



WOLLEGA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
COLLEGE OF BUSINESS AND ECONOMICS
DEPARTMENT OF ECONOMICS

Households' Multidimensional Poverty: The Case of Nekemte Town

MSc Thesis

By: Sultan Asfaw Oljira

July, 2021
Nekemte, Ethiopia



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**A Thesis Submitted to College of Business and Economics in Partial
Fulfillment for the Degree of Master of Science in Development
Economics**

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**July, 2021
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Statement of the Author

I declare that this thesis entitled “Households’ Multidimensional Poverty: The Case of Nekemte Town” is my work and that all sources of materials used for this paper have been appropriately acknowledged. This paper is submitted in partial fulfillment of the requirements for Master of Science degree in Development Economics at Wollega University. I seriously declare that this paper is not submitted to any other institution anywhere for the award of any degree or diploma.

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Acronyms

AF	: Alkire-Foster
CSA	: Central Statistical Agency of Ethiopia
DHS	: Demographic and Health Surveys
ETB	: Ethiopian Birr
FGT	: Foster, Greer and Thorbecke
GTP	: Growth and Transformation Plan
HDI	: Human Development Index
MDG	: Millennium Development Goal
MDP	: Multidimensional Poverty
MoFED	: Ministry of Finance and Economic Development
MPI	: Multidimensional Poverty Index
NGO	: Non-Governmental Organization
NTAOD	: Nekemte Town Administration Office Document
NULG	: Nekemte Urban Local Government
OPHI	: Oxford Poverty and Human Development Initiative
PPP	: Purchasing Power Parity
SNNPR	: Southern Nations, Nationalities and Peoples' Region of Ethiopia
UN	: United Nations
UNDP	: United Nations Development Program
US	: United States

Abstract

The study aimed at analyzing households' multidimensional poverty in Nekemte town. To achieve this objective, the study used both primary and secondary data. The primary data was collected from 379 sample households of Nekemte town through interview and questionnaire. It was based on cross sectional data collected during 2020/21. Alkire-Foster multidimensional poverty measurement: counting approach was employed to analyze the extent of multidimensional poverty in the study area. In this methodology, three dimensions (education, health and living standard) and eleven indicators were used. The result revealed that 20.6% of the population is under multidimensional poverty with average intensity and MPI of 41.5% and 8.55% respectively. Living standard dimension was the highest contributor to MPI followed by education dimension. To identify factors that determine households' multidimensional poverty in the town, binary logit model was employed. The logit model result indicated that household heads' educational level, family size and dependency ratio, income level, house ownership, saving habit, social capital significantly influence households' poverty in the town. Based on the findings, the study suggests improving economic activities, promoting access to education and improving saving habit. Moreover, improved targeting devices can be useful instruments in reducing poverty, in particular to reach those in severe poverty.

Key words: Multidimensional poverty, Nekemte town, Ethiopia, indicators, household

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Poverty has attracted the attention of academicians, researchers, international organizations and policy makers. Hence, it has become the major agenda since long. Different authors defined poverty like Sen (1999) who defined poverty as the deprivations of basic capabilities that individual or family experience. These deprivations could be economic, social, political, cultural, physical or spiritual. Poverty is lack of wellbeing covering both monetary and non-monetary aspects. It is not the mere lack of income to meet basic needs but deprivations in basic human capabilities such as achievement in education, health, malnutrition and self-respect in society (Sen, 1992). From this definition and various perspectives, poverty is seen as a phenomenon which goes beyond income and consumption standard but includes a state of wellbeing, which is economically, morally and socially undesirable, caused by different dynamic interactions which make some better-off and others worse off, to the extent that it seems originally designed at each individual level.

Measures of poverty that go beyond monetary or income measures have been motivated by concepts such as social exclusion and inclusion, basic needs, social cohesion, capability poverty, multidimensional poverty, and clustered disadvantage, among others. While each concept is distinct, each articulates human well-being or disadvantage directly, and generates the implication that measures of human disadvantage should include non-monetary aspects (UN, 2016).

Poverty is multidimensional phenomenon and its measurement that is based on consumption level is inadequate in explaining the multiple deprivations faced by poor (Dwi Rani and Teguh, 2011). Measurement of poverty in multidimensional is increasing fast in recent years. Multidimensional poverty measurement and analysis are evolving rapidly (Alkire *et al.*, 2014). The basis for measuring poverty in a multidimensional way is that people experience various deprivations at the same time (Robles and Andy, 2019). The multidimensional nature of poverty has been widely noted for a long time. Over the

last decade or so, however, both the theory and practice of measurement of multidimensional poverty have made rapid advances (Datt, 2017).

Around 30 percent of the world's people remain susceptible to multidimensional poverty which covers lack of the basic necessities such as food, education, health services, fresh water and hygiene which are important for human continuous existence. In addition, nearly 80 percent of the global population requires comprehensive social protection. About 842 million people of the world suffer from long-lasting hunger, and nearly half of all workers or more than 1.5 billion are in precarious employment (UNDP, 2012).

Across 107 developing countries, 1.3 billion people, 22 percent live in multidimensional poverty. Households in developing countries particularly poor families are more vulnerable than any other group to health hazards, economic down-turns, natural catastrophes and manmade violence. Poor households are repeatedly hit by severe idiosyncratic shocks such as death, pests or diseases that affect livestock or crops, injury or unemployment shocks and this all affect the wellbeing of these households adversely. About 84.3 percent of multi-dimensionally poor people live in Sub-Saharan Africa (558 million) and South Asia (530 million). 7 percent of multi-dimensionally poor people are in middle-income countries, where the incidence of multidimensional poverty ranges from 0 percent to 57 percent nationally and from 0 percent to 91 percent sub nationally. Every multi-dimensionally poor person is being left behind in a critical mass of indicators. For example, 803 million multi-dimensionally poor people live in a household where someone is undernourished, 476 million have an out-of-school child at home, 1.2 billion lack access to clean cooking fuel, 687 million lack electricity and 1.03 billion have substandard housing materials (OPHI and UNDP, 2020).

Several countries, especially Sub-Saharan Africa, have made poverty reduction and hence improvement in income and welfare is their main goals in their growth and development agenda. And most policy interventions adopted by these countries have only focused on poverty at a point in time (Sisay *et al.*, 2016)

Multidimensional poverty is high in Ethiopia in general and in rural Ethiopia in particular. In 2000, MPI in rural Ethiopia was very high (0.913) relative to urban Ethiopia (0.245). Over time, poverty in rural Ethiopia has been decreasing moderately. But in urban Ethiopia multidimensional poverty has not been decreasing; instead it has been increasing over time. Ethiopia was committed to attaining the MDGs by 2015. It developed the first

and second Growth and Transformation Plan which was designed to maintain rapid and broad based growth and eventually to end poverty. Despite all these steps, multidimensional poverty in Ethiopia has remained high (Tigre, 2018). As the study done by OPHI (2013) reveals, in Ethiopia 87.3% of the population was in multidimensional poverty in 2011 and 71.1% were in severe poverty. In the same year 6.8% of the population was vulnerable to multidimensional poverty. Regarding to urban poverty, in 2015/16 the number of urban Ethiopia poor was 90.1% and 21.0% was in severe poverty while 23.5% were vulnerable. Oromia region multidimensional is high as observed from different literatures. In 2011, 91.2% of the people were multi-dimensionally poor as OPHI result indicated. In addition, 74.9% and 5.2% were in severe and vulnerable to multidimensional poverty respectively.

Nekemte town's poverty situation is very severe as it is recognized from several indicators of poverty like high unemployment level, poor sanitation system, inadequate pure water supply, inadequate electric power supply, low wage employment for daily laborers, large percentage of population with low-income earning, inadequate health facilities, poor infrastructural facilities (roads, networks and etc.), poor housing services. In the town, 42% of the population was under income poverty in 2014 (Melese *et al.*, 2017). The income poverty gap in the town was 415.16 and 1.5% of the people were in severe poverty. With regard to multidimensional poverty, 21.5% of the households are multi-dimensionally poor now. As it is familiarized from different indicators of poverty, the poor of households are deprived in average weighted indicator of 42%. In view of these, this study aimed to investigate the level and factors affecting the households' multidimensional poverty in the town.

1.2 Statement of the Problem

Different studies have been conducted on poverty and multidimensional poverty in Ethiopia in general and in different areas of the country in particular. According to the study conducted by (Bersisa & Heshmati, 2016), Ethiopia is one of the poorest countries in the world. Gross national income per capita in 2002 was around US \$ 100 and life expectancy, educational enrolment and access to health services are all very low. Over the last 30 years, life expectancy and school enrolment have shown little improvement, and food production per capita has declined.

As study conducted by OPHI (2016) using Demographic and Health Survey (DHS) reveals, there was high acute multidimensional poverty in Ethiopia in 2011. In the same year, 87.3 percent of the population is under multidimensional poverty. The people are deprived in 64.6 percent of average weighted indicators. In addition, 6.8 percent of the people were vulnerable to multidimensional poverty while 71.1 percent were in severe poverty.

In addition, the study made by World Bank (2015) shows that in 2000, 11% of Ethiopia's poor lived in cities, but this rose to 14% in 2011. As a result the number of urban poor stayed almost constant between 2005 and 2011 at 3.2 million though urban poverty rates fell by almost ten percentage points (from 35% to 26%). In spite of Ethiopia's application of different policies and programs like GTP-I and GTP-II to attain MDG and eradicate poverty, poverty in general and multidimensional poverty in particular are still high in the country. The dynamics of a multidimensional poverty analysis show that poverty in rural Ethiopia is decreasing, but this is not observed in urban Ethiopia (Tigre, 2019). In addition, the result of study done by Cheha (2019), indicated that in 2013/14 and 2015/16 urban Ethiopia multidimensionally poverty head count ratio was 91.6% and 90.5% respectively.

According to planning and economic development office report of East Wollega (2012) as cited in Melese *et al.*, (2017), the economic activity and social infrastructure of the town is low and the overall living standard of the inhabitant is not in a good condition. As well, interruption of the electric power, communication network and water supply. Moreover, lack of diversified opportunities such as, lack of commerce, entrepreneurship, income shortage, sanitary problem and more of dwellers are engaged in occupation which have limited returns. This include large number of the residents employed in civil service, small scale industries (wood work and metal work) and in a number of petty business of preparing and selling the traditional popular drink- tella, arekie and teji. Regarding to educational status and number of dependent people of Nekemte town, the town administration office report (2020) shows that 10146 (7.34%) people are illiterate and 12854 (9.31%) are below grade 8. In addition, 21100 (15%) are children below age 10 while 6192 (4.52%) are 61 and above years old. Therefore, the entire above problems directly or indirectly have implication of multidimensional poverty in the town.

The above different findings on poverty in general and urban poverty in particular may be because of differences in these studies like definition differences, methodological differences, socio-economic differences, spatial and time differences of the relevant study areas. Even when the definitions of poverty are similar different outcomes can also be achieved if different methods are used. In addition, there is ethnic and socio-economic differences related with work tradition in these study areas; this means that the problem and determinants of poverty in different regions and/or cultural backgrounds differ. This indicates the need for this region, Nekemte town specific poverty study.

As it has been indicated in this paper, limited studies were conducted on multidimensional poverty in Ethiopia. However, most of the studies were studied at country level and there is no specific multidimensional poverty study made at the selected study area, Nekemte town. Hence, this paper is expected to bridge these gap in literature. In general, the study is aimed to fill the above mentioned gap by using Alkire and Foster method of multidimensional poverty measurement to analyze multidimensional poverty of households in the study area, Nekemte town.

The study was meant to answer the following questions:

- ✓ What is the level of households' multidimensional poverty in Nekemte town?
- ✓ What factors determine household multidimensional poverty in the town?

1.3 Objectives of the Study

1.3.1 General Objective

The general objective of the study is to analyze households' multidimensional poverty in case of Nekemte town.

1.3.2 Specific Objective

The specific objectives of the study are:

- ❖ To analyze the level of households' multidimensional poverty in Nekemte town.
- ❖ To examine the determinants of households' multidimensional poverty in the town.

1.4 Significance of the Study

A clear understanding of the level of poverty has great importance in leading to sustainable development. Hence, in order to take sound measure to alleviate poverty, it is necessary to have a reliable poverty profile. The study is aimed to analyze households' multidimensional poverty in Nekemte town. The paper is aimed to contribute to policy implication in reducing poverty in the study area. The finding on the level and severity of multiple deprivations of the households highlights the critical importance of taking measures (it serves as policy direction) in the study area. The result on the factors that influence multidimensional poverty helps to prioritize areas of intervention by policy makers, development practitioners, government and Non-governmental organizations (NGOs). The research done by following scientific research methodologies can contribute to the limited literatures available on urban poverty in the country in general and particularly to Nekemte town thereby probe other researchers to investigate the issue of urban poverty in the town further. Moreover, there is no similar study has been conducted in the study area; the paper therefore will serve as reference for future studies.

1.5 Scope of the Study

This study was limited to Nekemte town, East Wollega Zone, Oromia, Ethiopia. The study focused on households' multidimensional poverty analysis in Nekemte town. The data for the study was collected from the selected households of the town. The type of data used in this study is mainly cross-sectional survey supported. Alkire and Foster (2011 and hereafter) multidimensional poverty measurement method was employed to investigate the extent of multidimensional poverty (MDP) in the town. The method has three dimensions (education, health and living standard) and eleven indicators which includes year of schooling, child school attendance, child mortality, serious illness, electricity, water, sanitation, flooring material, room density, cooking fuel and asset ownership. For identification of factors affecting households' multidimensional poverty, binary logit model was used.

1.6 Limitation of the Study

No research is complete and free from limitations. This study is, therefore, faced different constraints. Accordingly, some sensitive factors such as income and assets may not be correctly obtained since few respondents were not willing to tell the exact amount. The

responses therefore may not be perfect. In addition, many factors can affect multidimensional poverty. In this study, only some variables which were assumed to determine households' poverty dominantly were included. The researcher is of the opinion that the study could have been much comprehensive had a number of variables been included. The budget provided to undertake the research is also small. The study would be more comprehensive had the budget been adequate. Moreover, the paper was limited by lack of availability of up-to-date secondary data profiles and shortage of time.

1.6 Organization of the Paper

The paper is organized into five chapters. The first chapter is introduction which includes background, statement of the problem, research questions, objectives, significance, scope and limitations and organization of the study. The second part deals with literature review that includes both theoretical and empirical literatures and conceptual and theoretical frameworks of the study. The third chapter presents description of the study area and methodologies used for the study. Chapter four comprises result and discussion of the collected data. The final chapter discusses about summary, conclusion and recommendations.

CHAPTER TWO

2. REVIEW OF THE RELATED LITERATURE

2.1 Theoretical Literature

2.1.1 Concept and Definition of Poverty

Poverty is defined as a variety of deprivations individual or household experiences at the same time or separately that represses the person's or households' abilities, to function, live a life of purpose and fulfillment and to be productive in the society. These deprivations could be economic, social, political, cultural, physical or spiritual. From this definition and various perspectives, poverty is viewed as a phenomenon which goes beyond income and consumption standard but includes a state of wellbeing, which is economically, morally and socially unacceptable, caused by various dynamic interactions which make some better-off and others worse off (Abdulai & Shamshiry, 2014)). Poverty is usually referred as deprivations that constrain the individual or family to meet the basic needs (World Bank, 2000).

