Multidimensional Poverty in Pastoral Area: The Case of Somali and Afar Regional States, Ethiopia

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Abstract

The purpose of this paper is to measure multidimensional poverty in pastoral areas of Ethiopia. It employed both primary and secondary data. The community level primary data was collected using focus group discussion. Secondary data was obtained from Living Standard Measurement Survey of Ethiopia, 2015. Mixed method research was employed to better understand multidimensional poverty. The qualitative result indicated that many groups expressed poverty manifests as loss of livestock's, lack of food, lack of water, lack of schooling and health services. The quantitative result confirmed that there is positive correlation among the three poverty dimension, implying multidimensional hypothesis is accepted. The poverty measure indicated 44% of the sample household found to be poor in two dimensions and 37% poor in one dimension and 8% were found to be poor in three dimensions. The results from mixed approach converge indicating that poverty is multidimensional in pastoral and agro-pastoral areas.

Keywords: Multidimensional Poverty, Mixed Method, Pastoralist, Agro-Pastoralist, Structural Equation Modeling

1. Introduction

Poverty is the main concern in Sustainable Development Goals (SDGs) (FAO, 2014a, b; IFPRI, 2014; Wild *et al.*, 2015). It is no longer a problem to the developing countries but also to the western nations as well (Melamed, 2014; Shepherd *et al*., 2014). Nowadays poverty related to major world problems like environment, terrorism, economic migration and internal displacement, local conflicts and social unrest etc. The slogan of SDGs 'leaves no one behind' by 2030 implies that the solution to this problem needs global cooperation like that of environment and terrorism. The SDGs aspires to eliminate poverty for all humanity (Norton *et al*., 2014). The success should be measured and judged by how it benefits the marginalized and excluded peoples at different corner of the world (Arauco *et al.*, 2014).

Regardless of combating effort by many stakeholders, poverty is continuing as the main social problem for most of developing countries including Ethiopia (Ecker and Nene, 2012; Tassew, 2014). Yet, the recent government report on poverty claims that total poverty and inequalities are lower at both national and regional levels including pastoral areas, and attributing this to the effectiveness of policies (MoFED, 2013). However, poverty in pastoral areas is multidimensional (Bird *et al.*, 2010); policies also paid insufficient attention in those areas (FAO, 2014a). The area is also harder to reach, or easier to ignore (HDCA, 2014). While much has been achieved, there are still excluded and marginalized groups in Ethiopia, especially among Afar and Somali pastoralists (Norton *et al*., 2014).Poverty is widespread and prevalent in Ethiopia which makes the country amongst the poorest nations in the world (UNDP, 2013).

Despite the government claim, empirical literatures show that poverty in general, and chronic and transitory poverty were pervasive in pastoral areas (Adugna, 2012). Studies by Little *et al*. (2007), Kejela (2007), Boku and Gufu (2010), Shiberu *et al*. (2013), and Abubeker *et al*. (2014) found that poverty is mainly associated with agro-pastoralists. In addition, there is a continuous debate among scholars on the way poverty is measured in these areas. There are many literatures on poverty in Ethiopia. (Works of Jones *et al*., 2008; Maru, 2010; Bigsten and Shimeles, 2011; Adem *et al.,* 2012a, b; Decore *et al*., 2012; Ahmed, 2013; Naschold, 2013; Bruck and Worknesh, 2013, Camfield and Joireman, 2013; OPHI, 2014) are few examples, in this regard.

Despite these the studies that analyze pastoralists and agro-pastoralists multidimensional poverty were scanty. As yet, studies conducted in different disciplines predominantly focus on livelihood, poverty profile and determinants of poverty by applying traditional income, consumption or asset approach. However, poverty is multidimensional and manifests itself in different ways in these areas. This invites different approaches and methods in dealing with it. Akin, under complex social structures such as pastoral societies, it is difficult to understand the relationships and causes of poverty using only traditional income consumption approach. Recently, it is acknowledged that the well-being of any society can be well understood if the multiple theories are simultaneously used (Wagle, 2008). There are no rigorous studies on multidimensional poverty using this innovative and integrated epistemological mix. The purpose of this paper is to measure the multidimensional poverty in Afar and Somali Regional States of Ethiopia. The paper is organized as the second section the underpinning theories, the third section provide the methodology followed, while the fourth part presents results and discussion, and the final part provide conclusion.

2. Theoretical Framework

Among different poverty theories, the traditional welfare theory is the dominant neo-classical theory in poverty analysis. Traditional welfare theory still influences researchers, policies and measurement of wellbeing in the poverty arena (Shaffer, 2002). This theory relates poverty with lowness of earning income/wages (Smith, 1998) and on choice based behavior as one of the primary cause of poverty. Individuals choose certain lifestyle that put them at much higher risk of poverty (Blank, 2003; Bradshow, 2007). The traditional welfare theory views poverty as the fault choice of the poor. In this perspective low income is clearly one of the major causes of poverty. It is assumed that the expenditure reflects the utility placed on the commodity purchased and consumed; then welfare can be measured as the total consumption enjoyed (proxied by income, consumption or expenditure data). Poverty is defined as the shortfall below some minimum level of resources (Cantillon and Nolan, 2001; Laderchi *et al*., 2003).

