

217 28

44/2

ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

THE DETERMINANTS OF OFF-FARM EMPLOYMENT
AND
ITS ROLE IN RURAL POVERTY ALLEVIATION

THE CASE OF OROMIA REGIONAL STATE



DELIL HASSEN
JUNE 2001

Addis Ababa University
School of Graduate Studies

**THE DETERMINANTS OF OFF-FARM EMPLOYMENT AND ITS
ROLE IN RURAL POVERTY ALLEVIATION: THE CASE OF
OROMIA REGIONAL STATE**

BY
Delil Hassen



Approved by the Board of Examiners:

Tassew Woldemanna

Advisor

Signature

Mulata Demeka

Examiner

Signature

Demese Chanyalew

Examiner

Signature

DEDICATION

This thesis is dedicated to late Hassen Mohammed, my father, late Riana Kumsa my mother, Jemila Mohammed, my wife, and our children Naol and Kanu.



ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
FACULTY OF BUSINESS AND ECONOMICS

THE DETERMINANTS OF OFF-FARM EMPLOYMENT
AND
ITS ROLE IN RURAL POVERTY ALLEVIATION: THE CASE OF
OROMIA REGIONAL STATE



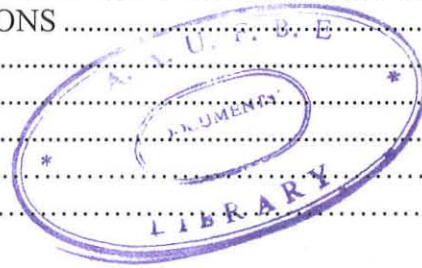
Submitted to the School of Graduate Studies in Partial Fulfillment of
the Requirement for the Degree of Master of Science in Economics
(Economic Policy Analysis)

Delil Hassen
JUNE 2001

TABLE OF CONTENTS

LIST OF ABLES.....	i
ABSTRACT	ii
ACKNOWLEDGEMENT.....	iii
CHAPTER ONE.....	1
1. INTRODUCTON	1
1.1 Background.....	1
1.2 An Overview of Oromia Regional State.....	4
1.2. Problem Statement.....	8
1.3 Objectives of the Study.....	11
1.4 Data Source and Methods of the Study	12
1.5 Significance of the study	13
1.6 Organization of the Study.....	14
CHAPTER TWO.....	15
2.LITRATURE REVIEW.....	15
2.1. Conceptual Framework.....	15
2.2 Empirical Evidences	19
CHAPTER THREE	28
3.ECONOMIC AND ECONOMETRIC MODELS.....	28
3.1 Farm Household Models.....	28
3.1.1 Theoretical framework.....	28
3.1.2 Farm Household Modeling for Oromia	30
3.2. Econometric model.....	35
3.2.1 Specification of the Logit Model.....	36
3.2.2 Definitions and expected signs of variables used in the analysis	37
3.3The Measurement of Poverty.....	40
3.3.1 Poverty Line.....	45
3.3.2 Properties of poverty indices	48
3.3.2 Analyses of Poverty Indices	49
CHAPTER FOUR	55
4. EMPERICAL ANALYSIS	55
4.1 Description of the Survey Data.....	55
4.1.1 Demographic Characteristics of the households.....	57
4.1.2 Farm Employment	61
4.1.3 Off-Farm Employment and Income.....	62
4.1.4 Locational characteristics	65
4.3. Estimation and Poverty Measurement	67
4.3.1. Logit Regression results	67
4.3.1.1 The likelihood ratio test of the model.....	68
4.3.1.2 Analysis of the regression results.....	69

4.4 Poverty Measurement.....	74
CHAPTER FIVE.....	78
SUMMARY AND POLICY IMPLICATIONS.....	78
5.1 Summary.....	78
5.2 Policy Implications.....	83
REFERENCES.....	88
Declaration.....	96
Appendices.....	97



LIST OF TABLES

PAGE

Table 4.1 Descriptive statistics.....	56
Table 4. 2 Off-farm employment participant and non-participant households heads by sex.....	57
Table 4. 3 Off-farm employment participant and non-participant households heads by marital status.....	58
Table 4. 4 Off-farm employment participant and non-participant households heads by religion.....	58
Table 4.5 Off-farm employment Participant and non-participant households heads by family size.....	59
Table 4.6 Off-farm employment Participant and non-participant households heads by age.....	59
Table 4.7 Off-farm employment participant and non-participant households heads by education.....	60
Table4.8. Employment Status of Households heads.....	60
Table 4.9 Main activity of household members.....	61
Table 4.10 Off-farm employment participant and non-participant households' agricultural endowments.....	62
Table 4.11 Households total annual incomes by sector & number of participants...	62
Table 4.12 Annual average households income by sources.....	63
Table4.13 Wage employment by type of employer	63
Table 4.14 Wage employment by activity	64
Table4.15 Place of wage employee-local (or migrant).....	64
Table 4.16: Problems faced migrant wageworkers after migration	64
Table 4.17 Period during which crafting was practiced.....	65
Table4.18 Problems faced non-farm operators	65
Table4.19 Location of household from the nearest market and the nearest road....	66
Table 4.20 Maximum likelihood estimation results.....	66
Table 4.21 poverty indices by employment categories.....	76

ABSTRACT

This study is motivated to find explanation that agricultural sector alone cannot ensure sufficient employment or sufficient income for the rural population. It attempts to suggest the need for integrating agriculture with off-farm sector so that they reinforce each other's growth and contribute to poverty alleviation.

The specific objectives of the study are to investigate factors influencing the probability of involvement in off-farm employment at household level, and to measure the impact of off-farm employment on rural poverty alleviation.

A survey data collected by the Ministry of Social and Labor Affairs on off-farm employment (wage and self-employed non-farm activities) in 1996 is used for analysis.

Farm household model is constructed to see how the farmers in the region allocate their time endowment for farm work, off-farm work and leisure. Moreover, a logit regression model is fitted to measure the effect of the determinants of the probability of off-farm employment. The factors are broadly divided into household, farm, financial and location characteristics.

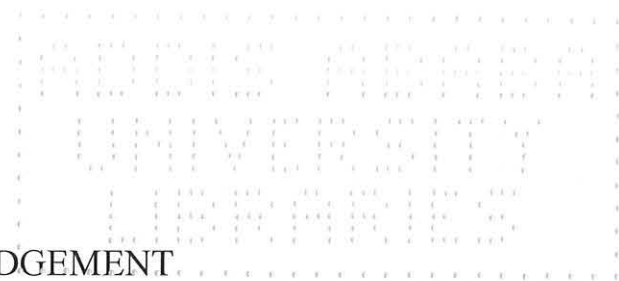
Among the household characteristics, the household size and religion (Orthodox Christianity as against other religions) are found to influence positively the involvement of household members in off-farm economy. To the contrary, marital status (married households against non-married households) and employment status (own account work against others) are found to influence negatively the probability of participation in off-farm sector.

Farm characteristics such as size of cultivated land for cereal crops, coffee and chat production, fertilizer use and number of cattle, have negative effect on the probability of engagement in off-farm sector. This implies that better off farmers with the above farm resources are less likely to participate in off-farm employment as compared to farm resource-poor households. Hiring in casual labor is positively related with the probability of off-farm work.

Credit recipients are found to participate more likely in off-farm activities than non-recipient households. This dictates the need to expand credit facilities to rural households to enable them diversify sources of their employment or income and hence escape poverty.

Relative poverty is measured with the help of FGT (Foster –Greer-Thorbeck) model based on the annual income of 1668 sample households. The measurement result shows that poverty is severe in rural Oromia. Nearly 65% of the sample households found to be poor. Nevertheless, poverty measures vary across employment categories, namely farm, off-farm and dual employment.

The results of the study suggest that the determinants of off-farm employment need to be addressed in view of integrating off-farm employment with farm employment. More over, narrowing the livelihoods gap between the rural households need to be the major focus of the Regional Government's development agenda.



ACKNOWLEDGEMENT

I thank my advisor, Dr. Tassew Woldehanna for his advice and encouragement to choose the title of the thesis, and his positive and timely response to my demand while guiding the thesis.

The Ministry of Social and Labor Affairs deserves special appreciation for making available such a region wide data for this study. My special thank goes to Niguse Geletu, who has spent a considerable time to provide the data.

I wish to extend my gratitude to the Bureau of Planning and Economic Development of Oromia for availing me information on the background of the Region.

I am grateful to Dr.Mulat Demeke, Associate Professor at the Faculty of Business and Economics, for providing me with relevant materials for the study, and for his advice during the course of the study.

I fail short of words to express the gratitude I have for my wife, Jemila Mohammed, for her tolerance of my decision to quit employment and rejoin university, and her encouragement and support during my study, with out which this achievement would have been impossible.

I wish to express my heart-felt gratitude to Mohammed Abba Rago, my Father in law and Zahara Mohammed, my mother in law and their children, particularly Hassen Mohammed for accepting my risk lover decision, and their continuous support and assistance. .

I am grateful to late Kemer Mohammed, my sister in low, Getachew Qitata, my intimate friend for their continuous encouragement and assistance during my hard time.

My thanks go to my close relatives and intimate friends Nassir Kedir, Foziya Mohammed, Asia Kelifa, Ferida Ababayehu,Umer Imam, Almaz Seifu, Girma Teka,Temam Musa,MohammedSani Adem , late Kemal Husen, ,Negash Mustefa, Faris Muleta, Dinberu Gera, Abdulkadir Adem,Dabe Qonshe, Kerem Temam, Delil Kedir, Imam Beshir for their support, encouragement and sharing my happiness.

Last but not list, I am indebted to Dagne Lema, Tahir Gero, Taye Yadeta, Poulos Gutema,Taddele Ferede and Tigist Lemma for editing the research document and their constructive comments and suggestions.

The list is not exhaustive but my thanks go to all friends who encouraged me and wished me a success.

CHAPTER ONE INTRODUCTION

1.1 Background

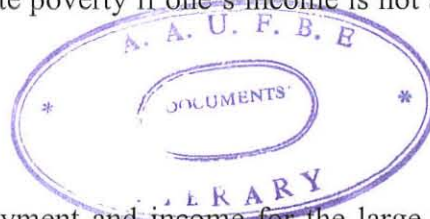
Ethiopia was food self-sufficient and its population food secure till the early 1960s. Moreover, it was net food exporter till four decades back. Sufian (1990) stated that in 1947 Ethiopia exported 150,000 tones of grain. The country was not only net exporter of food crops but also had a high share in the world food market. Other than feeding the local population, at one stage (1960-65), Ethiopia's export of pulse was over 5 percent of the total world's pulse export (Kuma and Mekonnen, 1995). This achievement was attained when the country was not acquainted with the current massive exogenous agricultural technologies. This could be attributed to favorable natural resources such as climate and soils, and low population growth.

Nevertheless, the trend has changed since the early 1960s. The country turned to be net food importer and the local population has become food insecure or fallen in poverty, with the situation increasingly deteriorating since then. At present, 50 to 60 percent of the total population of the country is estimated to be food insecure and live in absolute poverty (Befekadu and Berhanu 1999/2000). The challenges of the prevalent poverty are increasingly affecting large number of residents, both in rural and urban areas.

Poverty in Ethiopia is a multidimensional and manifests itself in low level of income /expenditure, high adult illiteracy rate, low school enrollment, poor health and sanitation, limited access to pure water, low life expectancy at birth, high infant, child and maternal mortality rate. Moreover, it is felt in low agricultural productivity, high urban unemployment and high rural

underemployment, lack of assets for investment and increasingly high environmental degradation.

Although poverty and its corollary food insecurity are serious problems of both urban and rural areas, the situation in rural areas is more severe. The percentage of food insecure people is higher in rural areas (52 percent) than in urban areas (37 percent). Further more, the rural population makes up 85 percent of the Ethiopian population. A household income, consumption and expenditure survey carried out by the Ethiopian Central Statistical Authority in 1995/96 indicates that a total of 28 million people in Ethiopia, of which 25 million live in rural areas, neither produce enough food nor have sufficient cash income to fulfill their basic food needs. Therefore, food insecurity in Ethiopia is primarily a problem of rural area (Resal Ethiopia 2000). Lack of opportunities for gainful employment or income generation, among other factors, is the cause of poverty. One is said to live in absolute poverty if one's income is not sufficient to meet minimum basic requirements for living.



In rural Ethiopia, the major source of employment and income for the large population is the farm sector. However, the labor force is increasing at an increasing rate in every part of the country. The number of people in the labor force increased from 22 million (or 51 percent) in 1984 to 36 million (or 69 percent) in 1994, indicating a 67 percent increase in the 10-year period (Befekadu and Berhanu, 1999/2000).

Due to increased number of rural households, the rural land holding of the 60 percent of the farmers fell below 1.0 ha (Mulat, 1999/2000). Consequently, a number of increasingly growing rural young and economically active population is forced to work on the fragmented family plots,

resulting in rural underemployment and insignificant or nil marginal contributions of the new entrants to the farm output growth. The produce of farmers with small farms is far below satisfying families' home consumption, let alone having surplus for market and investment. Rural residents depend on own production for 47 percent of their food requirements and purchase the remaining 53 percent (Befekadu and Berhanu, 1999/2000). As the possibility to expand the surface of cultivable land for the growing established households is limited, the average land holding will decline further.

Declining soil fertility, low level of technologies, irregularity of rain, recurrent droughts, lack of capital for investment and ill-designed successive Governments' economic policies are additional constraints causing food production to fall below the subsistence level even in non-drought years in Ethiopia. In short, the Ethiopian Farm is suffering from small plots size or fragmentation compounded by very low land productivity. Average grain yields per hectare in a normal climatic year using traditional technologies are around 10 quintals per hectare, a figure significantly below the yields achieved in most other African countries (Resal 2000). Hence, it is difficult for those families, who cultivate less than 1.0 hectare to meet their minimum food requirement of 2100 Kilocalories per day per adult person, which is equivalent to grain of 225 kg per person per year, implying they are in food poverty.

The massive efforts made by successive governments to reverse the poor performance of farm through institutional building, technological transfer, expanded extension services, credit facilities, etc. have not been ensuring sustainable improvements in agricultural productivity. Equally worse is that the size of industrial sector as a whole is small and stagnant, failing to absorb the urban labor force, let alone to respond to the rural-urban migrants. In 1994, the

unemployment rate in urban areas of the country was 22 percent among the 2.7 million economically active peoples (Befekadu and Berhanu, 1999/2000).

In the face of the declining food production per capita, and increasing underemployment and prevalence of poverty in the rural areas, large number of rural population, the poor in particular, are increasingly pushed to seek job in to off-farm sector with the purpose to diversify sources of their incomes for survival.

1.2 An Overview of Oromia Regional State

A. Physical Characteristics

Astronomically, Oromia extends from 3⁰ 40' N to 10⁰ 46' N latitude and from 34⁰ 08' E to 42⁰ 55' E longitude. With an area of 353,690 km² (about 32 percent of the total area of the country) it ranks first out of the nine Regional States and two Administrative Councils of Ethiopia. The Region has both international (in the west with Sudan and in the South with Kenya) and regional boundaries with all regions except Tigray. It embraces 12 Administrative Zones, 180 Districts and 375 Urban Centers. Addis Ababa is the administrative center of the Region (BOPED, 2000). According to the 1994 census report, the rural part of the Region was divided in to 10161 Farmers' Associations in 1994(Tamene, 1996).

B. Population

According to the 1994 Population and Housing Census result, in the year 1997, Oromia had 20 million populations, of which 17.7 million were rural (49.8 percent females) and 2.3 million were urban (52.95 females). This makes it the most populous Region in Ethiopia. The total average household size was estimated at 4.8 persons (4.5 and 4.9 persons per household for urban and rural areas, respectively). The crude population density of the Region was 57 persons per km² (BOPED, 2000).

C. Agriculture

Due to good climatic conditions and soil types, 50 percent of the total land area of Oromia (367,000km²) could be suitable for rain fed agriculture, out of which only 22 percent (4,021,940 hectares) are presently cultivated. Moreover, it has been proved that the productivity of the existing traditional agriculture could be increased with 4 to 5 folds by improving agricultural technology (such as modern implements, inputs and extension services). The Region has 858,762 hectares of land that can be brought under irrigation. But only 4.6 percent of these potentials are currently under irrigation (OESPO, 1998).

The Region holds about 47.75 percent of the cattle, 40.6 percent of the sheep, and 36.3 percent of the goats stock of the country in 1995/1996 (BOPED, 1996). Despite its large size, the live stock sub-sector has a share of not more than 15 percent in the Regional GDP where as the share of crops production is not less than 45 percent. The contribution of forestry and fishery to the Regional GDP are about 4.5 percent and 0.1 percent respectively (OESPO, 1999).

