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Development Planning Unit (DPU), University College London (UCL), UK
Pastoral & Environmental Network in the Horn of Africa (PENHA), UK

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'Status and Determinants of Poverty and Income Inequality in Pastoral and Agro-pastoral

Communities: Household-based Evidence from Afar Regional State, Ethiopia'

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Abstract

This paper analyzes the incidence and determinants of poverty and income inequality in pastoral and agro-pastoral communities in Ethiopia. 2,295 households from Zone 1 and Zone 2 of the Afar Regional State were surveyed and analyzed using the FGT poverty index, the Gini coefficient, and a logistic regression. We find that 47.6 percent of the households are poor, with an income deficit rate of 17.8 percent and a poverty severity index of 0.092. Food poverty accounts 33.7 percent with an income gap of Birr 33 per month per adult equivalent. There is a higher level of food poverty in pastoral (35.6%) than in agro-pastoral communities(29.8%). 35.6 percent of PSNP non-participants and 32 percent of the participant households are poor. Koneba district has the highest rate of poverty (0.584), but Mile has the lowest level (0.24). Gender of the household head, family size, access to credit &mobility is affecting poverty at a 1 percent level of significance. While participating in safety net package programs, membership in local institutions, distance to market area and remittances are significant at the 5 percent, education level of the head of the household is valid at 10%. There is an alarmingly high degree of income inequality (0.592) in the study area. The lowest Gini index (0.433) is found in Koneba district and the highest index (0.616) is observed in widowed heads of households. Besides strengthening the policies and programs designed to address poverty, measures to ensure equitable distribution of incomes; modernizing local institutions, increase provision of social services, introducing packages specific to women and youth are highly demanding.

Keywords: Afar, Determinants, Income Inequality, Pastoral and Poverty

CHAPTER ONE: INTRODUCTION

1.1. BACKGROUND AND JUSTIFICATION

Social protection, as a means to reduce and mitigate the risk of drought and disasters and to ensure long-term development, has gained prominence over recent decades. In establishing social security systems, countries around the world have different modalities and differing degrees of coverage, with their own stories of success and failure in implementation. Social protection can be viewed as part of a comprehensive and integrated set of measures intended to help people get out of poverty and become part of, as well as beneficiaries of, the development process, so as to ensure equity for all sections of the population (Giovanetti, 2010; ILO, 2014).

A recent report of the International Labor Organization (ILO 2014) notes that, in spite of the positive contributions and greater salience of social protection measures, only a small percentage of the world's population (27%) has access to comprehensive social security systems.

In Ethiopia, despite the reduction in the incidence of poverty and its severity over time, resulting from the implementation of different development policies and strategies, around 30 percent of the population is still living below the poverty line (MoFED, 2013).

In 2005, aiming to enhance the overall welfare of society, the Ethiopian government, in collaboration with multiple stakeholders, introduced the Productive Safety Net Program (PSNP), a social security intervention, in the Tigray, Oromia, Amhara and Southern Nations, Nationalities and Peoples (SNNP) regions of the country. However, because of local implementation capacity limitations and concerns about the appropriateness of the program for pastoral communities, implementation of the PSNP was delayed in the Afar and Somali regions (World Bank, 2011). Thus, implementation of PSNP in the Afar region began later in the form of a pilot program, with significant scaling up in 2009 (World Bank, 2011; see also Dynamic Institute for Consulting and Training report, 2010).

Pastoralist and agro-pastoralist communities live in the arid and semi-arid rangelands of the south and east, and they comprise nearly 13 percent of the population, while these areas constitute about 63 percent of the country's land mass (MoARD, 2009). Mobility is fundamental to pastoralists' strategies for coping with unpredictable rainfall and with livestock diseases, as well as ensuring the sustainable use of scarce natural resources (Stark et al., 2011).

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Evidence shows that poverty in Ethiopia is much more widespread and severe among pastoralists and agro-pastoral households. In Afar Region, nomadism is extensively practiced and is the main livelihood. Comparing progress in terms of poverty reduction since 1995/96, when official poverty level data began to be systematically compiled, regions which at that time had higher levels of poverty than Afar Region have shown more rapid improvement.

Recent records show that 36 percent of the population of Afar region lives below the official poverty line (MoFED, 2012). But, research carried out in certain districts of Afar Region indicated that the extent of poverty in pastoral and agro-pastoral communities is as high as 64.8 percent of the population (Indris & Adam, 2011).

Many studies have demonstrated that social safety net programs have a significant effect in terms of reducing income poverty. However, empirical studies in Ethiopia, as well as in other countries, have shown conflicting results in terms of the impacts of programs. Even though both the incidence of poverty and the poverty gap have substantially declined overtime in rural and urban areas, poverty and food insecurity remain widespread and severe. Moreover, poverty remains much more widespread and severe among pastoralist and "semi-pastoral" households (MoFED, 2012).

Data from evaluations of the PSNP in the mid to late 2000s showed that 75 percent of participant households improved their consumption in terms of both quality and quantity of food. In addition, participants were able to preserve and enhance their household's consumption from own production and to protect their assets, not having to resort to selling assets to buy food (Devereux et al., 2006; Rachel et al., 2006). A study conducted by Shimeles (2009) confirmed and consolidated these findings. Gilligan et al. (2008) found a positive and statistically significant effect of the program on food security relative to non-beneficiary households.

International experience includes some notable successes. A study of a similar intervention in Indonesia revealed that households' participation in a social safety net program affected their consumption positively (Sumarto et al., 2005). In Colombia, involvement in the Familias enAccion[1] program raised households' level of food consumption by 15 percent compared to the

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[1] The Familias en Accion program is a conditional cash transfer program in Colombia instituted as part of a poverty reduction strategy.

previous year (Ayala & Endara, 2005). In Mexico, Progresa[2] beneficiary families increased their food expenditure by 33.33 percent more than did non-beneficiary households (DFID, 1999) and in South Africa the poverty gap has been reduced by 47 percent under comparable interventions (Samson et al., 2005).

On the other hand, a number of studies from Ethiopia have found that PSNP beneficiary households failed to accumulate assets or grow their assets (Gilligan et al., 2008). Anderson et al. (2009) showed that livestock holdings for PSNP beneficiary households did not increase. Similarly, Nigussa and Mberengwa (2009) showed that PSNP beneficiary households had very limited assets, in terms of type and quality, and that the PSNP had failed to produce encouraging outcomes in terms of household assets, as well as consumption. The findings indicate that PSNP beneficiary households still remain poor. Using the Propensity Score Matching technique, Gilligan et. al. (2008) also found little impact of Ethiopia's PSNP on participants, although one has to note that this study was conducted much earlier in the implementation of the program. Thus, empirical studies from Ethiopia and other countries have shown inconsistent findings on the impacts of the program on livelihoods, its effectiveness as a social security tool and on its value in terms of other socio-economic benefits.

While a lot of research work has been carried out on productive safety net programs, with a focus on rural areas, there are some gaps and failings in literature. Notable failings include the employment of small sample sizes, conducting an evaluation at the infant stage of a program and failing to consider questions related to effective and efficient social security. The harsh Afar environment, together with a lack of resources and limited local research capacity, have discouraged researchers and made it difficult to conduct large-scale, systematic research work in the region.

This study intends to address these gaps in the literature through an in-depth investigation of the current social protection program in the pastoral and agro-pastoral communities of Afar Region. The study assesses the effectiveness of the Productive Safety Net Program (PSNP) in Afar Region in ensuring social security, enhancing livelihoods and addressing broader economic problems, using a large-scale household survey and a systematic method of analysis.

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[2]Progresa is a social assistance program in Mexico.

1.2. OBJECTIVES OF THE STUDY

1.2.1. Research Aims

This study aims to assess the incidence of poverty, the determinants of poverty and income inequality in the pastoral and agro-pastoral communities of the Afar region.

1.2.2. Research Objectives

- To analyze the incidence of poverty, poverty gaps, and the severity of poverty in Afar Region;
- To identify the major determinants of poverty in Afar Region;
- To assess the source of income and income inequality in Afar Region

1.3. RESEARCH QUESTIONS

The following are the central questions raised and addressed in this study:

- What looks like the incidence of poverty, gap,and severity in the pastoral and agro-pastoral communities of Afar region?
- What are the factors affecting poverty in the pastoral and agro-pastoral communities in Afar region?
- What are the major sources of household income in the pastoral and agro-pastoral communities?
- Is there a fair distribution of income in the pastoral and agro-pastoral communities of Afar regions?

1.4. SCOPE AND LIMITATIONS OF THE STUDY

A quantitative study was carried out in two zones and five districts. The selection of the districts was made in such a way that the different livelihood systems of the region were represented. This selection also enabled a comparison of achievements under the PSNP, and effectiveness in implementation, across districts. The scope of the study was limited geographically, given the resources available, the methodology and the number of variables to be considered. Two zones, zones one and two, were selected in view of their proximity to the highland areas where the PSNP has been implemented. The study also focused on selected variables, including food

security, sources of income and income inequality, as well as basic measures of poverty. Poverty was analyzed using the expenditure approach, which is relatively better than the income approach and asset approach. Food security was examined by looking at access to food and income inequality was measured using the Gini coefficient.

The limitations of the study should be noted here and these include:

- Due to a shortage of rainfall, resulting from the El Nino phenomenon, Ethiopia endured an exceptionally severe drought in 2015. More than ten million Ethiopians and the Afar people, in particular, suffered from a lack of food and were dependent on emergency food aid from international donors (ECMO, 2015). This is likely to have significantly affected the results of our survey, in terms of the level of poverty and other variables, in ways that are difficult to determine.