However, the contemporary debates on poverty acknowledge that poverty is multidimensional. In this regard capability and Social Exclusion theories are the most influential theories. The capability theory is the first of all that acknowledged poverty as multidimensional. Capability poverty theory, sometime called new social welfare theory, was developed in 1980's by Amartya Sen. Capability theory proposes the serious departure from concentrating on the means of living to the actual opportunity of living (Sen, 2009). In capability theory poverty is defined as the deprivation in the space of capabilities or faller to achieve certain minimal or basic capabilities (Sen, 2008). The most important and fundamental concept in this theory is the freedom that an individual can enjoy in the life he\she lives. Anand and Sen (1997) define poverty as unfreedom. People are unfree when they face famine, under nutrition, and little access to health care, little access to clean water, unnecessary morbidity, and premature mortality, lack of basic education and other opportunities, inequality between men and women and the denial of political and civil right (Sen, 1983; Jensen *et al.,* 2010).On the other hand, the concept of social exclusion is relatively recently introduced in the discipline of social science. The use and the meaning of social exclusion vary across countries and socially rooted in different traditions. However, the fundamentals of social exclusion in literature is seen as multidimensional, relationally dynamic and its relativity (Sen, 2000; Lauderchi *et al.,* 2003; Nevile, 2007; Morries *et al.,* 2009; Peruzzi, 2014). For many, definition of social exclusion generally means lack of participation in economic, social and political activities or opportunities (Wagle, 2008; Arauco *et al*., 2014). In this perspective, poverty is considered as a consequence of exclusion from economic, social, political or denial of opportunities and access to basic services (Barron, 2008; Morries *et al.,* 2009). As a point of departure, we assume multidimensionality of poverty in the pastoral and agro-pastoral areas of Afar and Somali regional states. Analyzing poverty in pastoral and agro-pastoral areas is so complex as compared to other ways of life. In such situation, understanding poverty relying on indicators like income, consumption and assets offer only weak proxies for a household's poverty status.

This invites the amalgamation of the poverty theory across social science disciplines. Hence, this paper uses the integrated theoretical approach to assess multidimensional poverty in pastoral and agro-pastoral areas. The multidimensionality perspective that is used here integrates traditional welfare theory, capability and social exclusion theories as underpinning theoretical perspectives. The multidimensional model of poverty attempts to test many poverty theories (Wagle, 2002; 2005; 2008). In multidimensional approach in general and the adopted perspectives in particular selecting indicators for each dimension, identification and weighting and aggregation are still controversial and there is a heated debate among researchers (Atkinson, 1987; 1999; Qizilbash, 2004; Cohen, 2010; Maasumi and Yalonetzky, 2013; Deconeq and Lugo, 2013).

3. Methods and Data

In this paper both primary data and secondary data were used. Primary data was collected at community level from the study areas. The non-probability sampling was used to collect primary data at community level. The data collected from the primary community level was used to triangulate data from secondary sources. The secondary data on Living Standard Measurement Survey (LSMS) was collected from the World Bank 2015 data base. The survey consists of five modules but household characteristics module and the livestock module are the main sources for the required data. A total of 322 randomly selected rural households were used as a sample.

3.1. Model Specification

Poverty is assumed to be multidimensional in pastoral and agro-pastoral areas of Ethiopia. To explain these economic wellbeing, capability, and social exclusion poverty dimensions were derived from integrated theoretical framework. These dimensions are unobserved or latent variables but measured using observed indicators. The three poverty dimensions are correlated among each other i.e poverty is multidimensional. This hypothesis was tested using the interrelationship among the three poverty dimensions (Wagle, 2008). The Structural Equation Model is the appropriate model to specify the relationship among three dimensions of poverty. The Structural Equation Model is the most appropriate to test a theory that explains the relationship among a group of variable; it allows to measure the complex relationship when the phenomena of interest is complex and multidimensional (McQuitty and Wolf, 2013). It is a system of equation that establishes the structure of the relationship among observed and unobserved quantitative variables (John and Dos, 2012). There are two broad classes of variables in SEM, observed and latent. The three poverty dimensions capability, economic wellbeing and social exclusion which are unobservable latent variables; while their indicators are observable and obtained from the data set. In SEM there are two parts; the first part is measurement model a system of equations that relates poverty indicators to the latent variables. While, the second part is structural model the equation that establish the relationship among the three poverty dimensions (Ullman, 2006). The following equation provides the measurement of each poverty dimension using their respective indicators. The measurement component of the model is presented as:

