSLWE). The wage rates received for non-farm self employment (NFSE) by farm households' members were significantly affected by gender, education, household size, labour supply to NFSE, availability of national electricity, health facilities, and location dummies, while the wage rates received for social and community service (SCS) by farm households' members were significantly determined by gender, education, level of income diversification, nearness to urban centre, all the communal infrastructure considered, IMR and location dummies.

Tobit regressions were posited to investigate the determinants of income shares from different sources. The results revealed that age, education, marital status, farming experience, household size, landholding, distance to the nearest urban towns and location dummies were the major significant determinants of rural farm households' farm share in total income. Age, gender, education, single-parent, experience in non-labour activities, nativity, dependency ratio, household owned permanent house, landholding, investment asset base, proportion of land devoted to tree cropping, distance to the nearest urban towns and location dummies were the significant factors affecting non-labour income share in total income of rural farm households. Also, age, gender, experience in non-farm unskilled labour activities, household size, landholding, investment asset base, proportion of land devoted to tree cropping, distance to the nearest urban towns and location dummies were the significant factors affecting non-farm unskilled labour income share in total income of rural farm households.

The results revealed that education, single-parent, experience in non-farm skilled labour activities, household size, landholding, distance to the nearest urban towns and location dummies were the significant factors affecting non-farm skilled labour income share in total income of rural farm households, while age, experience in non-farm self-employment activities, per capita animal asset, per capita investment asset, availability of electricity and health facilities, distance to the nearest urban towns and location dummies were the significant factors affecting non-farm self-employment income share in total income of rural farm households. Gender, education, marital status, dependency ratio, household owned permanent house, per capita landholding, animal asset base, investment asset base, availability of electricity and public water, and location dummies were the significant factors affecting social and community service income share in total income of rural farm households.

Tobit model was specified and used for the analysis of the determinants of income diversification with the inverse of Herfindahl index, a proxy for income diversification index

specified as the dependent variable. As such, the determinants of diversifications within the farm, non-farm and all sectors were determined for the farm households in the study sample. The results revealed that household size, dependency ratio, per capita land holding, per capita animal asset base, per capita investment asset base, distance to the urban area and location dummies were the significant factors determining the level of income diversification among rural farm households from all sectors. Single-parent, dependency ratio, per capita land holding, per capita animal asset base, availability of health facility and distance to the urban area were the significant factors determining the level of farm income diversification among rural farm households, while education, per capita land holding, per capita animal asset base, proportion of land devoted to tree crops, availability of electricity and public water, distance to the urban area and location dummies were the significant factors determining the level of income diversification among rural farm households into non-farm sector.

The poverty line was set for the study using the cost of basic needs method and the value was ₦253.39. The poverty incidence, depth and severity for the sample were 0.7640, 0.3287 and 0.1733, respectively while the mean per capita income in an average rural farm household in Southwest, Nigeria was ₦ 206.72 per day. Poverty incidence, depth and severity were most noticed among the rural farm households with large sized households, cultivated less than three hectares of land, living in mud houses and whose heads were female, had primary education as the highest educational attainment and non-natives. Educational attainment, main occupation of the household heads, household size, nature of household residential buildings, toilet facility and household source of drinking water were the factors that associated significantly with the poverty estimates, computed with data sourced from the rural farm households in southwest Nigeria.

In examining the effects of diversification into non-farm activities by the rural farm households on their poverty status, the Probit model was specified. The results revealed that age, education, per capita landholding, per capita investment, proportion of land devoted to tree crops, household owned a permanent house, diversification into farm sector, diversification into non-farm sector, participation in non-farm unskilled and skilled labour wage employments (NFULWE and NFSLWE) and availability of electricity were factors that significantly reduced the probability of being poor by the rural farm households, due to their poverty reducing potentials. Household size and availability of public water increased the probability of being poor by the rural farm households.

The marginal analysis revealed that an increase in farm and non-farm diversification level of the farm households had the probability ( $p < 0.10$ ) of reducing the poverty situation of

the rural farm households by 3.54% and 0.83%, respectively, while households' participation in skilled and unskilled wage employment significantly reduced the poverty level of the households ( $p < 0.05$ ). Increase in the participation of skilled and unskilled wage employment by the rural farm household members had the probability ( $p < 0.05$ ) of reducing the households poverty level by 11.02% and 10.68%, respectively.