- Moreover, given that emergency food aid was being provided to the rest of the community, excluding PSNP beneficiaries, it was difficult to assess the difference between PSNP beneficiaries and non-beneficiaries in terms of calorie intake. Such comparisons would have to be done in a "normal year" and estimation of a baseline year would be complicated.

- Although a random sampling technique would be appropriate across the whole study, due to the lack of a list of households at the village level, we were forced to use mixed sampling techniques in some cases.

1.5. SIGNIFICANCE OF THE STUDY

This research intended to assess the economic and development aspects of the pastoral and agro-pastoral communities, focusing on the incidence of poverty, the determinants of poverty and income inequality. This is, in essence, a development policy evaluation, that can help to fill observed gaps, from the perspective of pastoral and agro-pastoral communities. As this work involved the systematic analysis of large-scale household data, it provides a golden opportunity for policymakers and practitioners to address identified failings and to design new interventions and adjust policy in order to improve the well-being and livelihoods of the pastoral communities. The study is fundamentally supportive of the efforts of governmental administrations at different levels, and of non-governmental organizations. The study also

considers what is required for community institutions to play their role in this area, fully. The inadequacy of engagement with community institutions is one of the most important gaps identified and demands urgent intervention. The study is an addition to a growing body of literature on social protection in Ethiopia and complements the research work carried out to date on poverty, income inequality, and safety net programs in the pastoral and agro-pastoral communities.

CHAPTER TWO: DATA AND METHODOLOGY OF THE STUDY

2.1. NATURE OF DATA AND SAMPLING TECHNIQUES

2.1.1. DESCRIPTION OF THE STUDY AREA

Pastoralists and agro-pastoralists in Ethiopia are mainly located in the arid and semi-arid areas of the south and east of the nation, comprising around 13 percent of the population and 63 percent of the country's landmass.

The Afar Regional State, one of the nine Federal states of Ethiopia, consists of 72,053 sq. km., with a population of around 1.6 million (estimated in 2012). Compared with other regions, it is a vast and sparsely populated area, with 22.2 persons per square kilometer, Ethiopia's lowest area, situated in the north-eastern part of the country (CSA, 2007). The Afar region is located between 39^o34' and 42^o28' East (longitude) and 8^o49'and 14^o30'North (latitude). It is characterized by high temperature (25^0C-48^0C) and flat landscape with an altitude range of 116 meters below and 1600 meters above sealevel. Afar National Regional State is structured in five Zones, 32 weredas, 28 towns and 401 rural and urban Kebelles. It borders the countries of Eritrea in the north-east and Djibouti in the east, as well as Ethiopia's Somali regional state in the south-east, Tigray in the north-west, Oromia in the south and Amhara in the south-west.

87 percent of the population lives in rural areas, with pastoral and agro-pastoral livelihood systems. Women make up about 44% of the population, and 56% are men. In terms of the age profile, 43% of the population is under 15 years old. There are 247,284 households with an average family size of 5.7 persons, which ranges from 3.9 in the urban areas to 6.1 in rural areas (CSA, 2008).

While the population is overwhelmingly Afar, there is a degree of ethnic diversity in the Afar region. In 2008, the ethnic mix was as follows: Afar 91.8%, Amhara 4.5%, Argoba 0.92%, Tigrayan 0.82%, Oromo 0.7%, Wolaita 0.45%, and Hadiya 0.013% (CSA, 2008). In terms of religious composition, 96% of the regional population are Muslim and 3.86% Orthodox Christian, with very small populations of Protestants (0.43%), Catholics (0.09%) and others (0.02%). About 90% of the population bases their livelihoods on livestock production, with limited irrigated agriculture along the river basins and in low-lying areas. For the Afar, the basic livestock units are cattle, camels, goats, sheep, and donkeys. In general, the Afar communities participate in livestock production not only for economic reasons but also because of its social

and cultural significance, and its relationships to social values and the kinship systems as a whole (Getachew, 2001).
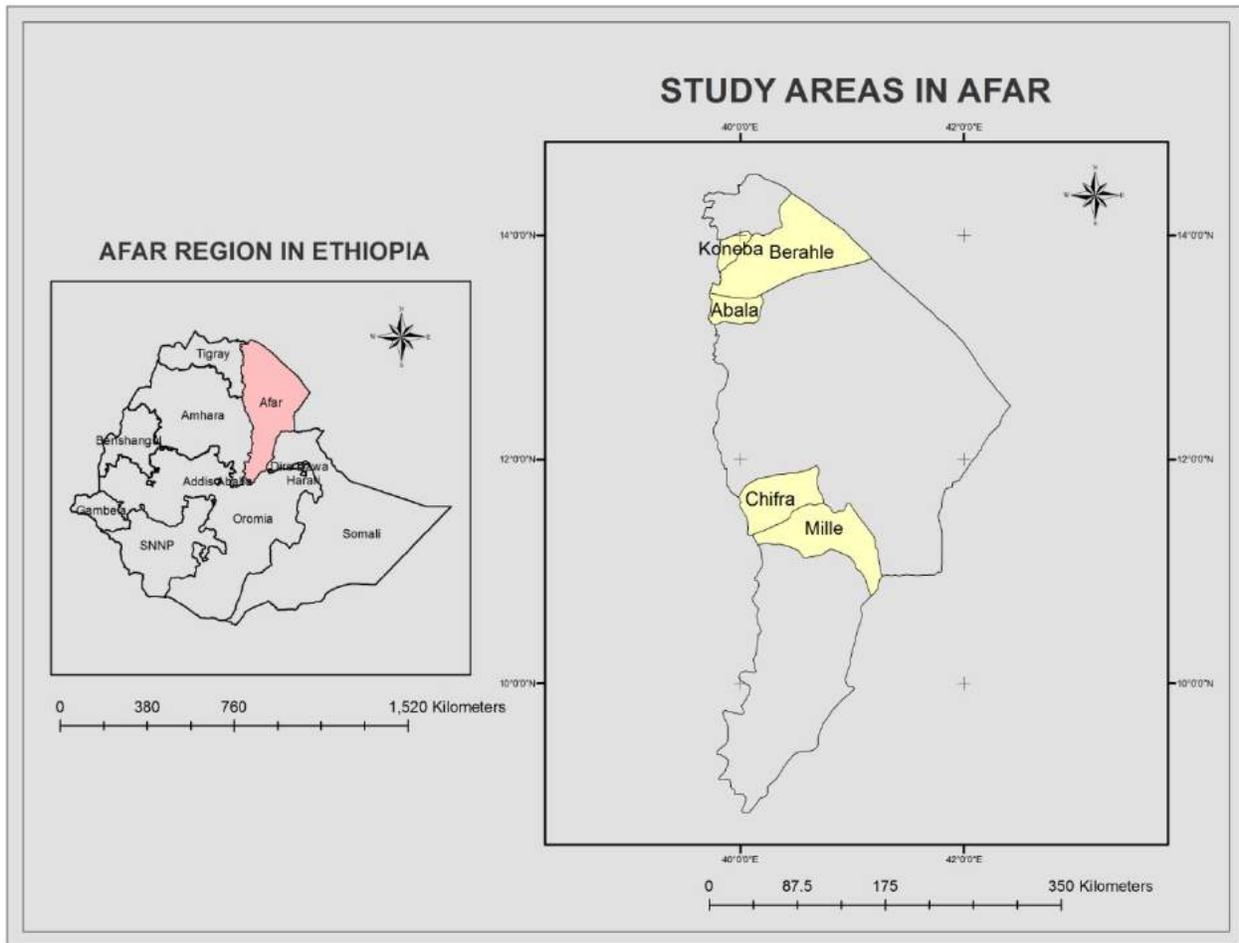
Figure 1. Administrative map of Afar Region and sampled districts

The study focuses on two zones of the Afar region, Zone 1 and Zone 2, which border the Tigray and Amhara regions.

Zone 1

According to Central Statistical Authority of Ethiopia (CSA, 2007), the Zone 1 has an estimated total population of 410,790, of whom 224,656 were men and 186,134 women. While 82,886 or 20.18% of the population were urban residents, a further 178,557, or 43.47%, were pastoralists. The zone covers an area of 30,242.10 square kilometers, and it has a population density of 13.58 persons per square kilometer. Asayita is the largest town and capital of the Zone 1. Geographically, Zone 1 borders in south, southwest, west, northwest, and north to Zone 3, Zone

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5, Amhara regional state, Zone 2, and Zone 4 respectively. Zone 1 also borders to countries of Eritrea and Djibouti in the northeast and east, respectively.

Zone 2

The Zone 2 has a population of 391,467 (estimated in 2012) and 55.9 percent are male, while 44.1 percent are female. The total area of the zone is 18,068.34 square kilometers, with a density of 22 people per km^2. Only 7.5% of the population is living in urban areas. Zone 2 is bordered to the south by Zone 1, to the southwest by Zone 4, to the west by Tigray Region, and internationally to the northeast by Eritrea. The administrative center and capital of Zone 2 is Aba'la (CSA 2007).

2.1.2. SAMPLING AND SOURCE OF DATA

This study employed a mixed approach with an emphasis given to a quantitative household survey supplemented by qualitative research. Quantitative research was used to examine micro-level evidence on the poverty, determinants of poverty and income inequality. In order to capture factors and variables that are non-quantifiable (either methodologically or for other reasons), qualitative methods of data analysis were also used to describe the socio-economic activities and institutions contributing for poverty reduction and enhancing household income in the pastoral and agro-pastoral communities.

