Determinants of multidimensional rural poverty in Burji and Konso area, Southern Ethiopia

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Determinants of multidimensional rural poverty in Burji and Konso area, Southern Ethiopia
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Abstract: This study was conducted in Burji and Konso area, Southern Ethiopia, specifically to measure the status of multidimensional poverty of rural households and to find its determinants. To address these objectives, 368 households were selected using simple random sampling techniques. The data were collected from primary and secondary sources. The interview schedule was used to collect primary data. Secondary data were collected from books, journals from the internet, unpublished researches, and different official reports. Both descriptive and inferential statistics were implemented. Alkire & Foster’s methodology with modified four dimensions and 14 indicators was used to analyze the multidimensional rural poverty index and a binary logistic regression model was employed to detect its determinants at the household level. Accordingly, the incidence of 76.6%, the intensity of 54.7%, and the multidimensional poverty index (MPI) of 0.419 were obtained in the study area. The value of multidimensional poverty varies across poverty cutoffs suggesting that the Adjusted Headcount Ratio (MPI) value is highly sensitive to the choice of multidimensional poverty cutoff. The binary logistic regression model output in marginal effects indicated as the education level of the household head was significant at a 1% significant level. The other variables livestock, farm size, and distance to the market were significant at a 5% significant level. Hence, expansion of non-formal education, expansion of off-farm and non-farm job opportunities, intensification and diversification of agricultural activities, 

ABOUT THE AUTHOR
The author has several work experience with the relation to rural area of Ethiopia. Having these experience, he joined and served in one of public University in Ethiopia up to assistant professor level. With this plenty of experience in different work places he accumulated experience and academic knowledge. The author conducted and engaged in several research works and published several articles on different reputable journals. Most publications of the author are focused on gender and development, livelihoods and poverty, and rural development and agricultural extension areas.

PUBLIC INTEREST STATEMENT
Poverty is one of the hoariest socio-economic problems affecting the growth and development of many countries in the world. Being so, poverty is now the first main concern or the global agenda that pulls different individuals, governments, and non-government agencies under one umbrella. Now day, poverty is the number one global agenda as it has indicated on Sustainable Development Goal “Goal 1 Ending poverty in all its forms everywhere in the world”. Currently, there are great tendencies over the world to measure poverty using the multidimensional poverty index (MPI) approach among different approaches of poverty assessment. Hence, the assessment of the determinants of multidimensional rural poverty in the Burji and Konso area has conducted. Accordingly, main determinants are identified and recommendations to overcome them are forwarded.
provision and strengthening livestock extension of poultries, and small ruminants improved breeds were recommended to be practical by Woreda to regional level officials.

**Subjects:** Sociology; Sociology & Social Policy; Development Studies

**Keywords:** deprivation; determinants of MPI; poverty; rural poverty

### 1. Introduction

Poverty nowadays is the priority of the global agenda that ties different governments under one umbrella (FAO, 2015). In line with this, the United Nations (2015) adopted the SDGs intending to improve people’s lives over the world over the next 15 years to solve this especially developing countries problem. By its very nature, poverty is a more rural phenomenon. The prevalence of poverty is different in urban and rural areas, especially in developing countries like Ethiopia. On top of that, the population of the developing countries is still more rural than urban (Alkire & Kanagaratnam, 2018).

Poverty is most of the time measured by uni-dimensional measures, typically founded on income or consumption expenditure. Nevertheless, poverty has many manifestations. Therefore, a solitary indicator like income cannot capture the various dimensions of poverty. Likewise, participatory exercises in poverty measurement disclose as poor people designate ill-being to include poor health, nutrition, lack of adequate sanitation and potable water, social exclusion, bad housing conditions, low education, shame, violence, disempowerment, and much more (Oyekale et al., 2019). Hence, another measurement that captures the relatively wide dimensions is preferable to illuminate poverty more vividly. The way of measuring poverty can prominently affect how one comes to comprehend it, how one investigates it, and the way one makes strategies to attack it.

A multidimensional poverty measure developed by AF incorporates different indicators that capture the intricacy of this phenomenon to guide policies aimed at reducing deprivation and poverty at a studied level. In this regard, Alkire and Kanagaratnam (2018) developed a method called Alkire-Foster (AF). This method is known for its flexible technique for measuring poverty or wellbeing. The AF method incorporates the several deprivations practiced by poor people in their day-to-day lives. It includes lack of education, inadequate living standards, poor health, and so on and can adapt to specific contexts. Beyond measuring multifacets of poverty, the AF methodology also can be modified to target services and monitor the effectiveness of such programs over time. Targeting monitoring of poverty can be done after identifying the determinants of this multidimensional rural poverty.