## 6.2 Conclusions

First, most (94 percent) of the rural farm households derived their income from a diversified portfolio of livelihood activities, with an average of three income generating activities per rural farm household at both farm and non-farm sectors. The income diversification level was significantly higher among the poor farm households than the non-poor. Likewise, involvement in non-farm labour activities was significantly more noticed among poor than non-poor farm households. Non-farm activities accounted for 67.1 percent of the total household income with self-employment having the largest non-farm income source, contributing 42.1 percent of the non-farm income.

Second, the returns to labour allocated to non-farm activities by rural farm households in the rural farm communities of the southwest Nigeria were found to be significantly lower, on the average, than what obtained in the farm activities. Also, the poor households when compared to non-poor households received lower returns from non-farm activities, on the average, than what were obtained in farm activities. These returns suggested that involvements of rural farm households in non-farm income generating activities were necessitated by the search for additional income to ameliorate on the households' poverty level and the attendant effect.

Third, the main factors that encouraged income diversification into non-farm employment at rural farm household level in the southwest Nigeria were higher education, availability of rural electricity, increase in the proportion of farmland devoted to tree crops and nearness to urban areas. However, income diversification to non-farm employment by farm households reduced with increase in farm size, animal asset base and access to public water source. The implication of this for policy is that rural farm households diversified into non-farm employment because they were poor concerning household ownership of productive assets (i.e. small landholding and poor animal asset base).

Fourth, evidence in the study showed that poverty remain high (poverty incidence, depth and severity were 76.4%, 32.9% and 17.3%, respectively) among the rural farm households in the southwest Nigeria due to low per capita income, large household size,

cultivation of small farm size, poor living conditions in relation to residential buildings, lack of potable water and toilet facilities, as well as low educational attainment.

Fifth, diversification into non-farm income generating activities, particularly participation in non-farm skilled and unskilled wage employment, significantly reduced the probability of rural farm households being poor. Other factors that significantly reduced the likelihood of rural farm households being poor were education (human capital asset), landholding, investment asset base, and owned a permanent residence (household productive assets) and electricity (communal asset) while large household size may trap rural farm households more inside poverty.

### **6.3 Policy Implications and Recommendations**

The implications for policy arising from the conclusion of this study as follows; First, it is evident that participation in non-farm income generating activities among rural farm households was higher and this non-farm sector played an important role in providing substantial income share in total income of the rural farm households and in alleviating their poverty. Thus, policies that can broaden the sectoral base of rural non-farm enterprises should be aimed at. This could be done by providing enabling environment (like rural electrification) to operate small scale and rural or micro enterprises.

Second, based on the evidence in this study that the high poverty level noticed among the rural farm households was fuelled by poor living conditions and low human capital and household assets, the key policy required to reduce the poverty should aim at expanding social infrastructure, more especially access to electricity; putting in place appropriate land reform policies that will encourage acquisition of more farmland; improving the level of educational attainment by establishing more schools in rural farming communities and strengthening the Universal Basic Education (UBE) programme; and promulgating aggressive birth control policy.

Rural farm households' diversification into non-farm employment, which was largely explained by poor household ownership of productive assets (i.e. small landholding and poor animal asset base) and improved human capital (higher education) and communal assets (availability of rural electricity), calls for intensive human capital development, rural development programmes and institutional policies. Likewise, if these policies are aggressively pursued, it will help in human resources training and skill-building of rural farm households' members; since empirical evidence had confirmed that their participations in non-farm skilled

and unskilled wage employment significantly reduced the probability of rural farm households being poor.