So, the study employed both primary and secondary sources of information. The most important source of information for the study was data collected using both structured and semi-structured questionnaires, complemented by interviews, focus group discussions and field observation. Using multi-stage random sampling, five pastoral and agro-pastoral districts and fifteen villages were covered in this study. A three-stage random sampling method was also employed to select representative households from the respective villages.

The selection of respondents through multi-stage sampling involved three steps:

- First, respondent households were classified based upon the administrative structure, and the sample size was allocated proportionately to districts based on their population size.
- Then, villages in each district were classified based upon their livelihood systems, that is, pastoralist, agro-pastoralist and mobile pastoralists. Three villages, two pastoralists, and

one agro-pastoralist were selected randomly from each district and the sample was again allocated proportionately, according to their populations.

- Finally, households were selected using a systematic sampling procedure from each already randomly selected village.

2.1.2.1. Geographical distribution of households

Based upon the projected population sizes of districts in 2016, the total sample size of 2,500 households was selected from 5 districts and 15 villages. Table 1, below, shows the number of sampled households for each district. However, because of missed values and unfilled questionnaires, a total of 2,295 (92%) households were used for analysis.

Table 1: Sample size by zone

Zone	District	Number of Respondents	Percentage	Cumulative share
Zone 2	Aba'la	376	16.38%	56.34%
	Berhale	552	24.05%	
	Koneba	365	15.9%	
Zone 1	Chifra	394	17.17%	43.66%
	Mile	608	26.49%	
	Total	2,295	100	

Source: SPIDA survey 2017

As Table 1 indicates, 56.34 percent of the total respondents were from Zone 2, while the remaining 43.66 percent of respondents were from Zone 1. 26.49 percent of respondents were drawn from Mile district, followed by 24.05 percent, 17.17 percent, 16.38 percent and 15.90 percent for Berhale district, Chifra district, Aba'la district and Koneba district respectively.

2.1.2.2. Sample share of the beneficiary and non-beneficiary households

Looking at sample households on basis of their participation in the Productive Safety Net Program (PSNP), 51.37 percent were participants in the program (of various types) and the remaining 48.63 percent were non-participants. Chart 1 shows the sample distribution of households based on PSNP participation. The total number of PSNP participants was 1,179 (51.37 %) and non-participants numbered 1,116 (48.63%).

Chart 1: Share of PSNP participant and non-participant households in the sample
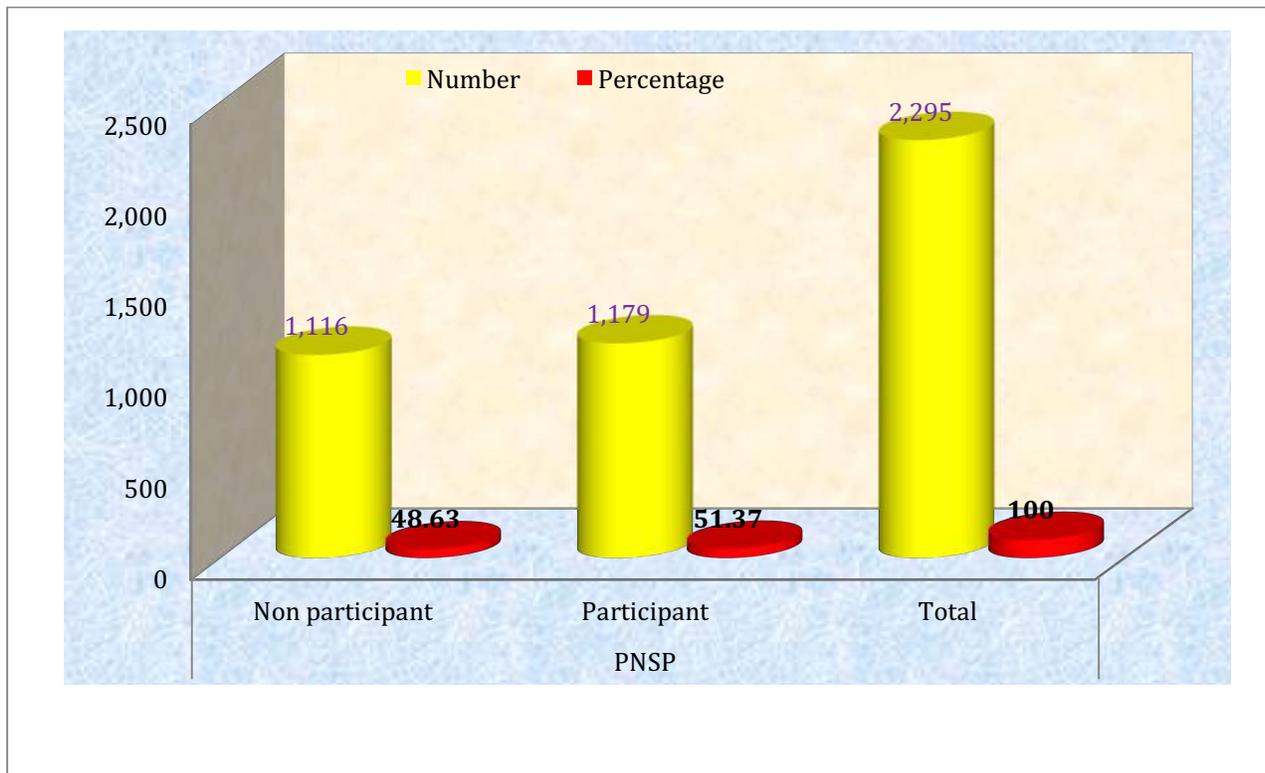
Source: SPIDA survey 2017

2.1.2.3. Sample composition and specific household features

Sample composition encompasses different household features, including gender, marriage status, level of literacy and different age categories. The ability of the data collection methods used to take into account different household features is important to the utility and quality of the research. The mean age of respondents was 36.7, ranging from 18 years to 65 years. The mean family size of the households was 5.7. A complication here is that men may have more than one wife, so that (total) family size varies widely, ranging up to 16 family members for a multiple-household family.

The number of male-headed households was more than double the number of female-headed households. As shown in Table 2, out of the total of 2,295 sampled households, 1,584 (69.01%) were male-headed households and 711 (30.99%) were headed by a female. Looking at productive safety net participation by gender of household head, 56.4 percent of participating households were headed by a female, and 49.12 percent were male-headed households. The non-participants were divided as follows: the share of male-headed households was 50.88 percent and

the remaining 43.6 were female-headed households. 53.68 percent of the sampled households have access to potable water, while the remaining 46.32 percent do not have access to any potable water source in their locality.

Table 2: Gender and access to services by PSNP participation

Gender	PSNP			Access to credit	PSNP		
	No	Yes	Total		No	Yes	Total
Female	310	401	711	No	1,046	1,093	2,139
	43.6	56.4	100		48.9	51.1	100
	27.78	34.01	30.98		93.73	92.71	93.2
Male	806	778	1,584	Yes	70	86	156
	50.88	49.12	100		44.87	55.13	100
	72.22	65.99	69.02		6.27	7.29	6.8
Total	1,116	1,179	2,295	Total	1,116	1,179	2,295
	48.63	51.37	100		48.63	51.37	100
	100	100	100		100	100	100
Potable Water	PSNP			**Health Post**	PSNP		
	No	Yes	Total		No	Yes	Total
No	459	604	1,063	No	285	244	529
	43.18	56.82	100		53.88	46.12	100
	41.13	51.23	46.32		25.54	20.7	23.05
Yes	657	575	1,232	Yes	831	935	1,766
	53.33	46.67	100		47.06	52.94	100
	58.87	48.77	53.68		74.46	79.3	76.95
Total	1,116	1,179	2,295	Total	1,116	1,179	2,295
	48.63	51.37	100		48.63	51.37	100
	100	100	100		100	100	100

Source: SPIDA survey 2017

It is to be expected that pastoralist and agro-pastoralist households have limited access to credit services, which can be influenced by culture, religion, the lack of infrastructural development, distance to major towns and other factors. Unsurprisingly, only 6.8 percent of the sample households had had the opportunity to make use of credit facilities provided by financial institutions and other financial service providing organizations.

Health services are among the most important social services for any community. In the study areas, 76.95 percent of respondents have access to health services at a nearby location, while the remaining 23.05 were far from such services.

There is strong social interaction, but exclusions and discriminations associated with the marital status of the head of the household both in the pastoral and agro-pastoral communities. Our survey considered the marital status of the household head. As shown in Table 3, below, 71.29% of respondents were married, 11.37% were divorced, 11.15% were single and 6.10% accounted by the widowed heads.

Table3: Marital status of household head

Marital status	Number of respondents	Percent
Married	1,636	71.29%
Single	256	11.15%
Divorced	261	11.37%
Widowed	142	6.19%
Total	2,295	100%

Source: SPIDA survey 2017

Education is widely seen as a basic social service needed to ensure an appropriate level of human capital formation. Even though educational services are rarely available in the pastoral communities, in recent years there have been significant improvements and the Ethiopian government has undertaken the designing of an appropriate schooling system that can function in pastoral areas. In our survey, the educational level of respondents ranged from the illiterate to those with a degree-level education and above.