Poverty refers to deprivations in basic capabilities of the individual or household and the deprivation of basic capabilities is multidimensional which includes premature death, obvious malnutrition, persistent disease and widespread illiteracy, etc. One should understand deprivations in basic capabilities with reference to people's actual living and empowerment. Such capabilities enhance poor people's basic capabilities through education and health care and will increase their productivity and income (Sen, 1999).

Although poverty is rarely about the lack of only one thing, the bottom line is always hunger, the lack of food. It has important psychological dimensions, such as powerlessness, voicelessness, dependency, shame, and humiliation. Poor people lack access to basic infrastructure roads (particularly in rural areas), transportation, and clean water and poor health and illness are also dimensions of poverty (Nafziger, 2006).

The concept of poverty, in simple terms, describes a situation of whether or not individuals or households possess enough resources or capabilities to meet their current needs for a living. The poor are, hence, underprivileged segments of society who do not have adequate food, shelter and access to education, health and other services. Poverty is multi-dimensional. One of the dimensions is the material deprivation, lack of access to

goods and services, which is measured in terms of income or consumption as indicators. The second dimension refers to low capabilities as manifested by low levels of educational achievement and poor nutritional and health conditions. Vulnerability and exposure to risk, and voicelessness and powerlessness are considered, respectively, as the third and fourth dimensions of being poor (Alemu *et al*, 2011).

To be poor is to be hungry, to lack shelter and clothing, to be sick and not cared for, to be illiterate and not schooled. But for poor people, living in poverty is more than this. Poor people are particularly vulnerable to adverse events outside their control. They are often treated badly by the institutions of state and society and excluded from voice and power in those institutions. The concept and notion of poverty go beyond unidimensional which is based on income or material deprivation rather it includes vulnerability and exposure to risk, and voicelessness and powerlessness (World Bank, 2001).

The dimensions of poverty added in the 1980s which increased the complexity of the meaning of poverty were the incorporation of the non-monetary aspects such as powerlessness and isolation, vulnerability and insecurity, capabilities and gender. The other dimension added in the meaning of poverty in the 1990s was lack of participation and social exclusion. Income is not the only indicator of poverty, and income or consumption based measure of poverty is not a human- centered measure that can't capture the deprivations dimensions such as education and health (Fetsum, 2018).

2.1.2 Concept and Definition of Multidimensional Poverty

Although poverty has been traditionally measured in monetary terms, it has many other dimensions. Poverty is associated not only with insufficient income or consumption but also with insufficient outcomes with respect to health, nutrition, and literacy, and with deficient social relations, insecurity, and low self-esteem and powerlessness (Christiaensen *et al.*, 2012). Multidimensional poverty encompasses the different deprivations experienced by poor people in their daily lives such as poor health, lack of education, inadequate living standards, disempowerment, poor quality of work, the threat of violence, and living in areas that are environmentally hazardous, among other. Monetary-based poverty measures can miss a lot. Studies have revealed that the overlap between monetary and non-monetary measures of poverty is not perfect. In most cases, not all individuals who are income poor are multi-dimensionally poor and not all multi-

dimensionally poor individuals are income poor. Both monetary and non-monetary measures of poverty are needed to better inform the policies intended to address the needs and deprivations faced by poor populations (OPHI, 2020).

Measuring poverty with a single income or expenditure measure is an imperfect way to understand the deprivations of the poor since, for example, markets for basic needs and public goods may not exist. Complementing monetary with non-monetary information provides a more complete picture of poverty (Afonso *et al.*, 2015).

The multidimensional nature of poverty has been widely noted for a long time. Over the last decade or so, however, both the theory and practice of measurement of multidimensional poverty have made rapid advances. Indeed, one measure of the growing recognition of multidimensional poverty is the publication of Multidimensional Poverty Indices (MPI) for more than 100 countries by the United Nations Development Program (UNDP) in its annual Human Development Report beginning with HDR 2010. Conceptually, the case for measuring multidimensional poverty over and above poverty measured in terms of consumption or income is straightforward (Datt, 2017).

One recently developed counting method, the Alkire-Foster counting approach, was adopted by the UNDP in 2010. Assisted by the Oxford Poverty and Human Development Initiative, UNDP used the approach to develop the global Multidimensional Poverty Index (MPI), which substituted its Human Poverty Index (in use since 1997). The index complements monetary measures of poverty with information on overlapping deprivations experienced simultaneously by individuals. It identifies deprivations in the same three dimensions as the Human Development Index (health, education and standard of living), and presents the number of people who are multi-dimensionally poor (i.e. deprived in at least one third of the dimensions) as well as the number of deprivations faced by the poor – thus revealing the incidence and intensity of poverty in a given region in a given time. It can be decomposed by dimension or by groupings (such as region, ethnicity and other), with useful implications for policy (Afonso *et al.*, 2015). Therefore, this study adopted the Alkire-Foster multidimensional poverty method in the analysis.

2.1.3 Theoretical Framework of the Study

There are three main schools of thought in literature concerning the definition and measurement of poverty. These theories include the welfare, the basic need and the

capability views or schools of thought (Esubalew, 2006). Although these theories recognize poverty differently, there are areas in which they share some common meaning and all of them judge an individual or household to be poor whenever he/she is lacking a reasonable minimum standard.

2.1.3.1 Welfare School

According to welfare school, the concept of poverty is related to the economic well-being of the people. For the presence of poverty income is income the determining factor. Income based poverty assessment is the most widely used approach by global developmental organizations like the World Bank. It assumes that the person is poor when he/she is unable to attain a level of material well-being deemed to constitute a reasonable minimum by the standard of that society. Whenever income or consumption falls below a predetermined monetary-equivalent poverty line, an individual or a household would be considered poor. According to Ravallion (1992), welferists base comparisons of well-being solely on individual “utility” levels which are based on social preferences. Problems related to this school are the need to make inter-personal utility comparisons to obtain welfare functions, the degree of validity of full information and unbounded rationality on the part of consumers.

2.1.3.2 Basic Need School

According to World Bank (2000), poverty is referred as deprivations that constrain the individual or family to meet the basic needs. It is defined as the deprivation of material requirements for the minimally acceptable fulfillment of basic human needs, including food (UNDP, 1997). This school considers that ‘something’ that is lacking in the lives of the poor is a small subset of goods and services specifically identified and deemed to meet the basic needs of all human beings. The needs in question are called ‘basic’ in the sense that their satisfaction is seen as a pre-requisite to quality of life; they are not initially perceived as generators of well-being. Instead of focusing on utility, the attention is here on individual requirements relative to basic commodities. In the traditional basic need approach, the basic goods and services usually include: food, water, sanitation, shelter, clothing, basic education, health services, and public transportation. As we can see, these needs go beyond the needs necessary for existence, generally known as

minimal needs which only include adequate nutrition, shelter and clothing (Asselin and Dauphin, 2001).

Thus, according to basic need approach poverty is defined as lack basic needs such as food, water, sanitation, shelter, clothing, basic education, health services and public transportation. It concentrates on the degree of fulfillment of basic human needs in terms of nutrition/ food, health, shelter, education, transport and so on. Asselin and Dauphin, (2001) argued that one of the main problems which confront this school is the simple determination of what the basic needs are. It is generally nutritionists, physiologists and other specialists who are called on to determine the basic needs of individuals. However, they are not always in agreement with one another. Unfortunately, the precise measurement of minimum needs particularly nutritional needs and their largest component is extremely difficult, and the subject of intense debate.

2.1.3.3 Capability School

Sen (1992) defined poverty as the failure of basic capabilities to reach certain minimally acceptable levels. It is lack of wellbeing covering both monetary and non-monetary aspects. It is not the mere lack of income to meet basic needs but deprivations in basic human capabilities such as achievement in education, health, malnutrition and self-respect in society. It must be seen as the deprivation of basic capabilities rather than merely as lowness of incomes, which is the standard criterion of identification of poverty. Poverty can be sensibly identified in terms of capability deprivation; the approach concentrates on deprivations that are intrinsically important (unlike low income, which is only instrumentally significant). This school focuses on neither the economic well-being nor the basic needs deemed to satisfy the minimum standard by the society, but on human abilities or capabilities to achieve a set of functioning. Such an approach to the definition and measurement of poverty suggests a broader set of criteria for assessing poverty than just income or consumption. This approach includes publicly provided but non-marketed services like: sanitation, health care, education and life expectancy (Phillip and Sanchez-Martinez, 2014).

Nowadays, all of these researchers (Sen, 1999; Pantazis *et al.*, 2006; Esubalew, 2006) and policy makers argue that poverty is not a one-dimensional or two-dimensional rather it is a multi-dimensional concept. As studies such as Jenkins and Micklewright (2007) and

Anand (2008) showed, Amartya Sen's capability approach is considered to have novel and extensive significance for the conceptualization of wellbeing and multidimensional poverty. Therefore, in this research the meaning of poverty is related to capability perspective in which poverty is lack of adequate access to services (health, education) and living standard such as water, electricity, sanitation etc. Hence, in this study poverty was analyzed by capability approach.

2.1.4 Approaches of Multidimensional Poverty Measurement and Analysis

A number of methodologies have emerged to assess poverty from a multidimensional perspective. The following are different approaches of multidimensional poverty discussed by Alkire *et al.*, (2015).

a) The dashboard approach

According to this approach, each dimensions of poverty are measured separately as a uni-dimensional measure; together these measures give empirical understanding into the multidimensional nature of poverty and these may include deprivation indices that use a set of closely related indicators to reflect uni-dimensional concept other than monetary poverty, such as material deprivation. A prominent implementation of a dashboard approach has been the Millennium Development Goals: a dashboard of 49 indicators was initially defined to monitor the eighteen targets to achieve the eight goals. Dashboards have the advantage of broadening the set of considered dimensions, offering a rich amount of information, and potentially allowing the use of the best data source for each particular indicator and for assessing the impact of specific policies (such as nutritional or educational interventions). However, they have some significant disadvantages. First of all, dashboards do not reflect joint distribution of deprivations across the population and precisely because of that they are marginal methods. Among marginal methods, dashboards assess each and every dimension separately but a priori impose no hierarchy across these dimensions. Also dashboards do not identify who is to be considered multi-dimensionally poor. Thus the dashboard method does not indicate the direction and extent of changes in overall poverty.

b) The composite indices approach

In this approach, the deprivation indices, possibly considered in a dashboard approach are converted into one single number. These indices have been published in the global Human Development Reports for several years. Well-known composite indices include the Human Development Index, the Gender Empowerment Index and the Human Poverty Index. Composite indices, like dashboards, can capture deprivations of different population subgroups and can combine distinct data sources. In contrast to dashboards, they impose relative weights on indicators, which govern trade-offs across aggregate dimensional dimensions. Such normative judgments are very demanding and have been challenged (Ravallion, 2011b).

c) The dominance approach

The dominance approach enables us to state whether a country or region is or is not unambiguously less poor than another with respect to various parameters and functional forms but it becomes empirically difficult to implement beyond two or more dimensions. It also shares with the Venn diagrams the disadvantage of not offering a summary measure. Moreover, the dominance approach only ranks regions or poverty levels from different periods ordinally; it does not permit a cardinally meaningful assessment of the extent of the differences in poverty levels. Poverty dominance in the multidimensional framework is slightly different in that it needs to consider the identification method as well as the assumed relationship between achievements, namely, whether they are considered substitutes, complements, or independent. In a multidimensional dominance approach, a poverty frontier based on an overall achievement value of well-being for each individual is used for identification, and the overall achievement is required to be non-decreasing in each dimensional achievement.

d) Venn diagrams

Venn diagrams are a diagrammatic representation that shows all possible logical relations between finite collections of sets. The name of Venn diagrams refers to John Venn who formally introduced the tool (Venn 1880), although the tool pre-existed and was known as Venn himself mentions as Eulerian circles (in fact, although Euler used them, there were uses of similar representations even before Euler). Venn diagrams consist of a collection of closed figures, such as circles and ellipses that include, exclude, or intersect one

another such that each compartment is associated with a class. Among marginal methods, Venn diagrams graphically represent the joint distribution of individuals' deprivations in multiple dimensions. Venn diagram shows all possible logical relations between finite collections of sets. It considers the joint distribution of deprivations for 2-4 dimensions. Yet they become difficult to read when more than four dimensions are used and do not per se contain a definition of the poor. The Venn diagram does not show summary measure hence no complete ordering.

e) Fuzzy sets

In this approach, mathematical technique is employed to identify mathematically the poor using fewer normative judgments. The fuzzy set approach addresses the intrinsic vagueness of the being poor predicate by using membership functions at the identification step. It builds on the idea that there is ambiguity in the identification of who is deprived or poor. Thus, instead of using a unique set of deprivation cut-offs for identification, it uses a band of deprivation cut-offs for each dimension. A person falling above the band is identified as unambiguously non-deprived, whereas a person falling below the band is identified as unambiguously deprived. Within the band of ambiguity, a membership function is chosen to assign the degree to which the person is deprived. Fuzzy sets are used to construct a summary measure, and they may address joint. The challenge lies in selecting and justifying the membership function, as well as in communicating results.

f) Axiomatic approach

This approach complies with the two steps of poverty measurement: identification and aggregation. In this approach, two broad identification methods have been used: the aggregate achievement approach and the censored achievement approach, with in the censored achievement approach, counting approach is used. The counting approach requires defining a deprivation cut-off Z_j for each indicator X_i , so that each person is defined as deprived or not in each indicator by comparing her/his indicator achievement with the corresponding deprivation cut-off and then, applying some aggregation function to the achievements across dimensions for each person to obtain an overall or aggregate achievement value. A person is identified as poor when her/his aggregate achievement is below the aggregate poverty cut-off. The summary well-being measures of the poor are then aggregated to obtain a poverty measure of the poor people.

The methodology proposed by Alkire and Foster (2007, 2011a) (AF hereafter) which belongs to the axiomatic approach, is the one which has been empirically implemented to the largest scale through the Multidimensional Poverty Index. It is also the one which has been used in national multidimensional poverty measures developed by governments of Colombia and Bhutan, among others (Alkire & Santos, 2013). Therefore, the axiomatic approach was used in this study since it captures joint distribution of deprivations, identifies the poor and also provide single cardinal index to measure poverty well than other approaches.

2.1.5 Multidimensional Poverty Measurement

2.1.5.1 The Alkire and Foster Methodology

The AF methodology combines a method for identifying the poor based on counting the number of (weighted) deprivations, and a method for aggregation, based on an extension of the unidimensional FGT (Foster, Greer and Thorbecke) family of measures to the multidimensional case (Alkire & Santos, 2013). The AF methodology of multidimensional poverty measurement creates a class of measures that both draws on the counting approach and extends the FGT class of measures in natural ways.

The MPI uses one member of a new family of poverty measures developed by Alkire and Foster (2007, 2011a; AF henceforth), the Adjusted Headcount Ratio or M_0 measure. The AF measures belong to a new generation of poverty measures that have renewed interest in the direct method by using solid aggregation methodologies based on axiomatic frameworks analogous to those which enabled the advances in income poverty measurement in the '70s and '80s. The AF measures additionally elaborate the identification step, making explicit the use of a dual cutoff approach and axioms that are joint restrictions on identification and aggregation procedures. These new poverty measures are described as multidimensional rather than unidimensional measures, and in essence they implement the direct vs. indirect method. The MPI applies the M_0 (adjusted head count ratio) measure to a set of ten deprivations related to the MDGs across three dimensions: health, education and standard of living. The information provided by the MPI differs from what individual MDG indicators can offer a dashboard approach because it identifies people with joint disadvantages (Alkire *et al.*, 2015).