Specifically, this study recommends as follows:

- (i) Nigerian government should intensify effort in providing basic social amenities in rural communities, especially, rural electricity.
- (ii) Government should encourage an integrated approach that promotes higher educational attainment among rural people because this will help in reducing their poverty status, as evidence had confirmed that poverty level was high among households with low educational attainment. In the diversification into non-farm income generating income with aim of reducing household poverty, households should encourage skill-building and training of members as artisans, for this effort will improve households' involvement in wage employments and consequently reduce the household poverty level.
- (iii) Enabling environment should be put in place by government to promote the production and ownership of more livestock by rural farm households, for this will provide the households with more income in combating poverty.
- (iv) Land reform policy should be reviewed to permit access to more land by rural farm households either through leasing or purchasing of such land for agricultural purposes.
- (v) Birth control should be encouraged through family planning policy among rural farm households to mitigate against high level of poverty, as the findings in this study, showed that there were high poverty outcomes among large-sized households and large household size fuel more poverty among rural farm households in the study area.
- (vi) Considering the low per capita income of an average rural farm household, policy should be aimed at raising incomes of rural farm households in both agricultural and non-agricultural sectors.
- (vii) Attention should be focused at understanding and developing the rural non-farm sector in Nigeria. This is to make the activities in the sector more rewarding and attractive to households with low household productive assets; as the study findings showed that the returns to labour allocated to non-farm activities by rural farm households in the southwest Nigeria were significantly lower, on the average, than what obtained in farm activities. Besides, participation in non-farm income generating activities among rural farm households provided substantial income share in total income, and with offered probability of reducing households' poverty.
- (viii) Evidence from the study showed that electricity was the main public asset that had significant effect on household poverty reduction. Therefore, government, communities and

non-governmental organizations should intensify effort on rural electrification in the rural farming communities of Southwest Nigeria.

#### **6.4 Suggestions for Further Research**

- (i) As poverty in Nigeria is still high and most rural dwellers are farmers, future research work should examine extensively the contributions of agricultural diversification or crop diversification on poverty reduction.
- (ii) Future research should investigate appropriate poverty reduction programme/strategy for specific geo-political zone in Nigeria, as this study covered only the southwest geo-political zone of Nigeria.

#### **6.5 Contributions to Knowledge**

- i). The study shows that the involvement in income generating non-farm labour activities is significantly higher among the poor farm households than the non-poor farm households in Southwest Nigeria.
- ii). Diversification into non-farm activities by the rural farm households in Southwest Nigeria is necessitated by ownership of or constraints experienced in terms of small landholding and poor animal asset base in the farm sector.
- iii). Non-farm employment that most rural farm households participated in is non-farm self employment but it is only non-farm wage employment (both skilled and unskilled wage employment) that significantly showed poverty-reduction potentials in Southwest Nigeria.
- iv). Most of the rural farm households had their members engaged in at least one non-farm livelihood activity to supplement the farm income and to achieve the cost (i.e. ₦253.39/person) of meeting the basic needs per day.

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**APPENDIX A**  
**SURVEY QUESTIONNAIRE**

**DEPARTMENT OF AGRICULTURAL ECONOMICS**  
**FACULTY OF AGRICULTURE AND FORESTRY**  
**UNIVERSITY OF IBADAN, IBADAN**

Dear Sir/Madam

**RURAL HOUSEHOLD SURVEY QUESTIONNAIRE**

It will be highly appreciated Sir/Ma, if you can kindly provide the following information on your household. The information is required in pursuit of a research aimed at assessing the extent to which the non-farm sector contribute to rural poverty alleviation in Southwest, Nigeria and identifying challenges faced by rural farm households in meeting the basic needs, and the response to various factors in this regard.

Please be assured that information supply shall be treated as strictly confidential, and will only be used for research purposes.

Thank you

**SCHEDULE A: COMMUNITY INFORMATION**

1. Name of Community: ..... Comm. Quest. No: .....
2. State: ..... LGA: ..... and Ward:.....
3. Estimated number of: (a) Buildings..... (b) People .....
4. Access road: ( ) Tarred & in good state ( ) Tarred, but in poor state ( ) Un-tarred but motorable ( ) Non-motorable
5. Electricity ( ) Linked to national grid ( ) Not linked to national grid ( )
6. Water source ( ) Pipe-borne ( ) Borehole ( ) Stream
7. Postal service ( ) Post Office ( ) Postal Agency ( ) None ( )
8. Land phone ( ) NITEL Analogue ( ) NITEL Digital ( ) None
9. Available GSM ( ) MTN ( ) Glo ( ) Celtel / Vmobile ( ) MTEL
10. Available Health Services ( ) General Hospital ( ) Maternity Centre ( ) Govt. Health Centre ( ) Private Hospital ( )
11. Available Schools ( ) Nur. / Pry ( ) Secondary ( ) Tertiary ( ) Others .....
12. Please tick important natural resource providing employment & income to community members: ( ) Forest ( ) Fishing waterfront ( ) Mineral deposit .....