The agricultural sector of the region is constrained by various problems, which could be categorized in to three: technological, institutional (infrastructures) and policy related. Low supply of farm inputs such as fertilizer, improved seeds and pesticides; weak extension services to the farmers; low level of conservation (water and soil) mechanism; use of backward implements and tools; inadequate supply of oxen; less experience in irrigation development, etc. have limited the efforts of the Region to barely satisfy its population's food requirement. Poor extension services and absence of saving culture are some of institutional problems facing Farm of the Region. Lack of adequate market and rural credit services, improper land use planning, unsustainable use of natural resources, low level of community participation in local development are policy related problems constraining the sector (Tamene, 1996). While on average about 75000 hectares of forests are destroyed each year for different purposes, only 20 percent of it is re afforested. Of the total fishery potential only 27 percent could be produced in the region (ORS, 2000)

D. Drinking Water Supply

In the Oromia Region, only 76.3 percent and 15.8 percent of the urban and the rural population have access to potable water in 1995, respectively. This is to say that only 22.2 percent of the Region's population has got access to potable water (Tamene 1996). This have, therefore, left the people (particularly women and children) vulnerable to a host of water and sanitation related infectious diseases. The majority of the population in the Region (mainly in the rural areas) uses unprotected water, such as spring water; hand-dug wells, rivers, lakes and rain fed seasonal wells (BOPED, 2000).

E. Health and Education Services

As regards health facilities, there are 24 hospitals, 114 health centers, 966 clinics and 130 health posts in Oromia. In 1992(E.C), there is 1 hospital serving 971,913 people; 1 health center for 196,088 people; 1 clinic for 23,141 people and 1 bed for 8742 people. This ratio compares with the standard of WHO, that is that one health center has to serve 100,000; one clinic to 10,000 and one bed to 3000 people. In all cases the facilities satisfy less than 50 percent of the requirement based on the international standards (ORS, 2000).

The number of doctors, nurses and health assistants in the Region is 267, 796 and 3159 respectively. Toilet users are 5 percent of the total population of the Region (BOPED, 2000). The services rendered by these institutions are, however, inadequate and below their capacity due to weak logistics and infrastructure support, inadequate operating budget, uneven distribution of staff to various health care units, and poor planning, organization and management (Tamene, 1996). According to the 1994-census result, in the Region, 78.4 percent of the population aged 10 years and above did not attend school, or are illiterate (BOPED, 2000).

F. Rural Road

The rural roads or rural transportation system plays a great role in the location and promotion of rural –based industries or investments. It also links the factories and their markets as well as the sources of their raw materials. Given this, the minimum road length per 1000 km² is about 100km/1000km². The other relative road distribution indicator is Road Efficiency, which is termed as road- population ratio. The continental average for Africa is 50 km and 0.61 km for

road density and road population ratio respectively. Oromia, with 353.7 km² total area and 22.4 million populations has the road density of 29/1000 km and the average road-population ratio of 0.43 km /1000 population in 1995/96(Tamene, 1996).

Despite its high resource potentials, Oromia is at its low level of development and the majority of its population is poor in all basic welfare indicators. Traditional farm dominates agricultural production and the available potentials including irrigation are under utilized such that the sector is not providing sufficient food or sufficient incomes for the majority of the rural households. Moreover, the rural population of the region is underserved with basic social and economic infrastructures, which has limited the capacity and capability of the peoples to efficiently utilize the available resources and to improve their welfare.

1.3 Problem Statement

Ethiopia is amongst those developing countries, which are suffering from abject poverty. Poverty has become the top priority in the development agenda of the country. On the other hand, donors are giving a serious attention to a poverty alleviating efforts of aid recipient countries to which Ethiopia has to respond.

Income is the most determining factor of poverty. Off -farm employment is the rural economic sector, next to farm, and provides sources of income diversification particularly for the poor section of the society. Hence, investigating and documenting on the features of the sector can provide important information in the process of attacking poverty.

Notwithstanding its contributions to the rural economy and its high potentials for growth, in Ethiopia, off-farm employment has been the worst neglected economic undertaking by development planning and researches. It is poorly integrated with farm by rural development policies. There are only few research findings on the sector, the analysis and recommendations of which are never sufficient to draw the attention of the policy decision makers, in the process of rural development, to the sector. The situation at Regional level is worse.

The Oromia Regional State has adopted the national comprehensive economic development strategy called "Agricultural Development-Led-Industrialization (ADLI)". The core of the strategy is to use agriculture as a springboard for the development of other sectors. The strategy embraces both import substitution and export led/derive strategies incorporating a parallel and coordinated development of agriculture and industry. Realization of this strategy is expected to lead to higher absorption of labor by industry, distribution of income, improvement in balance of payments, alleviation of poverty and growth rate of regional per capita income (OESPO, 1998).

The strategy under implementation indicates that the Region heavily depends on agricultural and industrial development to achieve the goal of poverty alleviation or economic growth. But, the average growth rate of agriculture (which contributes on average 65.7 percent) over the past half-decade has been 0.5 per annum, indicating that the food production – which is mainly for domestic consumption – grew by far lower than the rate of population growth (Tamene, 1996). All other economic sectors contribute only 34.3 percent to the Regional Domestic product though the Region has high industrial and service sectors development potentials (OESPO, 1999).

The second five year economic development plan (2000- 2004) of the regional Government incorporates agriculture, cooperatives promotion, irrigation, water supply, construction, transport

and communication, industry and trade, health, education, social security, culture and tourism, population, human resource development, finance, private investment, science and technology. There is nothing explicitly stated in the plan regarding the need to promote rural off-farm economy. Moreover, the integrated food security program for drought prone areas of Oromia Regional State (1999-2003) made no specific reference to off-farm employment.

As internal and external factors constraining both agricultural and industrial development of the country or the Region are likely to continue at least through the first quarter of the 21 century, both sectors are unlikely to sufficiently absorb the increasingly growing rural and urban labor force.

However, the Regional Government is making some efforts in rural areas to promote employment-generating schemes as an aid to ensure food security for the rural poor, and the provision of training and arrangement of credit facilities to the rural needy people. But, the intervention is not to develop off-farm employment on its own right. The promotion of the sector has so far been taken as one of the strategies to ensure agricultural development.

Farm receives substantial human, financial and material resources though it is not the exclusive source of employment and income in the rural areas. The bias against off-farm employment is associated at least partially with the fact that policy decision-makers do not have sufficient information and policy recommendations on the need to effectively integrate the agricultural development with off-farm sector, with out which rural development is unthinkable.

At regional and lower levels, meaningful records are lacking on the features of off-farm economy including its determinants, its contribution to the rural employment and incomes and its linkages with farm sector.

This study is motivated to find explanation that agricultural sector alone cannot ensure sufficient employment or sufficient income for the rural population. It attempts to suggest the need for integrating the off-farm sector with the farm sector so that they reinforce each other's growth and contribute to poverty alleviation.

1.4 Objectives of the Study

The inability of the farm sector in ensuring sufficient rural employment for the growing labour force and the low farm income level that keeps the majority of households below poverty line indicates the significance and the need for the promotion of off-farm employment. Planners and policymakers need to have sufficient and reliable information to design poverty alleviation strategies such that off-farm employment gets due attention. To this effect, the specific objectives of study are:

- a) To investigate factors influencing the probability of involvement in off-farm employment at household level, and
- b) To measure the impact of off-farm employment on rural poverty reduction.

1.5 Data Source and Methods of the Study

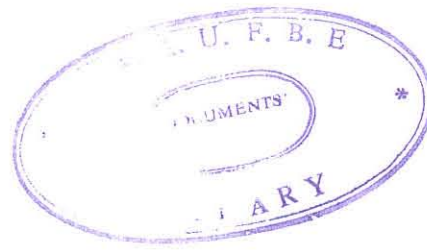
The data used in this study is obtained from the survey entitled “ Agricultural wage employment and rural non-farm Employment in Ethiopia” conducted, in 1996, by the Ministry of Labor and Social Affairs (MOLSA); financed jointly by UNDP and FAO.

The survey was conducted on representative samples covering the rural areas in five regions including Tigray, Afar, Amhara, Oromia and Southern Nation, Nationality and Peoples’ Regions.

The survey adopted a two-stage stratified sample design. At the first stage, kebeles (the lowest administrative unit) were selected and selection of households within the sample kebele at the second stage. The kebeles were selected with the probability proportional to the size of the households. The survey focused on identifying whether or not any member of the household was engaged in non-farm activities and/or wage employment. Hence, 30 households, 10 households with no members engaged in non-farm activities or wage employment, were selected at random systematically from a sample kebele. All together, a total of 200 kebeles and 5699 (against 6000 planned) households were covered, of which 60 kebeles and 1680 households were in Oromia.

This study involves both economic and econometric models analyses. Farm household model is constructed to see how rural farm households in the study Region could allocate their time to farm work, off-farm work and leisure. Based on this economic analysis, selection of an appropriate econometric model is made to measure the determinants of the probability of involvement in off-farm employment. Further, brief reviews of the widely used poverty indices

are made, and poverty index which best fits the data is chosen for the measurement of rural poverty.



1.6 Significance of the study

The evidences gathered from around the world indicate that there are sets of characteristics, which are postulated to determine the probability of involvement in off-farm employment. The widely recognized characteristics are household characteristics such as sex, age, family size, education religion, marital status and employment status; farm endowments and production; households' financial positions; job availability and location characteristics such as proximity to markets and roads.

This study measures and analyzes the direction and magnitude of the effects of many of the above characteristics on the probability of off-farm employment in rural Oromia.

Economically active rural population commonly involve in farm production and/or off-farm employment. The knowledge of the prevalence of poverty in each sector will help identify the concentration of the most disadvantaged section of the society. Moreover, poverty measurement results indicate the role of off-farm employment on poverty reduction in the rural areas. To this effect, the study measures relative poverty across rural employment categories.

1.7 Organization of the Study

The rest of the paper is organized as follows. Chapter two presents review of relevant theoretical and empirical literatures. Chapter three is construction of economic and econometric models. Chapter four is on empirical analysis. The last chapter gives summary and policy implications.

CHAPTER TWO

REVIEW OF LITERATURES

2.1 Conceptual Framework

Off-Farm employment in this study encompasses both off-farm wage employment and rural self-employed non-farm activities. Wage employees were those people who hired out/sold their labor for wage and worked outside their farm during the survey. On the other hand, self-employed non-farm operators were those people who were undertaking their own productive activities other than farm in the rural areas.

The concepts of rural and off-farm are less clear and vary across countries (Haggblade et al, 1989) states that, conceptually, people prefer to think of rural as depending on the function to size of a locality. People consider as rural any locality that exists primarily to service agricultural hinterland. In contrast, urban is manufacturing, government or other motor drives urban economies independent of agriculture.

Rural non-farm activities by definition include all activities other than those performed on the farm or related to farming: manufacturing (including processing, handicrafts, construction, trade and services). The concept of rural varies dramatically. Definition of rural includes rural towns with a population under 20 000 as per UN definition. Any locality that exists primarily to service agricultural hinterland will be considered rural. It must be, however, noted that countries choose to use different cut-off points in locality population. For instance, the threshold figures for urban areas is 5000 people in Ghana, 2000 in Kenya, and 20 000 in Nigeria. The ideal classification

should be based on occupational structure and population density (ILO/JASPA, 1991). In Ethiopia, the delimitation between rural and urban is that a locality with 2000 or more population is regarded as urban area (CSA, 1992).

The survey the data of which is used for this study is based on Farmers Association Structure, which is the lowest administrative unit in settled rural areas, with its own jurisdiction of rule dwellers formed by inhabitants. The members are engaged in agricultural & non-agricultural activities (MOLSA, 1997).

The growth of off-farm activities may be a result of “pull” factors arising from a vigorous expansion of demand for off-farm goods or services, or of “push” factors deriving from the inability of Farm to absorb the additional labor supply (WHO, 1988). The farm households can allocate time each year to work on their own farm (called farm work), to work off their farm (called off-farm), and to home time. Accordingly, it may receive annual income from the net return from farming operation, off-farm work, and non-farm assets (Huffman, 1991),

The individual’s decision to work outside the household and the decision to work in occupations other than farming are related to the value of time with in the household compared with alternatives outside the household and off the farm. The value of time in the household depends on the individual’s own characteristics and on the resource endowment of the household. Individual’s characteristics, such as age and education, can affect the value of time both inside and outside household, though it is difficult to predict a priori how factors such as education and intellectual ability will be related to employment out side the family farm (Rief and Cochrane, 1990).

The non-farm activities are increasingly being recognized as a means to tackle the growing employment problems in rural areas and to increase economic and food security particularly for the poorer rural households. Consequently, urban-rural income gap and income disparities exist among rural families can be reduced. Rural- urban migration can also be checked with improved rural sources of job opportunities. Employment promotion in the non- farm sector has a role to play in employment generation and in combating under employment in Farm (ILO, 1990):

- Rural non-farm sector activities can provide employment and an alternative means of income for the landless and increasing number of artisans and traders,
- Non-farm activities generally have a great potential of supplementing incomes of household during slack seasons particularly for small-scale farmers or household with very little land,
- Non-farm sector activities can stimulate agricultural production by providing essential inputs such as farm tools and implements and market outlets for Farm,
- The non-farm sector can provide some of the commodities and services required to meeting basic needs and, at the same time, contributing to skill formation and the development of entrepreneurship.
- Non-farm activities can assist in generating and in saving foreign exchange through production for exports and through import substitution.

Dejene (1997) discussed four types of linkages, as identified by Rains et al (1990), between agricultural and non-agricultural sectors: commodity exchange, finance, labor migration and exchange of information / technology. The outputs of agriculture and non-agriculture are partly consumed with in themselves and partly flow to each other; the factors payments they make constitute savings fund for the economy that finance investment in each; transfer of surplus labor

from agriculture to non-agricultural sector; technical information/education flow from non-agriculture to agriculture, a flow that enhances agricultural productivity.

Decisions of rural development policy are for the most part focused on tenure, institutional, technical, infrastructure, and aspects of agricultural development. In contrast, non-farm activities in agricultural areas receive little attention. But non-farm activities in rural areas are an essential element in the process of economic development and structural change from rural-agricultural to urban-industrial economies. Their extent and importance is largely explained in terms of their contribution to the huge tasks of mobilizing and servicing of agriculture and of catering to the non-food needs of the mass of the rural population. It follows that the design of rural development policies, in addition to providing the support to raise agricultural productivity, should also be addressed to the needs of local non-farm activities. In particular, the growth and concentration of such activities in the rural town and villages raises substantially the demand for infrastructure and services – electricity, water supplies, roads, schooling, health – for vocational training in on-farm activities, for banking and credit, and for the establishment of local urban institutions (Anderson and Leiserson, 1980).

Broadly speaking, non-farm economic growth is less effective in reducing poverty in states with “poor” initial conditions in terms of rural development (in both absolute terms and relative to urban areas) and human resources. Low farm productivity, low rural living standards relative to urban areas and poor basic education all inhibited the prospects of the poor participating in the growth of non-farm sector. Rural and human resource development appears to be strongly synergistic with an expanding non-farm economy in reducing poverty. Amongst the initial

conditions we have found to matter significantly to prospects for pro-poor growth, the role played by initial literacy is particularly notable (Ravallion and Datt, 1999).

2.2 Empirical Evidences

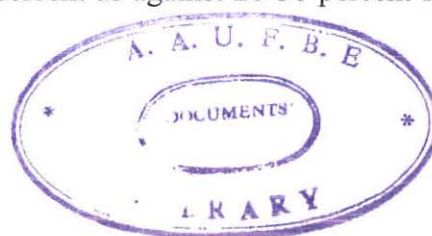
The major sources of off-farm wage employment in rural Ethiopia are agricultural activities, natural resources conservation and infrastructure building (MOLSA, 1997). According to Mulat and Teferi (1996) non-farm activities in the rural Ethiopia can be divided in to the following categories:

- Small-scale industrial activities such as food processing (e.g. flour milling, oil processing, soap making, food processing),
- Cottage industries (e.g. hand crafts, spinning of cotton or wool, cloth weaving and dying, pottery, leather tanning and distilling local brews),
- Artisan activities (e.g. blacksmithing, masonry, wood work carpentry, house construction, repair services and fabrication of farm tools)
- Commercial activities (e.g. trading and transportation),
- Infrastructure development activities (e.g. special public works, feeder roads and irrigation works and food for work programs), and
- Formal employment including professional, administrative and clerical works.

A sample survey results, reported by the Ministry of Labor and Social Affairs, for five Regions (Tigray, Amhara, Afar, Oromia and Southern Ethiopia) of Ethiopia shows that 15 percent of total rural households participated in wage employment and 9 percent were engaged in hand crafts and related activities (MOLSA, 1997).

Tassew (2000) observes off-farm employment in Tigray Region of Ethiopia as follows: Farm households involved in two types of off-farm activities: wage employment and self-employment (own business activities). Wage employment includes paid community development work (often called food-for-work), farm work, and manual work in construction, masonry, and carpentry. Self-employment included petty trading, transporting by pack animals, fuel wood selling, and charcoal making, selling fruits, making poetry and handcrafts and stone mining.