Ethiopia has made poverty reduction the first and most priority agenda of the government. To affect this, Ethiopia has made a consolidated effort towards poverty reduction. Ethiopia has significantly reduced the number of people below the monetary poverty line after years of solid effort (Tigre, 2018). However, poverty in Ethiopia is still one of the pressing problems catching the attention of the government, development practitioners, and researchers for more than two decades. Because of this, an indefinitely large number of scholars in Ethiopia is trying to study poverty, to discover the determinants of poverty to give some crucial ways/areas of intervention.

Whereas, in one way or another, the high amount of these studies of determinants of poverty in Ethiopia focus on one dimension of deprivation (income or consumption expenditure), not on the multiple dimensions of poverty. Currently, such a study of poverty based on a multidimensional index which includes education health, and living standards is become increasing in number. Even though these multidimensional approaches based study has increased in number, it covers limited
areas in Ethiopia, the dimensions and indicators of the study are fixed on the global designed three dimensions and ten indicators (Alemoyehu et al., 2015; Alemseged, 2016; Bruck & Kebede, 2013; Mekonen & Heshmati, 2016; Tigre, 2018). Thus, it has a dimensional and indicators limitation. Hence, determinants of poverty based on consumption expenditure or income-based research works on poverty are masking the realities and dimensions of the exact nature and magnitude of poverty. South Nations and Nationality Region is also a region that has a relatively high prevalence of multidimensional rural poverty of percentage. The area which this study has conducted is among the areas of this region where poverty is pervasive and repeatedly hit by drought and locust infestation. Based on these and its very nature (the prevalence of poverty), the study area has been included in the Productive Safety Nate program. Accordingly, the area is included in the Safety Nate program from its inception up to the current fifth round.

This is a time to change the focus of poverty measures from one-dimensional to multidimension thereby supporting the war against poverty reduction. Identifying the multidimensional rural poverty is a pace towards tackling it from multidimensional directions. AF methodology is very open to being modified to meet the specific rural context of the area to be studied (Burchi et al., 2018). Though multidimensional tools like the MPI have gained prominence in recent years, the vibrant assessments of multidimensional poverty that could provide comprehensive information on the drivers of poverty remain limited (Alkire, 2015). However, such assessments are an essential step in designing operative policies and programs that help contribute to attaining SDG 1’s objective to “end poverty in all its forms everywhere”. In this regard, this study is based on multidimensional poverty measurement methods developed by AF. Therefore, this study has objected to measure the status of multidimensional rural poverty and finding its determinants of rural households in the study area.

2. Methodology

2.1. Background of the study area

The study area (Burji and Konso) was an adjacent area that has been found in South Nations Nationalities and Peoples Regional State, Ethiopia. The study area is bounded by the Oromia region Mirab Guji Zone in the East, Borena zone in the South, South Omo Zone in Southern East and South West, Ale and Darashe special Woreda in the West, and Amaro special Woreda in the North. The elevation of the study area is in the range of 2600 m above the sea level which is the highest and 800 m below the sea level which is the lowest elevation.

According to the conventional Ethiopian agro-ecological zoning and information obtained from special Woreda agricultural offices, the climate of the study area, a considerable portion is Kolla or arid (55%), Woine Dega (sub-humid) which is 30%, and Dega or highland 10%. The total population of the study area is about 481,656 out of which Konso area is estimated to be about 325,975 from which the male population is estimated to be about 156,901 and the female population is 169,074 and Burji estimated 155,681, of whom 76,439 are men and 79,242 women according to the informant of the administration offers of the study area. The population is the projected number from the previous census and used by the administration of the area.

The livelihood of the people of the study area (well over 96% of the population) is agriculture-based. The agricultural system of the Konso area is somehow unique to the Burji area. The most immediate and notable feature of their renowned agricultural system especially in the Konso area is its traditional terracing constructed over large tracts of the rugged landscape.

2.2. Sampling techniques

The multistage sampling procedure was employed in this study. The sample size of this research has been determined by using Yamane’s (Yamane, 1967) formula with a 95% confidence level. The
The sampling procedure was a multistage sampling method and the final respondents of the study were 368 households selected using a simple random selection method.

2.3. Types, sources, and methods of data collection
Quantitative data were used to measure poverty and an interview schedule was used as a means of information and the sample household heads were the sources of information.

2.4. Methods of data analysis
In this study, global MPI developed by the Oxford Poverty and Human Development Initiative (OPHI) that encompasses ten indicators were modified according to the context-based consensus of group discussants. Accordingly, four dimensions and 14 indicators were used to measure multidimensional rural poverty in the study area. Hence, the index used in the study comprised 14 indicators and four dimensions. The weights and cutoffs for the collections of data were as recommended by Alkire and Foster (2011). The first work of data analysis was calculating multidimensional poverty analyses.