AF method includes identification step (identifying the poor) and aggregation step as shown below.

Identification

1. Defining the set of indicators which will be considered in the multidimensional measure. Data for all indicators need to be available for the same person.
2. Setting the deprivation cutoffs for each indicator, namely the level of achievement considered sufficient (normatively) in order to be non-deprived in each indicator.
3. Applying the cutoffs to ascertain whether each person is deprived or not in each indicator.
4. Selecting the relative weight or value that each indicator has, such that these sum to one.
5. Creating the weighted sum of deprivations for each person which can be called his or her 'deprivation score'.
6. Determining (normatively) the poverty cutoff, namely, the proportion of weighted deprivations a person needs to experience in order to be considered multi-dimensionally poor, and identifying each person as multi-dimensionally poor or not according to the selected poverty cutoff.

Aggregation

7. Computing the proportion of people who have been identified as multi-dimensionally poor in the population. This is the headcount ratio of multidimensional poverty H , also called the incidence of multidimensional poverty. $H = \frac{q}{n}$, Where, q is number of multi-dimensionally poor people and n is total population under study
8. Computing the average share of weighted indicators in which poor people are deprived. This entails adding up the deprivation scores of the poor and dividing them by the total number of poor people. This is the intensity of multidimensional poverty (A), also sometimes called the breadth of poverty. $A = \frac{\sum_{i=1}^q ci(k)}{q}$ where: ci -is censored deprivation score of individual, and q -is the number of poor people.

9. Computing the adjusted head count ratio, M_0 measure as the product of the two previous partial indices: $M_0 = H \times A$. Analogously, $M_0(\text{MPI})$ can be obtained as the mean of the vector of deprivation scores, which is also the sum of the weighted deprivations that poor people experience, divided by the total population.

Once the MPI has been computed and the deprivations of the non-poor have been censored, one can look at the censored headcount ratios: the proportion of people who are poor and deprived in each of the indicators. These headcount ratios differ from the raw headcount ratios: the proportion of the population that is deprived in that dimension or indicator. Raw headcount ratio aggregates deprivations pertaining to the poor (censored headcount) with deprivations among the non-poor. Censored headcount ratios differ from raw head count ratio in that they only consider the deprivations of those that are poor, ignoring the deprivations of the non-poor (in other words, counting them as zero).

2.1.5.2 Multidimensional poverty dimensions, indicators and cut-offs

The international MPI is an adaptation of M_0 with a particular choice of indicators, deprivation cutoffs and relative weights, and a poverty cutoff. The international MPI is based on ten indicators grouped into three dimensions reported in Table 1. The first column reports three dimensions: health, education and standard of living. The second column reports the ten indicators. Each dimension is equally weighted and indicators within each dimension are also equally weighted. The third column reports the deprivation cutoff of each of the ten indicators. The deprivation cutoffs are applied at the household level and thus refer to all members within the household. A household is identified as MPI poor if its deprivation score is larger than or equal to $k = 1/3$. Thus, MPI pursues an intermediate approach to the identification of the poor. Being an adaptation of M_0 , the MPI can be expressed as $\text{MPI} = H \times A$, where H is referred to as the incidence of poverty and A as the intensity of poverty (Alkire and Robles, 2016)

The dimensions, indicators, and deprivation criteria are presented below and explained with detail in the following diagram and table.

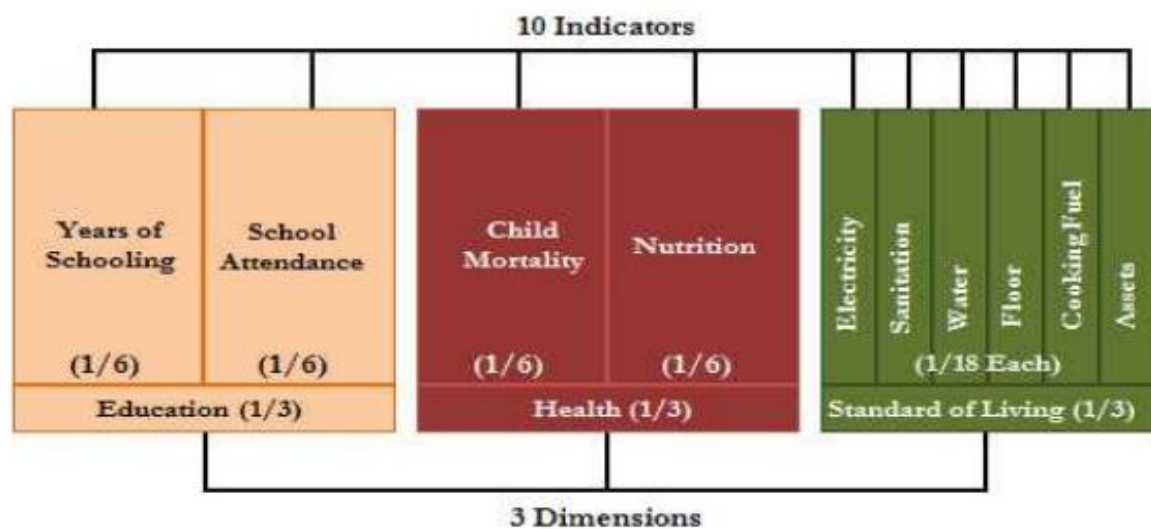


Figure 2.1 Composition of the MPI dimensions and indicators (source: Alkire and Santos, 2013)

Table 2.1 The dimensions, indicators, deprivation cutoffs and weights of the global MPI

Dimensions of poverty	Indicator	Deprived if...	Weight
Education	Years of Schooling	If no household member has completed 6 years of schooling	1/6
	Child School Attendance	Any school-aged child is not attending school up to the age at which he/she would complete class 8.	1/6
Health	Child Mortality	Any child has died in the family in the five-year period preceding the survey	1/6
	Nutrition	Any adult under 70 years of age, or any child for whom there is nutritional information, is undernourished in terms of weight for age.	1/6
Living Standard	Electricity	The household has no electricity.	1/18
	Improved Sanitation	The household's sanitation facility is not improved (according to MDG guidelines), or it is improved but shared with other households.	1/18
	Improved Drinking Water	The household does not have access to improved drinking water (according to MDG guidelines) or safe drinking water is at least a 30-minute walk from home, round-trip.	1/18
	Flooring	The household has dirt, sand, dung or 'other' (unspecified) type of floor.	1/18
	Cooking Fuel	A household cooks using solid fuel such as dung, agricultural crop, shrubs, wood, charcoal or coal.	1/18
	Assets ownership	The household does not own more than one these assets: radio, TV, telephone, bike, motorbike or refrigerator and does not own a car or truck.	1/18

Source: OPHI, 2010, OPHI, 2016 and OPHI, 2020

Note:

- Adults are considered malnourished if their BMI is below 18.5 m/kg². Children are considered malnourished if their z-score of weight for age is below minus two standard deviations from the median of the reference population.
- A household is considered to have access to improved sanitation if it has some type of flush toilet or latrine, or ventilated improved pit or composting toilet, provided that they are not shared.
- A household has access to clean drinking water if the water source is any of the following types: piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within a distance of 30 minutes' walk (round-trip) (Alkire and Robles, 2016) .

2.1.5.3 Vulnerability and severity of households' multidimensional poverty

Alkire and Santos (2011) identified the deprivation score of the person with which the person is considered vulnerable, poor and in severe poverty. According to them, the household including everyone in it is considered as vulnerable to multidimensional poverty if the households' deprivation scores (C_i) is 20 percent or higher but less than 33percent. Households are considered poor if the households' deprivation scores (C_i) is 33.3 percent or above. Households with a deprivation score of 50percent or higher are considered in severe multidimensional poverty.

2.2 Empirical Literature Review

The United Nations (2015) Millennium Development Goals Report indicated that 836 million people are still living in extreme poverty with an income level below one dollar a day. Raising the poverty line to \$2.5/day increases the proportion of poor to about 2.7 billion people (UNDP, 2014) which shows poverty in developing countries is very chronic and widespread. As study conducted by Alkire and Santos (2010) on 104 countries, which are home to million or 5.2 billion people reveals, 1,659 million (close to 1.7 billion) are poor according to the MPI. That means 32 percent of the total population in these 104 countries is poor. This figure lies between the total number of people living on less than \$ 1.25/day, which is 13789 million people (26 percent), and the total number

of people living with less than \$2/day which is 2,525 million people (48 percent). In Sub-Saharan Africa, a population-weighted average of 64.5 percent is poor people, which means about 458 million people are MPI poor in this region of the world.

From Sub-Saharan countries the following countries are the highest contributors in different indicators to multidimensional poverty. In Guinea, Mali, and Niger, more than 50 percent are poor and live in a household where at least one child has died. In Nigeria, Madagascar, Mali, and Burkina Faso 30 percent or more are poor and live in a household where at least a woman or a child is undernourished. In Liberia, the Central African Republic, Mali, Ethiopia, Burkina Faso, and Niger, more than 55 percent are poor and live in a household where there are children of school age not attending school. In Mozambique, Guinea, Burundi, Mali, Ethiopia, Burkina Faso, and Niger, more than 50 percent are poor and live in a household where no one has completed five years of education (Alkire & Santos, 2010).

Across 107 developing countries, 1.3 billion people, 22 percent live in multidimensional poverty. Children show higher rates of multidimensional poverty: half of multi-dimensionally poor people (644 million) are children under age 18. One in three children is poor compared with one in six adults. About 84.3 percent of multi-dimensionally poor people live in Sub-Saharan Africa (558 million) and South Asia (530 million). 67 percent of multi-dimensionally poor people are in middle-income countries, where the incidence of multidimensional poverty ranges from 0 percent to 57 percent nationally and from 0 percent to 91 percent sub-nationally. Every multi-dimensionally poor person is being left behind in a critical mass of indicators. For example, 803 million multi-dimensionally poor people live in a household where someone is undernourished, 476 million have an out-of-school child at home, 1.2 billion lack access to clean cooking fuel, 687 million lack electricity and 1.03 billion have substandard housing materials(OPHI & UNDP, 2020)

As OPHI & UNDP (2020) data indicates Sub-Saharan African countries have the highest percentages of people who are multi-dimensionally poor and deprived in years of schooling (Niger, Burkina Faso, South Sudan, Chad and Ethiopia) and school attendance (South Sudan, Burkina Faso, Niger, Chad and Mali). In Sub-Saharan Africa 71.9 percent of people in rural areas (466 million people) are multi-dimensionally poor compared with 25.2 percent (92 million people) in urban areas. In South Asia 37.6 percent of people in

rural areas (465 million people) are multi-dimensionally poor compared with 11.3 percent (65 million people) in urban areas. Deprivation in access to clean cooking fuel persists worldwide: 20.4 percent of people in the developing countries covered by the MPI are multi-dimensionally poor and lack access to clean cooking fuel. Deprivation in access to clean cooking fuel among poor people in rural areas and urban areas in Sub-Saharan Africa as well as in rural areas in South Asia, the Arab States and Latin America and the Caribbean requires urgent attention. There is a strong positive association between employment in agriculture and multidimensional poverty, particularly in Sub-Saharan Africa. Agricultural employment may not help reduce poverty in these countries without additional pro-poor policy interventions (OPHI & UNDP, 2020).

Ethiopia had shown significant progress in reducing monetary poverty over the last decades. Ethiopia was one of poorest country that had high poverty rate in the world in 2000, with 56% of the population living below US \$1.25 PPP a day and 44% of its population under the national poverty line. In 2011, less than 30% of the population lived below the national poverty threshold and 31% lived on less than US \$1.25 PPP a day (World Bank, 2015). However, this progress in wellbeing is not reflected in other non-monetary wellbeing dimensions such as electricity, health, education water etc.

In 2000 Ethiopia had one of the highest poverty rates in the world, with 56 percent of the population living on less than United States (U.S.) \$1.25 purchasing power parity (PPP) a day. Ethiopian households experienced a decade of remarkable progress in wellbeing since then and by the start of this decade less than 30 percent of the population was counted as poor (World Bank, 2004). Both in unidimensional and multidimensional measures of poverty and different standards, Ethiopia remain to be one of the poorest countries in the world (Apablaza & Yalonetzky, 2013). Ethiopia was ranked 174 in HDI out of 187 countries where average per capita income was less than half of the sub-Saharan average (The World Bank, 2014). Ethiopian government conducts Household Income Consumption Expenditure Survey analytical works in every five years to check the improvement on poverty reduction accomplishments. The results of the 1995, 1999, 2005 and 2011 Household Income Consumption Expenditure Survey and Welfare Monetary Survey of CSA shows that poverty head count index in the country measured by per capita income/consumption was 46%, 44%, 39% and 30% of the households respectively (CSA, 2012). Particularly, urban poverty accounted a head count index of

33%, 37%, 35% and 26% in the same years, respectively. This shows the high level of incidence of income or consumption poverty in urban Ethiopia. The incidence of income poverty in Tigray was 56%, 61%, 49% and 32% in 1995, 1999, 2005 and 2011, respectively. In urban areas of Tigray region, the incidence of income poverty was 46%, 61%, 37% and 14% in 1995, 1999, 2005 and 2011 respectively accounting for 32% point decrease from 1995 to 2011 (MoFED, 2012).

In Ethiopia, about 85% of the rural households were traveling less than five kilometers to get source of drinking water. Around 5% of the rural dwellers were travelling five to nine kilometers to fetch water for daily uses. The consistent accessibility in urban areas was found to be much better. Only 0.5% of the urban households lived five or more kilometers away from the nearest source of drinking water. All standard measures of poverty identify Ethiopia as one of the poorest countries in the world. The country has one of the lowest per capita GNP, and a large proportion of the population lives below a dollar a day (Alemu *et al.*, 2011; CSA, 2012).

Beshir *et al.*, (2016), made a study on income poverty in Arsi administrative Zone, Oromia, Ethiopia and found that income poverty was positively influenced by educational level, household size and business participation status of household heads. It was found that income poverty was negatively affected by age of households, marital status and economic status of parents. It was also found that income poverty was higher among divorced and widowed household heads as compared to the married groups. However, income poverty was lower for those participating in different business activities than household heads who do not participate in business activities.

Alkire and Kanagaratnam (2018) studied multidimensional poverty using 2016 DHS data for Ethiopia. Accordingly, result reveals that the poor in Ethiopia experience 51% of the total deprivations that would be experienced if all households were multidimensional poor (MPI poor) and deprived in all poverty indicators. The multidimensional headcount ratio and multidimensional poverty intensity were 83 % and 61%, respectively. This means 83% of households were poor and the share of deprivation each poor households experiences on average is 61%. Regarding to the uncensored headcount ratio, higher deprivation was observed in all indicators of multidimensional poverty. That is the percentage of households deprived in years of schooling (43.9), child school 44 attendance (33.7), child mortality (31.6), electricity (79.4), improved sanitation (93.4),

drinking water (63.7), cooking fuel (95.1), nutrition (50.8), flooring (84.5), and asset ownership (70.6) were extremely high.

