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# Analysis of the Extent of Households' Multidimensional Poverty: The Case of Nekemte City, Oromia, Ethiopia

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**Abstract**
The objective of the study was to examine the extent of households' multidimensional poverty in Nekemte City. To achieve this objective, the study used both primary and secondary data. The primary data was collected from 379 sample household heads of Nekemte City 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. 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. 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.
**Keywords**: Multidimensional, poverty, Nekemte, city, Ethiopia, indicators, household
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## 1. INTRODUCTION

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).

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.

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 rural 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 City 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 includes 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 City, the City 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. In view of these, the study is aimed to examine the extent of households' multidimensional poverty in Nekemte City.

## 2. REVIEW OF THE RELATED LITERATURE

### 2.1 Theoretical Literature

#### 2.1.1 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.

**2.1.2 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= $\sum_{i=1}^{q} ci\,(k)/q$ 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, $M_0$(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 MPI = H × 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.

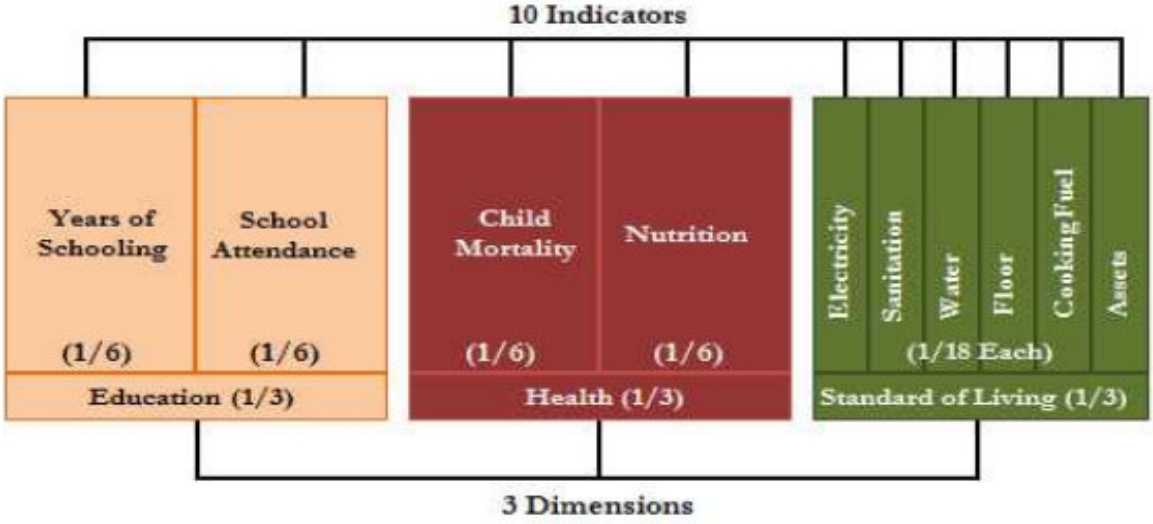


Figure 2.1 Composition of the MPI dimensions and indicators (source: Alkire and Santos, 2013)

**2.2 Empirical Literature Review**

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).

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 Citys 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 City.

## 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 City is one of the old and medium towns in the country, established in the mid-19$^{th}$ 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 City 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 City 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 City administration office, the City is divided in to seven sub citys of Darge, Bake Jama, Burqa Jato, Bakanisa kese, Chalalaki, Sorga and Keso. The City 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 $14^0$Cto $26^0$C (Melese et al, 2017; Encyclopedia, 2020; NTAOD, 2020).