It was implemented using the following 11 steps:

Step 1: Choose a unit of analysis.
Step 2: Choose dimensions.
Step 3: Choose indicators.
Step 4: Set poverty lines.
Step 5: Apply deprivation lines.
Step 6: Count the number of deprivations for each person.
Step 7: Set the second cutoff.
Step 8: Apply cutoff k to obtain the set of poor persons and censor all non-poor data.
Step 9: Calculate the headcount, H.
| Dimension        | Indicator          | SDG & target | Deprivation cutoffs                                                                 | Nested weight |
|------------------|--------------------|--------------|------------------------------------------------------------------------------------|---------------|
| **Education**    | Years of schooling | 4.1.1        | No household member has attained 8 years of schooling (primary schooling)           | 1/8           |
|                  |                    |              |                                                                                   | 12.5%         |
|                  | School attendance  | 4.1.1        | If at least one child in the household between 7–15 years of age is not attending  | 1/8           |
|                  |                    |              | school/missed school                                                              | 12.5%         |
| **Health**       | Child mortality    | 3.2.1        | If any child has died in the family in the five years preceding the survey.        | 1/12          |
|                  |                    |              |                                                                                   | 8.3%          |
|                  | Health facility access | 3         | If the household is located more than 5 km away from the nearest health facility   | 1/12          |
|                  |                    |              | (clinic, health station, hospital).                                               | 8.3%          |
|                  | Health facility quality | 3         | If the household reported dissatisfaction with at least one health facility visit  | 1/12          |
|                  |                    |              | or did not use a health facility due to cost, quality, treatment, or other reasons.| 8.3%          |

(Continued)
| Dimension          | Indicator                        | SDG & target | Deprivation cutoffs                                                                 | Nested weight |
|--------------------|----------------------------------|--------------|------------------------------------------------------------------------------------|---------------|
| Living conditions  | Improved sanitation facilities   | 11.7         | If the household has no access to improved sanitation facilities or uses an uncovered pit latrine, bucket and hanging toilet door are shared with another household. | 1/24          | 4.17%         |
| Water              | 6.1.1                            |              | If the household uses water from an unprotected well, rainwater, surface water (river/dam/lake/pond/stream), or Distance to water requires more than a 30-minute walk from home, round-trip to fetch water. | 1/24          | 4.17%         |
| Type of floor      | 11.1.1                           |              | The households with an earth/sand/mud and dung floor are assumed as deprived.       | 1/24          | 4.17%         |
| Roof material      | 11.1.1                           |              | If the house of the family is not covered by galvanized steel roofs.               | 1/24          | 4.17%         |
| Access to electricity | 7.1.1                          |              | If the household has no access to electricity.                                    | 1/24          | 4.17%         |
| Cooking fuel       | 7.1.2                            |              | If the household uses wood/straw/shrubs/grass. (The household cooks with coal/lignite/charcoal are non-deprived). | 1/24          | 4.17%         |
| Asset ownership    | Household property               | 1            | If the household does not own more than one of the following properties (radio, TV, telephone, bike, motorbike, refrigerator, a car, or truck) | 1/12          | 8.3%          |
|                    | Land                             | 11           | If the land owned by the household is less than one hector.                        | 1/12          | 8.3%          |
|                    | Livestock                        | 11           | If the household has livestock less than two TLU                                   | 1/12          | 8.3%          |

Source: Adapted from OPHI, 2017.
| No | Variables | Type | Measurement and value | Expected sign |
|----|-----------|------|-----------------------|---------------|
|    | Age       | Continuous | Age of the Household at the moment s/he was interviewed | ± |
|    | Sex       | Dummy | Male or female household head (1 if Male; 0 otherwise) | - |
|    | Marital status | Dummy | It measures the marital status of the HH (1 if married, 0 otherwise) | -/+ |
|    | Education | Continuous | The maximum level of schooling a person reports having completed. | - |
|    | Health status | Dummy | Whether the household has any permanent disability (1 if healthy, 0 otherwise) | - |
|    | Family size | Continuous | The number of household members lives in a given room. The family size of the households is measured in Adult equivalence | - |
|    | Labor migration | Dummy | It measures the presence of migration (1 if migration anywhere, 0 otherwise) | - |
|    | Livestock herd size | Continuous | Total livestock owned by farm households. It measured in terms of TLU | - |
|    | Farm size | Continuous | The total size of cultivated land. It measured in hectares | - |
|    | Saving culture | Dummy | The presence of saving culture (1 if yes, 0 otherwise) | - |
|    | Remittances | Dummy | Chance of getting remittance. 0 if no remittance; 1 if otherwise | - |
|    | Membership of CBOs | Dummy | Being membership of CBO (1 if yes, 0 otherwise) | - |
|    | Contact to DAs | Dummy | This is the communication & advice getting contact from DAs (1 if the contact frequency is quarterly or less than quarterly, 0 otherwise) | - |
|    | Cosmopolites | Dummy | Frequent visits of households in an urban area (1 if yes, 0 otherwise) | - |
|    | Participation in a leadership position | Dummy | Participation of household heads being different committee members at different levels of Kebele administration (1 if yes, 0 otherwise) | - |
|    | Distance from market | Continuous | The measures the distance of the market. The distance is measured in kilometers | + |

(Continued)
| No | Variables                              | Type          | Measurement and value                                           | Expected sign |
|----|----------------------------------------|---------------|-----------------------------------------------------------------|---------------|
|    | Distance to road                        | Continuous    | Distance of all-weather road from the residence of the household | +             |
|    | Access to mobile network                | Dummy         | Presence of mobile network access (1 if has access, 0 otherwise) | -             |

Source: Own collection.