Most household heads were illiterate. But our survey showed the range of educational possibilities, at all levels, that exist in the pastoral and agro-pastoral communities. Thus, Table 4, shows a wide range of educational attainment among our respondents. 81.09 percent of them were illiterate, while others had completed different levels and forms of schooling: elementary (6.01%), religious education (4.92%), high school (2.31%), junior school (1.92%), adult literacy classes (0.78%), college/diploma (0.96%), and university (0.57%).

Table 4: Literacy level of the household head

Literacy level	Number of respondents	Percentage	Cumulative Share
Illiterate	1,861	81.09%	81.09%
Religious	113	4.92%	86.01%
Adult literacy	18	0.78%	86.8%
Elementary	138	6.01%	92.81%
Junior	44	1.92%	94.73%
High school	53	2.31%	97.04%
Preparatory	33	1.44%	98.47%
Diploma	22	0.96%	99.43%
Degree	13	0.57%	100%
Total	2,295	100%	

Source: SPIDA survey 2017

2.1.3. The Data Collection Process

Before the data collection process was carried out; coordinators and enumerators were selected and trained for two days. Five district coordinators from each district, 15 village coordinators from each village and 104 enumerators participated in the data collection process. Two principal researchers and five associate researchers supervised data collection closely.

Through a pilot survey in Aba'la (agro-pastoralist) and Berhale (pastoralist), the content of the questionnaire was tested. This helped to measure the level of understanding of the questions on the part of both respondents and enumerators, as well as to determine whether there were any significant omissions or additional points that needed to be covered. The questionnaire was found to be satisfactory, with only minor corrections incorporated to fit with the cultural and livelihood systems of the pastoralist and agro-pastoralist communities.

2.2. METHODS OF DATA ANALYSIS

A quantitative household survey provides the basis for this study, aiming to assess various dimensions of poverty, in particular, its distribution and severity.

A binary logistic model is employed and various determinants of poverty are analyzed. Targets included the sources of income and its distribution, the impact of the PSNP on consumption and assets, as well as other key variables.

Primary data collected in the sample survey encompassed information on social and demographic characteristics, consumption, income, social services, livestock ownership and institutional variables. Quantitative data analysis involved the calculation of the Forster-Greer-Thorbecke (FGT) index and the application of an econometric to assess household poverty. The Gini coefficient was employed to measure the income distribution.

2.2.1. Poverty Analysis with Foster-Greer-Thorbecke Indices

We used the expenditure approach, with a family of poverty indices, developed by Foster, Greer, and Thorbecke (1984), to analyze the status of poverty among PSNP beneficiaries and non-beneficiaries. For the poverty line, we used a calorie intake of 2,200 kilocalories per adult equivalent, identified as the lowest amount of calories needed to sustain an adult equivalent for a day in Ethiopia.

The incidence of poverty was examined using the three FGT Measures. The Head Count Index (P_0) reflects the percentage of the poor, Poverty Gap Index (P_1) depicts the extent to which households are living below the poverty line (the poverty gaps) and the Poverty Severity Index (P_2) measures not only the poverty gap but also its distribution among the poor (WBI, 2005). So, we are aiming not just to assess how many people are poor, but also how poor they are (in relation to the established poverty line).

Where **Z** is the poverty line, Y_i is the actual expenditure (adult equivalent) of individuals below the poverty line, **n** is number of people, **q** is the number of poor people (normally those below the poverty threshold), **α** is poverty aversion parameter, a weighting that the researcher can set at 1, 0 or 2,[3] (WBI, 2005), the FGT index or Pα is given by:

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

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[3] **α** is value set by the researcher(at 0, 1, or 2) to determine the degree to which the measure is sensitive to the degree of deprivation for those below the poverty line Higher values of α give greater weight to the poorest and the degree to which they fall below the poverty line.

This is, roughly speaking, the number of poor households multiplied by the gap between each household's expenditure and the poverty line, divided by the total number of households. If the value of alpha is set at zero(α =0), then the FGT(Pα) simply becomes the Head Count Index (P$_0$), the share of the population that lives below the poverty line. (Setting alpha to zero simply reduces the expression in square brackets to 1, since anything set the power zero becomes equal to 1. And we are left with q, the number of poor people, divided by n, the number of people). When α has a value of 1, Pα is the Poverty Gap Index (P$_1$), which gauges the intensity of poverty. (It is the average poverty gap for a household in the sample divided by the poverty line). When α =2, Pα becomes the poverty severity index. This takes an average of the squared poverty gap for each household, and gives greater weight to how much a household falls below the poverty line).

Household expenditure is considered an adequate measure of household welfare in developing countries as it is better able to capture a household's consumption capabilities (Grootaert, 1986). There are two main reasons to use consumption expenditure as compared to net earnings from various livelihood activities. First, some components of household consumption are usually measured more accurately than income, and second, consumption is less susceptible to income volatility, especially in the context of rural households in developing countries, which strongly depend on agricultural income.

2.2.2. DETERMINANTS OF POVERTY IN A LOGISTIC REGRESSION

Econometric models are useful tools, but the accuracy research results depend greatly on having the proper identification of the model.

To determine the factors influencing pastoral and agro-pastoral poverty, we applied a logistic regression (essentially a regression where the explanatory variables are trying to answer a "yes or no" question), with the explained variable (poor or non-poor) being the dichotomous variable[4]. If the explanatory variables are dichotomous ("yes or no", dummy variables), the Logit model is the appropriate one (Gujirati, 2006).

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[4]A Logit model is applicable for qualitative binary variables that have two outcomes, ie. Y=1 if the head is poor and Y=0 if non poor.

The independent variables used in the analysis were demographic variables (sex, age, marital status of the head, family size), educational level, PSNP participation, health, participation in community affairs, access to water sources, distance to market, access to animal health services, credit services, savings, participation in local institutions, experiences of shocks and area of residence.

So, as we are seeking to explain a binary status (*i.e.* being poor or non-poor), let the underlying response variable **y*** is defined by the regression relationship (Ibid):

$$y_i^* = \beta_i X_i + U_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 1$$

Where y_i^* is the status of household, i is a set of coefficients for each explanatory variable and X_i is the set of explanatory variables (determinants), U_i is the error term and i represents households that run from 1 to n.

When y* is unobservable, we only observe a dummy variable *y* explained by:

y =1 if *y* >* 0, and

y =0 otherwise…………………………………………….2

Here, the response variable assumes two values, 1 if the household is poor, 0 if not. The likelihood of the household being poor rests on a group of variables represented by X so that,

$$P(y_i = 1) = F(\beta X) \text{ and}$$

$$P(y_i = 0) = 1 - F(\beta X) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.3$$

Where F is the cumulative distribution function for the error term U_i

Therefore, our Logistic regression model is given by:

$$Logit(P) = \ln\left[\frac{P}{1-P}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots\dots + \beta_n X_n \dots\dots\dots\dots.4$$

Where β_1, $\beta2\dots\dots\beta_n$ are the predictor variables, the age of household, size of household, literacy level of the head, etc., and P is the probability that the household is poor.

2.2.3. INCOME INEQUALITY

Ensuring equity in incomes is an important aspect of interventions that aim to enhance the welfare of communities. Interventions that address income inequality are a vital element in poverty reduction programs undertaken in the Least Developed Countries (LDCs), where addressing absolute as well as relative poverty is important in maintaining and promoting social cohesion.

Here, we assessed income inequality in the pastoral and agro-pastoral communities using the Gini coefficient (GC), the most commonly used measure of income inequality. The Gini gauges the share of the total income of the population that is earned by different segments of the population.

Graphically, the share of total income is presented on a vertical axis, and the corresponding share of the population earning that income along with a horizontal axis. If X_i is a point that lies on the horizontal (X-axis) representing the cumulative percentage of population and Y_i is a point on the vertical (Y-axis) representing the cumulative percentage of expenditure (our measure of income here), then the Gini-coefficient (GC) is given by the formula below (WBI, 2005);

$$Gini(GC) = 1 - \sum_{i=1}^{N} \left(X_i - X_{i-1} \right)\left(Y_i + Y_{i-1} \right) \ldots\ldots\ldots\ldots(1)$$

Where X_i is the cumulative percentage of the population, Y_i is the value of the cumulative percentage of income and N is sample size.

The Gini index can be straightforwardly calculated from the household income, expenditure or any welfare indicating data after sorting the observations. For the Gini coefficient, inequality varies from 0 to 1, with zero indicating that income is (perfectly) equally shared and distributed. When the GC approaches one, income is skewed to certain groups, with an unfair distribution.

The distribution of total household income and/or expenditure, income per capita and expenditure per adult equivalent shows the disparities across districts surveyed and also between the poor and the non-poor pastoral and ago-pastoral communities.

CHAPTER THREE: DISCUSSION AND ANALYSIS

3.1. POVERTY, DETERMINANTS AND INCOME INEQUALITY IN AFAR REGIONAL STATE

3.1.1. SETTING THE POVERTY LINE

The Cost of Basic Needs (CBN) approach was employed to determine the poverty line. This approach is used because current prices of goods and services have remained (almost) constant as compared with previous years, and so have the ability to show the real expenditure behavior of households, as well as the consumption patterns of households, since consumption or preferences can be assumed to remain constant despite changes in income. With this rationale for using the CBN, the following steps were employed to obtain the poverty line:

1. Identify and select the food items commonly consumed by the majority of the poor. 11 food items (Table 5) were identified.

2. Each food item in the bundle of goods is weighted with the appropriate unit of measurement (kilogram and liter).

3. Each unit of the food items consumed by a household in a month is divided by the corresponding number of adult equivalent units (AEU) members of the household to get the number of kilograms each adult individual gets in a month.