$$Y = \lambda\eta + \varepsilon$$

For all three dimensions, estimates of η would depend on their indicators sets Y which are truly observed variables for each household and it is a vector containing indicators for dimension of poverty. The interrelationship among the estimated latent variables of poverty dimensions (η) were represented by the structural model. Hence, the latent variable equation or structural model is specified as:

$$\eta = \beta\eta + \xi$$

Where β is a matrix of directed path coefficient, which accounts for the interrelationship among the poverty dimension. The second equation specifies the causal relationship among the three poverty dimensions. Therefore, these equations are the two main equations to be estimated. This can be done with the combination of factor analysis and multivariate regression. Structural Equation Model requires estimating poverty dimensions using the associated indicators and their interrelationship. Its measurement part attempts to measure the underlying poverty dimension using observed indicators. However, the response variables do not form the same family and links. Therefore, in this case fitting the Generalized Structural Equation Model is appropriate than SEM (STATA, 2013). The latent variable part tests whether the specified relationship among the latent poverty dimension holds empirically. The structural equation models were estimated using all household samples from study areas.

4. Qualitative Result

4.1. Perceived Meaning of Poverty

Participants were asked to tell what poverty means to them, in their own words and language. All participants in Afar referred to poverty as "*Idelle*" or "*Idedena*", alternatively. Likewise, for the Somalis, the Somali equivalents for the English word poverty were "*Fikirnemo*" and "*Sebolnemo*". In addition, participants were encouraged to give the understanding ideals used in defining of poverty. Accordingly, a wide range of perspectives and insights have emerged in defining poverty. Some communities associated poverty with lack of livestock, basic needs and services and spiritual base. However, livestock were at the center of the discourse used in defining poverty. Across many focus groups, participants reported "Poverty as failure to own livestock". In addition, poverty was also defined as lack of basic services, specifically lack of water service for both humans and livestock, on top of lack of education and health services. The above definitions were common to all participants included in the study from both regions. However, participants from *Afar* had a very specific definition of poverty that is shaped and framed by their religious background. To them, "Poverty is a challenge from Allah in this world to test human beings by making some 'the haves'' and others 'the have not'….. and the test is for both groups. The test to 'the have not' group is whether the individual obeys Allah's command, while they live under such circumstances, or not…". And, for 'the haves' group the test is whether she/he used what they have in accordance with Allah's way.

Across all groups, the participants were also asked to explain how poverty manifests itself in their communities. Focus groups participant offered a range of indicators showing prevalence of poverty in their communities. They stated that poverty manifests in their location in the form of "minimum number of livestock" that arises due to natural various shocks like drought. Moreover, many groups also expressed that poverty as lack of food and water for human and livestock, lack of schooling and health services, and lack of clothing for the kids. These are the indicators of poverty in their community. A female participant from '*Amasabure kebele'* made a point by making a reference to the four year old kid "…who does not have decent cloth and physical appearance… and used him as an example to tell what poverty looks like in the area. Finally, she cut short of telling the story as she cannot continue talking as she was getting starved." Despite the ongoing debate on measurement and poverty level in pastoral areas, the preliminary results show that poverty is a multi-factual and multi-faceted phenomenon in the areas.

4.2. Causes and Consequences of Poverty

Across all focus groups, participants discussed about the causes and consequence of poverty in their communities. Causes of poverty in pastoral and agro-pastoral areas are numerous. In most focus groups, participants offered natural factors as the main factor causing poverty, but there were other factors as well. The natural factors included mainly drought and death. Participants often express how drought causes poverty in their communities. For instance, there is a consensus that: "Drought is a challenge to the communities…frequent drought led to a reduced livestock size over time and eventually become a covariate risk. Drought more easily kills goats, sheep and cattle within a few days because of their weak resistance to drought as compared to camels…"

However, participants in Afar and specifically in City Zone had different views even for the camel. The participants stated the situation as "…this year even the camel is challenged by the longevity of the drought. As a result, this most of the community members lost their livestock and they are obliged to depend on the government handout…" Drought is the prime natural factor that drives communities into poverty, and the recurrence of drought in recent years worsens the problem. Livestock in pastoral and agro-pastoral areas multi-functions. Thus, reduction and loss of livestock have wider implications on the communities welfare. The other natural shock considered as the cause of poverty, especially for the children is death of a family member (specifically loss of a parent). The discussants were asked how the community members overcome such problems. Majority of them stated that it is the responsibility of their close relatives to take care of children who suffered a family loss. In this case, if the relatives are better off there is no problem even if the kids are many in number.