Step 10: Calculate the average poverty gap, \( A \).

Step 11: Calculate the adjusted headcount, \( M_0 \).

The MPI was calculated by multiplying the incidence of poverty with the average intensity of poverty across the poor (\( MPI = H \times A \)); as a result, it reflects both the share of people in poverty and the degree to which they were deprived. Households were identified as multidimensionally poor (or “MPI poor”) if they were deprived in at least one-third of the weight of indicators shown above; in other words, the cutoff for poverty \( k \) is 33.33\% (Alkire et al., 2016). The detail of dimensions and indicators used for the analysis of multidimensional rural poverty in the study area is explained in Table 1.

2.5. Econometric model
To achieve the determinants of poverty in the study area, there are alternative econometric models popularly used in many studies where the dependent variable takes dichotomous values, binary logistic regression is costumed method. Hence, the binary logit model is used to analyze the relationship between the household’s poverty status and its determinants.

The outcome of dependent variable in this study is dichotomous (in which there are only two possible outcomes) poor and non-poor. Accordingly, the measured result of multidimensional rural poverty status transformed into binary choice by using a specified deprivation cutoff point for the MPI. Thus, a household is deemed living in poverty \( (Y = 0) \) if the cutoff for poverty \( k \) is greater than 33.33\% or non-poor \( (Y = 1) \) if the cutoff for poverty \( k \) is equal or less than 33.33\%. The independent variables for this study were 18 variables. Their list, type, measurement, and expected sign are indicated in Table 2.

3. Results and discussion

3.1. Multidimensional rural poverty status
The multidimensional rural poverty status, incidence of poverty (the proportion of people identified as multidimensionally poor—\( H \)), and the intensity of poverty (the average proportion of weighted indicators in which the poor are deprived—\( A \)) in the study area has calculated. The detail result is presented in Table 3.

In turn, the average intensity of poverty, which reflects the share of deprivations each poor household experiences on average, is 54.7\%. That is, each poor household is, on average, deprived in more than two dimensions included in the MPI. The MPI is equivalently computed as the weighted sum of censored headcount ratios, which show the percentage of individuals who were identified as poor and are deprived of an indicator. Finally, the MPI of the research area (the households multidimensionally poor) was found to be 41.9\%.
Table 3. Multidimensional rural poverty status

| Status indicator variables                          | Value  |
|---------------------------------------------------|--------|
| Poverty cutoff (k)                                | 33.33% |
| Total deprivation score (c)                       | 177.632|
| Total sample population /households (n)           | 368    |
| A multidimensional poor households deprivation score | 154.23 |
| Multidimensional noon poor households number      | 86     |
| Multidimensional poor households (q)              | 282    |
| Headcount ratio/incidence (H)                     | 0.766  (76.6%) |
| The intensity of poverty (A)                      | 0.547  (54.7%) |
| Multidimensional poverty index (MPI)              | 0.419  |

Source: Computed from own field survey, 2020.

A previous similar study with three dimensions and ten indicators was done by OPHI (2017) reveals that the multidimensional rural area poverty at the country level was MPI of 0.637, incidence of 96.3, and intensity of 66.2%. Meanwhile, the multidimensional poverty status of the SNNPR was MPI of 0.574, incidence of 89.7%, and intensity of 64.0%. Another study of OPHI (2020) indicated as the MPI of Southern Nations, Nationalities, and Peoples’ Region (SNNPR) is reduced to 0.482. The result of this study is to some extent less than the regional MPI. The study area of this research showed that the multidimensional status of the study area is somehow low with that of the region. Thus, there is a progress after the release of that research or particularly the study area’s MPI is less than the regional average by its nature. This can be an indicator or it assures as Ethiopia is among fast-developing countries in the world.

3.2. The sensitivity of MPI to the change in poverty cutoff (k)

In multidimensional poverty, poverty cutoff, minimal level of deprivation above which a household is declared as poor is required to be fixed. The aggregate cutoff is just like a poverty line falling lower than or at the poverty line person is considered as poor. Multidimensional poverty with its headcount ratio and intensity of poverty at different cutoff levels are given in Figure 6. Generally, as the poverty cutoff (k) value increases, the headcount ratio and MPI will decrease, and the indicators in which the households deprived in or intensity (A) increases.