4. Sum all food per adult equivalent units consumed in a month to get the monthly requirement and divide by 30 days to compute the daily requirements of food for each adult equivalent unit in the household.

5. Assuming 2,200 kcal per adult equivalent to being the minimum calorie required per adult equivalent per day in Ethiopia, the researchers estimated the cost of meeting this food energy requirement.

Using this method, the food poverty line (FPL) was determined to be Birr 289.21[5] per month per adult equivalent or 3,470.52 per year. Once the food poverty line was computed, the total poverty line (TPL) was derived by taking the average food share of the lowest (first quartile) proportion of the population, represented by the formula presented in the footnote to the table below (Maru, 2004 and WBI, 2005), against the food poverty line which resulted in a total

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[5]The Birr is the Ethiopian currency and has an official exchange rate to the US dollar of Birr 25.55=$1.

poverty line of Birr 389.2[6] or 4670.44 per year per adult equivalent. The non-food poverty line (NFPL) came to Birr 99.79, which is 25.64 percent of the total poverty line.

Table 5: Food items used to estimate the poverty line

Food item	Kg/month / AE	Kcal/ 100g	kcal/month /AE	kcal/AE /day	Share (%)	Average price	Food expenses
Wheat	4.82	351	16918.2	563.94	25.63	14.5	69.89
Maize	7.1	362	25702	856.73	38.94	11	78.1
Barley	1.6	354	5664	188.8	8.582	10.5	16.8
Sorghum	2.9	380	11020	367.33	16.7	10	29
Onion	0.11	42	46.2	1.54	0.07	30	3.3
Berbere	0.18	15	27	0.9	0.041	130	23.4
Meat	0.16	143	228.8	7.6267	0.347	90	14.4
Butter	0.135	736	993.6	33.12	1.505	140	18.9
Sugar	0.2	400	800	26.667	1.212	30	6
Milk	3.9	79	3081	102.7	4.668	6	23.4
Oil	0.172	884	1520.48	50.683	2.304	35	6.02
	16.457	3746	66001.28	2200	100		**289.21**

Source: SPIDA survey, 2017.

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[6] $$Pl = \left[\dfrac{FPl}{\left(\dfrac{ASB}{TExpLow}\right)}\right] = \dfrac{289.21}{\left(\dfrac{353209.4}{475333.2}\right)} = \dfrac{289.21}{0.743} = 389.2 == 389$$

where   PL is the total poverty line

FPl   is food poverty line

ASB   is average food share of the bottom 30 percent

TExpLow is total expenditure of the bottom 30 percent

3.1.2. IDENTIFYING THE POOR

The level of poverty was measured using the Head Count Index (P_0), Poverty Gap Index (P_1) and Poverty Severity Index (P_2). The headcount index measures the percentage of the households who fall below the poverty line. The poverty gap index measures the extent to which the poor households are living below the poverty line. The poverty severity index reflects not only the poverty gap but also the degree of inequality between the households.

3.1.2.1. BASIC NEEDS AND FOOD POVERTY

The incidence of poverty was analyzed using the total food poverty line Birr 389.2 per adult equivalent per month and further discussion is based on the food poverty line of Birr 289.21. For various reasons, economic and non-economic factors, the non-food consumption expenditure of the households is considered to be high as it accounts for more than 25 percent of the total expenditure of the households. Most importantly, the cost of transportation is the main input influencing the price of manufactured goods and services needed by households.

Table 6: Total poverty across zones and districts

Category	District	Head Count Index(P0)	Poverty Gap Index(P1)	Poverty Severity Index(P2)	Total Poverty Line(TPL)
	Zone1	0.335(0.015)	0.127(0.008)	0.076(0.006)	389.2
Zone	Zone 2	0.531(0.014)	0.197(0.007)	0.099(0.005)	389.2
	Aba'la	0.566(0.026)	0.203(0.012)	0.098(0.008)	389.2
	Berahle	0.397(0.021)	0.131(0.009)	0.059(0.005)	389.2
District	Chifra	0.305(0.023)	0.112(0.012)	0.068(0.01)	389.2
	Koneba	0.696(0.024)	0.292(0.014)	0.159(0.011)	389.2
	Mile	0.355(0.019)	0.137(0.01)	0.081(0.008)	389.2
	Population	0.476(0.011)	0.178(0.005)	0.092(0.004)	389.2

Source: SPIDA survey, 2017.

Table 6 shows that 47.6 percent of respondents are living below the minimum calorie intake required. The poor households are 17.8 percent (Birr 69.8) below the poverty line with a poverty severity index of 0.092. Zone 2 has the highest level of poverty (53.1%), a poverty gap index of

0.197 and a poverty severity index of 0.099. Households in Zone 1 are characterized by a headcount index of 0.335, an income shortfall of 0.127 and a squared poverty index of 0.076.

All FGT poverty measures also varied across districts. Koneba has the highest level of poverty (69.6%), followed by Aba'la (56.6%) and Barahle (39.6%). The lowest poverty headcount index was recorded in Chifra (30.5%), followed by Mile (35.5%).

Thus, our findings are consistent with those of other research studies carried out on poverty and livelihoods in Ethiopia's pastoral and agro-pastoral communities (Mohammed, 2012; Ogato, 2009; Shibru et al., 2013), confirming the existence of a high level and severity of poverty. In what follows, we will mainly make use of the food poverty line to discuss the food security and food poverty status of pastoral and agro-pastoral households.

Using Birr 289.21 as the food poverty line, 33.7 percent of the respondents were found to be living below the poverty line, with a poverty gap index of 11.4 percent[7] and a poverty severity index of 5.4 percent. When we investigated the incidence of poverty across the zone, the highest level of poverty (38.4%) is recorded in Zone 2, with an income gap index of 0.125 and a squared poverty gap index of 6 percent (Chart 2).

Chart 2: Incidence of poverty by zone
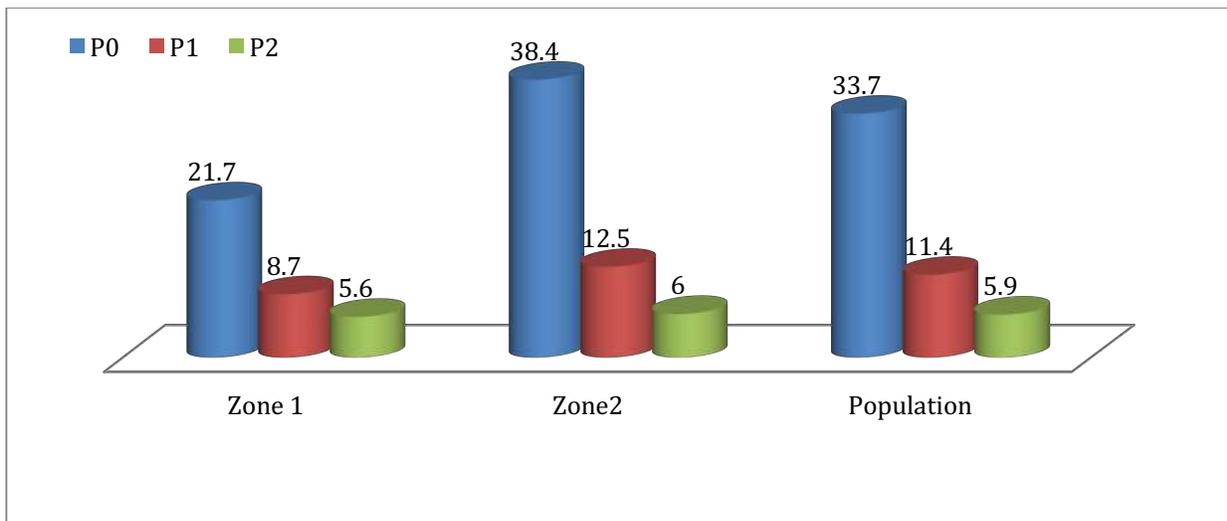
Source: SPIDA survey, 2017.

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[7]On average, Birr 32.97 per adult equivalent is required to lift the poor to the level of the poverty line. This is a useful gauge of how much is required in terms of transfer.

21.7 percent of respondents in Zone 1 were living below the poverty line, with an income gap index of 0.087 and a poverty severity index of 0.056. Thus, Zone 2 of the Afar region has the highest headcount index, poverty gap, and squared poverty gap index, when compared with Zone 1.

The highest incidence of poverty was observed in the Koneba district, with a headcount index of 0.584, a poverty gap index of 0.213, and a poverty severity rate of 0.105. In this district, more than fifty percent of respondents are living with a level of consumption below the minimum calorie intake required to sustain life.

This district not only has the highest percentage of poor but also has a larger poverty gap and a high poverty severity index.

Table 7: Level of Poverty across Districts

District	Head Count Index(P0)	Poverty Gap Index(P1)	Poverty Severity Index(P2)	Food Poverty Line
Aba'la	0.319 (0.024)	0.102 (0.009)	0.044 (0.005)	289.21
Berhale	0.268 (0.019)	0.078 (0.007)	0.034 (0.004)	289.21
Chifra	0.256 (0.022)	0.087 (0.009)	0.042 (0.006)	289.21
Koneba	0.584 (0.026)	0.213 (0.013)	0.105(0.009)	289.21
Mile	0.24 (0.017)	0.09(0.008)	0.05 (0.006)	289.21
Population	0.337 (0.01)	0.114(0.004)	0.054 (0.003)	289.21

Values in brackets are standard deviations

Source: SPIDA survey, 2017

On average, the poor households in this district need Birr 61.6 per month per adult equivalent to lifting them to a point where they get the minimum calorie intake needed per day. This amount of money is 186.7 percent higher than the amount of money required to raise the poor households to the poverty line.