In addition, '*Prosopis'* is found to be poverty aggravate factor. During the journey made to the site for interview, it has been observed that most of the pastor land in the in the Afar region is invaded by vigorous bushy plant. The participants expressed how this plant caused poverty among their communities. They stated that "the plant hinders the growth of grass under its canopy, and even eradicates grass species forever. This has created a shortage of grass for their livestock feed. What is more, this plant gets easily multiplied by goats and other animals do not graze or browse this plant."

This has a wider implication for livestock, their products and productivity. Since most of the animals owned by pastoralist and agro-pastoralist are either browsers like camel which depends on standing bushes or grazers like cattle which depend on the availability of grass. Feed and water were acknowledged as the two most important determinants of livestock production system. The existence of this invasive weedy plant in the area has multiple negative effects on the livelihood of pastoralists. The previous quantitative studies from different disciplines support this finding. The study by Samuel *et al*. (2012) in Awash indicated that the invasion by '*Prosopis'* reduces grass availability and lowers the water table. The study by Jema and Abdu (2013) showed the economic effect of this plant around Dire Dawa. They found that invasion by '*Prosopis'* has significantly decreased annual income of the agro-pastoral households from livestock and their products sale.

Further, the participants were asked to enumerate the consequences of poverty in their communities. In pastoral and agro-pastoral areas, the consequences of poverty are numerous. Across most focus groups, participants stated that poverty resulted in migration to a nearby town, increased dependency on the government for help, resulted in kids' drop out of school to help family in searching of water. Recently, loss of human life especially the kids are the victim in this regard. In pastoral and agro-pastoral areas the consequences of poverty do not only end up with suffering of human beings and loss of life but being sources of conflict among neighboring regions and creating social unrest as well. Nowadays, poverty is even a cause of clashes within the same clan. This consequence is explicit in Afar's *Zone 3* and *City Zone* of Somali region. The participants stated that "nowadays theft of livestock is the result of poverty in our community. This is one of the causes of conflict among *Afar*, *Somali* and *Oromo* community." Nonetheless, it is not uncommon for these communities to clash over resources such as rangeland and water points.

4.3. Categorization of Poor and Non-Poor

Measuring poverty is one of the challenges encountered by the practitioners. This is partly related to which poverty line to use and sometimes lack of clarity on how to determine the threshold itself. In pastoral and agro-pastoral areas, the communities have their own ways of classifying household economic status based on livestock. Participants of focus-group-discussions were asked on how they rank an individual's or a household's economic status in their communities. Across all focus groups, participants indicated that livestock were often used to classify members in the community into the haves and the have nots. In the two regions included in the study, camel, cattle and goats and sheep are the major livestock resources owned by most of the community members. These animals are multifunctional. The purpose varies by species. Among these, camels serve as a measure of social status and wealth indicator, followed by cattle. However, in relation to this, goats and sheep have less importance, and they are used for wealth ranking purpose. In fact, it has been learned that all animals are used by varied groups for ranking the wealth status of an individual or a household in the community.

During the data collection time all of the study areas were severely affected by drought. To avoid biases that could arise because of this natural shock, participants were asked to discuss about the issue under normal circumstances. Participants in most groups from Afar expressed a household was considered poor if camel, cattle, and goat and sheep holding were less than 10, 20, and 100 heads, respectively. The corresponding figures for respondents from Somali Regional States were 10, 30 and 50, respectively. By comparison there was uniformity within the groups in both Somali and Afar in using the stated threshold, but there was slight variation between these two regions for cattle, goat and sheep.

4.4. Community Needs

Finally, participants were asked to give suggestions on how poverty could be alleviated and to identify the community's needs to combat poverty in their respective areas. Accordingly, a range of community's needs was identified. The suggestions were summarized as provision of water for livestock and human beings, restocking, provision of school and health services, infrastructure development and access to financial services. Participant in all groups suggested that the provision of water is seen as the first priority in their communities. Water is one of the important factors that determine the existence of livestock and humans in such environments. A woman participant from Afar stated that "for us water means a lot… we get milk if water is available for our livestock and it is very essential for our survival too…"

So addressing this problem is the first priority across all communities in the study areas. Restocking is another sustainability issues raised by participants. They indicated that "… restocking is very important to overcome the effects of drought which occurs recurrently…" Another participant from in City Zone stated that:

"Most of our community members only have livestock and I devoted my life in managing livestock…. This is what I obtained from my parents and this is also what I inherit to my kids. We do not know how to run other activities that support our life and I am 55 years old now. When I lost livestock to the drought… the government had to support me to enable me to return to usual way of life that I am used to….if not I have to look for a loan to buy livestock that I lost…"

A study by Little *et al*. (2008) found that in Eastern Africa restocking is a good strategy to overcome poverty in pastoral areas and keep herders from falling out of pastoralism. The implication of this suggestion was that the respondents were more comfortable in their already adopted lifestyle. However, some groups did not rule out to be engaged in other diversified livelihood system. For instance, group participants in Afar suggested that they "… need farming along with livestock". This is actually the best strategy to reduce the risk of relying on a single enterprise. In addition, running two enterprises together enhances the productivity of both sectors. The two regions (Afar and Somali Regional States) have huge potential for farming, especially using the *Awash* and *Wabishebele* rivers, respectively. When pastoralists are under pressure from natural hazards such as drought, they look for diversification of income generation to cope with such shocks. The upcoming inclination forwards farming activities has it own implication for pastoralist settlement. Nevertheless, this result cannot he considered as conclusive since there are many other driving forces.