Getaneh, (2017) studied multidimensional poverty in three small towns of East Gojjam, Amhara region by using AF method. The study towns are Wojel, Yetmen and Felege Birhan. The sample households of the three towns were 326 out of which 30% female headed and 70% male headed households. He found that the headcount ratio (incidence) in the study towns was 55% on average. The intensity (the average deprivation of the poor) of the three towns was 47%. In each study town, the headcount ratios were accounted to be 63% in Wojel, 57% in Felege Birhan and 43% in Yetmen. With respect to the intensity of multidimensional poverty of each town, it was found to be 48%, 46% and 46% in Wojel, Yetmen and Felege Birhan, respectively. The MPI of the towns is found to be 30%, 26% and 19% in Wojel, Felege Birhan and Yetmen, respectively. The highest contributors to the MPI were years of schooling 6.4%, floor material 5.5%, durable assets 5.4%, type of cooking fuel 4.2% and source of electricity 2.9%. The largest average contributor to the MPI dimension was living standard, contributing more than 13%, accounted for more than 12% in Felege Birhan and Wojel and just over 15% in Yetmen. Next to living standard, education is the second poverty contributor. The least contribution to the MPI of all and individual study towns had come from the health dimension.

Generally, few studies were conducted on multidimensional poverty in Ethiopia and most of them are at national level. In addition, most of the studies were based on dashboard multidimensional poverty measurement method which apply a 'standard unidimensional measure to each dimension. Actually, OPHI studied in 2013 using Alkire and Foster method that simultaneously uses dual cut off and aggregates the dimensions. However, to the best of the researcher's knowledge there is no specific multidimensional poverty study made at the selected study area, Nekemte town. Hence, this paper is expected to link this gap in literature. In addition, this study will employ Alkire and Foster method to measure multidimensional poverty at household level and aggregate for the sample population. In general, the study is aimed to fill the above mentioned gaps by using Alkire and Foster method of multidimensional poverty measurement to analyze multidimensional poverty status of households in the study area, Nekemte town.

2.2.1 Urban Poverty

Study conducted by World Bank (2015) shows that in 2000, 11% of Ethiopia's poor lived in cities, but this rose to 14% in 2011. As a result the number of urban poor stayed almost constant between 2005 and 2011 at 3.2 million even though urban poverty rates fell by almost ten percentage points (from 35% to 26%). The first small areas estimates of poverty for the 95 largest cities and towns in Ethiopia were constructed for Poverty Assessment. The study confirms that the negative relationship between poverty and city size that underpins the oft-stated metropolitan bias also holds true for Ethiopia cities excluding Addis Ababa. Very small urban centers, rural towns are poorer than larger urban centers. Poverty rates in Addis Ababa and Dire Dawa, however, are much higher than this trend would predict. Addis Ababa is a city on a different scale to other cities in Ethiopia. The second largest city, Dire Dawa, has a population of about a quarter million. Although Addis Ababa is much larger than other cities or town in Ethiopia, the headcount poverty rate in Addis Ababa is quite high, and higher than it should be if the relationship between poverty and city size found in other Ethiopian cities was extrapolated. Dire Dawa also records much higher poverty rates than its size would predict (World Bank, 2015).

Melese *et al.*, (2017) conducted a study on determinants of urban poverty in the case of Nekemte town in six urban kebeles of the town. They identified determinants of poverty and found that family size and rural-urban migration have positive and significant effect on the household poverty. Sex of the household head, education level and salary were found to have negative and significant effect on poverty.

Debeli and Endegen (2019) made study on Urban Poverty and Its Determinants in Debre Markos City. And their findings of the study showed that, in the study area the proportion of the poor people is estimated to be 46.8% indicating that almost half of the people were unable to meet the monthly per adult consumption expenditure of 315 ETB. Six variables like family size, unemployment, house ownership have positive and significant effect on household poverty while education income, household health status have negative and significant effect at 1%, 5%, and 10% significance level. Mohammed (2017) did study on Determinants of Urban Poverty in Case of Southern Nations, Nationalities, and Peoples' Region (SNNPR), Ethiopia. The result of the study shows that marital status and saving is

found to have negative and significant effect while source of energy, number of dependency positive and significant effect on urban poverty in the study area.

2.3 Conceptual Framework of the Study

Conceptual framework is a set of ideas which shows the relationship between the dependent and explanatory variables used as base for making analysis and conclusion in the study (Misharch, 2015). It shows the links and relationships between dependent, explanatory variables and the background of the problem to be investigated. The dependent variable is household multidimensional poverty status whereas independent variables which are assumed to affect this dependent variable are demographic factors, socioeconomic and institutional factors that are depicted in the below figure.

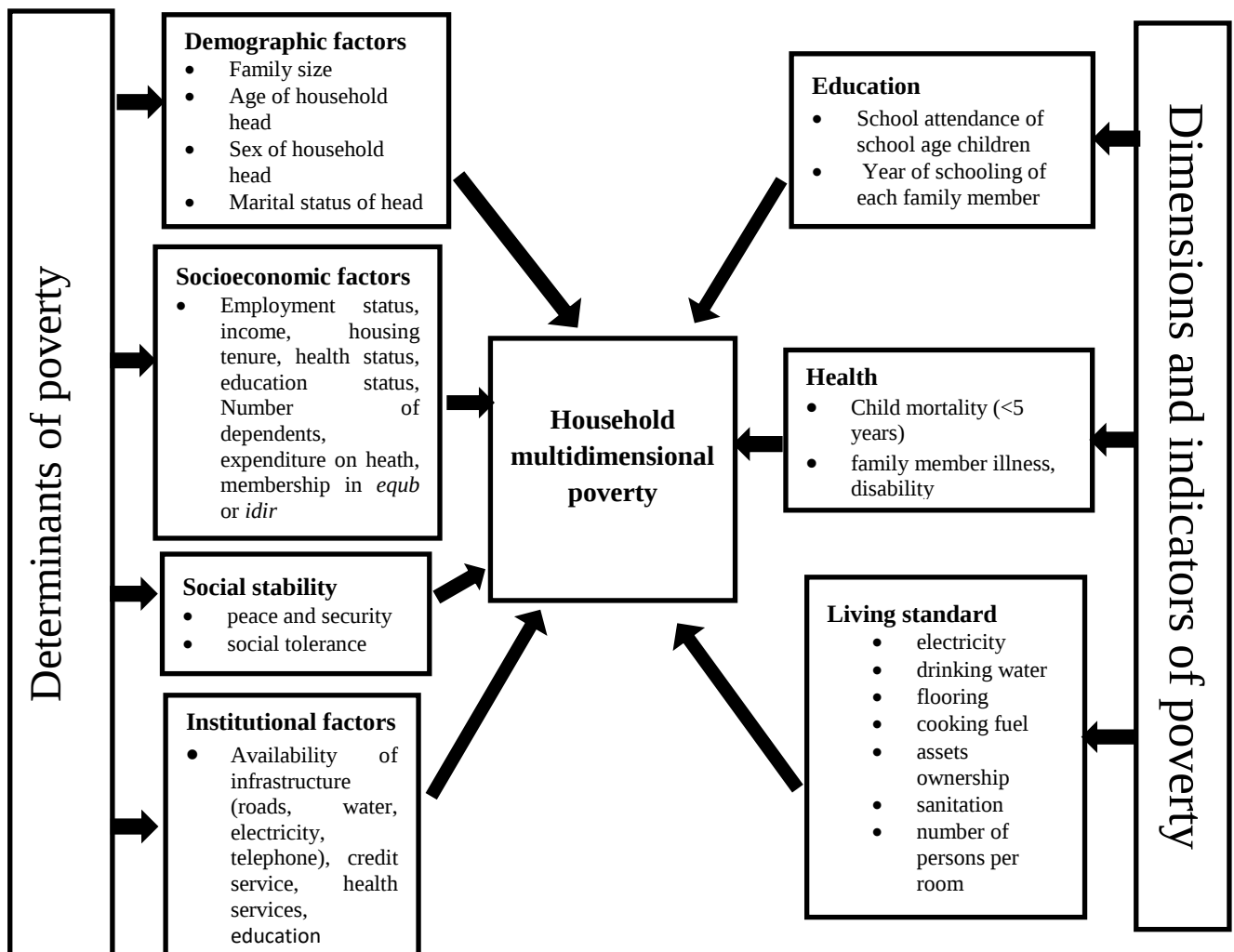


Figure 2.2 Conceptual framework of the Study (Source: Adapted from Fetsum, 2018)

CHAPTER THREE

3. METHODOLOGY OF THE STUDY

3.1 Description of the Study Area

Nekemte is a market town and separate woreda in western Ethiopia. It is located in the East Wollega Zone of the Oromia Region. The town is one of the old and medium towns in the country, established in the mid-19th century. However, it is highly under developed as a function of low attention was given to its development by successive regimes. Among other things, the development of town's trade and industry is found at a very infant stage. Nekemte urban local Government (NULG), administration of self-rule by the town was incorporated among the 20 selected cities in Oromia Regional state and reformed in 2005 in accordance with the proclamation No. 65/2003. The objective of the reform was to tackle the imbalance of life condition, lack of infrastructural services in the urban due to increasing rural-urban influx, shortage of residence, unemployment, aggravated poverty and its consequence such as crime, ill health that emanated from lack of sanitation, environmental pollution in the settlement of urban dwellers.

Nekemte was the capital of the former Wollega Province, and is home to a museum of Wollega Oromo culture. The town is situated on a flat, hilly landscape. It is located at a distance of 228 km west of Addis Ababa, 110km North East of Gimbi the principal town of west Wollega Zone and 250km North West of Jima zone in Oromia Regional state. Currently, it is a capital city of East Wollega zone of Oromia Regional state with the total land area estimated to be 5480 hectare. According to Nekemte town administration office, the town is divided in to seven sub towns of Darge, Bake Jama, Burqa Jato, Bakanisa kese, Chalalaki, Sarga and Keso. The town has a latitude and longitude of 9°5'N 36°33'E and an elevation of 2,088 meters. Its average annual rain fall is 1854.9 mm, and the average temperature ranges from 14⁰C to 26⁰C (Melese et al, 2017; Encyclopedia, 2020; NTAOD, 2020).

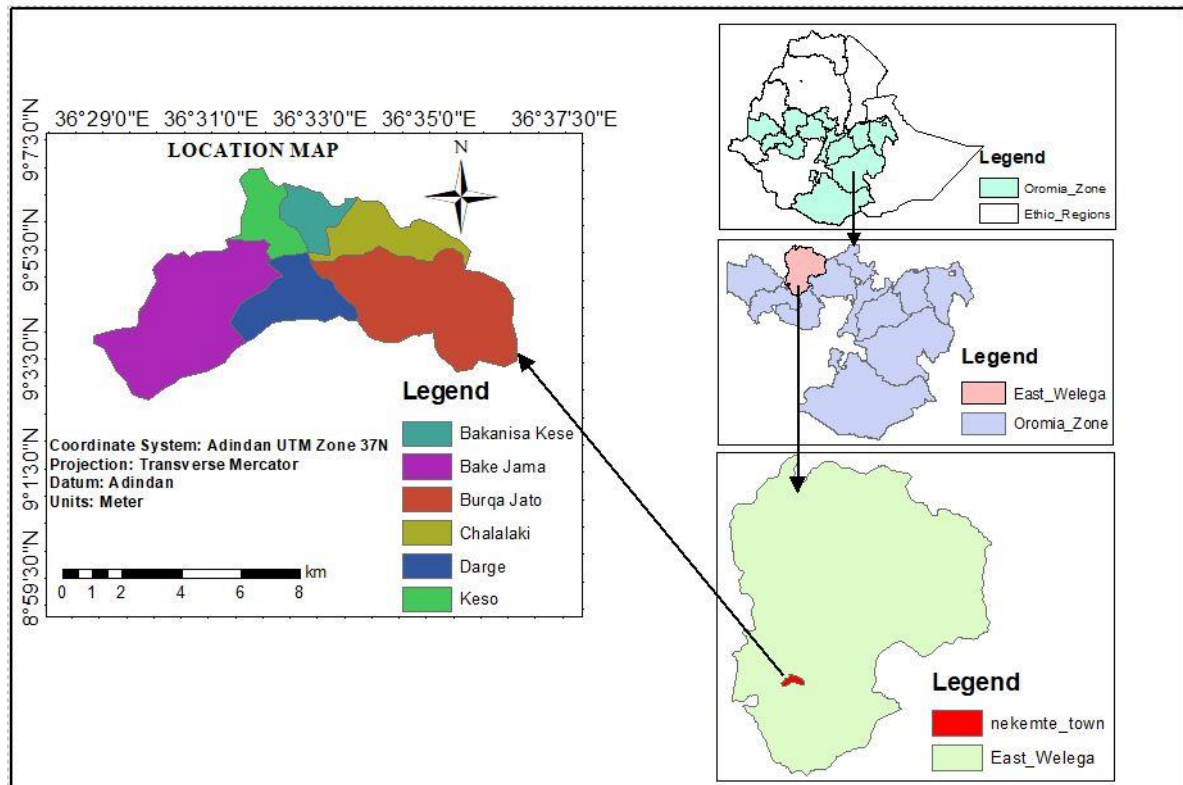


Figure 3.1 Location of Nekemte town in its national and regional setting

3.1.1 Population of the town

According to Nekemte Town Administration Office survey (2020), the total population of the town is 138,127. Of which 69400 are males while 68727 are females. Among the inhabitants of the town about 16813 (12.17%) are Muslims, 35126 (25.43%) are Orthodox, 80841 (58.53%) are protestant, 3298 (2.4%) are Catholic, 1216 (0.88%) are Wakefata and 833 (0.6%) are others. The total household of the town is 27629.

3.2 Data Type and Sources

Both quantitative and qualitative data types which were gathered from primary and secondary sources were used in this study. The primary data was obtained from sample households of the town. Secondary data for this study were obtained from different organizations like Central Statistical Agency of Ethiopia (CSA), World Bank and Nekemte town administration office. Moreover, unpublished and published documents such as research journals, local reports, international reports like UNDP report on poverty, OPHI report and other organizations reports were among the crucial secondary data sources that were used in this study.

3.3 Sampling Techniques and Sample Size Determination

Contacting every households of the town is impossible due to because it is time consuming and costly. Accordingly, the study used sample of 379 households that represents 27629 households of the town. Stratified sampling method was employed in selecting sample from households of Nekemte town. In this sampling, the population is partitioned into non-overlapping groups, called strata and sample is selected by some design within each stratum. Households were stratified based on their sub-town and then representatives from each sub town were selected by simple random sampling. The town is divided into seven sub-towns. Proportional contribution of each sub town to total sample was determined and then sample from each sub town was selected randomly. To determine the sample size for this study Kothari (2004)'s statistical formula was used. The formula is appropriate when the population is finite (Kothari 2004).

$$n = \frac{z^2 \cdot p \cdot q \cdot N}{e^2(N - 1) + z^2 \cdot p \cdot q}$$

Where: n-sample size

N - Total households of the town

e -Precision level = 5%

z = 1.96 (as per table of area under normal curve for the given confidence level of 95%).

P - The proportion of defectives in the universe= 0.5 based on most conservative sample size.

q = (1-p) = 0.5

$$n = \frac{(1.96)^2(0.5)(0.5)(27629)}{(0.05)^2(27629-1) + (1.96)^2(0.5)(0.5)}$$

$$n = \frac{26534.8916}{70.0304}$$

$$n = 379$$

Therefore, the sample is 379.

The proportional contribution of sub towns to sample is as presented in the table below.