Review of rural employment over twenty years period indicates employment in all the regions of the world including Africa grew more rapidly than agricultural employment. Consequently the share of non-farm activities in rural employment has been growing as well and the trend could be expected to continue undergo the structural transformation expected. The share of non-agricultural activity in total rural employment between 1950 and 1980 increased as follows: East Africa 5 to 10 percent, West Africa 12 to 26 percent, East and North Africa 13 to 14 percent. This compares with Latin America 10 to 15 percent south Asia 8 to 18 percent, and South East Asia 10 to 22 percent. Between 1950 and 1980 the share of rural agricultural labor as a percentage of rural total labor increased from 4.8 percent to 10.8 percent in East Africa while in West Africa rose from 11.9 percent to 26.3 percent (ILO, 1990). Rural employment share of non-farm activities in Sub-Saharan Africa ranges between 10-20 percent as against 20-30 percent for Asia (Haggblade et al, 1989).



Growth in rural non-farm employment opportunities has been a major feature of rural income growth, helping to absorb workers from lower productivity farming. This growth has been driven by a robust farm and improved rural economic infrastructure. Higher agricultural incomes have increased the demand for goods and services and helped finance off-farm employments (with input supplies playing a secondary role). Rural infrastructure both provides employment in the construction phase and reduces the costs of rural commerce. Rural Java (Indonesia) experienced a transport revolution and a burst of rural non-farm and peripheral urban employment in the late 1970s and early 1980s. This was the result of steady growth in rice incomes and direct and indirect government spending on schools, roads, and other rural infrastructure. Rural non-farm employment in China grew by 130 million jobs between 1980 and 1995, when total agricultural employment showed no growth, and total urban employment rose by 70 million jobs (World Bank, 1991)

In rural Tanzania, the proportion of rural non-farm activities income in total cash income per household rose from 25 percent in 1969 to 33 percent in 1977, 38 percent in 1980, and 47 percent in 1983. In rural Tanzania, and it has been known that about 87 percent of all rural households derive some cash income from rural non-farm activities (Bagachwa, 1997).

According to Islam (1993) the consensus that emerges from different country studies is that the proportional share of rural non-farm employment and income in the total income tends to be much higher for classes with relatively lower incomes or smaller holdings. Studies conducted in selected 11 villages in 5 Asian countries (Bangladesh, India, Pakistan, Sri Lanka and Thailand) show the following results. Wage employment tends to display the inverse relationship with land holding size in general. In the incidence of landlessness the compulsion of economic survival

push the poor in to seeking wage employment. With respect to self-employment the results across the villages are not the same. In four cases, there is a "U" type of relationship where the self-employment percentage is lowest for the middle-sized farm size; in another two cases, there is a positive relationship with the self-employment percentage rising along with farms. Only in the three cases is the inverse relationship detectable. In the remaining three cases no clear relationship emerged (Ashwani Saith, 1992).

The case study by Chin (1979) in Taiwan showed that income from non-farm activities was responsible for all of increase in real income for the average sample household and reduced income inequality within rural household. Low (1981) claims that the effect of increased off-farm-earning opportunities in Taiwan has been different from that experienced by two countries in the Southern Africa. The author, based on empirical analysis, mentions that the experience of Taiwan is comparable with those of Swaziland and Lesotho so far as the transfer of labor from farming to off-farm employment is concerned while the consequences for farm incomes and production have been different. The result indicates that there was a decrease in farm income and production in Swaziland and Lesotho as a result of labor transfer from farm to off-farm sector. In contrast, the off-farm opportunity increased farm production and had no effect in farm income in Taiwan. He attributed the limited capacity to increase farm productivity in the two African countries to limited technological improvements and infrastructure developments. His final conclusion is that in areas of low productivity, increasing off-farm employment results in labor transfer out of farming and leads to reduced farm incomes and production.

Farm in North America is highly integrated with the other sectors of the economy through markets for farm inputs, farm products, consumer goods and labor. The transfer of labor out of

Farm has occurred in three major ways. First, families may sever farm sector ties by quitting farming and retiring or taking a non-farm job. Second, the children become adults, they may leave Farm and take non-farm jobs, but their parents remain in farming until retire. Third, families may stay on their farms, but some family members may reduce their hours of farm work, taken on-farm jobs and become dual job holders .The relative attractiveness of this alternatives depends on the age of the farm operator, spouse, and children; the size of family; the size of the farm; the location of the non-farm job opportunities; the amount and type of skills of the individuals; and the cost of commuting or moving to non-farm jobs .All have been important sources of adjustment in North America (Hellberg et al ,1991)

A case study in Thailand shows that the determinants of off-farm work for individuals varied depending on whether primary employment or all employment (primary jobs plus secondary jobs) is examined. Age, education, sex, innate ability, and numeracy all had significant effects on the wages earned off-farm, but wages off-farm alone are not the determinant of off-farm work, because the decision to work involves a balance in of off-farm wages with the value of time on-farm. Women are more likely to work off- farm as a primary job than men, despite the fact that the men earn higher wages off-farm. Education is significant in primary off-farm work. The study proved that investment in human capital increased both on and off farm productivity and promoted the development of the study area. The improvement of roads and transportation similarly contributes to the economic welfare of the region (Rief and Cochran, 1990).

The regression results of dichotomous dependent variable model fitted for Pennsylvania farm operators and spouses by Finders et al (1991) to measure the influence of characteristics of individual, family, farm and location are summarized as follows. Age positively influenced the

likelihood of both the operators and spouses' off-farm work, but age squared variable showed negative signs for both and became insignificant for operators. The coefficient of years of education was positive for both, but was significant only for the farm spouse. The presence of children under 5 years of age and the number of children 14 or older in the household were positively related to participation in off-farm work among operators. Among farm spouses, the presence of young children reduced participation but the older children had no effect. For both operators and spouses, the employment of one spouse in off-farm had a positive effect on the off-farm participation of the other spouse. Operators of dairy farm were less likely to work off-farm than farmers with other principal enterprises. Operators on farms where livestock was the principal enterprises were more likely to work off-farm. Both dairy and livestock had no effect on spouse's participation in off-farm. Operators and spouses operating small farms as measured by annual sales had greater likelihood of working off-farm. No relation was found between distance and off-farm work. Changes in employment in manufacturing and services sectors were positively related to off-farm work.

Tegegn (2000) tested the effect on non-farm income of different determinants and reported the following results. It was found out that those not participating were older, have more family labor and own more livestock resources. These characteristics were thought to give these farmers better farm resources and make them less attracted to non-farm activities. Those participating in non-farm activities were found to be relatively younger and more educated. Education of household's heads was found to be significant determinant of the probability of off-farm employment.

Mulat and Teferi (1996) attribute the probability of involvement in the non-farm employment to personal attributes, farm income, and food balance and land endowment. The dependent variable of the study was defined as the ratio of non-farm income to farm income. The regressions results

indicate that age, livestock revenue, yield, land-holding size and food balance (food sale less purchase) have shown significant impact on the involvement in non-farm activities in the sample area. On the other hand, the effects of education, sex, crop revenue, and family size have become insignificant. The signs of the coefficients of the variables age, livestock revenue, yield and food balance are negative implying that they were inversely related with non-farm income.

Ababaw (2000) investigated the predictors of the probability of involvement in rural non-farm activities in the Amhara Region of Ethiopia. He found out that age of the household head was positively related to off-farm work, with a diminishing trend the older the head. Female-headed households were found to more likely involve in off-farm employment. Married households were less likely to participate in off-farm than others. Orthodox Christians were less likely to be engaged in off-farm activities than followers of other religions. All the above variables significantly determine the probability of off-farm employment.

Farm and off-farm rural economic sectors have positive linkages and hence the integration of their development essentially enables them to reinforce the growth of each other. Haggblade et al (1989) reports that seven empirical studies documented the power of farm –non-farm linkages in Asia. Based on data from India, Rangarajan (1982), it was found that a 1 percent addition to the agricultural growth rate stimulated a 0.5 percent addition to the growth rate of industrial output and a 0.7 percent growth rate of national income. In Malaysia, agriculturally induced rural income multiplier was 0.8. Evidence from Philippines showed that elasticity between agricultural employment and non-farm employment was 1 to 1.3.

In rural Africa, five different linkages between farm and non-farm were identified, two in factor-markets and three in product markets: *Capital flows*: The capital transfer is through surpluses involving fiscal, crop pricing, and trade policies. Non-farm earnings also play a crucial role in farmer acquisition of productive agricultural assets; especially land. *Labor flows*: Sizable magnitude of the labor moves back and forth between the rural farm and non-farm sectors. And 20-40 percent of the rural labor force works in both farm and non-farm activities. *Production flows*: Some rural enterprises supply inputs and services (such as blacksmithing activity) required by farmers through the backward linkages. In Africa, backward linkages appear to be weaker than those measured in Asia. In Asia, the backward linkage is reflected through the supply of fertilizer, equipment, cement and building materials, the key production inputs. *Forward Linkages from Farm to processors and distributors*: Forward linkages involve all processing activities including food, oil extraction, sugar production, tea drying and packaging, coffee and cocoa decoupling and drying which are often performed in rural areas by large enterprises. About 50 percent of rural trading represents a forward distribution link from Farm. *Consumption links*: As per capita farm incomes rise, the demand for local services, housing, durable livestock and horticulture products typically increases more rapidly than does the demand for food grains. The production of these commodities and services is labor intensive; hence rural employment in the non-food grain sector increases quite rapidly with per capita farm income. But, African spending pattern support far less rural non-farm activity than do those in Asia. The case study in Sera Leon shows that only 11-18 percent of incremental income was spent on rurally produced non-farm goods while the comparable Asian figures stand at 26-31 percent (Ibid, 1989).

Evans and Ngau (1991) estimated, for Kutus rural households in Kenya, the effect of non-farm income on farm decision making including the area under cultivation, the area of land devoted to

coffee, expenditure on production inputs and the proportion of maize yields sold (to purchase foodstuffs to replace maize) and found out that non-farm income contributed significantly to all four determinants of farm production. Tegegn (2000) in his similar study conducted in two Districts of Southern Ethiopia concluded that non-farm income had positive and significant effects on farm income, cultivated land, fertilizer used and farmland covered by coffee (the major cash crop in Ethiopia).

Using state level data for India spanning 35 years, and allowing for both state-specific fixed effects and time trends, we find that higher average farm yield, bigger state development spending, higher (urban and rural), non-farm output and lower inflation were all poverty reducing (Ravallion and Datt, 1999).

In Asia, Sub-Saharan Africa, and Latin Americas, rural non-farm work tends to be highly seasonal or part time. In Asia wages in these jobs are generally lower than wages in Farm. The poor are concentrated in traditional industries with low skill and capital requirements and very low labor productivity. Their products are normally intended for home consumption or the local market. Demand is an important constraint on non-farm economic activities, which depend heavily on the primary farm sector. In areas in which agricultural incomes have grown, non-farm employment has flourished and wages are raised. Non-farm employment is particularly important in providing work in slack seasons for landless laborers and women from poor households (World Bank, 1990).

CHAPTER THREE

ECONOMIC AND ECONOMETRIC MODELS

3.1 Farm Household Model

3.1.1 Theoretical framework

The agricultural household model is one that combines agricultural producer, consumer, and labor supply decisions of agricultural households in to a single conceptual framework (Hallberg et al, 1991).

In true subsistence households, where farmer, with out access to trade, can consume only what it produces and must rely exclusively on their own labor, production, consumption (and labor supply decisions) are made simultaneously. A large part of Farm of the modern time, however, is made up of semi -commercial farms in which some inputs are purchased, and some out puts are purchased and some out puts are sold. In this circumstances, producer, consumer, and labor supply decisions are no longer made simultaneously, although they are obviously connected because the market value of consumption cannot exceed the market value of production less the market value of inputs (Singh et al, 1986).

In setting the level of output and quantity of inputs the household will require prices of output and inputs and the technological relationship between output and inputs. In this calculation, the household does not need to know how much output it plans to consume or how much labor it intends to supply. But, consumption and labor supply decisions depend on prices and income, which is at least partly determined by household's farm profits (Sing et al 1986). That is, it has

CHAPTER THREE

ECONOMIC AND ECONOMETRIC MODELS

3.1 Farm Household Model

3.1.1 Theoretical framework

The agricultural household model is one that combines agricultural producer, consumer, and labor supply decisions of agricultural households in to a single conceptual framework (Hallberg et al, 1991).

In true subsistence households, where farmer, with out access to trade, can consume only what it produces and must rely exclusively on their own labor, production, consumption (and labor supply decisions) are made simultaneously. A large part of Farm of the modern time, however, is made up of semi -commercial farms in which some inputs are purchased, and some out puts are purchased and some out puts are sold. In this circumstances, producer, consumer, and labor supply decisions are no longer made simultaneously, although they are obviously connected because the market value of consumption cannot exceed the market value of production less the market value of inputs (Singh et al, 1986).

In setting the level of output and quantity of inputs the household will require prices of output and inputs and the technological relationship between output and inputs. In this calculation, the household does not need to know how much output it plans to consume or how much labor it intends to supply. But, consumption and labor supply decisions depend on prices and income, which is at least partly determined by household's farm profits (Sing et al 1986). That is, it has

been assumed that production conditions (farm technology, input, and output prices) affect consumption and labor supply decisions exclusively via income levels and that production decisions are entirely independent of consumption and labor supply decisions. Changes in the production sector have no implications on the shadow prices of labor or consumption. This allows to estimate the consumption and production sectors of the model independently or, more frequently recursively (Lopez, 1986).

The recursive (when production and consumption decisions are separable) model is possible due to the existence of markets for goods and for labor, and due to the perfect substitution between family and hired labor and between home produced and purchased goods. Intuitively, this allows the family to separate its decisions on goods demanded and household goods supplied, and difference being bought or sold (Strauss, 1984). This means the sufficient condition for recursiveness is that all markets exist for commodities that are both produced and consumed, with the household being price taker in each one and that such commodities are homogenous.

Lopez (1986) is of the view that there are several plausible situations for which the recursive model may not be appropriate, and hence developed a non-recursive model that allows for the measurement of inter dependent utility –and profit maximizing decisions. The main source of interdependence is the existence of endogenous shadow prices of on farm labor (it is dependent on both the production and consumption side of the model) instead of being equal to off-farm wage. Different preferences for on-farm and off-farm time allocations, commuting time to off-farm work, supervision costs associated with off-farm employment, difference in skills required by on-farm and off-farm works, entry barriers to off-farm work and absence of markets for goods (the Z goods) underlie the appropriateness of non-recursive model.

Tassew (2000) in his study on Tigray argues in favor of non-separable model as follows: Most of the farm labor comes from the family members and the use of hired labor is very limited. The available credit is supplied by public organizations and is strongly linked to extension activities. Farm households have limited access to off-farm work and are particularly rationed in the non-farm labor market. Their participation in the off-farm labor market is mostly limited to paid development work such as ‘food for work program’.

Farm-household models are often used to analyze household labor allocation in Farm in developing countries. Since these models incorporate both the consumption and production aspects of household, they capture the essential considerations underlying the allocation of family time between leisure and work. Moreover, they provide a framework for understanding household participation in labor markets as suppliers of family labor or as employers of hired labor (Sicular, 1986)

3.1.2 Farm Household Modeling

As in other regions of Ethiopia and in many African countries, subsistence farm dominates the farming system of Oromia. Farmers’ production and productivity is low and significant part of their produces is used for home consumption. Only small proportion of farmers has access to modern farm inputs and credit facilities. Majority households are poor in any welfare measures and are risk averters. Family labor is the major form of employment.

According to the data used in this study, a major labor employer is small-scale farm whose contract is only for short term or seasonal. Problems such as job searching time, job availability,

unfavorable work situations and low wage were reported to affect off –farm wage labor supply. Household labor supply to self-employment in non-farm activities were found to be constrained by lack of credit, high price off raw materials, lack of tools/equipments and low demand for home produced goods.

Hence, it is reasonable to expect high transaction cost, unequal on farm wage and off-farm wage, presence of commuting time, high supervision cost associated with hired in worker who likely has less incentive due at least to short term contract, imperfect substitution between family and hired labor, difference in satisfaction derived from individuals on-farm and off-farm labor supply, etc. These situations underlie imperfect market and hence can allow us to construct a non-separable/ non- recursive farm household model for the Region. Accordingly, the model is based on the following basic assumptions:

- a) The household is considered as a single decision making unit,
- b) The household has a well-behaved utility function with arguments being household consumption of various goods and of leisure,
- c) Market is assumed to be imperfect and commodities are heterogeneous,
- d) Households are assumed to have different preferences for on farm work and off-farm work due to existence of commuting cost associated with the latter. Commuting cost is assumed to reduce the motivation to seek job in to off-farm sector,
- e) Farm wage and off-farm wage are not equal and the former is determined endogenously by variables related with production and consumption sides of the model,
- f) Land and other capital inputs are assumed fixed for the production cycle,
- g) The household allocates its time to:

- i) Leisure,
- ii) Farm production, and
- iii) Off-farm employment.

It is assumed that the farm household maximizes its utility (U) function in any production cycle:

$$U = U(Y, T_h) \dots \dots \dots (1).$$

where Y is composite of consumption goods and T_h is house hold leisure. Household utility is assumed to be maximized subject to three constraints: income, time and production technology.