13. Average monthly rent on (a) 2/3 bedroom flat ..... (b) Single room .....(c) Room & parlor ..... (d) Shop .....

14. Average cost of transport (a) Okada drop ..... (b) Taxi drop.....

15. Approximate distance, travel time & travel cost from community to:

Town / City	Distance (km)	Travel time (Hr)	Travel cost (₦)
(a) The nearest paved road			
(b) The nearest town			
(c) Local Govt. Headquarter			
(d) State headquarter			

### SCHEDULE B: HOUSEHOLD INFORMATION

Household Name:.....

1. Please specify the following on head of the household: (a) Age ..... (b) Sex .....

(c) Marital status ..... (d) Highest Education ..... (e) Religion .....

(f) Native community: ..... (g) LGA: ..... (h) State.....

(i) Main occupation: .....(j) Farming experience .....

2. Please specify the number of household members who are currently aged (a) <1yr old ..... (b) 1 - <10yrs ..... (c) 10 - <18 ..... (d) 18 - <60yrs ..... (e) 60yrs + .....

3. Number of household members that are generating income: Male .....Female .....

4. Number of household members that are members of the following organizations

(a). Cooperatives..... (b) Esusu / Ajo group .....(c) Peer Groups .....(d) Social Club .....

5. Type of residential building: ( ) Block house ( ) Brick house ( ) Mud house

6. Owner of residential building ( ) Household head ( ) Spouse ( ) Extended family member ( ) Rented apartment ( ) Others .....

7. Toilet facility ( ) Water closet ( ) Pit latrine ( ) others .....

8. Farm size: Arable crops ..... acres Tree crops .....acres

(9). Livestock owned: Cattle: ... Sheep/Goats .....Poultry ..... Pigs .....Others...

(10). Size, current worth & annual rental income (if any) from assets owned by household members:

Asset type	Size / No	Current worth	Income derived from asset in the last 1yr
Farm land			
Undeveloped landed property			
Buildings			
Farm / processing machines & equip.			
Commercial vehicles			
Commercial Okada			
Shares / Stock in companies			

Investment in private business			
Furniture			
Electronics (fan, TV radio etc)			
Refrigerator			
Generator			
Others .....			

10. If any member of your household procured a loan within the last two years from any of the following sources, please indicate the purpose, amount applied for, amount granted and interest

S/No	Source	Purpose	Amount requested	Amount granted	Interest Rate
1.	Banks				
2.	Cooperative Society				
3.	Govt. agency (e.g. OSAMCA)				
4.	Ajo / Esusu Group / Private lenders				

11. Please provide information on the following items consumed and/or used by your household in the last one month.

FOOD ITEMS	Harvested from farm		Purchased from others		Actually Consumption	
	Quantity	Value	Quantity	Value	Cooked at home	Bought from food vendors
Fish						
Meat						
Cow skin						
Other meats						
Eggs						
Dairy products						
Beans						
Rice						
Maize						
Yam, cocoyam						
Vegetables						
Bread						
Lafun						
Garri,						
Beverages						
Soup ingredients						
Other foods						
<b>NON FOOD ITEMS</b>					<b>Amount (N)</b>	
House rent						
Drugs and health care						
Clothing						
Body care e.g. saloons						
Transportation						

Education	
Recharge cards	
Energy (NEPA)	
Fueling (Petrol/ Diesel)	
Household furniture/fitting	

12. Please provide the following information on each parcel of land cultivated by any member of your household to arable crops within the last 1 year