Table 3.1 Sample size from each sub town

S.no	Sub town	Number of household	Percentage contribution to total sample	Sample household
1	Cheleleki	5673	$\frac{5673}{27629} \times 100 = 20.5\%$	78
2	Burka Jato	4920	$\frac{4920}{27629} \times 100 = 17.8\%$	67
3	Darge	4623	$\frac{4623}{27629} \times 100 = 16.7\%$	63
4	Bakenisa Kase	4299	$\frac{4299}{27629} \times 100 = 15.6\%$	59
5	Kaso	3622	$\frac{3622}{27629} \times 100 = 13.1\%$	50
6	Bake Jema	3542	$\frac{3542}{27629} \times 100 = 12.8\%$	49
7	Sorga	950	$\frac{950}{27629} \times 100 = 3.4\%$	13
Total		27629	100%	379

3.4 Method of Data Collection

Household survey

The Primary data like demographic characteristics that included age, gender, education level of household head, income, health status of the households, education status, living standard and other determinants of household poverty was collected by distributing questionnaire and interviewing sample respondents. The questionnaire was first prepared in English and then translated to the regional language, Afan Oromo. The purpose of translation was to facilitate communication between enumerators and the respondents and not to miss relevant information because of language barrier.

3.5 Method of Data Analysis

3.5.1 Descriptive statistics

Descriptive statistics such as percentages, frequency distribution, mean, standard deviation, Chi-square, significance interval, and t-test were employed to analyze the numerical data that was obtained through household survey. The collected data includes demographic, health, education, socioeconomic and living standards and so on. Moreover, the poverty determinant factors that affect household poverty status were

tested whether they are statistically significant or not using chi-square test and independent t-test. Stata Statistical Package software version 14.2 was used as tool for data entry and analysis.

3.5.1 Procedures in Multidimensional Poverty Measurement

In this paper, the Oxford Poverty and Human Development Initiative (OPHI) method of multidimensional poverty measurement developed by Alkire and Foster (2007, 2011 hereafter) was used to measure and analyze the multidimensional poverty (Simultaneous multiple deprivation of households) because the method is flexible and can be used with different dimensions and indicators specific to different societies and situations (Alkire and Santos (2010). The method is called counting approach. The method uses M_0 (adjusted headcount ratio) which is the appropriate measure to be used whenever one or more of the dimensions to be considered are of ordinal nature, meaning that their values have no cardinal meaning (Alkire & Santos, 2010).

AF methodology consists of two steps which is identification and aggregation. To measure and analyze multidimensional poverty of households in the study area, MDP indicators are identified based on the global multidimensional poverty index with their deprivation cut-off and their weight which sum to one.

In identification step, the MDP indicators are identified with their deprivation cut-off and summing each deprivation score of each household and each household is identified as poor or not depending on the poverty cut-off, $k=1/3$ (0.333). To compute multidimensional poverty index (MPI) it needs to calculate the weighted deprivation score of individual and it is computed as:

$$C_i = \sum_{j=1}^d w_j g_{ij} \dots \dots \dots eq(1)$$

Where: w_j is the weight for each indicator j and g_{ij} is the deprivation score for household i in indicator j and d is the total number of indicators.

The deprivation score C_i of the i^{th} poor person can be expressed as the sum of the weights associated with each indicator j ($j = 1, 2 \dots 11$) in which person i , is deprived, $C_i = C_{i1} + C_{i2} + \dots + C_{i11}$

If the deprivation score of the household, $k \geq 0.333$, the household is considered as poor and if the deprivations score of the household, $k < 0.333$, the household is considered as non-poor.

After identifying the household as poor or non-poor the next step of MDP measurement is aggregation. To aggregate it needs to calculate headcount ratio (H), intensity of poverty (A) and MPI.

Headcount ratio or the proportion of people who experience multiple deprivations is calculated as:

$$H = \frac{q}{n} \dots \dots \dots \text{eq (2)}$$

Where: H is multidimensional headcount ratio (the proportion of the population that is multi-dimensionally poor)

q is number of multi-dimensionally poor households

n is total population under study

$$A = \sum_{i=1}^q c_i(k) / q \dots \dots \dots \text{eq (3)}$$

Where: $c_i(k)$ is censored deprivation score (represents the share of possible deprivations experienced by a poor person i). And A is intensity of multidimensional poverty (average deprivation score across the poor)

After computing headcount ratio, H and intensity of the poverty, A, it is possible to compute MPI and it can be calculated from head count ratio (H) and intensity of poverty (A). It is the product of the two measures, H and A.

$$\text{MPI (M}_0\text{)} = H \times A \dots \dots \dots \text{eq (4)}$$

MPI (M_0) clearly satisfies dimensional monotonicity, since if a poor person becomes deprived in an additional dimension, then A rises and so does M_0 . Another interpretation of M_0 is that it provides the share of weighted deprivations experienced by the poor divided by the maximum possible deprivations that could possibly be experienced if all people were poor and were deprived in all dimensions. It is relevant when poverty is viewed from the capability perspective, for example, since many key functionings are commonly measured using ordinal variables (Alkire, *et al.*, 2015)

The next step is to calculate the contribution of each multidimensional poverty indicators to total poverty (MPI). To calculate the contribution of each indicator to multidimensional

poverty, it needs to calculate censored headcount ratio of each indicator. The censored headcount ratio of an indicator is defined as the percentage of the population who is both multidimensionally poor and deprived in that indicator.

The percentage contribution of each indicator to overall poverty is computed as follows:

$$\text{Contribution of indicator } j \text{ to MPI} = \frac{w_j \text{CH}_j}{\text{MPI}} * 100$$

Where w_j is the weight of indicator j and CH_j is the censored headcount ratio of indicator j .

After computing the contribution of each indicator to MPI the next step is to calculate raw head count ratio, the proportion of households who are deprived in a particular indicator regardless of the category of households as poor or non-poor. It is calculated by adding the number of the households deprived in an indicator and dividing by total population.

3.5.2 Dimensions, Indicators and Poverty Cut-off

In this study, the AF methodology which is based on three dimensions of poverty (health, education and living standard) was used. Each of the dimensions has indicators which are presented in the following table. The poverty cut-off, k is 0.333. The poverty cutoff is the minimum deprivation score a household needs to exhibit in order to be identified as poor. A household is identified as MPI poor if its deprivation score is larger than or equal to, $k \geq 0.333$.

To identify the multidimensional poor, the deprivation scores for each indicator are summed to obtain the household deprivation score. A cut-off of 0.333 (1/3) of the weighted indicators is used to distinguish between the poor and non-poor households. If the deprivation score is 0.333 or higher, the household including everyone in it is considered as multidimensional poor. Households with a deprivation score of 0.2 or higher but less than 0.333 are close to multidimensional poor and considered as vulnerable. Households with a deprivation score of 0.5 or higher are severely multidimensional poor (Alkire and Santos, 2011).

The multidimensional poverty dimensions selected for this study are health, education and living standard. The selection of the dimensions is based on global MPI.

A) Education: For education two indicators are used. These are years of schooling and child school attendance. Each indicator is weighted equally at 1/6. Years of schooling acts

as a proxy for the level of knowledge and understanding of household members (Alkire and Santos, 2011).

Years of schooling: The household is considered to be deprived if one person in the household has not completed grade 6 and not deprived otherwise.

Child school attendance: A household is deprived if one of the school age children (age 7 -15years) are not attending school during the survey and not deprived if all the school age children are attending their schooling.

B) Health: This dimension consists of child mortality and illness (disability and morbidity) as indicators. The weight of each indicator is equal to 1/6. The death of a child is a total health functioning failure, one that is direct and tragic, and that influences the entire household. Most, although not all, child deaths are preventable, being caused by infectious disease or diarrhea; child malnutrition also contributes to child death (Alkire and Santos, 2010).

Child mortality: If any child in the household was dead in the past five years not because of accidents such as traffic, flooding, fire and falling from heights, a household is considered to be deprived by this indicator.

Illness (disability and morbidity): The household is considered as deprived in this indicator if household head is seriously ill and activities are stopped due to illness, receive no medical treatment and if received but not cured (Adetola, 2014; Getaneh, 2017).

C) Standards of Living: For this dimension seven indicators are considered. The weight attached to these indicators is equal and it is 1/21. These indicators include three standard MDGs indicators that are related to health and living standards which particularly affect women: access to clean drinking water, access to improved sanitation and the use of clean cooking fuel. Other indicators which indicate the quality of housing are access to electricity, flooring material and room availability. The other indicator in this dimension is the ownership of asset: radio, television, telephone house etc. The deprivation cutoffs for all of the indicators except the last two are based on the consensus of MDGs as stated by Alkire and Santos (2013). The living standard indicators are selected from infrastructure, housing and others. These include:

Water: A household has access to clean drinking water if the water source is any of the following types: piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within a distance of 30 minute walk (round-trip). If it fails to

satisfy these conditions, then the household is considered deprived in access to drinking water.

Electricity: A household is considered to be deprived in electricity if it did not have access to electricity.

Improved sanitation: A household is considered to have access to improved sanitation if the household has some type of flush toilet or latrine, or ventilated improved pit or composting toilet, provided that it is not shared. If the household fails to satisfy these conditions, then it is considered as deprived in sanitation.

Flooring: If the floor is dirt, sand or dung the household is considered as deprived in flooring. Households who are living in cement floors housing are non-deprived in housing. Mud floor is generally considered as poor quality houses by many researchers and has an impact on the health of households.

Room density: This indicates number of persons per room. A household is considered deprived in room if three and more than three persons lived per room. Overcrowding incubates disease and do not contribute to a sustainable environment. Conversely, a household was not deprived in room if less than three persons were living per room. The number of rooms excludes kitchens, bathrooms, toilets and rooms used for business purposes (UN-habitat, 2009).

Cooking fuel: A household is considered deprived in cooking fuel if the household cooks with animal dung, charcoal or wood, crop residue, straw/shrubs/grass and no ventilation of cooking smoke or had no improved oven. Excessive use of charcoal and firewood in a non-ventilated kitchen or improved oven affects the health of a household.

Asset ownership: If a household did not own more than one of radio, television, telephone, bike, motorbike, car, animal cart, refrigerator and did not own a house then each person was considered as deprived in durable assets. These assets are useful for leading a normal life by their own and are salable in times of emergencies. As many research results showed housing is the most important asset for urban residents as it is a source of income besides sheltering of households (Alkire and Santos, 2015; Getaneh, 2017).

Table 3.2 Summary of dimensions, indicators, deprivation cutoffs and weights of MPI

Dimensions and weights	Indicators	Deprivation status	Weight
Education(1/3)	Years of Schooling	Deprived if no household member has completed 6 years of schooling and not deprived otherwise. The deprivation index for deprived is 1 and 0 for not deprived.	1/6
	Child School Attendance	Deprived if any school-aged child is not attending school up to the age at which he/she would complete class 8 (age 7-15years). The deprivation index for deprived is 1 and 0 for not deprived.	1/6
Health (1/3)	Child Mortality	Deprived if any child has died in the family in the five-year period preceding the survey. The deprivation index for deprived is 1 and 0 for not deprived.	1/6
	Illness (disability and morbidity)	Deprived if household head is seriously ill and activities are stopped due to illness, receive no medical treatment and if received but not cured. The deprivation index for deprived is 1 and 0 for not deprived.	1/6
Living Standard (1/3)	Safe Water	Deprived if the water source is not any of the following types: piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is 30 minute walk from home, (round-trip). The deprivation index for deprived is 1 and 0 for not deprived.	1/21
	Electricity	A household is considered to be deprived in electricity if it did not have access to electricity. The deprivation index for deprived is 1 and 0 for not deprived.	1/21
	Improved Sanitation	Deprived if the household's sanitation facility is not improved, or it is improved but shared with other households. The deprivation index for deprived is 1 and 0 for not deprived.	1/21
	Flooring	Deprived if the household has dirt, sand, dung or 'other' (unspecified) type of floor. The deprivation index for deprived is 1 and 0 for not deprived	1/21
	Room density	A household is considered deprived in room if three and more than three persons live per room. The deprivation index for deprived is 1 and 0 for not deprived.	1/21
	Cooking Fuel	Deprived if a household cooks using solid fuel such as dung, agricultural crop, shrubs, wood, charcoal or coal. The deprivation index for deprived is 1 and 0 for not deprived	1/21
	Assets ownership	Deprived if the household does not own more than one these assets: radio, TV, telephone, bike, motorbike or refrigerator, car or truck and does not own house. The deprivation index for deprived is 1 and 0 for not deprived.	1/21

Source: Alkire and Santos, 2015, 2016 and Getaneh, 2017

Note: Each dimension has weight of 1/3.

- Education dimension has two indicators; each indicators weight is $\frac{1}{6} = \frac{1}{3} \times \frac{1}{2}$
- Health dimension has two indicators; each indicators weight is $\frac{1}{6} = \frac{1}{3} \times \frac{1}{2}$
- Living standard dimension has seven indicators, each indicator consisting weight of $\frac{1}{21} = \frac{1}{3} \times \frac{1}{7}$

3.6 Econometric Method of Data Analysis

In this study to analyze determinants of household's poverty, binary logit model was used. When the dependent variable is dummy (categorical), the ordinary least square regression models cannot be used. Rather qualitative response models such as logit and probit is used. The logit model was selected after comparing it with probit model by AIC (Akaike's Information Criteria and BIC (Bayesian Information Criteria). Logistic regression sometimes called the logistic model or logit model, analyzes the relationship between multiple independent variables and a categorical dependent variable, and estimates the probability of occurrence of an event by fitting data to a logistic curve. Binary logistic regression is usually used when the dependent variable is dichotomous and the independent variables are either continuous or categorical (Gujarati, 2004; Hyeoun-Ae, 2013). Hence, in this study binary logit model was used since the dependent variable which is household poverty is dichotomous variable which takes value 1 indicating the presence of poverty and 0 indicating absence of poverty and explanatory variables are both continuous and categorical.

3.6.1 Model Specification

Based on Gujarati (2004) the binary logit model is specified as follows:

$$P_i = E(Y = 1 / X_i) = \beta_1 + \beta_2 X_i \dots \dots \dots 1$$

$$P_i = E(Y = 1 | X_i) = \frac{1}{1 + e^{-(\beta_1 + \beta_2 X_i)}} \dots \dots \dots 2$$

$$P_i = \frac{1}{1 + e^{-Z}} = \frac{e^Z}{1 + e^Z} \dots \dots \dots 3$$

Where $Z_i = \beta_1 + \beta_2 X_i$

Equation (3) represents what is known as the (cumulative) logistic distribution function.

If P_i , the probability household being poor is given by eq (3), then $(1 - P_i)$, the probability household not poor is

$$1 - P_i = \frac{1}{1 + e^{Z_i}} \dots\dots\dots 4$$

Therefore, we can write

$$\frac{P_i}{1 - P_i} = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Z_i} \dots\dots\dots 5$$

Now $P_i/(1 - P_i)$ is simply the odds ratio in favor of being poor, the ratio of the probability that a household being poor to the probability that it will not poor.

Now if we take the natural log of (5), we obtain a very interesting result, namely,

$$L_i = \ln \frac{P_i}{1 - P_i}$$

$$L_i = Z_i = \beta_1 + \beta_2 X_i \dots\dots\dots 6$$

That is, L , the log of the odds ratio, is not only linear in X , but also (from the estimation viewpoint) linear in the parameters. L is called the logit, and hence the name logit models for models like eq (6).

3.6.2 Model diagnostic tests

Multicollinearity test

Multicollinearity is the case in which there is a perfect, or exact, linear relationship among some or all explanatory variables of a regression model. Before the estimation of the model, it is important look into the relations among the explanatory variables (Gujarati, 2004). The existence of multicollinearity between the explanatory variables was tested using variance inflation factor (VIF) for continuous independent variables and contingency coefficient (CC) for dummy independent variables after running regression. If the VIF of a variable exceeds 10, which will happen if R_j^2 exceeds 0.90, that variable is said be highly collinear (Gujarati, 2004).