The income constraint is given as:

$$PY \leq P_f Q_f - P_x X_f + (W_m - W_c) T_m + A \dots \dots \dots (2)$$

where P is the price of consumption goods, P_f is the price of farm goods produced and sold, Q_f is total farm output, P_x is the price of variable inputs, W_m is off-farm wage, W_c is commuting cost, X_f is the variable farm inputs, T_m is the number of off-farm work hours and A other exogenous net income. Equation 2 tells us that the total expenditure cannot exceed the household income.

The time constrain is given as:

$$T = T_f + T_m + T_h \dots \dots \dots (3)$$

Where T is the household total time endowment, T_f is farm work hours; T_m is off-farm work hours and T_h leisure (house work) hours.

And production constraint is given by:

$$Q_f = Q_f(T_f, X_f; K_f) \dots \dots \dots (4)$$

where K_f is fixed farm inputs.

The above three constraints on house hold behavior can be collapsed into one constraints as follows:

$$PY \leq P_f Q_f(T_f, X_f; K_f) - P_x X_f + W'_m T_m + A \dots \dots \dots (5)$$

where $W'_m = W_m - W_c$

where W'_m is net off-farm wage .

The utility function can be maximized subject to the new version of constraint. The solution requires employing Lagrange function (ϕ):

$$\phi(Y, T_h, T_f, T_m, T, P, P_f, P_x, W'_m, X_f, K_f, A)$$

$$\Phi = U(Y, T_h) + \lambda (P_f Q_f(T_f, X_f; K_f) - P_x X_f + W'_m T_m + A - PY) + \gamma (T - T_f - T_m - T_h) \dots \dots \dots (6)$$

where λ and γ are the Lagrange multipliers of the marginal utility of money and marginal utility of time respectively.

The Kuhn –Tucker conditions for an interior solution except for a boundary solution on off-farm work ($T_m \geq 0$) are

$$\frac{\delta\phi}{\delta X_f} = P_f \frac{\delta Q}{\delta X_f} - P_x = 0 \dots\dots\dots(7)$$

$$\frac{\delta\phi}{\delta T_f} = \lambda P_f \frac{\delta Q}{\delta T_f} - \gamma = 0 \dots\dots\dots(8)$$

where $P_f \frac{\delta Q}{\delta T_f} = \frac{\gamma}{\lambda}$

$$\frac{\delta\phi}{\delta K_f} = \lambda P_f \frac{\delta Q}{\delta K_f} = 0 \dots\dots\dots(9)$$

$$\frac{\delta\phi}{T_h} = \frac{\delta U}{\delta T_h} - \gamma = 0 \dots\dots\dots(10)$$

$$\frac{\delta\phi}{\delta Y} = \frac{\delta U}{\delta Y} - \lambda P = 0 \dots\dots\dots(11)$$

$$\frac{\delta\phi}{\delta T_m} = \lambda W'_m - \gamma = 0, T_m \geq 0, W'_m = \frac{\gamma}{\lambda} \dots\dots\dots(12)$$

$$\frac{\delta\phi}{\delta \lambda} = P_f Q_f(X_f, T_f, K_f) - P_x X_f + W'_m T_m + A - PY \dots\dots\dots(13)$$

$$\frac{\delta\phi}{\delta \gamma} = T - T_f - T_m - T_m \dots\dots\dots(14)$$

δU and δQ are partial derivatives of the functions of U and Q .

Equations (8 and 10) give conditions that must be met for optimal time allocation by an operator. The operator is assumed to always have hours of farm work and luxury/ home time. Equation 12 provides the optimality condition for off-farm employment.

If $\lambda W'_m - \gamma < 0$ or $W'_m < \frac{\gamma}{\lambda}$, then the marginal value of an individual's farm work or luxury /home time exceed his /her off-farm wage offer, net of commuting cost, and optimal hours of off-farm work are zero, i.e. $T_m^* = 0$ if $\lambda W'_m - \gamma = 0$, then an individual's off-farm wage, net of

commuting cost, equals the marginal value of his/her farm work, and optimal value of off-farm work may be positive.

3.2. Econometric model

The analysis will involve the investigation of the relative importance of explanatory variables (personal attributes, farm resource endowments and location characteristics) collectively in determining the probability of the participation of the sample households in off-farm employment. The dependent variable is a binary that it takes the value "1" for engagement of households in the off-farm employment and "0" otherwise.

There are several econometric models used to relate the probability that an individual makes a given choice to set of explanatory variables. In this study, however, we select the logit model for the following reasons:

1. The probit model and its alternative logit model are non-linear (in the parameters) statistical model that achieves the objective of relating the choice probability P_i , to explanatory factors in such a way that the probability remains in the (0,1) interval (Griffs, et al, 1993),
2. The logistic function is used because it represents a close approximation to the cumulative normal and is simpler to work with. The close similarity between the logit and probit models is confined to dichotomous dependent variables, and

3. In so many cases logistic regression is preferred to the probit due to its link to other models, such as linear models, and its simpler interpretability as the logarithm of the odds ratio and its eminence effort to retrospectively collected data analysis (McCulaah and Nelder, 1998).

The regression will be run with the help of econometric software known as “limdep”. Limdep is run in both dos and widows versions. One of its advantages of the software is to calculate marginal effect, which is different from variable coefficient for probability models unlike in the case of linear regression model.

3.2.1 Specification of the Logit Model

Let the probability a household is involved in off farm employment, P_i is given by

$$P_i = 1 \quad \text{if } W'_m \geq \frac{\gamma}{\lambda} \quad P_i = 0 \quad \text{if } W'_m < \frac{\gamma}{\lambda}$$

$$P_r(P_i = 1) = P_r(W'_m \geq \frac{\gamma}{\lambda})$$

$$P_i = \frac{1}{1 + e^{-BZ_i}}$$

where Z_i = explanatory variables of the logit models which are hypothesized to determine the decisions about involvement in off-farm employment, B = Logit coefficient.

Household characteristics, farm endowments, financial positions and location characteristics are hypothesized to determine involvement in off-farm employment.

The Model equation of one endogenous and sixteen exogenous variables is given as follows:

3. In so many cases logistic regression is preferred to the probit due to its link to other models, such as linear models, and its simpler interpretability as the logarithm of the odds ratio and its eminence effort to retrospectively collected data analysis (McCulaah and Nelder, 1998).

The regression will be run with the help of econometric software known as “limdep”. Limdep is run in both dos and widows versions. One of its advantages of the software is to calculate marginal effect, which is different from variable coefficient for probability models unlike in the case of linear regression model.

3.2.1 Specification of the Logit Model

Let the probability a household is involved in off farm employment, P_i is given by

$$P_i = 1 \quad \text{if } W'_m \geq \frac{\gamma}{\lambda} \quad P_i = 0 \quad \text{if } W'_m < \frac{\gamma}{\lambda}$$

$$P_r(P_i = 1) = P_r(W'_m \geq \frac{\gamma}{\lambda})$$

$$P_i = \frac{1}{1 + e^{-BZ_i}}$$

where Z_i = explanatory variables of the logit models which are hypothesized to determine the decisions about involvement in off-farm employment, B = Logit coefficient.

Household characteristics, farm endowments, financial positions and location characteristics are hypothesized to determine involvement in off-farm employment.

The Model equation of one endogenous and sixteen exogenous variables is given as follows:

$$\begin{aligned}
P_i = & \beta_1 + \beta_2 DSEXHH + \beta_3 AGEHH + \beta_4 HSIZE + \beta_5 DMHH + \beta_6 DOCHH + \beta_7 DEDHH \\
& + \beta_8 DOAWHH + \beta_9 SCLCC + \beta_{10} DEPH + \beta_{11} DCCPH + \beta_{12} DFUH + \beta_{13} DCLHI \\
& + \beta_{14} CRLL + \beta_{15} DNMKT + \beta_{16} DNROAD + U_i
\end{aligned}$$

3.2.2 Definition of variables used in the model

1. DSEXHH: Dummy for sex of household head; 1= male headed household; 0= female headed household. Male-headed households operate small industries, blacksmithing, and weaving and important trades more than do female-headed households. Male-headed households are expected to be more involved in off-farm employment than female-headed households.
2. AGEHH: Age of household head. As household head gets older, household will accumulate experiences and get better opportunities to diversify productive activities both in to farm and off-farm sectors. Age is expected to positively influence the probability of involvement in off-farm employment.
3. HSIZE: The household size of the household. In the face of declining land holding size and increasing poverty, large family implies higher underemployment for the household. This is likely to push economically active members to seek employment in off-farm activities.
4. DMHH: Dummy for married household heads; 1= married heads; 0= non-married heads including single, divorced and widowed. Married household is likely to be well

established and hence is better off in farm endowments and production than non-married households. Moreover, off-farm wage employment entails mobility and its social cost is likely to be high for married household. Therefore, married households are less likely to be involved in off-farm employment than the others.

5. DOCHH: Dummy for orthodox Christian household head of the household head; 1=Orthodox Christians;0= group of Muslims, catholic and others. Orthodox Christians are less likely to be involved in off-farm activities. Their settlement in highlands also forces them to focus on farming activities compared to followers of other religions.
6. DEDHH: Dummy for education of household head. Educated families have better access to information about employment and can have better and marketable skills. Hence, literate families are expected to be more involved in off-farm employment than illiterate families.
7. DOAWHH: Dummy for own account worker household head; 1= own account worker;0= employer, employee and others. Own account workers could be mainly labor self sufficient but are expected to be less involved in off-farm employment as their labor can less be in excess of households on farm labor supply than heads with other employment status.
8. SCLCCP: size of cultivated land for cereal crops production. Households with larger cultivable land are likely to allocate family labor and resources on farm activities and have less incentive to diversify activities to off-farm sector.

9. DCCPH: Dummy for coffee and chat producer households; 1=producer; 0= non-producer. In coffee and chat crops producing areas food production is less focused. These cash crops producers have sufficient time to allocate to off--farm activities such as trade and small industries though they can have higher farm wage than non-producers.
10. DEPH: Dummy for Enset producer households; 1= poroducer;0=non-producer. Enset production ensures households against food insecurity. Enset producers are less likely to seek off-farm employment.
11. DFUH: Dummy for fertilizer user households; 1= user;0=non-user. Households who use fertilizer undertake crop production more productively and are more likely food secure. Ability to use fertilizer is less likely to give incentives for involvement in off-farm activities.
12. NCOH: Number of cattle owned by household. Cattle are sources of food and income. Increased number of cattle is less likely to encourage household members to seek employment outside farming.
13. CRL: Credit received from local lenders. Lack of credit money or financial sources are one of the constraints to the development of off-farm employment in subsistence Farm dominated rural life. Therefore, as amount of credit received increases there is high probability for households to involve in off-farm employment.
14. CLHI: Dummy for casual labor hired in by household; 1=hired in household;0=non-hired in household. Households that hire in labor have likely shortage of family labor for farm activities. Therefore, they have less probability of seeking job in off-farm economy.
15. LHMKT: Location of household from the nearest market in hours. Households nearer to market have high access to inputs for non-farm activities and better market for their

outputs. Access to market increases the market value of off-farm products and is likely to encourage off-farm employment.

16. LHNROAD: Location of households from the nearest all weather road in hours.

Households closer to road have better access to market for their output and get better wage employment opportunities. Distance from road likely has negative influence on off-farm employment

3.3 The Measurements of Poverty

The socially and economically deprived population groups around the world are affected by a cluster of related, often coexist, factors which together constitute what may be termed the 'poverty syndrome: the major attributes of poverty are (1) low income levels that are inadequate to meet basic needs of food, clothing, and shelter; (2) diets that are quantitatively and often qualitatively deficient;(3) poor environment, poor access to safe water, and poor sanitation;(4) poor access to health care; and (5) large family size and high levels of illiteracy - especially female illiteracy (Goplan,1997) .

Although it is evident that poverty in one country affects prosperity in another country, poverty is the problem of the third world countries. It is likely to expect that the poor in the advanced countries have better economic power to fulfill their minimum basic requirements. The world has deep poverty amid plenty. Of the world's 6 billion people, 2.8 billion----almost half---live on less than \$2 a day, and 1.2 billion----a fifth---live on the less than\$1 a day, with 44 percent living in South Asia, 24 percent in Sub-Saharan Africa, 23 percent in East and Pacific, 6.5 percent in Latin America and the Caribbean, 2 percent in Europe and Central Asia and 0.5 percent in

outputs. Access to market increases the market value of off-farm products and is likely to encourage off-farm employment.

16. LHNROAD: Location of households from the nearest all weather road in hours.

Households closer to road have better access to market for their output and get better wage employment opportunities. Distance from road likely has negative influence on off-farm employment

3.3 The Measurements of Poverty

The socially and economically deprived population groups around the world are affected by a cluster of related, often coexist, factors which together constitute what may be termed the 'poverty syndrome: the major attributes of poverty are (1) low income levels that are inadequate to meet basic needs of food, clothing, and shelter; (2) diets that are quantitatively and often qualitatively deficient;(3) poor environment, poor access to safe water, and poor sanitation;(4) poor access to health care; and (5) large family size and high levels of illiteracy - especially female illiteracy (Goplan,1997) .

Although it is evident that poverty in one country affects prosperity in another country, poverty is the problem of the third world countries. It is likely to expect that the poor in the advanced countries have better economic power to fulfill their minimum basic requirements. The world has deep poverty amid plenty. Of the world's 6 billion people, 2.8 billion----almost half----live on less than \$2 a day, and 1.2 billion----a fifth----live on the less than\$1 a day, with 44 percent living in South Asia, 24 percent in Sub-Saharan Africa, 23 percent in East and Pacific, 6.5 percent in Latin America and the Caribbean, 2 percent in Europe and Central Asia and 0.5 percent in

Middle East and North Africa. Six infants of every 100 do not see their first birthday, and 8 do not survive to their fifth. Of those who have reached school age, 9 boys in 100, and 14 girls, do not go to primary school (World Bank, 2000/2001)

The causes of poverty are multi- dimensional and their effects reinforce their continuity. World bank (1997) states that the courses and consequences of poverty in Sub-Saharan Africa were complex. The basic causes of poverty were lack of access to services and opportunities and inadequate endowments; in ability to support rural development in poor regions; inadequate access to markets for goods and services the poor can sell; low endowment of human capital; destruction of natural resources; in adequate access to assistance for those living at marginal and those victimized by transitory poverty; in adequate participation of the poor in development programs. The large number of people in poverty implies inefficient use of resources and the increasing risk of upheaval.

The approach to reducing poverty has evolved over the past 50 years in response to the deepening understanding of complexity of development. In the 1950s and 1960s many viewed large investments in physical capital and infrastructure as a primary means of development. In the 1970s awareness grew that physical capital was not enough, and that at least as important was health and education in their own right but also to promote growth in the incomes of poor people. The 1980s placed emphasis on improving economic management and allowing greater play for market forces. In the 1990s governance and institutions moved to center stage. It proposes a strategy for attacking poverty in three ways: promoting opportunity, facilitating empowerment and enhancing security. *Promoting opportunity* means that expanding of opportunities for poor people including jobs, credit, roads, electricity, markets for their produce, and the schools, water,

sanitation, and health services that underpin the health and skills essential for work. *Facilitating empowerment* involves changes in governance that make public administration, legal institutions and public service delivery more efficient and accountable to all citizens – and by strengthening participation of poor in political and local decision making. Also important is removing social and institutional barriers that result from distinctions of gender, ethnicity, and social status. *Enhancing security* is reducing vulnerability – to economic shocks, natural disasters, ill health, disability and personal violence (World Bank, 2000/2001).

Amrita Sen (1982) states that the first requirement of the concept of poverty is of a criterion as to who should be the focus of our concern. The specification of certain consumption norms, or of a poverty line, may do part of the job: the poor are those people whose consumption standards fall short of the norms, or whose income lie below that line (Ravallion, 1992). In the measurement of poverty two distinct problems must be faced : (i) defining the poor among the total population; and (ii) constructing an index of poverty using the available information on the poor (Sen, 1997). The questions to answer before measuring poverty are how to assess individual well-being or welfare, at what level of measured well-being do we say that a person is not poor and how to aggregate individual indicators of well-being in to a measure of poverty. The first two questions are identification problem while the third is aggregation problem (Ravallion, 1992).

It is common to equate a person's "well-being" with his or her command over commodities. The precise measure used in practice can vary; it may simply be money income, or it may be money metric utility, where by money income is adjusted for differences in the prices faced in a way which is consistent with an ordinal representation of individual preferences over alternative commodity bundles. The common element is that command over commodities is what matter in

assessing well-being. This approach has come under attack from Sen (1997b, 1984, 1985a, 1987a,b). Sen is critical of the use of both “opulence”(income, wealth or commodity position) and “utility”(whether interpreted as happiness, desire fulfillment, or simply choice) as measures of well-being, arguing that they constitute the wrong space in which to make such assessments. Instead, he argues that “well-being” has to do with being well, which in the most elementary terms is about being able to live long, being well nourished, being healthy, being literate, and so on. What are valued intrinsically are people’s achievements – their “beings and their “capabilities to function. Opulence can have importance as an instrument for expanding capabilities, while utility can provide evidence of achievement (Anand and Ravallion, 1993).