The other community needs suggested by most focus groups participants were the provision of services and infrastructure such as school, health services and road. Participants raised problems regarding different services. In some areas health centers and schools were not accessible even to the agro-pastoralists. A participant from *Fafan zone* in Somali region complained:

"…In search for modern education, we send our kids to schools situated 10 km away from our living areas and we do not have health centers and road… during the rainy season the *Toga* overflows and those who were out of home to pay visit to a market in a nearby town were unable to come back home.… simply because of absence of a bridge on Toga river let me tell you, for us the only development we can talk about is the presence of peace and security in our areas as compared to the earlier times that is the only development we can boost of….." During our field visits, it was observed that in some areas there were physical infrastructures for social services such as schools and health centers. Even though such infrastructures do exist, the centers were not giving adequate services or no services at all. For example in *Amosobure Kebele*, it was observed that the school and health posts were constructed before two years, before but they did not provide any service. Similarly, empty health posts were observed. A participant from that area summed up the situation saying that ''when we need drugs, there are no drugs in the center".

5. Quantitative Result

5.1. Household Poverty Profile

Before presenting results of multidimensional poverty analysis, provision of unidimensional poverty analysis results could be informative. Hence, this part is complementary to the multidimensional poverty analysis results presented in the ensuing sub-section. Here, poverty assessment based on indicators like consumption, asset holding, education and access to basic services and infrastructure are presented. When poverty is measured using this approach, usually different poverty lines are considered. Table 1 and 2 (see appendix provides the result for these poverty indicators).

Consumption is one of the most widely employed measures of welfare in most developing countries. However, here the focus is to measure food poverty; hence, food consumption expenditure by household was considered. Food consumption includes food items that a household had purchased most frequently. The LSMS data set has 16 food items and all of them were considered in the construction of aggregate food consumption by the sample households. In addition, the food produced at home by a household and food from gift and other sources were also included. These were the three possible food sources asked in LSMS household module. The purchase part was collected in both consumed amount and total value. However, the home production and consumption from other sources were collected in terms of the amounts consumed.

To determine aggregate consumption, first the unit values reported by the sample households were calculated from purchase sub-section. It was obtained by dividing the total value by the amount purchased. Then this unit value was used for valuation of home production and amount of food attained from other sources.

The food consumption aggregate was obtained as sum of purchases, home production and gotten from other sources. Similarly, the total consumption expenditure by a household was constructed from food expenditure and non-food expenditure by a household. Finally, food share was calculated from total consumption expenditure. To measure food poverty the cut-off point had been chosen. Here, the proportion of 60 percent advocated by the World Bank was used as a cut-off point to demarcate the household as poor or non-poor.

According to this identification criterion, a household that spends greater than 60 percent of expenditure on food was considered poor. On the other hand, those households that spend less than 60 percent of expenditure on food were not considered poor. The basic assumption was that the poor would spend more on food than other consumption components. The matrix plot shows (not reported) that the majority of the observations lie to the right of 0.5 using the bottom left of the cell or higher than 0.5 in the upper right cell. This indicates that majority of the sampled households spent more on food consumption. To be exact in proportion, the result in Table 3 shows that 77 percent of the sampled households spent more than 60 percent of their expenditure on food consumption; the proportion was higher in Somali with 79 than 74 percent in Afar. The implication is that most of the households were found to be poor in pastoral and agro-pastoral areas of Ethiopia.

The other most important poverty measure was based on asset approach. Asset includes a number of components, however. In pastoral and agro-pastoral context, livestock are considered as a measurement of wealth and prestige. The pastoral communities classified themselves into the 'haves' and the 'have nots' based on livestock ownership. Qualitative study results have shown that, the classification varies with livestock type; camel was seen as the most important measure of wealth status of households followed by cattle and small ruminants in that order.

The major livestock owned by the households were camel, cattle; goat and sheep. As mentioned earlier, first these livestock type were converted in to the Tropical Livestock Unit (TLU) at sub-aggregate level and then the total TLU was computed as the sum of these sub-aggregates for each household. Then the cut-off point was constructed based on community level data. Accordingly, cut-off point corresponding to each livestock type has been identified. In both regions, there were no differences among the two regions on the camel number used to classify poor from non-poor, but there were variations regarding the other animals. To construct a common poverty line certain assumption and procedure were required. To operationalize, these cut-off points were converted into TLU and then average TLU had to be computed for each region.