The second highest degree of poverty is recorded in the Aba'la district, which had a poverty headcount index of 0.391, poverty gap index of 0.102 and a squared poverty gap index of 0.044.

The Barahle district is characterized by a poverty headcount index of 0.268, a poverty gap index of 0.078 and a squared poverty gap index of 0.034. In Chifra district, 25.6 percent of households were living below the poverty line, with an income gap index of 0.087 and a poverty severity index of 0.042.

The lowest level of poverty is observed in Mile district. Here, 24 percent of the surveyed households are poor, living a full 9 percent below the poverty line. The poverty severity index was 0.05. In this district, households need Birr 26.02 per adult equivalent to reach the minimum required calorie to sustain life. The amount of money corresponding to the poverty gap index in Mile is Birr 6.95 less than the population income shortfall and 57.8 percent less than the income shortfall of the district that features the highest incidence of poverty (Koneba).

As indicated above, a total of fifteen villages drawn from the five districts have been included in this study. As Table 8 reveals, there is an alarmingly high incidence of poverty, greater than the population poverty headcount index of 0.335, in Koneba, Elhena, Wahdes, Mesgid, and Gelaeso. The highest headcount magnitude is found in Koneba village, Koneba district, with a poverty level of 0.713, a poverty gap index of 0.276 and a severity poverty index of 13.7.

To raise the living standard of the households in Koneba village to the level of the poverty line would require Birr 79.8 per adult equivalent per month. The second highest incidence of poverty was seen in Elhena village, Koneba district, with a headcount ratio of 55.2 percent, a 21.2 percent income shortfall and a poverty severity index of 11 percent. The third highest incidence of poverty was seen in Wahdes village, Koneba district, with an incidence of poverty ratio of 0.519, a poverty gap index of 0.143 and a poverty severity index of 0.055. This might be due to the fact that the villages in Koneba district lie in remote areas where there are no roads, no electricity, and no social services, and where there is a greater vulnerability to drought. All of these factors disadvantage the district relative to others.

On the other hand, the lowest level of incidence of poverty (14.9%) was found in Bure village, Berhale district, followed by Taeboy (15.9%) in Chifra district and Bekelidaar village (19%), in Mile district. In Bure village, the monetary value of the poverty gap index amounted to Birr 8.39 and the poverty severity index was 0.008. In Taeboy village the poverty gap index was 4.1

percent and the poverty severity index was 1.9 percent. In Bekelidaar village the poverty gap index was 7.2 percent and the poverty severity index was 4.4 percent.

Table 8: Poverty across villages

Group	P0	P1	P2	FPL
Bekelidaar	0.19 (0.029)	0.072(0.015)	0.044 (0.011)	289.21
Bure	0.149 (0.027)	0.029 (0.006)	0.008 (0.002)	289.21
Daar	0.315 (0.033)	0.093 (0.012)	0.039 (0.007)	289.21
Elhena	0.552 (0.035)	0.212 (0.018)	0.11 (0.013)	289.21
Gelaeso	0.388 (0.044)	0.113 (0.016)	0.046 (0.009)	289.21
Gerero	0.198 (0.036)	0.064 (0.014)	0.029 (0.008)	289.21
Geseyonaleas	0.28 (0.031)	0.102 (0.014)	0.051 (0.009)	289.21
Gube	0.247 (0.044)	0.077 (0.016)	0.032 (0.008)	289.21
Harsis	0.244 (0.029)	0.094 (0.015)	0.054 (0.011)	289.21
Hidmo	0.307 (0.037)	0.108 (0.016)	0.05 (0.009)	289.21
Koneba	0.713 (0.049)	0.276 (0.026)	0.137 (0.019)	289.21
Mesgid	0.393 (0.041)	0.148 (0.019)	0.074 (0.013)	289.21
Sabanademale	0.335 (0.035)	0.11 (0.015)	0.055 (0.01)	289.21
Taeboy	0.159 (0.032)	0.041 (0.012)	0.019 (0.007)	289.21
Wahdes	0.519 (0.057)	0.143 (0.021)	0.055 (0.011)	289.21
Population	0.337 (0.01)	0.114 (0.004)	0.054(0.003)	289.21

Values in brackets are standard deviations
Source: SPIDA survey, 2017

3.1.2.2. POVERTY AND DEMOGRAPHIC VARIABLES

3.1.2.2.1. Poverty and gender of the head of the household

The magnitude, depth, and severity of poverty differ across households within a particular community or section of that community. Many studies on pastoral and agro-pastoral communities support the idea that households headed by females have higher poverty, poverty gap, and severity indices.

As depicted in Table 9, 37.2 percent of the female-headed households in our survey were unable to cover the amount of food required to sustain life. These households are situated 12.8 percent below the poverty line with a severity index rate of 0.065. The male-headed households have a lower level of poverty than their female-headed counterparts. The incidence of poverty measured as the poverty headcount index is 0.307, with an income shortfall index of 0.112 (requiring Birr

32.4 to lift these households to the poverty line level) and a squared poverty gap index of 0.053. In this study, we found that female-headed households have a headcount index of 0.065 and a higher level of poverty, poverty gap index and poverty severity index than male-headed households.

Table 9: Poverty and gender of household head

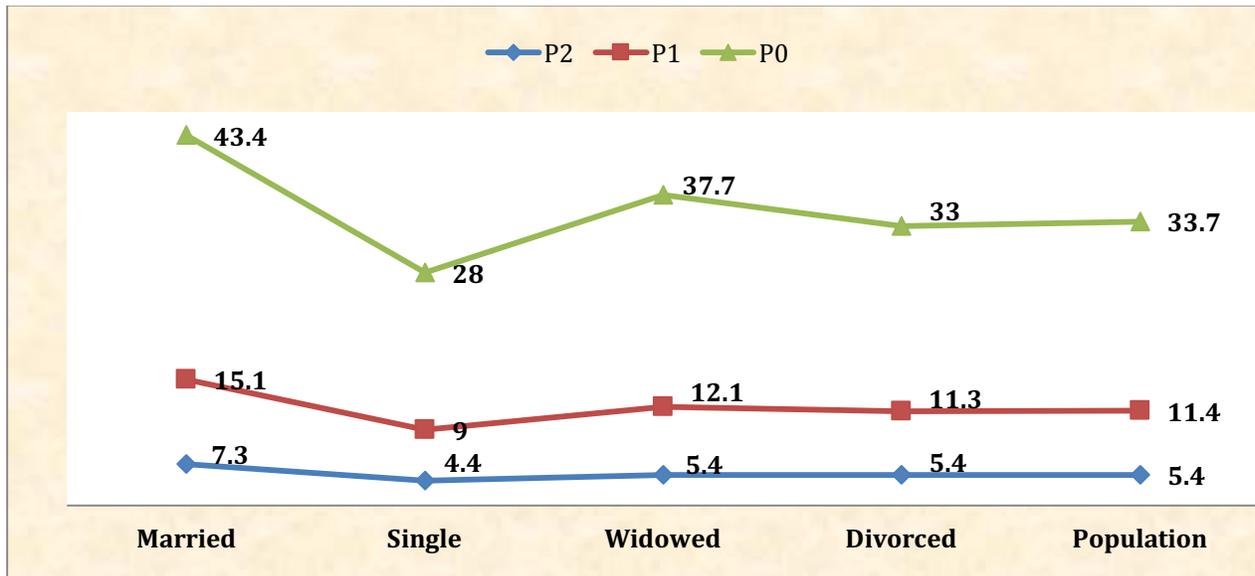| Gender	P0	P1	P2	FPL
Female	0.372 (0.016)	0.128(0.007)	0.065 (0.005)	289.21
Male	0.307 (0.014)	0.103 (0.006)	0.053 (0.003)	289.21
Population	0.337 (0.01)	0.114 (0.005)	0.058 (0.003)	289.21

Values in brackets are standard deviations
Source: SPIDA survey, 2017

3.1.2.2.2. Poverty and Marital Status

In poverty studies, the marital status of the household head is generally recognized as a demographic variable. The marital status of the head of the household has both economic and social influences. As a result, LDC governments increasingly tend to consider this question in their development agenda and policy interventions. In our research, as poverty is influenced by the marital status of the head of the household, due attention has been given to this factor in assessing the magnitude of and determinants of poverty. In our study, the highest poverty headcount index (0.434) was observed in married households, with a poverty gap level of 0.151 and a severity index of 0.073, while the lowest level of the incidence of poverty (28%) was recorded in single households, with an income gap index of 0.9 and a poverty severity index 0.044 (Graph 1).

37.7% of the widowed and 33% of the divorced households heads are poor, and unable to attain the required minimum calorie intake for a healthy life. The high incidence of poverty in married households might well be a consequence of large family sizes. 75% of the married, 14% of the widowed and 7% of the divorced have a family size greater than 4. High dependency ratios aggravate household poverty. Another factor is a lack of supplementary jobs for household members.