By common usage “Poverty” exists when one or more persons fall short of a level of economic welfare deemed to constitute reasonable minimum, either in some absolute sense or by the standards of a specific society. The literature in developing countries has often taken a fairly narrow definition of “economic welfare”, therefore persons consumption of goods and services. “Reasonable minimum” is then defined by pre-determined “basic consumption needs”, especially nutrition. Both these steps are controversial if material well being deemed to constitute a reasonable minimum by the standard of the society (Ravallion, 1992).

Poverty can be defined in terms of private income or consumption (usually consumption rather than income, in order to allow for consumption smoothing over time (Datt et al, 2000). The decision to use consumption based rather than an income-based measure of individual welfare is motivated by several considerations (Atkinson, 1989):

1. Income can be interpreted as a measure of welfare opportunity while consumption is interpretable as a measure of welfare achievement. Since not all income is consumed, nor is all consumption is financed out of income the two measures typically differ,
2. Consumption typically fluctuates less than income. Individuals rely on saving, credit and transfer to smooth the effects of fluctuations in income on their consumption and therefore consumption provides a more accurate and more stable measure of individual's welfare overtime,
3. Policy makers hold the belief that survey respondents are more willing to reveal their consumption than they are willing to reveal their income
4. In developing countries a relatively large proportion of labor force is engaged in self – employed activities and measuring income for these individuals is particularly difficult. Similarly, many individuals are engaged in multiple income-generating activities in a given year, and the process of recalling and aggregating income from different services is also difficult.

3.3.1 Poverty Line

Poverty line is the level of standard of living below which people are poor. The line separates poor households from non -poor households. Once the poverty line is established, their total per capita income or per capita consumption measures the welfare of the households. Consumption and income are the aggregate money metric of welfare. The money metric measures are however

criticized for their failure to incorporate such important issues as education and health services, consumption of leisure, length and health of life, autonomy self-esteem or participation, consumption of public goods, powerlessness and isolation.

The most common approach in defining a poverty line is to estimate the cost of a bundle of goods deemed to assure that basic consumption needs are met. The difficulty is in identifying what constitutes basic needs. For developing countries, the most important component of a basic needs poverty line is the food expenditure necessary to attain some recommended food energy intake. This is then augmented by a modest allowance for non-food (Lipton and Ravallion, 1993). Those households, which attain below the minimum basic consumption needs, are designated to be under poverty line.

The concept of minimum is itself difficult to fix, since minimum requirements, in terms of the intake of calories and proteins, vary with the amount of physical activity of an individual. There are also large inter-individual variations in requirements stemming from physiological factors such as age, sex, body weight and size, and metabolism (Anand, 1997).

Different poverty lines are used to overcome the problems associated with measuring poverty. What kind of poverty line to use and how to determine the level of the line vary depending on how one chooses to define poverty, which is multidimensional and manifests itself in various forms. There is a general consensus that poverty should be defined either in relative or absolute terms. Relative poverty is concerned with the distribution of income and inequality in living conditions among population. It is measured in relation to the national average income. Absolute poverty, on the other hand, is concerned with the satisfaction of the human basic needs of society

and, as such, is measured with a yardstick that indicates the minimum standard of living. Relative poverty line is usually set at two-third or one-third of the average income in a country. Relative poverty line will vary, therefore, with the level of income. An absolute poverty line, on the other hand, usually constitute the cost of a minimum consumption basket, based on the food necessary for a recommended caloric intake plus the cost of basic nonfood items which is consistent with the spending patterns of the poor (Getahun, 2000).

There are two objections to defining poor in terms of relative poverty line. First, the method prejudices the extent of poverty (it is P percent by definition!). Second, it implies that the poor are always with us. In trivial statistical sense there is always a bottom person in the income distribution, and thus one could never actually eradicate poverty. Even so, it could still be perfectly reasonable for a government to be continually concerned with the lowest percent of the population (Foster et al, 1997).

The most popular approaches of constructing poverty lines are the Food Energy Intake (FEI) Approach and the Cost of Basic Needs (CBN) Approach. Both approaches are discussed in turn as follows.

The Food Energy Intake (FEI) Method: The method of setting the poverty line stipulates the cost of attaining a predetermined level of food energy intake. The common procedure is to run a regression of cost of a basket of commodities consumed by each household over the caloric equivalent or the food energy implied from the baskets of goods (Abebe, 1998). This methods proceeds by defining the consumption expenditure or income level at which a person's typical food energy intake is just sufficient to meet a predetermined food energy requirement. It aims at measuring consumption poverty (Ravillion and Bidani, 1992)

Cost of Basic Needs (CBN) Methods: We follow common practice in taking poverty to mean a lack of command over basic consumption needs, and the poverty line to be the cost of those needs. One method of implementing this definition is to stipulate a consumption bundle considered adequate for basic consumption needs and then to estimate its cost for each of the sub groups being compared in the poverty profile (Ravellion and Bidani, 1994). By this approach, the total poverty line is constricted as the sum of a food and non-food needs. The food and non-food poverty lines are embody value judgments on basic food and non-food needs. The poverty lines are set interims of a level of per-capita consumption expenditure that is deemed consistent with meeting these basic needs (Datt, 2000).

The approach developed by Ravillion and Bidani (1994) to estimate the Engle function for food expenditure by regressing food share on the logarithm of total expenditure, taking care of differences in household size and composition and other exogenous variables. They have compared and contrasted this method with the FEI method in constructing poverty lines using the Indonesians data and concluded that the CBN method offers a consistent and robust poverty profile (Abebe 1998; Getahun, 2000).

Implementation of the CBN method poses a number of problems. Degree of arbitrariness in defining basic needs is inevitable; although it is not obvious that consistent poverty ranking s will be affected much by the definition of basic needs. Another problem is that cross-sectional (and some times inter-temporal) price data are incomplete, amendments are unreliable; this is particularly problematic for nonfood goods. Achieving consistency, even in terms of the basic consumption needs, may then be difficult.

3.3.2 Properties of poverty index

Several criteria have been advanced as being desirable ones for a poverty measure to satisfy: focus, symmetry, monotonicity, weak transfer sensitivity, sub group consistency, decomposability. But, not all poverty indices satisfy all the properties (Sabramanian, 1997). These axioms are briefly described below:

Focus: Poverty index should be insensitive (other things equal) to an increase in the income of a non-poor person.

Symmetry: The poverty index is invariant with respect to a permutation of income across individuals.

Monotonicity Axiom: Other things equal, reduction in poor person's income should increase the value of the poverty measure.

Transfer: Other things equal, transfer of income from poor person increases poverty index

Weak transfer Axiom: Other things equal, transfer from poor person increases poverty index, provided the beneficiary of the transfer continues to remain poor after the transfer

Transfer Sensitivity: A poverty index should be more sensitive to transfers at the lower than at the upper end of the income distribution of the poor.

Sub-group consistency: Overall poverty should increase when, *ceteris paribus*, poverty in any sub-group increases.

Decomposability Axiom: The poverty index should be amenable to being expressed as a weighted sum of subgroup poverty indices, the weights being the sub group population shares.

3.3.3 Analyses of Poverty Indices

There are many poverty indices with different properties. This study makes review of only those indices, which are widely used by poverty analysts.

Head Count Ratio: The head count ratio is the ratio of the number of people with income less than poverty line to the total population size. It is simply the fraction of poor units in the population.

If incomes or consumption expenditures distribution in the population is ranked in ascending order such that:

$$Y_1 \leq Y_2 \leq \dots \leq Y_q \leq Z \leq Y_{q+1} \leq \dots \leq Y_n \dots \dots \dots (1)$$

where Z is an exogenously given poverty line, q is the number of people earning income level below Z and n is the total population. Then, the Head count ratio, H , is defined as:

$$H = q/n \dots \dots \dots (2)$$

H is a measure of prevalence of poverty and is said to be a very crude index. It is insensitive to the extent of the short fall of income from the poverty line (depth of poverty). It is also insensitive to the distribution of income among poor people. Thus, H , violates both monotonicity and transfer axioms.

Poverty Gap Index: Poverty gap measures the depth of poverty and is defined as the mean deviation of income of the poor from the poverty line. It is the average gap between the living standard of the poor households and the poverty line.

The poverty gap index is defined as:

$$PG = \frac{1}{n} \sum_{i=1}^q \left(\frac{Z - Y_i}{Z} \right) \dots \dots \dots (3)$$

It can be written as

$$PG = HI = H \frac{(Z - Y_p)}{Z} \dots \dots \dots (4)$$

Where Y_p is the mean income or expenditure of the non-poor and I is referred as ‘income gap ratio’-the average shortfall of income from the poverty line. As poverty gap is dependent on mean income, it gives no information on the extent of income distribution among the poor. It does not capture the severity of poverty. Hence, it satisfies the monotonicity axiom but does not satisfy the transfer axiom.

In the words of Sen (1997) any poverty index worthy of consideration should be able to provide three basic information on poverty; it should be able to identify who the poor are, capture their average deprivation and thirdly their relative deprivation among themselves. As a result, H captures only who the poor are, or measures the prevalence of poverty; poverty gap measures the average deprivation.

Sen's Index: A new measure proposed by Sen (1976), which satisfies both monotonicity and transfer axioms: This index measures the relative deprivation, which reflects inequality of income among the poor.

The Sen's Index is defined as:

$$S = [H(I + (1 - I)G_p)] \dots\dots\dots(5)$$

S=Sen's poverty index

H=Head count ratio

I=Average income short fall as a percentage of the poverty line

G_p= Gini coefficient for the poor population or Gini index of the distribution of income among the poor.

Sen's index satisfies the following axioms: Monotonicity, Transfer, and Relative Equity, Ordinal Rank Weight, Monotonic Welfare and Normalized Poverty Value.

Sen's poverty index captures the properties of poverty such as: poverty incidence, relative deprivation among poor and average deprivation as reflected by the use of H, G_p, and is increasing in the three of them.

FGT class of Decomposable Poverty Measures: The FGT (Foster-Greer-Thorbecke) poverty index is (i) is adaptively decomposable with population share weights, (ii) satisfies the basic properties proposed by Sen, and (iii) is justified by a relative deprivation concept of poverty. The

Sen measure that rely on rank-order weighting fail to satisfy the basic condition that an increase in sub group poverty must increase total poverty. The inequality measure is shown to be the squared coefficient of variation and indeed the poverty measure is pressed as a combination of inequality measure, the headcount ratio, and the income gap-ratio (Subramanian, 1997). Unlike Sen's poverty index, in FGT index, deprivation depends on the distance between a poor household's actual income and the poverty line rather than the olds that lie between a given households and the poverty line.

The FGT index is defined as:

$$P_{\alpha}(Y,Z) = \frac{1}{n} \sum_{i=1}^q \left[\frac{Z - y_i}{Z} \right]^{\alpha} \dots\dots\dots(7)$$

where as $\alpha \geq 0$ and is the measure of poverty aversion parameter,

n=total number of households in population

q=the number of poor households

Z=the line for the households

Yi=household income

The poverty index, P_{α} , changes when α takes different values that is when $\alpha=0$, P_{α} reduces to Head count, and when $\alpha=1$,it reduces to poverty gap. As α increases more and more weight is given to the poorest.

The FGT index will be used to measure poverty in this study. It satisfies the monotonocity axiom for $\alpha > 0$,the transfer axiom for $\alpha > 1$,and the transfer sensitivity axiom for $\alpha > 2$.It is sub group

decomposable. It also helps to arrive at the contribution of subgroup (employment sector) to total poverty.

The contribution of s sector is computed as:

$$C = \frac{L_s P_{\alpha s}}{P_{\alpha}}$$

where $\alpha=0$ for P_0 , $\alpha =1$ for P_1 and $\alpha =2$ for P_2 ; L_s is the proportion of total population in sector s ;and $P_{\alpha s}$ is poverty in sector s, P_{α} is total poverty in rural area.

The poverty measurement will be across the type of the employment of the rural households, namely farm producers, off-farm participants and dual employment (farm and off-farm) holders. The households' incomes will be adjusted to adult equivalent before measurement is carried out. The measurement result will involve the measures of prevalence of poverty, depth of poverty and severity of poverty. The contribution of each employment selector to total poverty will also be measured. From the result, what we learn more is the relative importance of poverty in each employment category than the absolute impoverishment of the individuals. Because the data available for poverty measurement is the household income, which in the most cases is underestimated and hence is less relevant for poor countries like Ethiopia, where the fulfillment of the minimum basic needs is the serious problem of the majority peoples.

The following are expected as the impact of off-farm employment on poverty measures is concerned:

Households hold dual employment (farm plus off-farm) will show the least prevalence, depth and severity of poverty than the other two categories as captured by FGT measures. This attributes to the diversification of income generating activities.

Households involved in only farm employment show less incidence, depth and severity of poverty than those engaged in only off-farm work. This is due to higher farm return than off-farm return.

Households engaged in only off-farm activities will show the worst poverty measures. This is the result of lack/shortage of farm endowments and poor performance of the sector.

CHAPTER FOUR

EMPIRICAL ANALYSIS

This chapter has two main sections, namely, data description and model estimation. The first section presents the description of the data and the second section logit estimation and poverty measurement. As both methods measure the same data, the agreement between their results verifies the validity of the study.

4.1 Description of the Survey Data

The survey was conducted in order to study off-farm employment. Structured questionnaire was the method used for data gathering. The data are divided into different sections including sample households' demographic characteristics, farm/ agricultural employment (crops production and animal husbandry), off-farm employment (wage and self employed non-farm activities), location characteristics and some related supplementary issues. This chapter briefly describes part of the data that is required for this specific study. The survey exercise covered 1704 (against 1800 planned) sample households inhabiting rural Oromia. Households involved in off-farm employment or reported off-farm income are 995 (58.4 percent) of the total sample. The remaining 709 (41.6 percent) households were found to be non-participants of off-farm work and derived their livelihood only from farm sector. The mean values of the dependent and explanatory variables are presented in the following table.

Table 4.1 Descriptive Statistics based on no missing observations (No.1704).

Variable	Mean	Std. Dev.	Minimum	Maximum
Dependent Variable				
Dummy for the probability of off-farm employment (DPOE)	0.58	0.49	-	-
Explanatory Variables				
Dummy for sex of household heads (SEXHH)	0.86	0.35	-	-
Household size (HHS)	5.30	2.40	1.00	15.00
Age of household heads (AGEHH)	43.00	36.20	14.00	98.00
Dummy for married household (DMHH)	0.82	0.39	-	-
Dummy for Orthodox Christian head (DOCH)	0.47	0.50	-	-
Dummy for own account worker hh head (DOAWHH)	0.81	0.39	-	-
Dummy for education of household head (DEDHH)	0.37	0.48	-	-
Cultivated land for cereal crops (CLCC)	1.13	1.14	0.00	8.25
Dummy for coffee and chat producer household (DCCPH)	0.12	0.33	-	-
Dummy for Enset producer households (DHEPH)	0.11	0.31	-	-
Dummy for fertilizer user households (DFUH)	0.36	0.48	-	-
Number of cattle owned by hh (NCOH)	3.83	11.38	0.00	404.00
Dummy for casual labor hired in by hh (DCLHI)	0.12	0.32	-	-
Credit received from local lenders (CRHLL)	48.63	388.13	0.00	15000.00
Location of household from the nearest market (LHNMKT)	1.63	1.75	0.00	24.00
Location of household from the nearest road (LHNROAD)	2.37	3.08	0.00	44.30

The mean of dummy variable shows the odd ratio of the event occurred.

Source: Own Computation

4.1.1 Demographic Characteristics of the households

The demographic characteristics of households are among the major determinants of the probability off-farm employment. In light of this, the sex, age, marital status, religion` education of the heads, the family size and the employment type of households participated in the off-farm employment are described in comparison with that of non-participants with the use of tables.

Sex

Male-headed households accounted nearly 86percent for both participants and non-participants. Sex of household head does not seem to be differential factor to adjust to one or the other job alternative.

Table 4. 2 :Off-farm employment Participant and non-participant households heads by sex

Characteristics	Participants		Non-Participants	
	Frequency	Percentage	Frequency	Percentage
Sex				
Male	852	85.6	608	85.6
Female	143	14.4	101	14.4
Total	995	100	709	100

Source :Own Computation

Marital Status

Married households dominate marital status for both groups. But the proportion of married households for participants group is less than for the non-participant group implying higher proportion of non-married households for participants.

Table 4.7 Off-farm employment participant and non-participant household heads by education

Characteristics	Participants		Non-participants	
	Frequency	Percentage	Frequency	Percentage
Illiterates	643	64.6	434	61.2
Literate s	352	35.4	275	38.8
Total	995	100	709	100

Source: Own Computation

Employment Status

The employment status of households heads is given in table 4.3. The own account work is the dominant form of employment (81 percent).