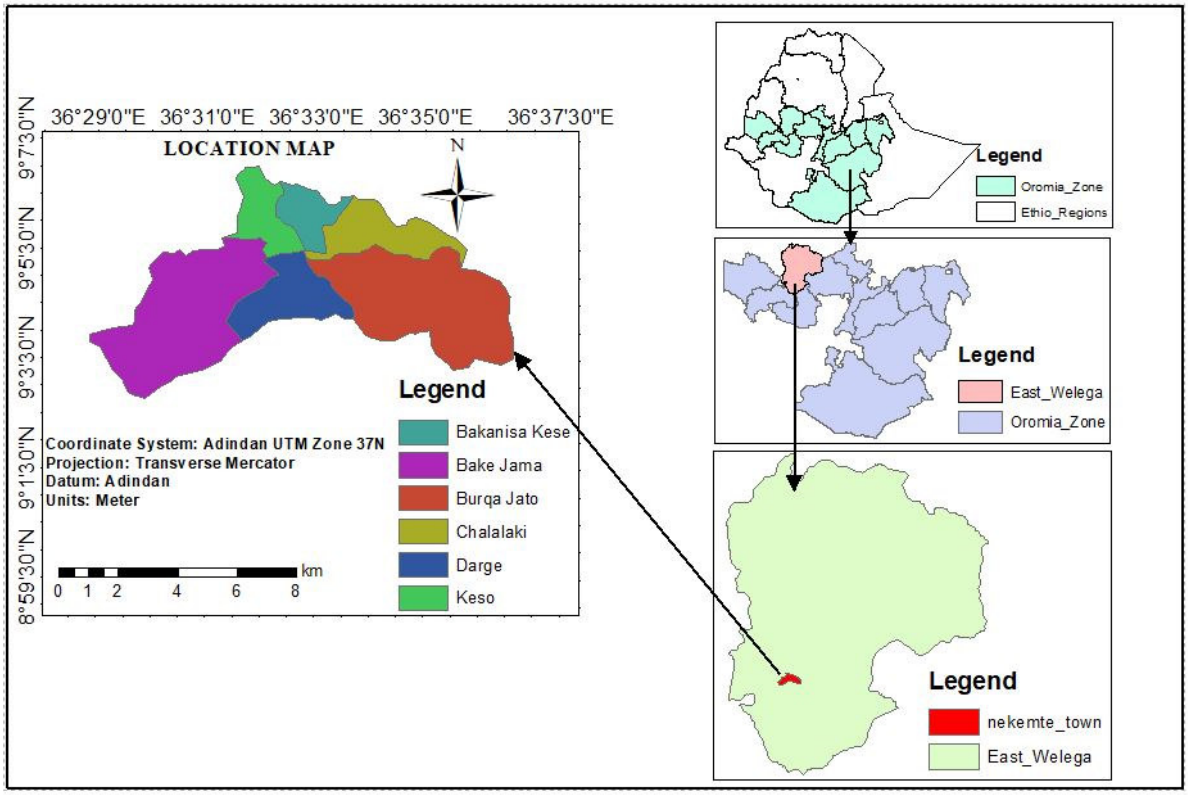


Figure 3.1 Location of Nekemte City in its national and regional setting

### 3.2 Sampling Techniques and Sample Size Determination

Contacting every household of the city 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 city. Stratified sampling method was employed in selecting sample from households of Nekemte City. 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-city and then representatives from each sub city were selected by simple random sampling. The city is divided into seven sub-citys. Proportional contribution of each sub city to total sample was determined and then sample from each sub city 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).

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

Where: n-sample size
N - Total households of the city
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 city to sample is as presented in the table below.

Table 1: Sample size from each sub city

| S.no | Sub city | 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 |

### 3.3 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.

### 3.4 Method of Data Analysis

#### 3.4.1 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.

#### 3.4.2 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:

$Ci = \sum_{j=1}^{d}$ wjgij……eq(1)

 

Where: 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... 11) in which person i, is deprived, $C_i = C_{i1} + C_{i2} + \ldots + C_{i11}$

If the deprivation score of the household, k≥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:

$H = \frac{q}{n}$……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

$A = \sum_{i=1}^{q} ci\ (k)/q$ ……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.

MPI ($M_0$) = H×A……..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: Contribution of indicator j to MPI = $\frac{wj\ CHj}{MPI}$ *100

Were $w_j$ 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.

**Table 2: Dimensions, indicators, deprivation cutoffs and weights of MPI (Table view)**

| 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 | 1/21 |

 

| | | | |
|---|---|---|---|
| | | not deprived. | |
| | 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 cook 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 |
| | Asset 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 $\frac{1}{21}=\frac{1}{3}\times\frac{1}{7}$

Table 3: 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 | - |

## 4. RESULT AND DISCUSSION

### 4.1 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×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.

#### 4.1.1 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 City 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.

**4.1.2 Intensity of poverty (A)**

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

$A = \frac{\sum_{i=1}^{q} ci\,(k)}{q}$ 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.

**4.1.3 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×A

MPI = 0.206×0.415 = 0.0855

The MPI of the Nekemte City was found to be 8.55%. This indicates that on average the households of the City were deprived by about 8.55% out of the total potential deprivations. On the other hand, households of the City were deprived in 8.55% of the deprivations from the potential deprivation that would be experienced if every household in the City 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: 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 (∑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

**4.1.4 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 = $\frac{WiCHi}{\text{MPI}} \times 100$ Where Wi is weight of indicator i and CHi is censored headcount ratio.

 

Table 5: 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. 1.5 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 6: Vulnerability to and severity of households' poverty

| Status | Number of persons | Percent |
|---|---|---|
| **Non poor (ci<33.3%)** | 301 | 79.4 |
| **Vulnerable (20% ≤ci ≤33.3%)** | 14 | 4.64 |
| **Poor (ci≥33.3%)** | 78 | 20.6 |
| **Severely poor (ci ≥ 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 present and they are in severe poverty.

**4.1.6 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 7: 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 city 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.

## 5. CONCLUSION AND RECOMMENDATIONS

### 5.1 Conclusion

This study was made at Nekemte City which is found at East Wollega Zone of Oromia region aiming at investigation of extent 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 city. 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.

### 5.2 Recommendations

The findings of the study identified the extent of multidimensional poverty in the city. Based on the findings of the study, the following recommendations are forwarded that might mitigate multidimensional poverty problem in the city.

- Year of schooling was the highest contributor to multidimensional poverty of households in the city. 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 city, it needs the government to promote education sector to reduce the problem of poverty in the city.
- 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 City 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 City Water Resource and Mining Office in collaboration with the City 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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