As it has been found in Figure 2, at the point where the poverty cutoff is equal to (k = 20%), the headcount ratio (incidence) is 0.978, intensity (A) = 0.49. As both incidence (H) and MPI decreased slightly to k = 40%, the intensity of poverty was increasing similarly. After the cutoff point of 40%, both the incidence (H) and MPI dropped down fast. But, on the contrary, the average proportion of weighted indicators in which the poor are deprived (A) will increase. At the end, when the (k) value increases approaching 100%, similarly, the incidence (H) and MPI approach to zero. Whereas, on the contrary, the intensity (A) increases and approaches to 1. The notable finding observed from Figure 1 is that the value of multidimensional poverty varies across poverty cutoffs suggesting that the adjusted headcount ratio (MPI) value is highly sensitive to the choice of multidimensional poverty cutoff. This finding and the trend of poverty cutoff and MPI value were directly in line with Tigre (2018).

3.3. Determinants of multidimensional rural poverty

Before presenting binary logistic regression outputs and drawing conclusions based on variables that determine the possibility of multidimensionally poor, it is important to confirm that the data fit the basic expectations of the model, if not outcomes may be confusing. As to Bewick et al. (2005), the weak correlation among the explanatory variables is a prerequisite before running the model. Therefore,
diverse multicollinearity diagnostics tests were executed to crisscross the level of collinearity between each independent variable.

Among the diagnostic tests conducted, Spearman’s correlation matrix and variance inflation factors were used to check the presence of multicollinearity among the explanatory variables. There were no independent variables that had Spearman’s correlations near ±1 and the p-values revealed significance very low (0.01) level. Likewise, the VIF for the independent variables used in this research extended between 1.32 and 1.76. As to Gujarati (2004), there is no linear relationship among the tested independent variables since the VIF was not exceeded 5 for all tested variables. This qualified the explanatory variables to be included in the model.

The contingent coefficient result indicated as there is no correlation between the given two independent variables exceeded to that amount implies dependencies. Therefore, it has been concluded as the level of associations between independent variables is not a serious problem in this logistic regression analysis.

3.4. Binary logistic regression result
There are several alternatives to present the logistic regression estimates result report. Accordingly, the results explain determinants of multidimensional rural poverty analyzed using logistic regression and reporting coefficients found in, reporting odds ratios found in, and reporting marginal effects. However, the estimated coefficients result and marginal effects results are displayed in Table 4. The marginal effects tell us how a dependent variable (outcome) changes when a specific independent variable (explanatory variable) changes. The other covariates are assumed to be held constant. So, marginal effect result is preferable to economics-oriented researches. Hence, the marginal effect has been chosen for the interpretation of binary logistic regression results. Accordingly, Table 4 is used for direct interpretation of results in the estimation of the marginal effect after logit and result of the marginal effect indicates the effect of all examined independent variables on the possibility of being multidimensionally poor in the study area.

The result reported in Table 4 showed the logistic regression estimate of determinants of the multidimensional rural poverty in the study area. The multidimensional poverty was taken for poverty cutoff (0.333) as the poverty line to group households above the line as poor and just on
the line & below the line as non-poor as per directed and used by Conconi et al. (2014) and Alkire et al. (2016). Accordingly, 86 respondents were below the cutoff point and 282 respondents were above the cutoff point. The result of the binary logistic model with significant LR chi2 (18) at 78.92; chi-square 0.0000 and Pseudo R2 0.1977 shows that the model is a good fit for the data.

Table 4. Logistic regression estimates of determinants of multidimensional rural poverty logistic regression number of obs = 368 LR chi2(18) = 78.92 prob > chi2 = 0.0000 log likelihood = -160.08817 Pseudo R2 = 0.1977