Table 4.8 Employment Status of Households heads

Employment Status	Frequency	Percentage
Employer	135	7.9
Own Account worker	1382	81.1
Employee (out)	134	7.9
In active	48	2.8
No Response	5	0.3
Total	1704	100

Source: Own Computation

Activities

The main activities of the population above the age of seven are found to be Farm (46 percent), housework (32.5 percent), and self-employed non-farm works (4 percent). Self-employed non-farm activities include crafting, selling foods and drinks, trade, small industries and related operations. These do not include however off-farm wage employees and those who operate self employed non-farm activities as a secondary job.

Table 4.9: Main Activity of household members

Activity	Frequency	Percentage
Farm	3065	46.4
Housework	2152	32.5
Self employed non-farm works	281	4.2
Unemployed	19	0.3
Student	638	9.6
Others	462	7
Total	6627	100

Source: Own computation

4.1.2 Farm Employment

Farm employment involves agricultural activities including crop production and animal husbandry. As indicated in table 4.10 the proportions of households involved in farm production including land cultivation, Enset production, coffee/chat production, cattle rearing are less for participants than non-participants. . However, 100 percent of the participants were found to be goat/sheep owners. This might be that off-farm participants accumulate resources by investing off-farm income in small animals.

Users of fertilizers were less than 40 percent for both groups. But, the proportion for participants is less by 5-percentage point higher than for non-participants. The percentage of credit receivers from local lenders was higher for participants than the other group. Participants show higher percentage of households, which hired in casual labor. The case might be that dual job operator households hired in labor to overcome labor shortage while diversifying both farm and off-farm activities. Households who reported farm income are 83 percent for participants and 95 percent for non-participants. This is inline with the study made by Tassew (2000) and Tegegn (2000).

Table 4.10: Agricultural endowments for participants and non-participants

Description	Participants		Non-Participants	
	Freq.	Percentage	Freq.	Percentage
Households cultivated land for cereal crops	666	67	600	84.6
Households hired casual workers	123	12.4	67	9.4
Households owned cattle	562	56.5	466	65.7
Households owned their own oxen	391	39.3	365	51.5
Households owned goats/sheep	995	100	561	79.1
Households purchased fertilizer	329	33.1	272	38.4
Households produced coffee and chat	93	9.3	105	14.8
Households received Credit from local lender	241	24.2	140	19.7
Households cultivated Enset	102	10.3	81	11.4
Households had farm incomes source	827	83.1	673	94.9

Source: Own Computation

4.1.3 Off-Farm Employment and Income

Not all sample households responded to the interview about their income. Only 98 percent households revealed their total annual income. Households reported off-farm incomes are 58 percent of the total sample households. The average annual off-farm income for operators was Birr 531. The contribution of off-farm income to households' total annual income was nearly 19 percent during the survey.

Table 4.11: Households' total annual incomes by sector and number of participants.

Sector	Participant Households	Total Income	Average Income	Share (%)
Farm	1501	2303953.19	1534.95	81.3
Off-Farm	995	528676.03	531.33	18.7
Total	1668	2832629.22	1698.00	100

Source: Own Computation

Dividing off-farm income into off-farm wage income and self-employed non-farm income, households who reported wage income are 33 percent of the total. Self-employed non-farm activities, according to the survey, are divided into 4 main categories, namely, crafting, food and drinks, trade and small industries. The households engaged in crafting, food and drinks, trade and industries are 13 percent, 7 percent, 8 percent and 0.1 percent of the total households. A total of 637 households reported self-employed non-farm income.

Table 4.12: Annual average households income by sources

Source	Frequency	Mean Income.
Annual average income from small Industries	13	1309.45
Annual average income from food /drink	127	206.36
Annual average income from handcrafts	225	392.87
Annual average income from trade	140	606.14
Annual average wage income	547	430.17
Annual average total off- farm income	995	531.33

Source: Own Computation

As indicated in Table 4.13, small holding farm was the highly dominant employer (75 percent) of off- farm wageworkers followed by Government establishment (8.2 percent).

Table 4.13: Wage employment by type of employers

Description	Frequency	Percent
Employer		
Small holding farm	495	74.4
Private commercial farm	27	4.1
State farms	5	0.8
Government Establishment	55	8.3
NGOs	25	3.8
Others	58	8.7
Total	665	100

Own Computation

Farming including land preparation, weeding, harvesting and threshing/transporting activities were the major sources (64.7 percent) of off-farm wage employment followed by infrastructure construction (6 percent).

Table 4.14: Wage employment by type of activities

Description	Frequency	Percent
Activity		
Agricultural Activities	430	64.7
Natural resource conservation	9	1.4
Infrastructure	39	5.9
Others	187	28.0
Total	665	100

Source: Own Computation

Over 80 percent of the laborers were found to be local and about 18 percent migrant/seasonal (stayed outside their home more than one week).

Table 4.15: Place of employment-local (or seasonal)

Place	Frequency	Percentage
Local	535	80.5
Seasonal	121	18.2
No response	9	1.4
Total	665	100

Source: Own Computation

Migrant wageworkers reported several problems to secure job and smoothly undertake their duties.

Table 4.16: Problems faced after migration

Problem	Frequency	Percent
Shelter	14	11.6
Getting jobs	23	19
Low wage	30	24.8
Long search time	12	9.9
Mobility problems	19	15.7
Medical services	28	23.1
Other problems	8	5.9

Source: Own Computation

About 81 percent of crafting operators reported to undertake their activities for part of the year and 19 percent for all year round.

Table 4.17 Duration of crafting operations

Operation	Frequency	Percentage
Part of the year	174	80.9
All year round	39	18.8
No response	2	0.9
Total	215	100

Source :Own Computation

It was reported that entry to non-farm activities were constrained mainly by low technology, high raw materials prices, low output demand and lack of credit.

Table 4.18: Problems faced on performing non-farm activities

	Crafting	Food and drinks	Trade	Small Industries
Lack Tool/equipment	28	11	1	1
High price of raw materials	19	13	3	1
Low price of products/output	25	27	12	1
Lack of credit	23	20	51	-
Busy with farm work	51	5	10	-
Others	20	17	39	3
Total	166	93	116	7

Source: Own Computation

4.2 Location characteristics

As indicated in table 4.19, 59 percent of off-farm participant households live within one hour radius from market and only 22 percent of households travel over 2 hours to reach the nearest market. Similarly, 54 percent are far away from the nearest all weather road and 38 percent households cannot be serviced with all weather road unless they travel for over 2 hours either on

4.3. Estimation and Poverty Measurement

4.3.1. Logit Regression results

Table 4.20: Maximum likelihood estimation results of variables influence the probability of off-farm employment.

Variable	Coefficient	Standard Error	t-ratio	P[Z >z]	Marginal Effect
Constant	1.274	0.262	4.858	0.0000*	0.3080
DSEXHH	0.124	0.152	0.820	0.4123	0.0300
AGEHH	0.00131	0.00208	0.630	0.5288	0.00032
H SIZE	0.474	0.0248	1.916	0.0554***	0.0115
DMHH	-0.256	0.143	-1.788	0.0738***	-0.0618
DOCHH	0.226	0.108	2.083	0.0373**	0.0546
DEDHH	-0.142	0.112	-1.273	0.2030	-0.0344
DOAWHH	-0.799	0.144	-5.563	0.0000*	-0.193
SCLCC	-0.324	0.0570	-5.718	0.0000*	-0.0783
D EPH	0.142	0.168	0.849	0.396	0.0344
D CCPH	-0.478	0.159	-3.000	0.0027*	-0.116
D FUH	-0.198	0.116	-1.671	0.0948***	-0.047
NCOH	-0.224	0.0101	-2.213	0.0269**	-0.00543
DCLHI	0.560	0.173	3.245	0.0012*	0.135
C RLL	0.0009	0.00045	1.977	0.0481**	0.000216
DNMKT	-0.0375	0.0311	-1.206	0.12277	-0.0090
DNROAD	-0.000734	0.0178	-0.041	0.9672	-0.00018
<i>Log likelihood function</i>			-1091.701		
<i>Restricted log likelihood</i>			-1157.008		
<i>Chi-squared</i>			130.6140		
<i>Degrees of freedom</i>			16		
<i>Significance level</i>			.0000000		

* Significant at 1percent, ** significant at 5 percent and ***at 10 percent
Source: computed from sample survey data

4.3. Estimation and Poverty Measurement

4.3.1. Logit Regression results

Table 4.20: Maximum likelihood estimation results of variables influence the probability of off-farm employment.

Variable	Coefficient	Standard Error	t-ratio	P[Z >z]	Marginal Effect
Constant	1.274	0.262	4.858	0.0000*	0.3080
DSEXHH	0.124	0.152	0.820	0.4123	0.0300
AGEHH	0.00131	0.00208	0.630	0.5288	0.00032
H SIZE	0.474	0.0248	1.916	0.0554***	0.0115
DMHH	-0.256	0.143	-1.788	0.0738***	-0.0618
DOCHH	0.226	0.108	2.083	0.0373**	0.0546
DEDHH	-0.142	0.112	-1.273	0.2030	-0.0344
DOAWHH	-0.799	0.144	-5.563	0.0000*	-0.193
SCLCC	-0.324	0.0570	-5.718	0.0000*	-0.0783
D EPH	0.142	0.168	0.849	0.396	0.0344
D CCPH	-0.478	0.159	-3.000	0.0027*	-0.116
D FUH	-0.198	0.116	-1.671	0.0948***	-0.047
NCOH	-0.224	0.0101	-2.213	0.0269**	-0.00543
DCLHI	0.560	0.173	3.245	0.0012*	0.135
C RLL	0.0009	0.00045	1.977	0.0481**	0.000216
DNMKT	-0.0375	0.0311	-1.206	0.12277	-0.0090
DNROAD	-0.000734	0.0178	-0.041	0.9672	-0.00018
<i>Log likelihood function</i>			-1091.701		
<i>Restricted log likelihood</i>			-1157.008		
<i>Chi-squared</i>			130.6140		
<i>Degrees of freedom</i>			16		
<i>Significance level</i>			.0000000		

* Significant at 1percent, ** significant at 5 percent and ***at 10 percent

Source: computed from sample survey data

4.3.1.1 The likelihood ratio test of the model

A test of hypothesis $H_0; \beta_2 = \beta_3 = \dots = \beta_k = 0$ can be easily carried out using the likelihood ratio (Judge et al 1985).

Two sets of maximum likelihood estimates of the parameters are obtained one under the assumptions that H_0 is true, and the other under the assumption that H_1 is true. Substituting these estimates into their respective likelihood functions gives the maximized values of the likelihood. If the maximum value of the restricted likelihood (under H_0) is not much less than the maximum value of the unrestricted likelihood (under H_1), then there is no evidence in the data to refute H_0 . If the restricted maximum is much less than the unrestricted maximum or, in other words, the data have strong preferences for H_1 , this constitutes evidence against H_0 (Griffiths, 1993).

Let $L(H_0)$ and $L(H_1)$ be the maximized values of the log likelihood functions under H_0 and H_1 respectively. The likelihood ratio test that compares these values is based on the statistic $\lambda_{LR} = 2[L(H_1) - L(H_0)]$. λ_{LR} has an approximate $\chi^2_{(j)}$ distribution, where j is the number of restrictions under H_0 . We reject H_0 when $\lambda_{LR} > \chi^2_c$, where χ^2_c is a chosen critical value from $\chi^2_{(j)}$ distribution. Or when the computed value is larger than the critical value, the hypothesis is rejected.

From the table the value of the restricted log likelihood is -1157.008 and the value of unrestricted log likelihood is -1091.701. Therefore, the value of the log likelihood ratio is given as:

$$\begin{aligned}\lambda_{LR} &= 2[L(H_1) - L(H_0)] \\ &= 2(-1091.701 - (-1157.008)) \\ &= 132.614\end{aligned}$$

At $\alpha = 0.01$ level of significance the test critical value is $\chi^2_{(16)} = 32$. Hence, we reject the null hypothesis that the selected variables chosen to have determined the probability of the involvement in off-farm employment are not significantly different from zero.

4.3.1.1 The likelihood ratio test of the model

A test of hypothesis $H_0; \beta_2 = \beta_3 = \dots = \beta_k = 0$ can be easily carried out using the likelihood ratio (Judge et al 1985).

Two sets of maximum likelihood estimates of the parameters are obtained one under the assumptions that H_0 is true, and the other under the assumption that H_1 is true. Substituting these estimates in to their respective likelihood functions gives the maximized values of the likelihood. If the maximum value of the restricted likelihood (under H_0) is not much less than the maximum value of the unrestricted likelihood (under H_1), then there is no evidence in the data to refute H_0 . If the restricted maximum is much less than the unrestricted maximum or, in other words, the data have strong preferences for H_1 , this constitutes evidence against H_0 (Griffiths, 1993).

Let $L(H_0)$ and $L(H_1)$ be the maximized values of the log likelihood functions under H_0 and H_1 respectively. The likelihood ratio test that compares these values is based on the statistic $\lambda_{LR} = 2[L(H_1) - L(H_0)]$. λ_{LR} has an approximate $\chi^2_{(j)}$ distribution, where j is the number of restrictions under H_0 . We reject H_0 when $\lambda_{LR} > \chi^2_c$, where χ^2_c is a chosen critical value from $\chi^2_{(j)}$ distribution. Or when the computed value is larger than the critical value, the hypothesis is rejected.

From the table the value of the restricted log likelihood is -1157.008 and the value of unrestricted log likelihood is -1091.701. Therefore, the value of the log likelihood ratio is given as:

$$\begin{aligned}\lambda_{LR} &= 2[L(H_1) - L(H_0)] \\ &= 2(-1091.701 - (-1157.008)) \\ &= 132.614\end{aligned}$$

At $\alpha = 0.01$ level of significance the test critical value is $\chi^2_{(16)} = 32$. Hence, we reject the null hypothesis that the selected variables chosen to have determined the probability of the involvement in off-farm employment are not significantly different from zero.

This hypothesis test shows that the demographic characteristics, farm endowments and production, financial position and location characteristics determine the probability of off-farm employment.

4.3.1.2 Analysis of the regression results

A total of 16 explanatory variables are chosen for the estimation of the determinants of the probability of off-farm employment summarized in Table 4.19.

1. Dummy for sex of household head

The coefficient of sex variable is positive as expected. However, it is insignificant and hence statistically not different from zero implying that male-headed and female-headed rural households have almost similar probabilities of involvement in off-farm employment.

2. Age of household head

The age of the household head shows positive influence on the involvement of households in off-farm employment. But it has insignificant coefficient indicating that the effect of age on decision about involvement in off-farm employment is statistically zero.

3. Household size

Household size shows positive relationship with the probability of off-farm employment as expected. Its coefficient is significant at 5percent significance level. With increased family size, at least two things can be expected. On the one hand, large family size implies sufficient labor force for the households, which enable diversification into different farm and /or off-farm activities. On the other hand, large family size increases the marginal utility of money and decreases the marginal utility of leisure and hence raises the probability of involvement in off-farm employment.

4. Dummy for married household head

The marital status of households has relationship with the probability of off-farm employment as indicated by statistically significant coefficient. Married households are less likely to be involved in off-farm employment than their non-married counterparts.

This can be attributed (but not limited) to their better access to farm resources. As a result, they could be less attracted in off-farm employment. On the other hand, the shadow farm wage could be lower than observed off-farm wage for the non-married households.

5. Dummy for own account worker head

A relationship is observed between employment status of heads of households and families involvement in off-farm employment. The coefficient for own account workers is negative and significant. The result indicates that households with own account employment status are less likely to be involved in off-farm employment as compared with others.

6. Dummy for Orthodox Christian head of household

The regression result shows that Orthodox Christians have a higher probability of involvement in off-farm employment. This can be because of different reasons. Most of the high land areas of the region where food crops are produced and supplied to big cities and towns including Addis Ababa are mainly inhabited by Orthodox Christians. More over, food and drinks are prepared and sold in the rural areas by this religious group. Furthermore, the cereal crops producer highlanders are known to move to cash crops, Government establishments and state farms in search of wage employment particularly during slack seasons. Muslims and endogenous religion followers dominate the lowlands, where pastoralism dominates economic activities. In the low land off-farm activities are not yet well practiced either due to limited access to market and road or limited demand for off-farm products and services. The middle highlands, where cash crops (coffee and chat) are produced, Muslims and catholic Christians dominate. Cash crop producers are less involved in wage employment as their farm return is high.

7. Dummy for literate household head

Education has negative relation with off-farm employment implying that literate families have less probability of involvement in off-farm employment than illiterate families. This can be attributed to the fact that off-farm employment is given low status by the society such that literate families who are likely to have better opportunities may not be attracted to it. Moreover, the low return from the sector may not be attractive. But its coefficient is not significantly different from zero implying education has no effect on the probability of off-farm employment.

8. Size of cultivated land for cereal crops

Cultivated land is negatively related with the involvement in off-farm employment as hypothesized. It has very large coefficient implying high magnitude of influence on the probability of off-farm employment. In traditional Farm the amount of outputs produced is significantly determined by size of land brought under cultivation and, the amount and regularity of rainfall. Households with larger cultivable land are more likely to be food secure and to have sufficient access to cash income, and it increases the marginal values of labor on the farm. As a result, it is reasonable to think that they have less probability of taking alternative job than households cultivate less amount of land. A unit change in cultivated land has 8.8 percent effect in favor of the probability of non- involvement in off-farm employment.