Description	Arable Crop Farms				Tree Crops			
Crop(s)								
Total Farm size (Acre)								
Mode of land acquisition								
Number of separate plots / parcels								
Indicate size of each separate parcel if more than one								
No of cassava / tree crop stands /heaps								
Annual rent, if leased								
Average distance of parcels from home (miles)								
Cost of all planting materials planted								
Quantity of fertilizer used (bags)								
Total cost of fertilizer used (₦)								
Cost of other agrochemicals (₦)								
Total cost of tractor services used (₦)								
Total costs of hired labour used (₦)								
Worth of farm produce (₦)								
• Harvested and sold to date								
• Harvested and consumed at home								
• Yet to be harvested								

13. Please provide the following information on labour used on household the farm during the last production season.

Description	Arable Crop Farms				Tree Crops			
	Family members	Hired labour	Wage rate	Wages	Family	Hired	Wage rate	Wages
• Land preparation								
• Planting								
• 1 <sup>st</sup> Weeding								
• 2 <sup>nd</sup> Weeding								
• 3 <sup>rd</sup> Weeding								
• Fertilizer Application								
• Pest control (setting traps)								
• Harvesting & Others								
• Processing								

Description	Arable Crop Farms				Tree Crops			
Farm Produce								

14. Please provide the following information on each livestock enterprise raised by members of the household within the last one year

Description	1	2	3
Livestock type / name			
Current population			
Cost of stock (e.g. day old chicks purchased)			
Cost of feeds used			
Cost of vaccines, drugs, vitamins, etc			
Cost of maintenance & repairs of housing			
Number of paid farm workers on full time			
Estimated No. of work hours put in by all household members per week (hrs/day x people x workdays)			
Wages & salaries of farm workers			
Other production costs			
Number of livestock sold within the last 1yr			
Avg. price of livestock sold			
Quantity of livestock product sold			
Avg. price of livestock product sold			
Worth of livestock/products consumed at home			

15. If any of your household members was involved in processing agricultural commodities, please provide the following information on what was processed in the last three months

Description	1	2	3
Produce Name			
Source of Produce			
Quantity Processed in the last 3 months			
Cost of purchasing / worth of farm produce processed			
Processing costs			
• Hired Labour Costs			
• Worth of household labour			
• Transportation			
• Milling & Other machine services			
• Water & Other materials (packaging etc)			
• Energy (NEPA, Petrol, Diesel)			
• Others			
Value of products sold			
Worth of products consumed at home			

16. Please provide the following information on each of your household members that participated in any of the farm works or other income generating activities within the last one year.

Description	1	2	3	4	5
Age					
Sex					

Description	1	2	3	4	5					
Highest education										
Marital Status										
Main Occupation										
No. of days, and avg. no. of hours/day spent by member on each of the following in the last 3months:										
	Days	Hrs/d	Days	Hrs/d	Days	Hrs/d	Days	Hrs/d	Days	Hrs/d
Household farms										
Processing farm produce										
Hunting, Fishing, Lumbering										
Collection of non-timber forest products, water & other NR										
Working as paid labour on other people's farms										
Artisanship / craft work										
Transport business										
Trading (shop keeping/hawking )										
Govt./ other paid employment										
Social & Community Services										
Household shores e.g. cooking, baby sitting, etc										
Others (specify )										
Please specify income generated in the last 1 year by members when working on each of the following:										
Processing farm produce										
Hunting, Fishing, Lumbering										
Collection of non-timber forest products, water & other NR										
Working as paid										

Description	1	2	3	4	5
labour on other people's farms					
Artisanship / craft work					
Transport business					
Trading (shop keeping/hawking )					
Govt./ other paid employment					
Social & Community Services					
Others (specify )					

17. Please provide the following information on the reason why your household and household members participated in non-farm works or other income generating activities.

Reasons	Households	Individual
To augment farm income		
Farming cannot absorb all the available labour time		
Employment and Job opportunity arises		
Less work to do on farm		
Little land to cultivate		
Labour needed non-farm		
Wage attractive		
Money is needed urgently/Quick way of making money, credit constraint		
Required skilled/capital/license /certificate		
Non-farm have lucrative incentives		
Just do not want to work non-farm		
Others (Specify)		