The result showed 11.63 TLU and 11.53 TLU in Somali and Afar Regional states, respectively (see Table 2 in the appendix). These figures were almost the same. The common cut-off point was computed from these two averages as 11.58 TLU to compare households using this indicator. Accordingly, in this community the household that owned more than 11.58 TLU was considered as non-poor, otherwise poor. The uses of this line need caution. There is a probability that it underestimates poverty. For example, the household that had 12 TLU was considered non-poor because its holding lies above 11.5 TLU thresholds. However, if this household had only a camel for which total TLU was computed in terms of camel he/she had only 9 which categorize him as poor irrespective of the region he/she lived. To avoid this and related disputes it was assumed that all households had a mix of these livestock type for several reasons. Based on this demarcation 69.93 percent of the sampled households had TLU which was less than the threshold level in Somali regional state, while it was 71 in Afar regional state. Overall, 66 percent of pastoral and agro-pastoral households were poor, using this indicator. However, this result is inconsistent with the previous findings for instance like Devereux (2007) found that the majority of pastoralist and agro-pastoralist households do not poor using livestock as poverty measure.

Education was often used as an indicator of poverty in the dashboard approaches. In the rural areas education increases retrieval and use of the information, awareness and knowledge about the proper utilization of resources on which their livelihood depends. This indicator was constructed as the average education level attained by the household members, excluding children under 11, those who did not start schooling and those who have attended less than the first cycle. This is based on the assumption that education has a spillover effect on the household members. Based on this indicator those households with member who did not get enrolled for schooling were considered poor, and those having members with completed years of schooling as not poor. Following this, 47 percent of sample households did not have schooling record in Somali regional state and 32 percent in Afar. But the combined sample showed that 42 percent of the sample households were educationally poor. Access to basic services and infrastructure availability are also useful dimensions in the poverty assessment. There are different community level characteristics that are associated with poverty. These include access to road, telecommunication service, extension services, health services, market and access to financial services.

The delivery of these basic social services to pastoralist and agro-pastoralist are found to be very low. As can be seen from Table 2 showed, most of these services were not available to pastoral and ago-pastoral communities. The most severe one was access to financial services and institutions. Financial services rendering institution like commercial banks to pastoralists and agro pastoralists as such services are often concentrated in towns and cities. Moreover, their services are not inclusive given the religious base of these communities. Still worse, 93 percent of the sample households had no access to micro-finance institutions which are assumed to be relatively compatible to these communities as they do not depend on the interest rate for delivering finance services.

Similarly, the distribution of the health services was found to be poor. For example, 82.3 percent of the sample households had no access to hospitals and health centers. In addition, 80 percent of pastoral and agro-pastoral households did not have access to telephone services. Access to potable water is one of the most important inputs in the livestock production system. However, only 26 percent of the households in these communities had access to water points. Similarly, 66 percent had no access to the market institution that is very important for the pastoralist to convert their livestock and livestock products and by-product into cash.

5.2. Multidimensional Poverty Status

Measuring multidimensional poverty status starts first by testing of the hypothesis followed by the measurement. This was done using correlation/covariance among these poverty dimensions and their indicators. The test was based on the correlation coefficient among the three poverty dimension and the correlation among their indicators. Confirmatory Factor Analysis was performed to test the multidimensionality poverty hypothesis proposed. The correlation coefficient from the estimation result presented in the table 3(see appendix). The correlation evidence from Confirmatory Factor Analysis resulted from structural equation model indicated that the sign of the relationship was as expected and consistent with the definition of multidimensional poverty derived from the integrated theoretical models. As expected the capability dimension has positively related with the economic wellbeing dimension, with the correlation coefficient of 0.67 this indicated that there is positive association between capability and economic wellbeing dimensions. On the other hand, the social exclusion positively correlated with the both economic wellbeing and capability dimensions with the correlation coefficients of 0.68 and 0.5, respectively.

In addition to the correlation coefficient among the three poverty dimension validation test were also important in testing the hypothesis proposed. The validation test was performed using simple correlation and by getting the convergent and discriminant validation evidences of the three poverty dimensions measured by observable indicators. At latent stage the discriminant validation required that the correlation between latent variables must be less than the perfect correlation that is 1 or -1. And also small correlations between latent variables indicate discriminant validity. Here the discriminant validity indicated the extent to which economic wellbeing discriminates from capability and social exclusion dimensions. The correlation coefficients among the three dimensions were also less than perfect correlation see table 3 this is in favor of discriminatory validity for the dimensions used.