| Multidimensional poverty status | Estimated coefficients | Marginal effects |
|---------------------------------|------------------------|------------------|
|                                 | Coef. | P>|z| | dy/dx | P>|z| |
| Age: The age of the hh          | -.0322505 | 0.021 | -.0045257 | 0.018* |
| Sex; if 1 Male, 0 if Female     | -.1388871 | 0.835 | -.0194901 | 0.835 |
| Marsta; Marital status of the hh. (1 if married, 0 otherwise) | 1.287444 | 0.075 | .1806673 | 0.071* |
| Edu; Household head education   | -.1692793 | 0.000 | -.023755 | 0.000*** |
| Healsta; Health status of hh. (1 if healthy, 0 otherwise) | -.1264488 | 0.767 | -.0177446 | 0.767 |
| Farmsize; Farm size of the household | -.0416242 | 0.483 | -.0058411 | 0.482 |
| Laigm; Migration (1 if yes, 0 otherwise) | -.23301 | 0.514 | -.0326984 | 0.513 |
| Livestoc; livestock in TLU      | -.1414758 | 0.029 | -.0198533 | 0.026** |
| Farmsize: Farm size of the household | -.5130258 | 0.012 | -.071993 | 0.010** |
| Savcult; Saving culture of the hh. (1 if yes, 0 otherwise) | -.0610836 | 0.852 | -.008571 | 0.852 |
| Remit; Remittance (1 if yes, 0 otherwise) | -.4043783 | 0.325 | -.0567465 | 0.323 |
| Cbcomemb; Being membership of CBO (1 if yes, 0 otherwise) | -.5774042 | 0.076 | -.0810273 | 0.072* |
| Contada: Contact with extension agents (1 if had contact, 0 otherwise) | -.0368936 | 0.924 | -.0051773 | 0.924 |
| Cosmop; Cosmopolitanes of the hh. (1 if yes, 0 otherwise) | -.1685229 | 0.603 | -.0236489 | 0.603 |
| Leadpart; Leadership participation (1 if yes, 0 otherwise) | -.1445776 | 0.652 | -.0202886 | 0.652 |
| Dismar; Resident distance from market | .0935767 | 0.036 | .0131316 | 0.033** |
| Disroad; Resident distance from road | .1076717 | 0.068 | .0151096 | 0.065* |
| Accmobnw (1 if has access, 0 otherwise) | -.5011404 | 0.012 | -.0703251 | 0.139 |
| _cons                           | 3.380533 | 0.002 | - | - |

Notes: *** indicates the marginal effects level significance at 1% significant levels. ** indicates the marginal effects level significance at a 5% significant level. * indicates the marginal effects level significance at a 10% significant level. Source: Author's computation (2020).
Table 4 reveals that only the education of household heads is statistically significant at a 1\% rate significance. Whereas, the three variables, namely, livestock in TLU, farm size, and distance to the market of the respondent household head was at a 5\% rate of statistical significance determining multidimensional rural poverty. The other four variables, namely, age, marital status, being members of community-based organizations, and distance to the road is also statistically significant at a 10\% significance level.

In the other direction, only distance from the market was statistically significant at a 5\% rate of significance in determining. Except for the distance to market and distance to the road which is the risk factor that has a positive relationship with multidimensional rural poverty, all other significant variables are revealed a negative relationship with multidimensional rural poverty. This indicated that they are protective factors of multidimensional rural poverty in the study area. The detailed explanations of these statistically significant explanatory variables are presented hereafter.

**Education (Edu):** The logit regression analysis shows that the extent of multidimensional poverty has a negative relationship and is closely connected with the education status of the households. Among the different predictors of household characteristics and other studied variables, only the education level of the household head is statistically significant at a 1\% level of significance. The result of marginal effects found in Table 4 indicates that for every additional increase of education unit, the likelihood of being multidimensional poor reduces by 2.37\% on average, holding all other variables constant.

Education increases the understanding of household heads to educate and vaccinate children properly as per the standard. This helps the household to lessen child mortality, increases school attending the chance of children, equip the household with necessary household facilities, own essential assess, and thereby contribute to the reduction of multidimensional household poverty. Moreover, it increases the knowledge power which helps the households fight against other multiple deprivations. Thus, increasing the education level is a favorite instrument for alleviating multidimensional poverty. The result is similar to studies such as Desawi (2019) and Feleke et al. (2020) which indicated that educational attainment of household heads helps to reduce multidimensional rural poverty.

**Farm size (farmsize):** Farm size is another economic variable used in this study and it is significant at less than 5\% significance level and has a negative influence on the household's being multidimensionally poor in the study area. The econometric result found in Table 4 above indicated as holding all other variables constant, for every additional increase in a unit of farm size, the rural households being multidimensional poor reduces on average by 7.19\% while all other variables are kept constant. The result is similar to the study of Zegeye (2017) which indicated farm size of household heads helps households to reduce multidimensional rural poverty. Amao et al. (2017) reported as land ownership has a negative association with poverty from the logistic regression estimates of determinants of poverty in rural Nigeria.

The plausible explanation for this is that the farm is a fixed asset that never reduces its value under the appropriate management of land. In addition to that, the life of rural people directly depends on farmland and livestock production. Especially, these two production factors play a crucial role in determining the rural peoples, the whole social status, and particularly the multidimensional poverty level. These findings and explanations agree with the hypothesis that farmers who have larger farmland holdings would be less poor than those with smaller farm sizes. As the farmland increases, the probability of diversifying the production and the chances of generating a high amount of production increases. Sometimes the farmland can be considered as collateral to take credit from different local sources in addition to being a source of income, food, etc. Hence, having big farmland increases the availability of capital that could increase the probability of investment in the purchase of farm inputs which increases food production and later ensure the possibility of being out of poverty to farm households.
**Livestock in TLU (livestoc):** Livestock is an economic factor that is negatively associated with and protective factors of multidimensional rural poverty. Owning livestock was significantly associated with multidimensional rural poverty at a 5% probability level. According to the model result, it has a marginal effect of −0.0198533 which means for every additional increase of livestock in TLU, the likelihood of multidimensional poor decreases by 1.98% on average, holding all other variables constant. This finding is matched with the findings of Shugri (2016) and Zegeye (2017) where livestock was found significant to reduce multidimensional poverty at a 1 percent of statistical significance.