9. Dummy for Enset producer household

Production of Enset has positive effect on the probability of off-farm employment. Enset is produced in the high altitude or “Dega” areas. It is food security crop and mostly used for home consumption. Once planted its production does not as such require the involvement of male members of households, and is processed by mothers and girls. Although, in the most cases it ensures households against food insecurity, yet it does not guarantee households with cash income required for basic non-food needs and for other purposes. The fact that males’ labor may be underemployed and the need for cash could push males to seek wage labor by moving to cash crop areas, state farms and other wage employment opportunities. Moreover, sisal, the by-product

16. Distance of household from the nearest all weather road

Distance from the nearest all-weather road is negatively related with the probability of involvement in off-farm employment. However, in the model, the probability that road is not related with off-farm employment is strong.

4.4 Poverty Measurement

Poverty in this study is measured across the types of employment the sample households were found to hold during the interview exercises. As discussed earlier, a poverty line can be estimated based on individual's income or consumption expenditure. Both measures have their merits and demerits in fixing the line below which people are said to be poor. The survey gathered only household income data, the only option we have to use for the intended measurement. Nevertheless, the income variable can satisfy the purpose of the study, as it is to compare the status of rural employment in terms of their respective participants' livelihood status/wealth levels rather than to measure absolute impoverishment of the people in each category. The household incomes are adjusted to adult equivalent to determine per capita income of the population.

A total of 1668 households reported their annual income generated from farm sources or off-farm sources or both. The mean annual income of the sample population was found to be Birr 423 per adult equivalent unit (AEU) in 1996. But as indicated in Table 4.11 the total mean household income was Birr1698 for the same year.

A relative poverty line approach is used to measure poverty indices. Usually two-third of an average income of a study people or a national income is taken as a poverty line. Here, the average income of the people is considered to be specific. Taking $\frac{2}{3}$ of the mean income of the sample population, the poverty line becomes Birr 282 per AEU. This means, the rural relative poverty line for rural Oromia was Birr 282 per year or Birr 5.87 per week per adult equivalent unit in 1996.

Both the mean and the poverty line are very low when compared with the national relative poverty line of Birr 835 as estimated by MEDAC in 1999 based on expenditure data gathered by CSA in 1995/1996.

Nevertheless, it is not surprising to see such differences between the figures calculated based on income and expenditure variables. Because, the data gathered based on income can have the following major characteristics:

- 1) People are less willing to reveal their income than their expenditure on consumption, and usually underestimate if they are bound to reveal,
- 2) As rural households do not record the incomes they earn from various sources at different times of a year, they find it difficult to recall as time passes, and
- 3) Many rural household heads, particularly illiterates, do not feel free to tell the exact amount of income they earn per year lest the Government may get that information and impose taxes on them accordingly.

On the other hand, a food poverty line estimated by Trufat (1996) based on rural household survey- consisted of 15 rural sites (covered 1500 households)-conducted by Economics Department of Addis Ababa University was Birr 5.05 per week per Adult Equivalent unit (AEU). Based on this cut-off line the number of poor people were found to be 53 percent, poverty gap, 30 percent and poverty severity, 21 percent as captured by FGT index.

As indicated in the table 4.21 a total of 828 households earn income from both farm and off-farm sectors, 673 from only farm and 167 from only off-farm sources. Poverty is measured based on the above estimated relative poverty line Birr 282 per year. The measurement result is discussed as follows:

The result shows the proportion of poor people as captured by the head count ratio index (P_0), the depth of poverty as captured by poverty gap index (P_1) and the intensity of poverty as captured by FGT index- P_2 . Of the total households reported their income nearly 65 percent are found to be poor or live under poverty line, the poverty gap which shows the average deficit of

the income of the poor is 35 percent and the severity of poverty which measures the income inequality among the poor is 24 percent for rural Oromia.

Poverty is the least sever for the dual jobholders. Of the total 828 households 55 percent are poor. For this group, the depth of poverty is 26.8 percent and the intensity of poverty 16 percent. This employment sector contributes 42 percent to the total poverty. Its contribution to the depth and intensity of poverty is 37 and 34 percent, respectively.

Poverty is found to be the worst for pure off-farm operators. Nearly, 86 percent of the households are poor. The depth of poverty is 54 percent and the intensity 39 percent. The contribution of this sector to total poverty is the least due to less proportion of the population in this employment category.

The second worst poverty is observed in farm sector. Seventy one percent of the operators are poor. The poverty gap and severity are 42 percent and 29 percent in the sector, respectively. This sector contributes the most to total poverty. All the poverty measurement results meet the expectation of the study.

Table 4.21: poverty indices by employment categories

No.	Type of employment	Sample	P ₀	P ₁	P ₂	Percentage contribution to total poverty		
						P ₀	P ₁	P ₂
1	Farm	673	0.7137	0.4172	0.2922	44.43	47.55	49.00
2	Off-Farm	167	0.8586	0.5412	0.3916	13.27	15.31	16.58
3	Farm and Off-Farm	828	0.5517	0.2678	0.1620	42.27	37.54	34.00
	Total	1668	0.6481	0.3540	0.2365	100	100	100

Source: Own measurement

From the measurement results we learn that Off-farm employment has significant effects on rural poverty reduction. About 58 percent of the sample households reported to generate their income from various off-farm sources. Of this 167(10 percent) of the total households are found to have based their livelihood only on off-farm sector. This group constitutes the poorest section of the

rural people in the Region. Over 95 percent of them are land less households; very few of them reported ownership of an ox, or a cow.

Those farm households who diversified their productive activities both sectors are found to be in better position in income or welfare than those households who limited their operation only to a single sector. This justifies the need to integrate both sectors to bring about substantial improvements in the rural areas.

The poverty measurement result strengthens the existing evidences such as that off-farm income supplements farm income or replace it and, off-farm employment provides primary employment to landless households, transfers the excess or underemployed farm labor and alleviate rural poverty.

CHAPTER FIVE

SUMMARY AND POLICY IMPLICATIONS

5.1 Summary

The agricultural development is receiving almost exclusive attention of the rural development and poverty alleviation policy of Oromia. The measures taken by the Regional Government is to remove the institutional, technical and infrastructure bottlenecks to realize the development of available agricultural potentials so that rural development is achieved and rural poverty alleviated. There is obvious bias against the development of off-farm employment. The sector is worst neglected by the development plan of the region despite its contribution to economic development and its capability of growth. Moreover, development researches have not yet appreciated the role of off-farm economy on the rural development. Development efforts and the achieved results of Farm, so far, seems enough to prove that Farm alone can never ensure rural development and poverty alleviation.

This study is motivated from the view that it is unrealistic to think that agricultural sector alone can ensure sufficient employment or income for rural population. It also attempts to suggest, the need to reasonably integrate development of Farm with that of off-farm sector so that they will reinforce their growth and enable effective poverty alleviation.

The study attempts first to analyze the major factors postulated to determine the probability of involvement in off-farm employment at household level. Based on the survey data used for this work, sets of factors are hypothesized and measured with the use of statistical tools to see the

direction and magnitude of their influence on the decision regarding participation in off-farm employment. The variables are categorized in four major groups, namely household characteristics, farm characteristics, financial positions and location characteristics.

The second focus of the study is to measure poverty across rural major employment types vs. farm employment, off-farm employment and both. This is intended to realize the extent to which the off-farm employment contributes to rural employment and incomes and thereby to poverty alleviation.

The fact that higher percentage (58) of the reported involvement of sample population in off-farm employment signifies that off-farm employment has very important place in rural economy. A total of 638 households reported incomes from different self-employed non-farm activities and 547 households from wage employment. On average, the rural income generated from off-farm sector accounted for 18.7 percent of the total. Despite these significant shares of the sector in both employment and income generation, participants expressed their dissatisfaction on various problems. They faced constraints to enter in to the sector and to sustain their operations. Among the constraints, the seasonal wage employees reported low wage, long waiting time, and lack of medical services. This is due to the fact that their major employer (74percent) was a small holding farmer who could not fulfill all basic requirements for employees. The major problems raised by non-farm operators are lack of credit facilities, lack of tools /equipment, high input prices and low outputs demand and hence low profit.

Among the demographic (household) characteristics selected as determinants of the decisions regarding off-farm employment male sex, age of household head, family size, religion (Orthodox

against others), and employment (own account working against other employment statuses) are found to be positively related with the probability of involvement in off-farm employment. On the other hand, becoming couple and education are found to influence negatively the decisions in involvement in off-farm work. Of all factors, the magnitude of the influences of family size, Orthodox Christianity and getting married and own account working are the highest. In a growing population and increasingly declining land per household ratio, significant labor transfer from farm sector to off-farm sector is justified. Due to high population pressure, the size of land holding and soil productivity of the central highland areas where cereal crops produced, Orthodox Christians dominate. Household farm incomes are unlikely to be sufficient or satisfy their basic needs. To supplement their meager farm incomes adult members (almost all males) migrate to the cash crop area and relatively surplus producing areas in search of wage employment particularly during their slack time. Hence, they are likely to be major wage labor suppliers. Moreover, households embrace Orthodox Christianity are involved in local liquor production. Married households are likely to be well established and better off in farm endowments and outputs than the non-married ones. It is not surprising to see significant and positive coefficient in favor of the disadvantaged non-married groups. Own account workers are also found to be less likely involved in off-farm employment as against households with other jobs status. This could be due to the full absorption of their labor in farm or lack of interest to participate in off-farm employment due to different reasons.

In the farm endowments included are size of cultivated land, Enset production, coffee and chat production, fertilizer use, cattle ownership and hired in casual labor. Cultivated land, coffee and chat production, fertilizer use and total cattle owned by households show negative effect on the probability of involving in off-farm employment. This is indicative of the fact that the

households, which are better off in the above farm resources, are less likely to seek alternative jobs in non-agricultural sector. The major underlying reason may be that returns to labor is higher on the farm than off-farm. On the other hand, Enset land and hired in casual labor are found to have positive influence on off-farm employment. Enset is mainly produced for home consumption (non-traded good). It guarantees the producers against food insecurity. But its contribution to cash income is minimal. More over, female members process it. This implies economically active male members are un /under employed, and hence bound to involve in non-farm employment in their place or move to other areas in search of wage employment. More over the sisals by- product from processed Enset can be used for rope and basket making which male members usually do and sale to generate incomes. Rich households who diversify their jobs in to various farm and off-farm activities usually hire in labor. This may be the reason for casual labor to be positively related with the probability of off-farm employment. The magnitudes of influence of cultivated land, coffee and chat, total cattle ownership and hire in casual labor are found to be significant in determining the probability of involvement in off-farm employment.

As an element of financial position, credit is included in the factors hypothesized to determine decisions about involvement in off-farm employment. The amount of credit received from local lenders is found not only be positively related with the probability of off-farm employment but also its influence is significant on households involvement in the sector. At least two reasons can be expected to underlie this result. First, self-employed non-farm operators may borrow from local lenders to maintain or expand their activities. Secondly, the poorest household engaged in wage or petty trades may borrow from better off farmers for consumption in cash or in kind. What we have to appreciate is that the local lenders charge as high interest rates as 100 percent for less

than a year due period. This is due to the absence of formal credit institutions or bank, which would arrange credit facilities for the majority of small farmers and mobilize rural savings.

Location characteristics include market and road. The logit regression result shows that the distance of households from the nearest market and the nearest all weather road negatively affects the probability of involvement in off-farm employment. This implies households closer to market and road are more likely to be involved in off-farm employment. This can be attributed to the fact that farmers at far distances from both infrastructures may find it difficult to easily get market information, face high transport cost and lack job opportunities. But, the influences of both factors are insignificant in statistical term implying closeness to market or road neither facilitates nor hinders the probability of involvement in off-farm employment. However, improving infrastructure (road) will help reduce transportation cost.

Involvement in off-farm employment as measured by households incomes generated from the sector has significant impact on rural poverty alleviation. More than half of the households in rural Oromia generate their income from activities outside Farm or sources unrelated to Farm. The livelihoods of ten percent of the total households are based only on off-farm sector. Farm households who diversified their productive activities to off-farm economy are found to be better off when compared with those households who confined their operations to farm sector. In fact, the proportion of poor people of pure farm operators is greater than that of farm and off-farm operators by 16-percentage point.

The empirical result of this study shows the extent of the severity of poverty in rural Oromia. Of the total rural population nearly 65 percent are poor in the sense that their income is less than the

poverty line. The depth of poverty is very high that the poor require, on average, 35 percent of income to reach the poverty line. The people found to be poor not equally suffer from poverty. Poverty is less severe to those poor people whose income is closer to the poverty line. In fact, the income inequality among the poor people is 24 percent and those at the lower end are the worst affected group of people by the challenges of poverty. Poverty is the worst severe for only off-farm operators, moderately severe for pure farm operators and less severe for holders of both jobs.

5.2 Policy Implications

It is really a paradox and sad enough to learn that poverty has become so severe in rural Oromia while the Region claims to possess the largest shares in natural resource potentials in the country. The poverty in rural Oromia is a multidimensional that it reflects itself in disappointing monetary and non-monetary welfare indicators including low per capita income, low agricultural productivity, high rural underemployment, low education and health services coverage and poor rural transport facilities.

The successive Governments have been investing substantial human, financial and material resources in the rural areas of the Region to improve the welfare of the people. However, with alarmingly increasing population, the livelihood of the overwhelming majority is seen deteriorating rather than showing improvements. This dictates that the Government in power needs to be ever ready to revise and develop development policies flexibly in line with changing situations in the lives of the people it represents such that the best development option is chosen.

In light of this, the Region is advised to have rural development policies that reasonably integrate the development of farm sector with that of off-farm sector to effectively attack poverty.

In order to realize the growth of off-farm employment and alleviate poverty, some policy ideas are suggested as follows:

The minimal attention given to the sector by rural development and poverty alleviation policies of the regional Government implies lack of reliable information, which can reflect a regional picture of the off-farm employment. To understand the current development of the sector, its contribution to rural employment and incomes, its potentials, its development constraints, its positive linkages with the farm sector, its impact on poverty, etc. an in-depth assessment of the sector need to be conducted by a concerned Bureau of the Region. The findings can enable the Government to appreciate and remove the existing bias against the sector.

We have seen that the family size has positive influence on the probability of involvement in off-farm employment. This attributes mainly to the declining per capita land holding with increasing adult members of households. In such a circumstance, underemployed economically active members are forced to adjust to off-farm sector for survival. This dictates the need to widen the employment opportunities in off-farm economy. Therefore, the Regional Government, in its effort to attack poverty, is advised to enable private sector and NGOs raise their existing small shares in creating job opportunities for the people in rural Oromia. More over, the Government needs to allocate development budget to the sector so that the current pressure on Farm will be relieved

The higher probability for the highlander Orthodox Christians to involve in off-farm employment as against followers of other religions is not that they are luckier than the latter. In most cases, they are pushed rather than pulled to the sector due to the poor and declining agricultural performances. On the other hand, the less likelihood for pastoralists and cash crops producers to engage in off-farm sector does not mean they are fully satisfied with their farm return, or they have zero time for off-farm activities, or off-farm employment is not profitable in such areas. The major problem has to be attributed to lack of job opportunities in off-farm sector or lack of capability to initiate and promote new activities outside the old established nature-favored traditional farm. If so, all groups require support and assistance. In pastoralist areas for instance promotion of agro-industries such as tanning and food industries seem feasible. People in cash crops areas have relatively higher income than the non-cash crops areas to invest. Moreover, they have more idle time than grain crops producers. Further, they can also provide good markets for off-farm goods and services. Therefore, the Regional Government is advised to be committed to identify such potentials through studies, and to enable relevant investments, and encourage local people through the provision of training and credit facilities and market information so that they will be attracted to off-farm employment. Migrants from other regions and within the region can have better job opportunities, as a result. This needs to be one of the poverty alleviating and development strategies for the Region.

As indicated by the regression results, those households that were better off in farm endowments and inputs use are found to be less involved in off-farm employment as against the disadvantaged groups with farm resources. From poverty measurement results, we have however realized that holding both employments is found to reduce poverty measures more than doing Farm alone. Therefore, wealthy farmers need to be encouraged and helped by the Government and NGOs to

take up off-farm employment in addition to the farm employment they are in. This will contribute to employment creation efforts in the Region.

As discussed earlier, credit is found to be the determinant of the probability of off-farm employment. However, the self-employed non-farm operators responded that lack of credit was among the top constraints to enter in to the sector and sustain their operations. Local lenders are the major credit providers in the rural areas though the Regional Government has already started, in limited areas, rural credit facilities. Besides limited access to credit money, many people hardly afford to pay back the high interest rates charged by lenders who operate in the absence of competition from supply side. The formal credit arranged by the Government alone could not open sufficient access to credit by many people who demand it to start or expand off-farm activities. Therefore, efficient mechanisms have to be devised to involve legally registered private organizations or banks, which may have interest in rural credit provisions, and also NGOs have to be encouraged to effectively work in this area. Both can compliment the Government efforts in realizing rural development and poverty alleviation. Moreover, involvement of private sector and NGOs in such areas will enable the Government to shift its resources to limited but very important areas such as the construction of rural roads and the development of human resources through the expansion of health and education facilities.