Model Specification error test

The link test was conducted after the logistic regression to detect a specification error. This test regress the independent variables on its predicted value ($\hat{y}$) and the predicted value squared ($\hat{y}^2$). The link test indicates that the model equations were properly

specified if the predicted hat-statistic ($\hat{y}$) is significant. If the model is properly specified, the prediction squared ($\hat{y}^2$) should be insignificant.

Model Fitness tests

The goodness of fit or calibration of a model measures how well the model describes the response variable. Assessing goodness of fit involves investigating how close values predicted by the model are to the observed values. The Hosmer-Lemeshow test is a commonly used test for assessing the goodness of fit of a model and allows for any number of explanatory variables, which may be continuous or categorical (Bewick et al, 2005). Therefore, in this study, fitness of the model was tested using Hosmer-Lemeshow test and the model fits the data well.

3.7 Definition of Variables and Hypothesis

The variables are categorized into two main types. These are the dependent variable and independent variable. The dependent variable is household poverty status (it is dummy variable which takes 1= poor and 0 = otherwise). If the households' deprivation score (the sum of the weighted deprivations) is 33.3% or higher the households are classified as poor whereas those with less than 33.3% deprivation score are classified as non-poor. Independent (explanatory) variables are the determinants of urban poverty variables which are thought to have significant role in determining urban poverty in Nekemte town. The variables which determine urban household poverty (explanatory variables) are explained below with their hypotheses.

Household heads' education level (edu): Education level of household head is continuous variable measured in years or grade attended. It is hypothesized that there is negative relationship between household education level and poverty since educated households have opportunities to get employed with better income, do businesses and any economic activities based on their knowledge that makes them gainful enough and escape from poverty. Desawi (2019), Alemayehu *et al.*, (2005), Bogale *et al.*, (2005) and Tsegaye *et al.*, (2014), Mekonnin and Almas (2016), Melese *et al.*, (2017) argued that level of education and poverty are negatively correlated.

Sex of household head (Sex): Sex is dummy variable containing two categories. It is hypothesized that female headed household has high probability of being poor than male

headed. Esubalew (2006) studied determinants of urban poverty in Debre Markos by employing logit model and found that as female heads the household the probability that a household falls into poverty increases (Positive relationship between female head and poverty).

Family Size (famsz): Family size of households is continuous variable measured in the number of individuals living in the household and share common kitchen. Empirical literatures indicate that there is a positive relationship between households' size and poverty. Yared (2005), Mekonnen and Almas (2016) for Ethiopia, Mohammed B. (2017) for Southern Nations, Nationalities, and Peoples' of Ethiopia, Getaneh (2017) for small towns of East Gojjam, and Debeli and Endegen (2019) for Debre Markos, Melese *et al.*, (2017) for Nekemte town concluded that, households with larger family size have more probability of being falling into the poor category than those with lesser family.

Household Head Income (Income): Households' income is continuous variable measured in ETB. Holding other variables constant, there is no need to debate that income directly or indirectly affects wellbeing of an individual. It has a multiplier effect on the living standard of people. Therefore, it is thought that income level of household head has negative effect on household multidimensional poverty. Getaneh (2017), Adugna and Sileshi (2013) and Desawi (2019) concluded that income negatively influence poverty. That means, as income of the household increases the probability of households falling into poverty decreases.

Marital status: Marital status of household head is dummy variable. It has effect on poverty since it has relationship with income of household. Some scholars suggest that single headed households have high probability to escape from poverty than married. This is because it is assumed that married households are supposed to be larger in family size. Larger family size in developing countries is associated with high incidence of poverty since many of the labor force are unemployed (Esubalew, 2006)

Age: Age is a continuous variable measured in years. Regarding to the effect of age of household on poverty, there is different suggestions from different scholars. Some scholars argue that as far as household gets old poverty increases. This is because productivity decreases at old age and their saving level becomes low. Whereas others argue that age is correlated with high productivity and it affects welfare positively, it is

negatively related to poverty (Daniel, 2018, Yared, 2005). The third argument is neither of the two above. It is assumed that income is low at young age, increases at adult (middle) age and then decreases when the person gets old. This is related to the life cycle hypothesis which suggests that saving is low at relatively young age, high (increases) at the middle age of the individual and then decreases at old age.

Dependency ratio: Dependency ratio is continuous variable. It is the ratio of number of family member who are not in labor force (young or old) to the number of family member who are in the labor force. Thus, the dependents, which constitute the youth and old, are the real burdens in Ethiopia. Dependence ratio in adult equivalent unit has positive relationship with poverty status of household heads (Ermias *et al*, 2019; Daniel, 2018).

Access to Credit: Access to credit is dummy variable. Using credit is expected to reduce poverty by investing in different activities that are productive and profitable. As study done by Alemayehu *et al.*, (2006) reveals credit use is negatively related to poverty. This means, the probability of being poor is low for credit users than non-credit users.

Household Housing Tenure: House ownership is dummy variable having two categories. Nowadays the matter of house ownership becomes a serious issue of urban dwellers and it is supposed to play significant roles in the incidence of poverty. It is hypothesized that the probability of households being poor is low for household who owns house. Rent may reduce financial capacity of household and may lead to poverty. Ownership of house in urban areas is really an important indicator of poverty in most developing countries. This indicator is of paramount importance because it is households' wealth which generates income flows. Therefore the households' house ownership negatively affects poverty (Esubalew, 2006).

Social capital: is broadly defined to be a multidimensional phenomenon encompassing a stock of social norms, values, beliefs, trusts, obligations, relationships, networks, friends, memberships, civic engagement, information flows, and institutions that foster cooperation and collective actions for mutual benefits and contributes to economic and social development (Bhandari & Yasunobu, 2009). In this paper, social capital is defined as membership in social institutions like *equb* and *idir*. It is dummy variable having two categories. It is hypothesized that having social capital reduces the probability of households being poor.

Saving: Saving habit is dummy variable. It is expected to affect poverty negatively. That means the probability of households' being poor is low for savers and high for non-savers. Mohammed (2017) argued that poverty and saving are negatively correlated.

Table 3.3 Summary of explanatory variables with their expected sign

Explanatory Variables	Variable Definition	Variable Type	Expected sign
Household head Education (edu)	Education level in grade	Continuous	-
Sex	Sex of household head: 1 for male and 0 for female. The sign is for male	Dummy	-
Family size (Fams)	Family size of household	Continuous	+/-
Income of households (Income)	Household head income level	Continuous	-
Marital status (Married)	D1: 1 for married and 0 otherwise,	Dummy	-
Age	Age of household head in years	Continuous	+/-
Dependency ratio	Number of dependents (not in the labor force)/ labor force of the household	Continuous	+
Access to credit (credit)	1 if yes and 0 otherwise.	Dummy	-
Household housing tenure (housing)	House ownership of household. 1 for owned and 0 otherwise	Dummy	-
Social capital	D=1 if yes and 0 otherwise	Dummy	-
Saving	D=1 for savers and 0 otherwise	Dummy	-

CHAPTER FOUR

4. RESULT AND DISCUSSION

Introduction

In this chapter, the results and major findings of the study are presented in three sections. The first section presents the demographic and socio-economic characteristics of sample respondents. In the second section, level of households' multidimensional poverty (Head count ratio, intensity of poverty, multidimensional poverty index, severity, vulnerability and the contribution of each multidimensional poverty dimension to multidimensional poverty index is discussed and presented. Finally, econometric model results, in-line with the objective of the study are presented.

4.1 Demographic Characteristics of Sample Households

Demographic characteristics of households include age of household head, sex of household head, family size, and marital status of households. These variables help to clearly depict the background of respondents and the effect of these variables on poverty both by descriptive and econometric model. These variables are presented in the following tables.

Table 4.1 Sex and marital status of respondents and poverty

Variable	Category	Frequency	Percentage	Poor		Non poor		Chi square	Pr
				Frequency	Percentage	Frequency	Percentage		
Sex	Female	61	16.09	22	36.07	39	63.93	10.6656	0.001***
	Male	318	83.91	56	17.61	262	82.39		
Marital status	Married	290	76.52	46	15.86	244	84.14	10.6656	0.000***
	Others	89	23.48	32	35.96	57	64.04		

Source: Computed from own survey data of February, 2021

Note: ***, **, * indicates significant at 1%, 5% and 10% respectively.

Sex: As it can be seen from the table 16.09% of the households are female headed while 83.91% are male headed. Pearson's Chi square test was made to compare whether there is sex difference between poor and non-poor or not. The result indicated that 36.07% of female headed households are poor while 63.93% of female headed households are non-poor. On the other hand, 17.61% of male headed households are poor and 82.39% of male headed households are non-poor. This indicates that female headed households are poorer than male headed. The Chi2 test (10.6656) shows as there is statistically significant sex difference between poor and non-poor at 1% significance level.

Marital status: With regard to marital status of households, married household heads constitute 76.52% and others constitute 23.48%. As it is shown in the above table (4.1), 15.86% of married household heads are poor while 84.14% of married household heads are non-poor. On the other hand, 35.96% of other household heads are poor and 64.04% are non-poor and. This shows that married household heads are non-poor than others. The Chi2 test (10.6656) shows that marital status has statistically significant difference between poor and non-poor at 1% significance level.

Table 4.2 Age and family size of respondents and poverty

Variable	Min	Max	Mean	Std. Dev.	Poor		Non poor		Mean diff	t-test	Pr
					Mean	Std. Dev	Mean	Std. Dev			
Age	15	73	39.80739	11.44609	40.32051	14.49092	39.67442	10.5401	-.6460942	-0.4438	0.6574
Family size	1	10	4.44591	1.936588	4.641026	2.006317	4.395349	1.918292	-.2456768	-0.9985	0.3187

Source: Computed from own survey data of February, 2021

As it can be seen from the table the minimum age of the respondents is 15 and maximum is 73. Mean age of the respondents is 39.8. The mean age of poor household heads is 40.32051 while mean age of non-poor is 39.67442. An independent t-test was conducted to compare the mean age difference between poor and non-poor households and found to be statistically insignificant. That means there is no significant mean age difference between poor and non-poor. Regarding to family size of household, the mean of family

size of sample households is 4.44591 while the minimum family size is 1 and maximum is 10. The mean family size of poor household heads is 4.641026 while mean family size of non- poor is 4.395349. An independent t-test was conducted to compare the mean difference between poor and non-poor households and found to be statistically insignificant. That means there is no significant mean difference between poor and non-poor.

4.2 Socio-economic Characteristics of Sample Respondents

Under this section, socio-economic characteristics of respondents like education level, income, dependency ratio, house ownership, social capital (membership in *equb* or *edir*), and saving habit of households are discussed.

4.2.1 Comparison of poor and non-poor households for continuous independent variables

Table 4.3 Descriptive statistics of socio-economic characteristics of households for continuous variables and poverty

Variable	Min	Max	Mean	Std. Dev.	Poor		Non poor		Mean diff	t-test	Pr
					Mean	Std. Dev	Mean	Std. Dev			
Education level	0	19	11.08179	4.921732	7.282051	4.874789	12.06645	4.437969	4.784394	8.3115	0.0000***
Income	0	7000	6742.627	6590.438	2837.731	3953.383	7757.9	6762.211	4920.169	6.1545	0.0000***
Dependency ratio	0	2.5	.4605145	.5123492	.6856538	.6612392	.4021728	.4493707	-.2834811	-4.4624	0.0000***

Source: Computed from own survey data of February, 2021

Note: ***, **, * indicates significant at 1%, 5% and 10% respectively.

As it can be seen from the table the minimum education level of the respondents is 0 and maximum is 19. Mean education level of the households is 11.08179. The mean education level of poor household heads is 7.282051 while mean education level of non-poor is 12.06645. That means households with low education level are poorer than households with high education level. An independent t-test was conducted to compare

the mean difference between poor and non-poor households. The t-test result (8.3115) shows that there is statistically significant mean education level difference between poor and non-poor at 1% level of significance. That means households with low education level are probably poorer than households with high education level.

Income: As it is shown in table the minimum income of the respondents is 0 and maximum is 70000. Mean income of the respondents is 6742.627. The mean income of poor household heads is 2837.731 while that of non-poor is 7757.9. This indicates that low income households are poorer than high income households. The independent t-test result (6.1545) shows that there is statistically significant mean income difference between poor and non-poor at 1% level of significance.

Dependency ratio: minimum dependency ratio of the respondents is 0 and maximum is 2.5. Mean dependency ratio of the respondents is 0.4605145. The mean dependency ratio of poor household heads is 0.6856538 while that of non-poor is 0.4021728. This indicates that households who have large dependency ratio are poorer than households who have small dependency ratio. The independent t-test result $|-4.4624|$ shows that there is statistically significant mean dependency ratio difference between poor and non-poor.

4.2.2 Comparison of Poor and Non-poor Households for Dummy Independent Variables

Table 4.4 Descriptive statistics of socio-economic characteristics of households for dummy variables and poverty

Variable	Category	Frequency	Percentage	Poor		Non poor		Chi square	Pr
				Frequency	Percentage	Frequency	Percentage		
Access to credit	Yes	70	18.47	13	18.57	57	81.43	0.2120	0.645
	No	309	81.53	65	21.04	244	78.96		
House ownership	Yes	197	51.98	12	6.09	185	93.91	52.6908	0.000** *
	No	182	48.02	66	36.26	116	63.74		
Social capital ownership	Yes	262	69.13	23	8.78	239	91.22	72.3223	0.000** *
	No	117	30.87	55	47.01	62	52.99		
Saving habit	Yes	245	64.64	19	7.76	226	92.24	69.7361	0.000** *
	No	134	35.36	59	44.03	75	55.97		

Source: Computed from own survey data of February, 2021

Note: ***, **, * indicates significant at 1%, 5% and 10% respectively

Access to credit: As it can be seen from the table 4.4, 18.47% of the households have access to credit while 81.53% have not. Pearson's Chi square test was made to compare whether there is access to credit difference between poor and non-poor or not. The result indicated that 18.57% of households who have access to credit are poor while 81.43% of households who have no access to credit are non-poor. On the other hand, 21.04 % of households who have no access to credit are poor and 78.96% of households who have no access to credit are non-poor. This indicates households who have no access to credit are poorer than households who have access to credit. The Chi2 test the result shows that there is no significant difference between poor and non-poor on access to credit.

House ownership: From the above table, 51.98% of the households have house while 48.02% have not. Pearson's Chi square test was made to compare whether there is house ownership difference between poor and non-poor or not. The result indicated that 6.09% of households who have house are poor while 93.91% of households who have house are non-poor. On the other hand, 36.26% of households who have no house are poor and 63.74% of households who have no house are non-poor. This indicates households who do not have house are poorer than households who have house. The Chi2 result (52.6908) indicates that there is statistically significant difference between poor and non-poor at 1% significance level.

Social capital: As shown in the above table, 69.13% of the households have social capital while 30.87% have not. Pearson's Chi square test was made to compare whether there is house ownership difference between poor and non-poor or not. The result indicated that 8.78% of households who have social capital are poor while 91.22% of households have social capital are non-poor. On the other hand, 47.01% of households who have social capital are poor and 52.99% of households who have no social capital are non-poor. This indicates households who have no social capital are poorer than households who have not. The Chi2 result (72.3223) indicates that there is statistically significant difference between poor and non-poor at 1% significance level.