At the indicator level convergent validation was indicated by evidence that different indicators of theoretically similar or overlapping latent variables are strongly interrelated. The discriminant evidence provided indicators from two distinct latent variables are not highly interrelated. The result from factor analysis was reported in table 5 in the appendix. The item test correlation result showed that the indicators of the three unobserved poverty dimensions were not highly correlated indicating that the latent variables they associated with are distinct. The discriminant validity test based on indicators and dimension showed that the use of three poverty theories as separate but interrelated dimension was appropriate. This confirms that the multidimensional hypothesis and showing that the inclusions of these dimensions were right. However, the causal effect among these poverty dimensions were not supported by the model the result indicated insignificant causal estimates among poverty dimensions. The next step was estimation of poverty status of the households. To perform this first the factor score for each household must be estimated. This was done for all three dimensions using SEM as a data reduction technique. The scores serve to rank the households. The estimation of SEM required the data has to be normally distributed. The multivariate normal distribution is one of the strong assumptions in SEM. Therefore, both unvariet and multivariate normality test was performed. The result from both test indicated that the data was highly skewed. The Mardia Skewness, Mardia Kurtosis and Doornik-Hansen test result rejects the null that the data has normal distribution. In addition, the kernel density estimation also supported this result.

The estimation for the SEM was reported in table 6 in the appendix. However, the goal was to estimate the scores for latent variables. The score was estimated using Bayesian mean score estimation techniques for each household for the three dimensions. The factor score for the capability, economic wellbeing and social exclusion for households were represented by a composite measure that summarizes the information provided by their respective indicators. These estimated factor score was used to rank the households. This allows us to see the relative position of a household in the overall distribution. The greater score puts a household at higher rank than household with low score. The larger the score indicate the household was better off than the household who has lower score. Once the household was ranked based on the score in each dimensions the next step is measuring or identifying of poverty. This required the cutoff point on the scores estimated. The mean and median scores are the two highly suggested in this regard. Here, the median score was used as cutoff point for demarcation.

Multidimensional poverty status of the household required first identification of the household based on each dimension and then aggregation over the three dimensions. The poverty measure cutoff point was applied to the estimated factor scores for each dimension of poverty. The result from the unidimentional measures showed high concentration of poverty for all three dimensions in both Somali and Afar regional states. Capability poverty was 47.54 percent in Somali regional state, while 56 percent of the rural households were capability poor in Afar. For the economic wellbeing dimension 45.2 and 61.5 rural households were poor in Somali and Afar regional states, respectively. On the other hand only 54.4 percent of the households were provided the basic social services facilities in Somali regional state. The 46 percent still excluded in this region. In Afar 60 recent of rural household was excluded from basic services delivery.

The multidimensional poverty status of each household was obtained by aggregation of his/her status from unidimensional result above. The bar chart (see figure 1 in the appendix) shows the frequency distribution of the households as per the result from aggregation of the three dimensions. As per the result, only 31(10.4 percent) of the households was not poor in any dimension. The remaining 266 households were found to be multidimensionally poor with variation among the three poverty categories.

The other important issues were categorizing the household according to the degree of poverty experienced. The household experiencing poverty on all three dimensions was considered as abject poor. As the result in table 4 above shows only 24 (8.1 percent) of the household found to be abject-poor. This group was deep-rooted in poverty, and their likelihood of escaping poverty was less as compared to the other categories. The households experiencing poverty in any two dimensions considered as very poor. The 131(44.1 percent) of the households were found to be in a very poor category. This was the group where most of the poor household concentrated. The households that are poor on any single dimension called poor. The result showed 111(37.4 percent) of the households were poor in one dimension. This group is relatively better off with much higher chance of escaping poverty than the rest of poor categories. Overall, 89 percent of rural households were found multidimensional poor in the pastoral and agro-pastoral areas. This result is consistent with the OPHI (2014) finding using different multidimensional poverty index which confirms that these areas were multidimensional poor as compared to other regions of Ethiopia.

6. Conclusions

Poverty is multidimensional particularly in pastoral and agro-pastoral areas. Due to this multifaceted poverty, professionals from different social sciences develop and use various theories that explain the phenomena. This research was intended to investigate multidimensional poverty in pastoral areas of Somali and Afar regional states. This study integrated different theories to explain poverty. It acknowledges the wellbeing of the human being as unobservable and introduce latent variable concept to capture the wellbeing in different dimensions.

The Q-square approach was employed in poverty analysis. The quantitative and qualitative result were presented in a separate sections, this is just one approach to present the finding. There may be other much better approaches of presenting the finding from mixed method research. The participants from FGDs showed poverty that is manifested in the areas in different ways. The cause also varied and ranges from natural causes like drought to deliberate exclusion by state not providing even basic services. The finding from quantitative result confirms this and poverty is multidimensional. The findings suggest that the integrated theories better explained poverty in these areas. The multidimensional hypothesis derived from the integrated theoretical model was confirmed. The findings from qualitative and quantitative converge in this regard.