Hiring in casual labor is positively related with off-farm employment. The main implication is that the better off households hire in casual labor. The rich households are those who could hold both farm and off-farm sectors. Hence, the Regional Government need to encourage, through institutional support, the households who are willing and capable of diversifying their productive

activities in to both farm and off-farm sectors, because, they expand job opportunities to rural un/under employed labor force in addition to keeping their families out of poverty.

Non –farm operators responded that lack of tools/equipment, high prices of raw materials and low output demand were among the major constraints to their operations. This requires knowing alternative supply origins for easy access to inputs and alternative out puts markets and other related issues such as transport costs. Therefore, besides expanding access to credit facilities in the rural areas, the Government, through pertinent Bureau(s), needs to give technical advises and supports to the participants.

The pure off-farm operators are members of the worst poverty ridden group. This attributes mainly to their lack of cultivable land. It is however beyond this study to comment whether there is a need to open access to land for them. But, rural development policy has to prioritize narrowing the livelihood gap between this and other groups.

Finally, this study has not exhausted information about off-farm employment. Hence, it is suggested that similar researches have to be conducted based on proper sample size to enable the Region have reliable information and sufficient policy recommendations.

REFERENCES

- Abebaw Getachew (2000) Factors Influencing Engagement in Non-Farm Activities, The case of Amhara Region, unpublished MSc. Thesis, Addis Ababa University
- Abebe Shimelis (1998) Poverty measurement analysis: A guide to the literature, Unpublished Preliminary Draft, Addis Ababa
- Ahmed,A,U.,and Shums,Y.(1994) Demand Elasticities in Rural Bangladesh, an Application of AIDS Model, The Bangladesh Development Studies,VolumeXXII,N0.1
- Anand, S. (1997) The Definition and Measurement of Poverty, In: Measurement Of Inequality and Poverty, S. Subramanian (edt.), and p.242-80, Delhi, Oxford University Press, and Calcutta Chennai Mumbai.
- Anand, S. and Ravallion, M. (1993) Human Development in Poor Countries: On the Role of Private Incomes and Public Services, World Bank, Washington, D.C.
- Anderson, D., and Leiserson, M.W. (1980) Rural non-farm employment in Developing countries, Economic Development and cultural change28, no2: 227-247.
- Bagachawa, M.S.D. (1997) The rural informal sector in Tanzani', In: Farewell To Farms: De agrarianization and employment in Africa, Bryce son, D.F.and Jamal, V. (eds.) p.137-154. African Studies Center, Leiden.
- Befekadu Degefe and Berhanu Nega (1999/2000) Annual Report on the Ethiopian Economy, (edt.), Volume I.
- Behrman, J. (1990) The action of human resources and poverty on one another, World Bank, Washington, D.C.

- Blackwell Publishers Oxford (1994) Oxford Bulletins of Economics and Statistics, Volume 56, No.2, UK and Cambridge, MA. USA
- Bureau of planning and economic Development of Oromia (2000) Physical and Socio-economic profiles of 180 districts of Oromia Region, Physical Planning Department, Finfinne.
- Bureau of planning and economic Development of Oromia (2000) Condensed physical geography of Oromia, Physical Planning Department, September, Finfinne
- Chin, D. (1979) Rural poverty and the structure of farm household income in Developing Countries: Evidence from Taiwan. Economic, Development And cultural Change 27 no.2: 283- 301, Co. New York, US
- Darcon,S., and Krishnan,P. (1996) ‘ A consumption – based measure of poverty for rural Ethiopia in 1989 and 1994’, In: The Ethiopian Economy, Poverty and Poverty Alleviation Proceedings of the Fifth Annual Conference on the Ethiopian Economy,Bereket Kebede and Mekonen Tadesse (Eds.).P.125-162, Addis Ababa.
- Datt, G. et al (2000) Determinants of Poverty in Mozambique, Consumption and nutrition division, International Food policy Research Institute, Washington, D.C. 20006, USA.
- Deaton, A. (1997) The Analysis of Household Surveys, a micro econometric Approach to Development Policy, The World Bank, The Johns Hopkins University Press Baltimore and London.
- Dejene Aredo (1997) The Linkage Between Farm and Non-Farm: A conceptual Frame Work, In: Ethiopian Journal Of Economics, volume 1,No.2, April, Addis Ababa, Ethiopia
- Evans, Emrys Hugh, and p.Ngau.(1991) Rural-Urban relations, household income diversification and agricultural productivity, Development and change 22: 519-545.

- Findeis(1991) Multiple Jobs Holding among Farm Households, (edt.), Iowa State University Press/Ames.
- Findieis, J.L.etal (1991) Effects of Location on Off-Farm Employment Decisions, In: Multiple Jobs Holding among Farm Families, M.C. Hallberg, Jill L. Findeis, Daniel A.Lass (edt.), Iowa State University Press /Ames
- Getachew Driba(1995) Economy at the Crossroads, Famine and Food Security in Rural Ethiopia, Addis Ababa.
- Getahun Gobeze (1999) Measurement and Determinant of Rural Poverty: A comparative Analysis of Three Villages, Unpublished MSc Thesis, Addis Ababa.
- Getahun Tafesse(2000) The Dynamics of Poverty in Ethiopia., In: A Symposium for Reviewing Ethiopia's Socioeconomic Performance 1991-1999,InterAfrica Group. Addis Ababa.
- Goplan, D.C.(1997) Under nutrition: Measurement and Implication. IN: Measurement of Inequality and Poverty, S. Subramanian (edt.).P.180-216, Delhi, Oxford University press, Calcutta Chennai, Mumbai
- Greene, H, W (.2000) Econometric Analysis, Fourth Edition, New York University, USA.
- Griffis, E, G. (1993) Learning and Practicing Econometrics, John Wiley and Sons, Inc. USA.
- Gujirati, D.N. (1995) Basic Econometrics, Third Edition, United States Military Academy, West Point, McGraw-Hill, Inc.
- Hanson, B. (1991) The Political Economy of Poverty, Equity, and Growth, A world Bank Comparative Study, Oxford University Press.
- Huffman, W.E. (1991) Agricultural household models: Survey and Technique, In: Multiple Jobs Holding among Farm Families, M.C.Hallberg, Jill L.Findeis, Daniel A. Lass (edt.). Iowa State University Press /Ames
- ILO (1974) International Labor Review: Volume109, No.3 March, Geneva.

- ILO(1988) Rural Employment Promotion: International Labor Conference 75th Session, report VII, Geneva
- ILO/ JASPA (1991) African Employment Report (1990), World Employment Programs,
- ILO/JASPA (1985) Labor Use and Productivity and Technological Change in African Smallholder Farm: The Case of Nigeria, Addis Ababa.
- Johnston, J (1984) Econometric Methods, Third Edition, McGraw-Hill Book Company.
- Kmenta, J. (1986) Elements of Economics, Econometrics, Macmillan Publishing
- Kuma Tirfe and Mekonnen Abraham (1995) Grain Marketing in the Context of Recent Policy Reforms, In: Ethiopian Farm: Problems of Transition: Proceedings of the Fourth Annual Conference on the Ethiopian Economy, Dejene Aredo and Mulat Demeke(edt.), Addis Ababa.
- Lipton, M. and Ravallion, M.(1993) Poverty and Policy, Poverty and Human Resources, policy research department, working papers, the World Bank.
- Lopez,R.E.(1986) Structural Models of the Farm Household that Allow for Interdependent Utility and Profit-Maximization Decisions, In: Agricultural Household Models: Extensions, Applications, and Policy, Singh,I.and Squire,L.and Straus,J.(eds.), World Bank Publication, The Johns Hopkins University, p.306-325
- Low, A.R.C. (1981) The effect of off-farm employment on farm incomes. The interaction of non-agricultural employment, agricultural development and reduced chronic food Production: Taiwan contrasted with Southern Africa, Economic Development and cultural change 29,no.4: 741-7.
- Mccullah,p. and Nelder,J.A.(1989) Generalized Linear Models, Chapman and Hall, London
- κ MEDAC (1999) Poverty Situation in Ethiopia, Welfare Monitoring Unit, Addis Ababa.

- MOLSA (1997) Agricultural Wage Employment and Rural Non-Farm Employment in Ethiopia: Survey Results, Addis Ababa.
- Mrs. Grace Majumdar Consultant, UNDP and counterpart Team (1999) Study on Regional Income Accounts of Oromia: Estimates, Economic study Project Office, Regional Government of Oromia, January, Addis Ababa.
- Mulat Demeke (2000) 'Ethiopian Farm since 1991: Its Performance and Challenges Faced', In: A Symposium for Reviewing Ethiopia's Socioeconomic Performance 1991-1999, Inter Africa Group, Addis Ababa.
- Mulat Demeke and Teferi Regasa (1996) 'Non-farm Activities in Ethiopia: The case of North Shoa', In: The Ethiopian Economy, Poverty and Poverty Alleviation Proceedings of the Fifth Annual Conference on the Ethiopian Economy, Bereket Kebede and Mekonen Tadesse (Eds.), P.125-162, Addis Ababa.
- OESPO (1998) Final report on industrial sector study of Oromia, Executive Summary I, Development Consultants, Finfinne.
- Oromia Regional State (.2000) Five years Development Plan (2000-2004): Afan Oromo Version, Finfinne, Ethiopia.
- Pindyck, S.R., and L. Rubinfeld, D. (1981) Econometric Models and Economic Forecasts, Second edition, McGraw-Hill International Editions Economics Series
- Presscot, N. and Menno Pradhan, M. (1997) A Poverty Profile of Cambodia, World Bank, Washington, D.C.
- Ravallion, M. (1992) 'On hunger and public action: review article on the book by Jean reze and Amartya Sen', In: The World Bank Research observer, Volume 7 Number 1, Washington, D.C.

- Ravallion, M. (1992) Poverty comparisons, A guide to concepts and methods, World Bank, Washington, D.C.
- Ravallion, M. (1993) Poverty and Policy, Working papers, Policy research Department, World Bank.
- Ravallion, M. (1996) Issues in Measuring and Modeling Poverty policy, Research work paper, the World Bank.
- Ravallion, M. and Datt, G. (1999) When is Growth pro-poor? Evidence from the diverse experiences of India's states, In: Policy Research Working Paper 2263, World Bank.
- Ravallion, M. and Bidani, M. (1994) How Robust Is a Poverty Profile, The World Bank economic Review. Vol. 8 No.1. P.75 - 101
- Ravallion, M. and Datt, G. (1999) When is Growth pro poor? Evidence from the diverse Experiences of India's states, Policy research working paper, World Bank.
- Resal Ethiopia (1999) Employment and Labor Mobility in Ethiopia, European Food Security Network, Transverse d 'Escope6, bte9 B-1348 Louvain-la-Neuve.
- Resal Ethiopia (2000) Income Diversification in Amhara: The Need for a Strategy, European Food Security Network, Transverse d 'Escope 6, Bte 9 B- 1348 Louvain-la-Neuve.
- Rief, Y.M, and Cochran, S.H. (1990) The off-farm labor supply of farmers: The Case of Chiang Mai Valley of Thailand, Economic Development and Cultural Change, 34, no.2: 299-314.
- Saith, A. (1992) The Rural Non-Farm Economy: Processes and Policies, World Employment Program, ILO, Geneva.
- Sen, A.K. (1997) An Ordinal Approach to measurement, In: Measurement of Inequality and Poverty, S. Subramanian (edt.). P.159-79, Delhi, Oxford University press, Calcutta Cheney Mumbai

- Sicular T.(1986) Using Farm Household Model to Analyze Labor Allocation on China Collective Farm, In: Agricultural Household Models. Extensions, Applications, and Policy, Singh,I.and Squire,L.and Straus,J.(eds.), World Bank Publication, The Johns Hopkins University, p.277- 305
- Singh, I. et al (1986) The Basic Model: Theory, Empirical Results, and Policy Conclusions, In: Agricultural Household Models. Extensions, Applications, and Policy, Singh,I.and Squire,L.and Straus,J.(eds.), World Bank Publication, The Johns Hopkins University, p
- Steven Haggblade,Peter Hazell and James Brawn(1989) Farm –Non-farm linkages in rural sub-Saharan Africa, World Development, volume 17 no.8P.1173-1201
- Strauss, J. (1984) Marketed Surpluses of Agricultural Households in Sierra Leone, American Journal of Agricultural Economics.
- *Subramanian.S. (1997) The measurement of Inequality and Poverty, In: Measurement of Inequality and Poverty, S. Subramanian (edt.).P.1.53, Delhi, Oxford University Press, Calcutta Chennai Mumbai.
- Sufian Ahmed (1990) Food grain production in the state farm and peasant farm Sectors, Case study of comparative economic performance in Arsi Region, Unpublished Thesis, Addis Ababa University.
- Tamene Haile-Georges (1996) Socio-Economic Profile of Oromia, Regional Development strategy and Policy Analysis Unit, Macro-Planning Department, Bureau of Planning and Economic Development, Finfinne.
- Tassew Woldehanna (2000) Economic Analysis and Policy implications of Farm and Off- Farm Employment, A Case Study in the Tigray Region of Northern Ethiopia, Wageningen

- Tegegn Gebre Egziaber (2000) Non-Farm Activities and Production Decisions of Farmers, The case of Damotgale and Kachabira Weredas in Southern Region of Ethiopia, Social Science Research Report, Series –no.15, March, Addis Ababa, Ethiopia.
- The Case of Amhara Region, unpublished MSc. Thesis, Addis Ababa University.
- ✓ Townsend P. (1974) The Concept of Poverty, H-E-B Paperback, Heinemann, London.
- Trufat Bekele (1996) Poverty in Ethiopia, A thesis presented to the school of Graduate studies, Addis Ababa, Ethiopia
- World Bank (1980) Poverty, Growth, and Development, Washington,
- World Bank (2000/2001) Attacking Poverty, WDR Website: [www. worldbank. Org/poverty /wdrpoverty](http://www.worldbank.org/poverty/wdrpoverty).
- World Bank (1986) Agricultural Household Models, Extensions, Applications, and Policy, Singh, I. and Squire, L. and Straus, J. (eds.). The Johns Hopkins University Press, Baltimore and London.
- World Bank (1990) Poverty, World Bank.
- World Bank (1997) Taking Action to Reduce Poverty in Sub-Saharan Africa, Washington, D.C.

Appendix: 1

Adult Equivalent Conversion Factors According to Age and Sex

Age (years)	Adult Equivalent Consumption Unit	
	Male	Female
0+	0.25	0.25
1+	0.37	0.36
2+	0.42	0.40
3+	0.46	0.43
4+	0.49	0.46
5+	0.53	0.48
6+	0.56	0.49
7+	0.58	0.49
8+	0.58	0.49
9+	0.58	0.49
10+	0.70	0.64
11+	0.71	0.64
12+	0.73	0.66
13+	0.77	0.68
14+	0.81	0.70
15+	0.85	0.70
16+	0.89	0.72
17+	0.92	0.75
18-29+	1.03	0.82
30-59+	1.03	0.83
>60	0.68	0.61
Adult	1	0.81

Source: James, W.P.T. and E.C. Schofield (1990), Human Energy Requirements: A manual for planning and Nutrition, Published for FAO by Oxford University Press.

Appendix: 2

Yearly Mean Income Distribution of Deciles by Employment Category (1996)

Deciles	Farm Sector		Off-Farm Sector		Farm and Off-Farm Sector		Total	
	per cent	per cent	per cent	per cent	percent	percent	per cent	per cent
1	20.52	0.56	15.89	0.92	54.18	1.04	30.24	0.72
2	48.97	1.40	39.87	2.30	96.70	1.86	65.30	1.55
3	75.44	2.11	36.38	2.65	128.18	2.46	96.31	2.28
4	103.92	2.84	72.78	4.20	168.45	3.24	126.50	2.99
5	136.29	3.73	92.45	5.34	216.48	4.16	166.63	3.94
6	76.32	4.83	119.31	6.89	274.53	5.28	212.89	5.04
7	230.92	6.32	152.50	8.81	357.73	6.87	282.05	6.67
8	320.29	8.77	195.79	11.30	492.49	9.46	382.46	9.05
9	466.24	12.76	280.55	16.20	728.19	13.99	582.71	13.78
10	2074.35	56.78	706.38	40.79	2686.88	51.63	2281.31	53.93
Mean	365.38		173.19		520.43		422.64	

Source: OWN COMPUTATION

Note: The percentage shows the income obtained by the group as indicated by the deciles. Except in the case of pure off-farm, the income earned by the top ten percent of the people accounts over 50 percent of the income of the population.

Declaration

I, the undersigned, declare that the thesis is my own original work and has not been presented in any other University. All sources of materials used in this thesis have been duly acknowledged.

Name: Delil Hassen

Signature: *Delil Hassen*

Date: June 2001

Place: Addis Ababa