Saving habit: 64.64% of the households are savers while 35.36% are non-savers. Pearson's Chi square test was made to compare whether there is saving habit difference between poor and non-poor or not. The result indicated that 7.76% of saver households are poor while 92.24% of saver households are non-poor. On the other hand, 44.03% of

non-saver households are poor and 55.97% of non-saver households are non-poor. This indicates households who are non-savers are poorer than households who are savers. The Chi2 result (69.7361) indicates that there is statistically significant saving habit difference between poor and non-poor at 1%.

4.3 The Level of Households' Multidimensional Poverty

In this study poverty indices such as H, A, and MPI were computed for households since the target population is household. Multidimensional poverty comprises head count ratio (H), proportion of population that is multi-dimensionally poor and intensity of poverty (A), is average proportion of indicators in which poor households are deprived. Multidimensional poverty index is calculated by multiplying the incidence of poverty by the average intensity across the poor ($H \times A$). A household (person) is said to be poor if he/she is deprived in at least one third of the weighted indicators or one third of the weighted dimensions. To identify the level of multidimensional poverty head count ratio (H), proportion of population that is multi-dimensionally poor and intensity of poverty (A), average proportion of indicators in which poor people are deprived and MPI are calculated below.

4.3.1 Head count ratio (H)

As it has been mentioned in the literature part, headcount ratio (H) is the proportion of household (people) who have been identified as multi-dimensionally poor in the population. It is calculated by the following formula.

$H = \frac{q}{n}$ Where: H is head count ratio, and q is number of poor households, and n is total sample households.

$$H = \frac{78}{379} = 0.206$$

Based on the above result, the head count ratio (the proportion of households that are multi-dimensionally poor) is 0.206. That means 20.6% of the total households of Nekemte town were multi-dimensionally poor. In other words, in this society 20 percent of households were MPI poor. They are deprived at least either all the indicators of a single dimension or a combination of indicators across dimensions.

4.3.2 Intensity of poverty (A)

Intensity of poverty is the average deprivation score across the poor. It is calculated by the following formula.

$A = \frac{\sum_{i=1}^q c_i(k)}{q}$ Where: $c_i(k)$ is censored deprivation score (represents the share of possible deprivations experienced by a poor household i) and q is number of poor households.

$$A = \frac{32.39}{78} = 0.415$$

The poor households were deprived in 41.5 percent of the average weighted indicators, so the intensity is 41.5 percent.

4.3.3 Multidimensional Poverty Index (MPI)

MPI combines two key pieces of information: the proportion or incidence of people (within a given population) who experience multiple deprivations and the intensity of their deprivation (the average proportion of weighted deprivations they experience). On the other hand, MPI reflects the proportion of weighted deprivations that the poor experience in a society out of all the total potential deprivations that the society could experience.

$$MPI = H \times A$$

$$MPI = 0.206 \times 0.415 = 0.0855$$

The MPI of the Nekemte town was found to be 8.55%. This indicates that on average the households of the town were deprived by about 8.55% out of the total potential deprivations. On the other hand, households of the town were deprived in 8.55% of the deprivations from the potential deprivation that would be experienced if every household in the town were poor and were deprived in all indicators. It should be noted at this point that MPI ranges from 0 to 1 and higher levels show higher poverty and lower level indicates low poverty.

Note: The probable reason for the relatively low level of acute multidimensional poverty in the study town could be because of the changing of one of health indicator (nutrition) by serious illness (disability) like Getaneh (2017).

Table 4.5 Summary of MPI, Head count ratio and Intensity of poverty

Number of households	379
Number of non-poor persons	301
Number of poor persons (q)	78
Sum of deprivation score of the poor ($\sum ci$)	32.39
Head count ratio (H) = $\frac{q}{n}$	0.206
Intensity of poverty (A) = $\frac{\sum Ci(k)}{q}$	0.415
Multidimensional poverty index (MPI) MPI = H×A	0.0855

Source: Computed from own survey data of February, 2021

4.3.4 Contribution of Each Dimensions and Indicators to MPI

The multidimensional poverty indices are decomposed based on the indicators in order to identify the highest and lowest contributor to the MPI of the people in the study town. To determine the contribution of indicators to MPI one can determine censored head count ratio, the proportion of people (households) who are poor and deprived in each of the indicators (Santos and Alkire, 2011). It is calculated by adding up the number of poor households and deprived in that indicator and dividing by the total sample. After calculating the censored head count ratio, then we can calculate the contribution of indicators to MPI by the following formula.

Contribution of indicator i to MPI = $\frac{W_i CH_i}{MPI} \times 100$ Where W_i is weight of indicator i and CH_i is censored headcount ratio.

Table 4.6 Censored head count ratio and contribution of indicators and dimensions to MPI

Dimension	Indicator	number of poor households & deprived by the indicator	Censored headcount ratio	Weight of indicator	Contribution of indicator	Contribution of dimension
Education	Year of schooling	49	0.13	1/6	25.35%	37.7%
	Child school attendance	24	0.0633	1/6	12.35%	
Health	Seriously ill (disability)	15	0.04	1/6	7.8%	17.07%
	Child mortality	18	0.0475	1/6	9.27%	
Living standard	Safe water	0	0	1/21	0	45.23%
	Sanitation	71	0.1873	1/21	10.43%	
	Electricity	0	0	1/21	0	
	Flooring material	63	0.1663	1/21	9.26%	
	Room density	60	0.1583	1/21	8.82%	
	Cooking fuel	74	0.19	1/21	10.9%	
	Asset ownership	40	0.103	1/21	5.82%	

Source: Computed from own survey data of February, 2021

Note: *CHi represents censored head count ratio of each indicator*

As it is shown on the above table, the highest contributor to MPI is living standard dimension which accounted 45.23% followed by education dimension while the least contributor is health dimension which contributed 17.07% to MPI. The indicator in which the poor are most deprived is cooking fuel and sanitation. 74 households of the poor are deprived in cooking fuel while 71 households of the poor are deprived in sanitation. That means almost all poor have no improved cooking fuel and sanitation. Cooking fuel and sanitation contributed 10.9% and 10.43% to MPI respectively and they are the highest contributor from living standard indicators. The overall highest contributor to MPI from indicators is year of schooling which contributed 25.35% and the least contributor is child mortality indicator which accounted 7.8%. High contribution of year of schooling is not because households are deprived in it than other indicators of living standard but it is because its weight is greater than that of living standard indicators.

4.3.6 Households' Vulnerability to and Severity of Multidimensional Poverty

As it has been discussed in literature part, a household is considered vulnerable to poverty if it is deprived in the weighted indicators score of 20-33.3 percent and poor if it is deprived in the weighted indicator score of 33.3 percent or more. In addition the household is considered being in severe poverty if deprived in 50 percent or more. The following table shows the number of vulnerable and in severe multidimensional poverty.

Table 4.7 Vulnerability to and severity of households' poverty

Status	Number of persons	Percent
Non poor ($ci < 33.3\%$)	301	79.4
Vulnerable ($20\% \leq ci \leq 33.3\%$)	14	4.64
Poor ($ci \geq 33.3\%$)	78	20.6
Severely poor ($ci \geq 50\%$)	20	16.68

Source: Computed from own survey data of February, 2021

Note: *ci* represents deprivation score of households

As it is presented in the above table, 79.42 percent of the households are not poor whereas 4.64 percent of households are deprived in the weighted indicator score of more than 20 percent but less than 33.3 percent and they are considered vulnerable to multidimensional poverty. In addition, 20.58 percent of total respondents are deprived in the weighted indicator score of above 33.3 percent and hence they are multi-dimensionally poor. Finally, 16.68 percent of total sample respondents are deprived in the weighted indicator of more than 50 percent and they are in severe poverty.

4.3.5 Raw Head Count Ratio

Raw head count ratio is the percentage of households deprived in a particular indicator regardless of households' status of multi-dimensionally poor or non-poor (Alkire and Santos, 2010). Raw headcount ratio aggregates deprivations pertaining to the poor (censored headcount) with deprivations among the non-poor. It shows the deprivation rates (percentage) in each indicator, which includes everyone who is deprived, ignoring whether they are multi-dimensionally poor or not.

Table 4.8 Raw head count ratio

Dimension	Indicator	Frequency	Percent
Education	Year of schooling	52	13.72
	Child school attendance	24	6.633
Health	Seriously ill (disability)	17	4.45
	Child mortality	21	5.54
Living standard	Safe water	0	0
	Sanitation	214	56.46
	Electricity	0	0
	Flooring material	156	41.16
	Room density	163	43.00
	Cooking fuel	244	64.38
	Asset ownership	69	18.21

Source: Computed from own survey data of February, 2021

As it is defined, raw head count ratio shows the percentage of households who are deprived in a particular indicator. As it can be seen from the table, majority of households of the town are deprived in cooking fuel and sanitation followed by room density and flooring material which accounted 64.3%, 56.46%, 43% and 41.16% respectively.

4.4 Econometric Results of the Determinants of Multidimensional Poverty

Binary logistic regression model was employed to estimate factors that determine the probability of households being multi-dimensionally poor. The major results of these estimates for surveyed sample households are presented in Table 4.11 with their marginal effects. Identification of the descriptive and inferential statistics only may not be enough to stimulate policy actions without the influence of each determinant factor to poverty is known for priority based intervention. However, before discussing logistic regression results and drawing conclusions it is important to verify the data meet the basic assumptions of the model, unless results may be misleading

4.4.1 Model Diagnostic Tests

Before estimation of the model, multicollinearity, model specification error test and model goodness of fit test were done. The result of the test is as follows. In addition,

Hosmer and Lemeshow test was also carried out to test the model goodness of fit and omitted variables and the result presented in the table below (chi2=13.01 and Prob> chi2=0.1115) shows that the model fitted the data well and there is no omitted variable.

Table 4.9 Hosmer and Lemeshow model goodness of fit test

number of observations =	379
number of groups =	10
Hosmer-Lemeshow chi2(8) =	13.01
Prob> chi2 =	0.1115

Multicollinearity test was made by Spearman rank correlation coefficient test and variance inflation factor (VIF) and any variable having multicollinearity problem was cleared. Therefore, the value of Spearman rank correlation coefficient for all variables was less than 0.5. VIF of all independent variables is less than 10 and the mean VIF is 5.07 which indicate the absence of multicollinearity problem between the independent variables.

Finally, the model specification test was also done by link test and the result indicated that hat-square is insignificant so that the model is correctly specified. The detail of the result is presented in the appendix.

4.4.2 Logit Model Estimation Result

Table 4.10 Logit model result

Poverty	Coef.	dy/dx	p-value	X	Sig
Age	-.016	-0.001	.371	39.807	
Sex	.691	0.043	.162	0.839	
Married	.052	0.004	.909	0.765	
Education	-.136	-0.010	.003	11.082	***
family size	.339	0.025	.001	4.446	***
dependency ratio	.747	0.056	.017	0.461	**
Credit	.496	0.043	.305	0.185	
Income	-.0001317	-9.89e-06	.05	6724.840	**
Housing	-1.344	-0.107	.006	0.520	***
Social capital	-1.189	-0.110	.003	0.691	***
Saving	-1.228	-0.110	.001	0.646	***
Constant	.38		.703	2.331	
Log likelihood = -113.75577			Prob> chi2	0.000	
Pseudo r-squared			0.410	Number of obs	379

Source: Computed from own survey data of February, 2021

Note: ***, **, * indicates significant at 1%, 5% and 10% respectively

From eleven explanatory variables included in the model seven variables are statistically significant. Five of them are significant at 1% while two variables are significant at 5%. The interpretation of the effect of these variables on households' poverty is as discussed below. Because it is not possible to interpret the coefficients of logit model it is interpreted from marginal effect.

Education of household head: Education is important to improve human productivity through enhancing efficiency of labor and make aware of various livelihood opportunities. The coefficient of education is significant at 1 % level of significance with negative sign. The marginal effect result reveals that every extra year of schooling of the household head decreases the likelihood of the household's being poor by 1%. The justification behind is that education increase employment opportunities and promote livelihood diversification to lessen the risk of poverty. The result is consistent Desawi (2019), Alemayehu *et al.*, (2005), Bogale *et al*, (2005) and Tsegaye *et al*, (2014) who found negative relationship between education and poverty.

Family size: Family size has positive effect on households' poverty and statistically significant at 99% confidence. A one unit (person) increase in family size increases the probability of household's being poor by 2.5%. This is probably due to the fact that households with large number of economically inactive and unemployed members have high probability of being poor because economically inactive and unemployed cannot add value to economy. This study is consistent with the many previous studies conducted by Anyanwu (2012), Esubalew, (2006) and Tsegaye *et al.*, (2014) which associate poverty with large household's size, and contradicted with the result of Desawi (2019), Dawit *et al.*, (2011), and Fetsum (2018) who found negative relationship between family size and poverty.

Dependency ratio: The coefficient of dependency ratio is statistically significantly at 1 % level of significance with positive sign. As ratio of dependents to productive age group increases the probability of household's being poor increases by 5.6%. This is because the dependents contribute nothing to household's income but increase the probability of being poor. This is due to the fact that dependents do not add value to the development of economy rather increases probability of being poor. The result is consistent with (Ermias *et al*, 2019) who found dependence ratio in adult equivalent unit has positive relationship

with poverty status of household heads. That means as the dependency ratio of the household increases the probability of households being poor increases.

Income of household: Income of household has negative effect on households poverty and statistically significant at 5% level. Every increase in households' income decreases the likelihood of household's being poor. The study is consistent with the result of Adugna and Sileshi (2013) and Desawi (2019) who found that household's income is negatively related with the probability of households being poor. Income allows households to function financially, maintain their health and living standard, and strengthen household wellbeing through creating new opportunities.

House ownership: The coefficient of house ownership was found to be negative and it is significant at 1% level. The marginal effect result indicates that the probability of households' being poor is low for house owners and high for those who do not have house. This is due to the fact that households who have house do not spend extra expenditure for house rent while those who do not have house have high expenditure of house rent. The result is similar with the result of Esubalew (2006) which revealed households' ownership of house negatively affects poverty.

Social capital: In this paper, social capital was defined as households' membership in *equb* and/ *edir*. The coefficient of social capital was found have negative effect on households' poverty and significant with 99% confidence. The probability of households' being poor is low for households who have social capital as compared to those who do not have. The logic is that households who have social capital (member of *equb* or *edir*) saves more and can receive loan to diversify their livelihood and escape from poverty.

Saving habit: Saving habit affected households' multidimensional poverty negatively and it is statistically significant at 1% level of significance. The marginal effect result shows that the probability of being poor is high for non-savers than that of savers. This could be because households who are savers can afford for education and can improve their living standard. The result is similar with the study conducted by Mohammed (2017) who found negative and significant effect of saving on poverty.