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Graph 1: Poverty and marital status of the household head

P2   **P1**   **P0**

	Married	Single	Widowed	Divorced	Population
P0	43.4	28	37.7	33	33.7
P1	15.1	9	12.1	11.3	11.4
P2	7.3	4.4	5.4	5.4	5.4

Source: SPIDA survey, 2017

3.1.2.2.3. Poverty and Educational level

Despite the extremely limited supply of educational services in the pastoral and agro-pastoral communities of the Afar region, level of education is expected to have a positive impact on the livelihoods and earnings of households, via its direct and indirect influences. Education improves the technological adaptation of households, improves the ability to utilize health services, increases the capacity of households to participate in economic activities and motivates people to use family planning services. In our survey, we found that different levels of education among households. The great majority of households are illiterate (81.1%), which is evidence of the restricted supply of education services in the study area.

We found different levels of poverty across the different categories of education and educational levels of the household heads. As shown in Table 10, a poverty incidence of 35.2 percent was observed among the illiterate households, with a poverty gap of 12 percent and a 5.7 percent poverty severity level. The second highest level of the headcount index (32.3%) was found with heads of households who had completed high school. Poor households with this educational level had a 9.1 percent income shortfall and a poverty gap index of 3.5 percent. We found the lowest poverty headcount index in the preparatory/high school achiever households with an incidence of poverty of 0.079, a poverty gap index of 0.022 and a poverty severity index of 0.007.

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Table 10: Poverty and educational level of the household head

Group	P0	P1	P2	Poverty line
Illiterate	0.352 (0.012)	0.12 (0.005)	0.057 (0.003)	289.21
Religious	0.308 (0.046)	0.077 (0.016)	0.034 (0.011)	289.21
Adult literacy	0.241 (0.107)	0.102 (0.068)	0.079 (0.066)	289.21
Elementary	0.308 (0.042)	0.11 (0.018)	0.056 (0.012)	289.21
Junior	0.236 (0.066)	0.083 (0.025)	0.041 (0.015)	289.21
Preparatory	0.079 (0.044)	0.022 (0.013)	0.007 (0.004)	289.21
High school	0.324 (0.069)	0.091 0.024)	0.035 (0.012)	289.21
Diploma	0.111 (0.074)	0.01 (0.007)	0.001 (0.001)	289.21
Degree	0.105 (0.099)	0.077 (0.072)	0.057 (0.053)	289.21
Population	0.337 (0.01)	0.114 (0.004)	0.054 (0.003)	289.21

Values in brackets are standard deviations.

Source: SPIDA survey, 2017.

For households where the head of household has an informal religious education (Kalwa/Quoarinic) and has completed their elementary school, the poverty gap index was 0.308. Taken together, diploma and first-degree holder households have a lower level of poverty, with a headcount less than 11.1 percent. Even though there is a relatively low level of poverty in the households characterized by high levels of education, we did not find a clear relationship between the level of education and the incidence of poverty. Our study shows an unclear or uneven correlation here, with ups and downs with respect to an increase in the level of education.

3.1.2.3. Poverty and community variables

The Government has allocated a significant percentage of its budget to social services, education, and health, as well as to water supply, electrification, irrigation, improved farm and pastoral

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inputs and to social protection interventions programs, like the productive safety net program, which target the poor, vulnerable and disadvantaged.

i. Poverty, livelihood systems,andprogram participation

The Ethiopian government has introduced different programs intended to improve the livelihoods of households, enhance their access to food during times of food shortages, and protect household assets, especially livestock from depletion. These, with the basic goal of maintaining the consumption level of poor households, are the aims of the Productive Safety Net Program.

Afar Region features both pastoral and agro-pastoral livelihood systems, each with a distinct way of life. Both are included in our study. As indicated in Chart 3, the highest level of poverty (35.6%) is in the pure pastoral communities rather than in the agro-pastoralist communities, who have a poverty headcount index of 0.298. The pastoral households' have a higher poverty gap index of 0.11 and squared poverty gap index of 0.056. The agro-pastoral communities were found to have an income shortfall index of 11.2 percent and a severity of poverty index of 0.065. Our comparative analysis of poverty based on the livelihood system of respondents contradicts the study conducted by Kijela et al. (2005), which assessed the pastoral and agro-pastoral communities in the Borena zone.

Participation of households in such programs and the provision of the basic social services are expected to make a positive contribution to reducing the incidence of poverty and to enhance the consumption level of households. For the PSNP in Afar Region, we found a significant difference between the percentages of poor among participating and non-participating households.

The lower level of poverty headcount index (0.32) was recorded in the households who are participating in the program. These poor participant households would need Birr 34.7 to lift them to the minimum calorie intake required to sustain a basic life, which is 2 percent higher than the amount required for their program participating counterparts. Even though 35.6 percent of the program non-participants are poor, they are situated 10.8% below the poverty line and would only require Birr 31 to attain the required calories per month. (It should be noted here that

program participants are selected precisely because they are poorer than non-participant households, to begin with).

Chart 3: Poverty and access to social services and livelihood
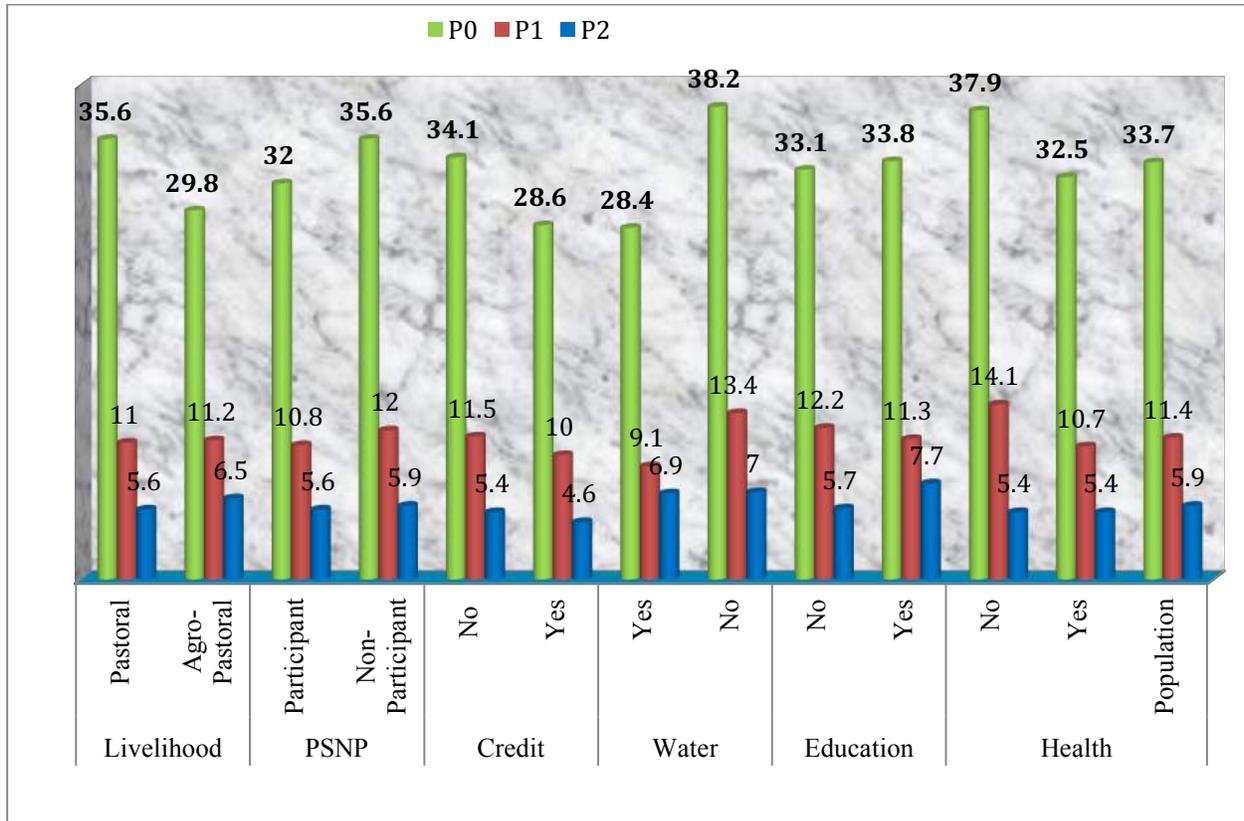
Source: SPIDA survey, 2017.

ii. Poverty and households' access to social services

In this study, the incidence of poverty was also analyzed on the basis of households' access to different social services. For various reasons, households differ in their need or desire to participate in finance and credit facilities. Because of poor infrastructural development and the particular cultural and religious features of the communities, the kinds of credit facilities available in the non-pastoral communities are either not available or have not been fully utilized. Still, households in these pastoral communities have a common practice and tradition of informal credit services, with money provided during times of need, when households face a financial deficit, by other community members family members, relatives, clan leaders, friends or neighbors.

In our study, we found that the magnitude, gap, and severity of poverty differ on the basis of households' access to credit facilities in the pastoral and agro-pastoral communities in Afar Region. Access to financial services is important in enabling households to cover short-term financial constraints, to open new businesses, to buy a farm or non-farm inputs, to buy livestock or breeding stock, or to buy consumable goods. As indicated in Chart 3, there is a higher level of poverty (34.1%) among households who do not have access to credit facilities who need Birr 32.5 per month for each adult equivalent to reach the poverty line. Besides, 28.6 percent of the households who are using credit services are living below the poverty line. Our findings are similar to those of many other studies assessing the role of access to credit facilities. The existence of a high level of poverty among households who do not have access to financial (credit) services in our study is in line with the findings of Elhadi et al. (2012).