The conceivable description for this is that livestock has a very decisive role in the life of rural people being a food source, means of transportation, draft power, income-generating source, production force, and status determinant in rural areas social context. In the group discussion, one person briefs as livestock is a bank for the rural community where they save money during the good season and drawback money during drought as well as any health and social problem encounter there. Therefore, it is possible to conclude by saying that the more the livestock the lower multidimensional poverty levels and even more likely to become better off over some time.

**Distance from the market (dismar):** As depicted in Table 8, distance from the market is one of the variables which has statistically significant at a 10 percent probability level and positively associated variables or one of the risk factors for the prevalence of multidimensional poverty in the rural study area. Holding the other thing on their value, the marginal effects shows that for each increase in the additional market distance unit from the household residence, the probability of the household fell to poverty increases by 1.31% on average. The higher the market distances from the household residence, the greater the chance of the households falling into multidimensional poverty. Hence, the proximity of households to the market can provide the rural household with better market access and thereby contributing to pulling down households’ chance of falling into poverty.

The comprehensible explanation is that access to the market allows the household to involve in different off-farm and none farm activities and other income-generating activities like small-scale trade. This can be an additional source of agriculture-based income that could keep the household above the multidimensional poverty cutoff point. Moreover, where markets are found there are some better living facilities and better residences than a rural area. This relatively enlightened area (market area) can initiate rural households to behave similarly with these market area residents. In general, market distance is a noticeable determinant of multidimensional rural poverty. The result is similar to the study of Feleke et al. (2020) which indicated distance to the market help households to reduce multidimensional rural poverty.

**4. Conclusion and recommendations**

**4.1. Summary**
The study was conducted in Burji and Konso area in southern Ethiopia. A sequential mixed research design method was used to accomplish this study. The quantitative types of data were used in this study. The sample size of this research has been determined by using Taro Yamane’s formula with a 95% confidence level. The sampling procedure was a multistage sampling method and the final respondents of the study were 368 households selected using a simple random selection method. The data was collected using an interview schedule. Alkire & Foster Methodology with modified four dimensions and 14 indicators used to analyze multidimensional rural poverty index.

Accordingly, the planned objectives are accomplished by turn and the following summary has been done. The multidimensional poverty analysis has explicated as the headcount ratio/incidence 76.6%, the intensity of multidimensional rural poverty 54.7%, and MPI 0.419 in the study area. The highest contributor to the multidimensional poverty out of 100% in the study area was deprivation...
in school attendant, health service quality, and livestock indicators were among the major ones. When the result was crosscheck with their allotted weight, health service quality, land, school attendant, and cooking fuel were the highest in their descending order.

The determinants of multidimensional rural poverty were identified using binary logistic regression method marginal effects of the education level of the household head were significant at a 1% significant level. The other variables which include farm size of the household, possession of livestock in TLU, and resident distance from the market were significant at a 5% significant level.

MPI is elastic and can be stretched to include different other several dimensions and indicators. So, from these angles, here it has concluded as the MPI method is more robust and proxy for measuring poverty, particularly in today’s SDG context. These are mirrored as multifaceted interventions are important to reduce MPI based poverty. Since MPI goes in line with SDG of the world and its social impact on improved rural livelihood is significant than others, using MPI seems decisive in the overall poverty reduction program. Moreover, MPI could use as a monitoring tool to follow up on the implementation and effectiveness of several developmental intervention programs.

4.2. Conclusions
The first focus of this study was to assess the current status of multidimensional rural poverty based on AF’s approaches. In line with this, determinants of MPI at the household level were examined using a binary logistic regression model.

The proportion of people identified as multidimensional poor and the average proportion of weighted indicators in which the poor are deprived were scored high result indicating high incidence and intensity of multidimensional rural poverty. Accordingly, the MPI of the area is below regional and country level. However, this result is not a result that could be taken as an acceptable level of MPI. But, the study gives clues as the MPI is reducing from time to time. Anyhow, it reminded the concerned bodies about rural multidimensional poverty, to think over and implement integrated and multifaceted additional interventions to reduce MPI at the level set in SDG level.