Most of the sample households were poor multidimensional. The implication of this result is that for such households the likelihood of escaping poverty becomes low. Thus, addressing poverty in these area calls for targeting these different dimensions simultaneously. The government has to provide the basic services like school and health facilities, and ensure the smooth functions of these basic services.

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Appendix

Table 1: Unidimentional Poverty Profile

Poverty Type	Somali Region	Afar Region	Total
Food	78.54	73.79	77.02
Asset	63.93	70.87	66.15
Education	46.58	32.04	41.93
Adequacy of Food	60.73	71.84	64.29

Source: Author calculation using LSMS, 2015

Table 2: Access to Basic Services in the Study Area

Type	Access	No Access	Distance (kilometer)
Road	-	-	34.27
Extension Agent	75.72	24.28	51
Market	33.85	66.15	73.94
Commercial Bank	0	100	-
Micro-Finances	6.83	93.17	51
Water Points	25.47	74.53	-
Hospital &Health	17.68	82.3	23
Tele Services	20.50	79.50	33

Source: Author calculation using LSMS, 2015

Table 3: Correlation among Poverty Dimensions

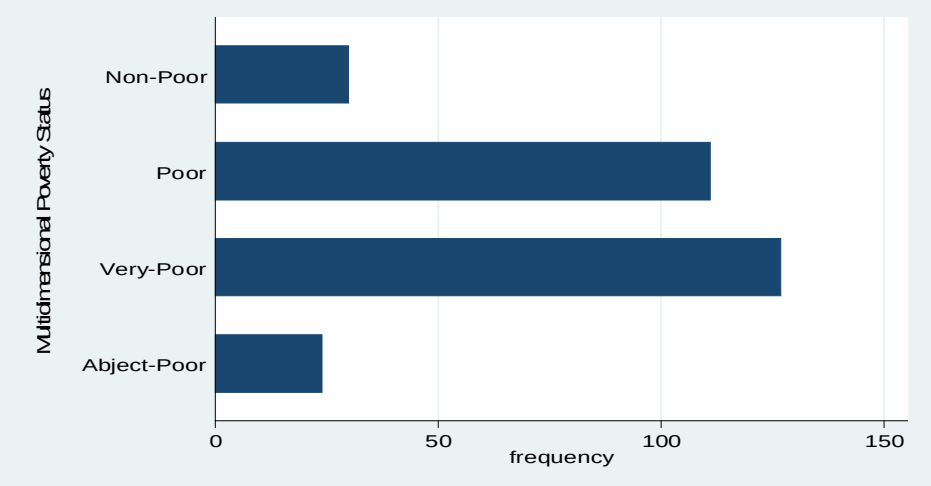
Dimensions	Capability	Economic Wellbeing	Social Exclusion
Capability	1.000	0.000	0.000
Economic Wellbeing	0.6720	1.000	0.000
Social Exclusion	0.5590	0.6817	1.000

Source: Author calculation using LSMS, 2015

Table 4: Multidimensional Poverty Incidence

Areas	Poor	Very Poor	Abject poor	Non Poor
Somali Region	32.52	49.00	7.77	11.17
Afar Region	48.35	34.07	8.80	8.79
Combined	37.37	44.11	8.08	10.44

Figure 1: Multidimensional Poverty



Source: Author calculation using LSMS, 2015

Table 5: Correlation among Poverty Dimensions

Market Access	297	0.51	0.40
Finance Access	297	0.34	0.46
Water Access	297	0.42	0.43
Extension Access	297	0.54	0.39
Consumption	297	0.54	0.39
Income	297	0.34	0.46
Asset	297	0.21	0.50
Empowerment	297	0.26	0.48
Health	297	0.34	0.46
Food Adequacy	297	0.45	0.42
Education	297	0.35	0.45

Source: Author calculation using LSMS, 2015

Table 6: Estimation from the Structural Equation Model

Variables	**Coefficients**
Per capita Consumption <-Wellbeing	-3.02
	(4.25)
Asset <-wellbeing	0.012
	(0.56)
Per capita Income <-wellbeing	-1.26
	(0.91)
Food Adequacy<-wellbeing	1
Education<-Capability	2.74
	(0.68)
Health<-Capability	-2.43
	(2.68)
Empowerment <-Capability	1
Access to Extension <-Social Exclusion	1
Access to Market <- Social Exclusion	1.05
	(0.58)
Access to Finance <- Social Exclusion	0.31
	(0.13)
Access to Water <- Social Exclusion	0.20
	(0.07)
Var (Wellbeing)	0.061
Var (Capability)	0.134
Var (Social Exclusion)	6.10
Cov(Capability Wellbeing)	0.034
Cov(Social Wellbeing)	0.322
Cov(Social Capability)	0.288
Observation	297

Source: Author Estimation Data LSMS, 2015