CHAPTER FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study analyzed households' multidimensional poverty in Nekemte town by employing binary logit model. Sample of 379 households were selected from residents of the town by stratified and then simple random sampling method. Alkire and Foster (2011) multidimensional poverty measurement methodology was used to set the poverty line and classify households as multidimensional poor and non-poor. A household was categorized as poor if it is deprived in one-third of the weighted indicators of multidimensional poverty. The descriptive analysis result revealed that 20.6% of the households of the town are multi-dimensionally poor. The intensity of multidimensional poverty in the town is 41.5% which indicates the households are deprived in 41.5% of average weighted indicator. The indicator which is highest contributor to multidimensional poverty is year of schooling from education dimension followed by child school attendance from equally weighted indicators. It is also indicated that living standard dimension is the highest contributor and contributed 45.23% to multidimensional poverty. From the living standard, more households are deprived in improved cooking fuel followed by improved sanitation and room density. The variables that predicted multidimensional poverty in the study area includes age, sex, marital status, family size, educational level, dependency ratio, access to credit, income, households' house ownership, saving habit and social capital. The logit model estimation result showed that, household heads level of education, family size, dependency ratio, income level, social capital and saving habit of households determine households' multidimensional poverty in the town. It is also found that are family size and dependency ratio have positive and significant effect on households' multidimensional poverty whereas household heads' education level, income, saving, house ownership and social capital have negative and significant effect on households' multidimensional poverty in the town. Education level, family size, house ownership, saving habit and social capital are significant at 1% whereas income and dependency ratio are significant at 5% level of significance.

5.2 Conclusion

This study was made at Nekemte town which is found at East Wollega Zone of Oromia region aiming at investigation of extent and determinants of multidimensional poverty. To analyze the level of multidimensional poverty, the study used Alkire and Foster method of multidimensional poverty measurement. The findings indicated that there are considerable multidimensional poor people in the town. The study identified the proportion of poor and non-poor and which group of people is the poorer. As a result, female headed households are on average poorer than male headed households. The contribution of each multidimensional poverty indicators to multidimensional poverty people was not equivalent among each other. Some of the multidimensional poverty indicators have taken a lion share in contributing to multidimensional poverty. The highest percentage deprivation contributor from the selected multidimensional poverty indicators were year of schooling from education dimension and cooking fuel and sanitation from living standard dimension. To identify factors affecting multidimensional poverty in the town, binary logit model was used. The logit model was compared with probit model and found to be suitable for the data. The logit model result indicated that The important factors that increase the probability of households' being multi-dimensionally poor are large family size and high dependency ratio. The significant variables that reduce the likelihood of being multi-dimensionally poor in the town are high education level, high income level, being saver, having social capital, and house ownership of households. Educational level of household heads' negatively and significantly affects households' multidimensional poverty. This is because education enables those in paid formal employment to earn higher wages and escape from poverty.

5.3 Recommendations

The findings of the study identified the level of multidimensional poverty with its major determinants in the town. Based on the findings of the study, the following recommendations are forwarded that might mitigate multidimensional poverty problem in the town.

- Year of schooling was the highest contributor to multidimensional poverty of households in the town. Therefore, it is better if the government promotes and

motivates adults by opening and providing primary and secondary school extension programs to continue their education.

- As increase in households' education level lowers the probability of households' poverty in the town, it needs the government to promote education sector to reduce the problem of poverty in the town.
- Almost all of the poor households are deprived in cooking fuel. The households responded the reason why they do not use improved cooking fuel such as electric *mitad* and stove is high payment for electric consumption. So, it needs the Ethiopian Electric utility in collaboration with its district in Nekemte town to provide electricity with low and affordable price to improve households cooking fuel problem.
- Sanitation is the second highest contributor to households' multidimensional poverty from living standard dimension. It is scarcity of water supply which created sanitation problem. Hence, it needs Nekemte town Water Resource and Mining Office in collaboration with the town Administration to improve water supply to reduce sanitation problem. In addition, the households should improve their sanitation by connecting to a public sewer and a septic system, making pour-flush latrine, simple pit latrine, ventilated and improved pit latrine and also do not sharing with other households.
- Since households' house ownership decreases the probability of households being multi-dimensionally poor, it is better if the government and concerning body provide residential place for households to mitigate the problem households are facing like room density and sharing of sanitation with others.
- As income and saving habit of households decrease the probability of households being multi-dimensionally poor, households should diversify their income to save more and escape from the problem of poverty.
- Because increased family size and dependency ratio increases the likelihood of households being multi-dimensionally poor, the households' should use proper family planning to reduce the risk of multidimensional poverty. On the side of government and health bureau, it needs to create awareness on the use of family planning by promoting extension workers.

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APPENDICES

Appendix 1

Questionnaire



Wollega University

College of Business and Economics

Department of Economics

Household Survey Questionnaire to be completed by sample households

Dear Sir/Madam, My name is Sultan Asfaw and I am Master of Science student at Wollega University College of Business and Economics Department of Economics. I am conducting research on “Households’ multidimensional poverty in Nekemte town”. Your household has been randomly selected to provide me necessary information that will be input for my research. The interview will take about half an hour. Your response will assist me to achieve my research objectives. I hope that your answer/information will be completely confidential and accurate. The information will be used only for academic purpose. I highly appreciate your assistance and I thank you for your cooperation in advance.

General direction

Please encircle the appropriate answer for the questions from the given choices and fill in the black space for the open ended questions and for extra answers.

Part I. Identification Information

1. Sub-town name _____ 3. Date of interview____/____/____

Part II. Household head data information

1. Age of household head _____

2. Sex - 1.Female 2. Male

3. Marital status

1. Single 2. Married 3.Divorced 4. Widowed

4. Household head highest educational level.

1. Not read and write 2. Grade attended_____

5. Employment status of household head.

1. Employed 2. Unemployed

6. If your answer for Q.5 is employed, what is your main occupation?
1. Self-employed 2. Government employee 3. NGO employee
 4. Other (specify) _____
7. If your answer for Q.6 is self- employed, which type of self-employed are you engaged in?
1. Petty-trade/*Gulit* 4. Handicraft (embroidery, pottery)
 2. Preparing and sale of local drinks. 5. Metal /Woodwork
 3. Sale of food 6. Hotel service
 7. Others _____

Part III. Household data information

8. Family member's size (including yourself) _____
- Number of family members below age of 15 _____; M_____ F_____
- Number of family members between 15 & 64 _____; M_____ F_____
- Number of family members above 64 _____; M_____ F_____
9. How many the economically active (productive) individuals (15 – 65 years) are employed? _____. And how many of them are unemployed? _____.
10. Did you use credit within one year for business? 1. Yes Birr 2. No
11. Your monthly average income in Birr: _____.
12. On what basis does the household occupy the dwelling?
1. Privately owned 2. Rented 3. Other _____
13. Do you think that you have trust and relationships with others? 1. Yes 2. No
14. Are you a member of *equbor idir*? 1. Yes 2. No

Part IV. Household health and education

15. Is there any household member not completed six years of schooling?
1. Yes 2. No
16. If yes for Q.14 what is the reason?
1. No access to school 3. Do not want/ no interest
 2. Lack of money for schooling 4. To help family
 5. Others _____
17. Is there any School age children (7-15 years) in your household member that are not attending school at this time? 1. Yes 2. No
18. If your answer for Q.16 is yes, what is the reason for not attending?
1. No access to school 3. Do not want/ no interest
 2. Lack of money for schooling 4. To help family
 5. Illness 6. Others _____
19. Is there any member in your household faced any health problem at least once during the last 2 months period or during survey? 1. Yes 2. No
20. If yes for Q.18 what was the sickness/ injury the one faced?

1. Malaria 2. Injury 3. Dental 4. Diarrhea
5. Tuberculosis 6. Other _____

21. Do you or any other member of the household have any physical difficulties/disability or serious illness? 1. Yes 2. No

22. If your answer to question number Q.21 is yes what type (more than one can be chosen)

1. Seeing 2. Hearing
3. Walking/climbing steps 4. Concentrating/remembering
5. Unable to self-caring (washing, feeding, dressing, toileting)
6. Other _____

23. For how many days were you or others absent from the usual activity due to the health problem during the last 2 month?

Number of days _____

24. Is there any child (below five year) dead in the household in the past five years? 1. Yes 2. No

25. If the answer is yes for Q.22 what was the cause for death?

1. Diarrhea 2. Accident 3. Malaria 4. Pneumonia 5. Others

Part V. Household living standard

26. What is the main source of drinking water for your household?

1. Private tap in the compound 2. Communal tap outside
3. Protected well /spring (private) 4. Protected well /spring (shared) or rain water
5. Unprotected well or spring 6. River /lake/ pond
7. Other _____

27. What is the distance from your house to water source (in meters) if the source is out of compound? _____

28. What type of toilet facilities does the household use?

1. Flush toilet or ventilated Pit latrine –private 2. Pit latrine private not ventilated
3. Flush toilet or ventilated Pit latrine –shared by households with in the house or compound.
4. Communal (shared by small community) flush toilet or ventilated Pit latrine.
5. Field /forest 6. Pit latrine shared- not ventilated 7. Others

29. What is the main source of light and powering for the household?

1. Electricity meter- private 2. Electricity meter- shared with neighbor
3. Solar energy 4. Bio -gas 5. Local kerosene lamp (Kuraz).
6. Other _____

30. The floor of the main dwelling is predominantly made of what material?

1. Mud/dung 2. Parquet or polished wood 3. Cement screed
4. Plastic tiles 5. Cement tiles 6. Ceramic/marble tiles 7. Others _____
31. How many rooms (excluding kitchen, toilet, bath room & rooms used for business) does the household occupy? Number of rooms _____
32. Do more than three people live in one room? 1. Yes 2. No
33. Which type of cooking fuel does your household frequently use for cooking purpose?
1. Electricity 2. Wood/Leaves/ crop residue/Animal dung/ Charcoal/grass
3. Butane gas 4. Others _____
34. Does the household's kitchen have chimney or ventilation such as open or open-able window?
1. Yes 2. No
35. What is the primary type of oven (*Mitad*) used for baking *injera*/bread?
1. Traditional *mitad* (removable) 2. Traditional *mitad* (not removable)
3. Electric *mitad* 4. Other _____
36. If for Q.35 & 36 is traditional *mitad* and oven/stove why do not you use electric, energy saving or any other modern oven?
1. No access 2. Owning (purchasing) cost is high
3. Running (electric power fee) cost is high 4. Other _____
37. Which type of the following assets does your household own? If none record 0

No	Item Name	Number of items
1	Telephone	
2	Television	
4	Radio	
5	Refrigerator	
6	Animal cart	
7	Car	
8	Motorbike	
9	Bike	
10	House	
11	Others_____	

Appendix 2

Model Comparison by AIC and BIC

For logit

Akaike's information criterion and Bayesian information criterion Obs	ll(null)	ll(model)	df	AIC	BIC
379	-192.663	-113.756	12	251.512	298.762

Note: N=Obs used in calculating BIC; see [R] BIC note.

For probit

Akaike's information criterion and Bayesian information criterion Obs	ll(null)	ll(model)	df	AIC	BIC
379	-192.663	-114.526	12	253.052	300.302

Note: N=Obs used in calculating BIC; see [R] BIC note.

Multicollinearity test by Spearman's rank correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) age	1.000										
(2) sex	-0.107	1.000									
(3) married	0.004	0.418	1.000								
(4) educ	-0.290	0.261	0.359	1.000							
(5) famsz	0.315	0.001	0.244	-0.030	1.000						
(6) deprat	0.053	-0.079	0.098	-0.021	0.192	1.000					
(7) credit	0.078	-0.069	-0.089	-0.063	0.115	-0.104	1.000				
(8) income	0.132	0.164	0.212	0.243	0.251	-0.138	0.141	1.000			
(9) housing	0.318	0.140	0.302	0.228	0.295	0.017	0.131	0.473	1.000		
(10) sociacapt	0.005	0.329	0.304	0.341	0.169	-0.134	0.141	0.349	0.444	1.000	
(11) saving	0.052	0.202	0.241	0.355	0.119	-0.081	0.025	0.315	0.372	0.366	1.000

Multicollinearity test by VIF

Variable	VIF	1/VIF
age	8.55	0.116995
Famsz	8.03	0.124514
sex	7.36	0.135803
Educ	6.86	0.145675
married	6.42	0.155744
Sociacapt	5.03	0.198625
Saving	3.80	0.263177
housing	3.42	0.292407
income	2.95	0.339087
Depart	2.02	0.494244
credit	1.32	0.756216
Mean VIF	5.07	

Model Specification Test

Number of obs = 379
 LR chi2(2) = 158.37
 Prob> chi2 = 0.0000
 Log likelihood = -113.47571 Pseudo R2 = 0.4110

poverty	Coef.	Std.Err.	z	P>z	[95%Conf. Interval]
_hat	1.084	0.163	6.650	0.000	0.765 1.404
_hatsq	0.039	0.050	0.770	0.440	-0.060 0.137
_cons	-0.047	0.202	-0.230	0.815	-0.442 0.348

Goodness of fit test

Logistic model for poverty, goodness-of-fit test

(Table collapsed on quantiles of estimated probabilities)

number of observations = 379
 number of groups = 10
 Hosmer-Lemeshowchi2(8) = 13.01
 Prob> chi2 = 0.1115

Logistic model estimation result

Poverty	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	Sig
Age	-.016	.018	-0.89	.371	-.052 .019	
Sex	.691	.494	1.40	.162	-.277 1.659	
Married	.052	.453	0.11	.909	-.836 .94	
Educ	-.136	.046	-2.95	.003	-.227 -.046	***
Famsz	.339	.106	3.20	.001	.132 .547	***
Depart	.747	.314	2.38	.017	.133 1.362	**
Credit	.496	.483	1.03	.305	-.45 1.442	
Income	-.0001317	0	-1.96	.05	0 0	**
Housing	-1.344	.487	-2.76	.006	-2.299 -.389	***
Sociacapt	-1.189	.405	-2.94	.003	-1.982 -.396	***
Saving	-1.228	.367	-3.35	.001	-1.947 -.509	***
Constant	.38	.996	0.38	.703	-1.571 2.331	

Log likelihood -113.75577

Pseudo r-squared 0.410 Number of obs 379

Chi-square 157.814 Prob> chi2 0.000

Akaike crit. (AIC) 251.512 Bayesian crit. (BIC) 298.762

*** $p < .01$, ** $p < .05$, * $p < .1$

Marginal effects after logit
 $y = \Pr(\text{poverty}) (\text{predict})$
 $= .08182277$

variable	dy/dx	Std.Err.	Z	P>z	[	95%	C.I.	]	X
age	-0.001	0.001	-0.910	0.365	-0.004	0.001	39.807		
sex*	0.043	0.026	1.640	0.101	-0.008	0.094	0.839		
married*	0.004	0.033	0.120	0.908	-0.061	0.069	0.765		
Educ	-0.010	0.004	-2.710	0.007	-0.018	-0.003	11.082		
Famsz	0.025	0.008	3.000	0.003	0.009	0.042	4.446		
Depart	0.056	0.026	2.160	0.031	0.005	0.107	0.461		
credit*	0.043	0.047	0.910	0.361	-0.049	0.134	0.185		
income	-9.89e-06	0.000	-2.220	0.026	-.000019	-1.2e-06	6724.840		
housing*	-0.107	0.043	-2.480	0.013	-0.192	-0.022	0.520		
sociac~t*	-0.110	0.049	-2.230	0.025	-0.207	-0.014	0.691		
saving*	-0.110	0.043	-2.580	0.010	-0.194	-0.026	0.646		

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Definition of Local Terms

Equb- is an indigenous and informal local institution in Ethiopia established voluntarily to rotate member's savings on lottery basis

Iddir- is an indigenous and informal local association in Ethiopia established voluntarily for the purpose of mutual help in time of risks, funeral and mourning activities, and other social events.

Mitad- is a large circular flat griddle, either a black clay plate or a specialized electric stove used for baking *injera*.

Injera- is a sour fermented flatbread with a slightly spongy texture, traditionally made of teff, maize and other flour.