The binary logistic regression analysis result revealed that education level of the household, livestock possession, saving culture, age increment of the household, and farm size of the household, leadership participation, and access to the mobile network was found to influence multidimensional rural poverty at a different level of significance with the negative relationship being the protective factor of multidimensional rural poverty. Whereas, distance to the market, distance to all-weather road, and marital status were significantly determined the multidimensional rural poverty being the risk factor in the study area. So, it has been concluded that the increase in the number of livestock possession as well as expanding and developing the saving culture in the area is among the remedies to reduce multidimensional poverty in the study area. Even though the farmland expansion is not a viable solution for farmland shortage, diversification, intensification, and thereby increase of production and productivity per given farmland have been found the remedy to reduce multidimensional rural poverty of the study area.

Distance to market and distance to the all-weather road were significant and associated positively with the poverty status of the study area. Hence, this study qualifies the importance of all-weather roads and market in a reasonable short distance to skip out of poverty in the study area. Road eases the movement and the market provides access to different commodities at a reasonable cost. This in turn contributes to having improved livelihood of the studied area.

The education level of the household, livestock size in TLU, farm size per household, and the households’ residence distance from the market were variables being the main determinants of multidimensional poverty at a 1% and 5% significance level in the study area.
However, this study has its limitations like in this study, the data were taken by “snap-shot” at a particular period which means it is cross-sectional data. Though every type of survey has its weakness, the cross-sectional (one at a time) survey method has limited capacity to show specifically consumption expenditure-based poverty status of the household than longitudinal data which can show relatively better performance due to frequent observations over a while. Nowadays, the definitions of poverty becoming wider than ever before. The SDG is one witness which indicates as poverty has different dimensions. Even though additional dimensions and indicators are used for multidimensional analysis in relation to AF methods in this study, possible dimensions like psychological wellbeing and political dimensions of poverty are not included in this study.

4.3. Recommendations

Probably, it could be difficult to push those households who have no formal education to join the formal school. Therefore, non-formal educations like adult education should be provided for those adults who cannot join formal education. Similarly, Farmers’ Training Centers found in each Kebele should strengthen delivering frequent skill-oriented training for farmers. Despite elementary school expansion, the Woreda level education offices and the community itself should strengthen the rules and regulations to engagement all school-aged children to school and prepare regulations to reduce dropouts from the school.

Livestock particularly small ruminants and poultry are considered as the liquid asset almost equally like money. They can change any time they need money because livestock is considered the way they save money to be financially secure. Livestock provides food for consumption and marketing purposes. Surely, the majority of poor households do not have an improved breed of poultry, goat, and sheep. Therefore, the Woreda level agricultural offices should strengthen poultry production and small ruminants’ extension service since they are fast to be reproduced and demand less investment cost. In such a way, they can easily change to money despite household consumption service.

Regarding the farm size, attention should be given to the regional and federal agricultural sectors to synchronize the agricultural development and extension strategies to intensification and diversification of agricultural activities. Moreover, both off-farm and non-farm additional income-generating job opportunities should expand in the area to increase the income of the households. Expansion of markets is the key to buy different inputs and to sell different agricultural commodities. Therefore, the government needs to strengthen rural road network provision service and related infrastructures to transport inputs and outputs from/to market at a reasonable price.

4.4. Future research perspectives

Different countries and researchers add different dimensions like income, empowerment, and so on. Hence, the researcher agrees with the addition of additional dimensions and urges different researchers to add other relevant contextual dimensions under the methodological framework of Alkire and Foster.

This study practiced household as the level of analysis. However, poverty can be analyzed at the individual level or intra-household level. In other directions, child or women-based multidimensional poverty analysis can be studied at the micro or macro level of analysis. Therefore, future researches can be a focus on one of these study areas.

4.5. Ethical considerations

Even though this study provides recommendations for policymakers and development practitioners to manage interventions in the way to reduce poverty, this study also has made efforts to contribute to the previous studies.

This study is new in the study area and it has disclosed the poverty status and determinants of poverty using two separate approaches. Doing this has indicated the priority area of budget
placement and intervention for practitioners. Moreover, this study can be a resource of reference for further research in the study area and elsewhere in the country.

The other significant contribution is the inclusion of farmland ownership and livestock ownership as an additional independent dimension in multidimensional rural poverty (MPI) studies in the country. Since these indicators emanate from the focus group discussion held in the research area, it encourages researchers to explore such variables/information rather than fully depending on the literature.

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Disclosure statement

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Ethical considerations

Research ethics require that the researcher must ensure the confidentiality of the research participants and protect them from any harm. In line with this, the research was carried out according to the ethical guidelines of Wolaita Sodo University, Ethiopia. Before interviews and discussions, verbal informed consent was elicited from research participants to record their voices. For individual case studies, culturally appropriate and sensitive methods of inquiry were applied. The necessary precaution was made to ensure confidentiality. Participants have thoroughly explained their rights and the purpose of the research. Care was taken to ensure participants know their responses are kept anonymous and confidential.

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