38.2 percent of the households who do not have access to safe potable water are poor, living 13.4 percent below the poverty line, with a poverty severity index of 6.9 percent. 28.4 percent of the households who do have access to safe drinking water would require Birr 26.4 to reach the poverty line and they have a poverty severity index of 0.046. Chart 5 shows that there is no significant difference between the incidence of poverty among households having access to education nearby and those that do not. 33.8 percent of the households who do have access to education facilities are poor, with a poverty gap index of 0.113 and a squared poverty gap index of 0.057. And 33.1 percent of those who do not have access to education is poor, requiring Birr 35 to attain the minimum required calorie intake per adult equivalent per month, and having a squared income gap index of 0.07. When it comes to health services, we do find a significant difference in the magnitude of poverty on the basis of households' access to health services nearby and at lower transport costs. A relatively lower incidence of poverty (32.5%) was recorded in households who have access to health facilities and a higher level of poverty (37.9%), poverty gap and poverty severity index were observed with those who live far from health facilities.

iii. Poverty and household mobility

Most pastoral communities practice seasonal, transhumant movement. The mobile nature of households makes government interventions more complex and difficult to implement. This

affects the provision of education and health services, as well as the implementation of programs like the one assessed here.

As a result, the provision of social services is very limited and long distances must be traveled to reach service providers in the pastoral areas. Compared with the agro-pastoralists, we found that pastoralist households have higher levels of poverty on the three measures. When we compare poverty across pastoral communities, we found that those communities with the highest frequency or degree of mobility recorded the highest incidence of poverty.

Table 11: Poverty by mobility nature of the pastoral households

Group	Category	P0	P1	P2	FPL
	Non mobile	0.305 (0.015)	0.099 (0.006)	0.046 (0.004)	289.21
Pastoralist	Nomads (Mobile)	0.385 (0.014)	0.132 (0.006)	0.061 (0.004)	289.21
	Population	0.356 (0.01)	0.114 (0.004)	0.054 (0.003)	289.21

Source: SPIDA survey, 2017.

As evidenced in Table 11, 38.5 percent of the nomadic communities are poor, with an income shortfall of index of 0.132 (Birr 28.2) and a poverty severity index of 0.061. Compared with the nomads, non-mobile or less mobile pastoralists have a lower level of poverty (30.5%) with poverty gap index of 9.9 percent and a squared poverty gap index of 0.046. (Note that even the "non-mobile" pastoralists are likely to move during harsh dry seasons, or else to have some household members move with the animals at different times of the year).

3.2. ECONOMETRICS MODEL ON DETERMINANTS OF POVERTY

Identifying the particular factors influencing the livelihoods of the community is important in designing development policies and in enhancing the applicability or appropriateness of interventions. Poverty in the pastoral and agro-pastoral communities is influenced by specific household features as well as community-level variables, and geographical differences, among other things. We applied an econometric model to analyze the determinants of poverty in the pastoral and agro-pastoral communities. Our model employed some 18 explanatory variables, among which 9 were found to be statistically significant as determinants of the level of

household poverty. When we estimated the model, we found that most of the variables (their association with the outcome) had the expected sign, though half of them were not statistically significant influences on the incidence of poverty in Zone 1 and Zone 2 of the Afar Region. The age of the household head was hypothesized to have a positive association (i.e. old age was expected to be associated with greater poverty), but this turned out to be negative. This result might be due to the support that government, NGOs, other institutionsand family members provide to old people.

Table 12 shows the results of model estimation. Gender of the household head, family size, mobility, the number of household members participating in non-pastoral/farm employment and credit utilization were statistically significant at the 1 percent level. PSNP participation, household head's involvement in local institutions, remittances and distance to market were statistically significant at the 5 percent level. In addition, literacy was found to be statistically significant at the 10 percent level.

Before fitting the regression model, endogeneity, multicollinearity, and normal tests were conducted. These tests indicated that there was no serious econometric problem that would lead to biased estimation. In any case, we employed robust standard errors and corrected for heteroscedasticity. (In this type of regression one might anticipate statistical problems, perhaps due to the possibility of the explanatory variables being related to each other. For example, those households with large herds might be the same ones accessing credit. This might result in inaccurate or biased estimates for the coefficients.)

Table 12: Determinants of poverty using a logistic model

Poverty	Odds Ratio	Robust Std. Err.	z	P>z
Age of household head	-0.001	0.001	-0.81	0.419
Sex of household head (1= male)	-0.060	0.018	-3.36	0.001***
Remittances (1=yes)	-0.146	0.069	-2.1	0.037**
Saving account (1= yes)	-0.041	0.051	-0.8	0.423

Local institutions (1=yes)				
	-0.056	0.027	-2.07	0.039**
Family size	0.077	0.004	17.5	0.000***
Marital status (1= Married)	-0.015	0.02	-0.75	0.451
Literacy (1= literate)	-0.039	0.023	-1.7	0.089*
Asset value	-8.17E-03	6.57E-03	-1.24	0.214
Health access (1= yes)	-0.021	0.02	-1.05	0.294
Mobility (1=yes)	0.077	0.017	4.54	0.000***
PSNP (1= yes)	-0.04	0.02	-2.02	0.043**
Livelihood (1= agro-pastoralist)	-0.005	0.019	-0.29	0.773
Distance to market	0.011	0.005	2.26	0.024**
Non-pastoral/farm employment	-0.177	0.103	-3.66	0.000***
District (Aba'la district was taken as a benchmark)				
Berhale	-0.058	0.029	-2.03	0.043**
Chifra	-0.141	0.032	-4.47	0.000***
Koneba	0.094	0.037	2.53	0.011**
Mile	-0.084	0.032	-2.65	0.008***
Tropical livestock unit	8.98E-04	6.08E-04	1.48	0.14
Credit Utilization (1= yes)	-0.088	0.031	-2.82	0.005***
Extension contact (1= yes)	-0.069	0.05	-1.36	0.173
Constant	0.0743	0.024	-7.95	0

Number of observations = 2295

Wald chi2(21) = 375.06

Prob> chi2   =   0.0000

Pseudo R2   =   0.2095

Log pseudo likelihood = -1124.2074

Note: *, ** and *** indicate statistical significance at the 0.01, 0.05 and 0.1 levels, respectively. (The odds ratio gives a measure of the variable's association with the "outcome", poverty).

Poor households differ from the non-poor in several ways including the socio-economic characteristics, program participation, institutional participation and others factors. The determinants which are found to be significant are treated in three sections below.

3.2.1. Household variables

There are two variables: sex of household head and family size. They were statistically significant in the incidence of poverty in the pastoral and agro-pastoral communities. The coefficient associated with gender has the expected sign and is significant. Compared to female-headed households, the odds ratio for the male-headed households, the likelihood of being poor was reduced by 0.06. Given that other variables are constant; this might be explained by the fact that male-headed households have a better capacity to allocate their available resources in such a way as to obtain more calories per capita than their counterpart female-headed households. Moreover, male-headed households might have alternative income sources and resource entitlements than female-headed households. The result is consistent with the work of Alemayoh et al. (2008), Etim and Patrick (2010) and Mohammed et al. (2014).

Family size affects the incidence of poverty positively and remains significant at the 1 percent level of significance. A one unit increase in family size increases the odds-ratio (likelihood) of being poor by 0.077. The likely explanation is that as family size increases demand for household food increases, with limited opportunity for off-pastoral employment opportunities in the region. This finding is also in line with the empirical findings of Babu (1991), Bigsten et al. (1999), Dercon (1999), MoFED (2002), and Oduru and Aryee (2003).

One dimension of poverty is education, particularly when poverty is defined to include a shortage of capability and knowledge deprivation. The coefficient associated with literacy was found to be negative and significant, which means that literate household heads are less likely to be poor than are illiterate households. Having a literate household head modestly reduces the likelihood of a household being poor, with an odds ratio of 0.039. An explanation for this is that education might increase earning potential and improve the occupational and geographic mobility of labor.

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3.2.2. Community level factors

There are community-level variables that can affect the probability of being poor and the magnitude of this poverty in the pastoral and agro-pastoral communities. The probability of being poor depends on whether the household participates in the productive safety net program. The regression result from the logistic model revealed that households' participation in the PSNP helps to reduce the probability of being poor. The odds ratio shows that when involved in the PSNP, the odds ratio of a household being poor declined by a factor of 0.04, other things being constant. This might be because PSNP beneficiaries were getting the opportunity to raise their consumption through their participation in public works or through the receipt of direct support during times when their households were exposed to food shortages.

The seasonal or continuous transhumant mobility of households also affects the livelihoods of the households in various ways. While it enables pastoralists to maintain their herds, it has made the introduction of household-based interventions more complicated and challenging. As a result, mobile households are more likely to be poor than non-mobile communities, and the odds ratio of being poor for mobile communities is 0.077. An important factor here is that mobile households are households that might not receive support under the PSNP, precisely because of their mobility. The access of mobile pastoral communities to both components of the PSNP is greatly constrained, even when such households are in a food crisis and in need of such support. Their situation might well be made worse because these households are situated far from markets market, social services, and other services that could enhance their welfare.

Household members' participation in non-pastoral and farm activities also affects the incidence of poverty in the study area. A person's participation in such employment reduces the odds of being poor, with a negative odds ratio of 0.177. This variable is found to be strong and statistically significant in determining poverty in pastoral communities. Clearly, household members' participation in an income generating activity helps the household to increase consumption.

Lack of finance is amongst the major bottlenecks that constrain the pastoral people from undertaking productive investment and increasing the productivity of existing activities or establishing profitable new economic activities. Access to and utilization of credit is expected to provide better chances of getting involved in non-pastoral activities, as a result of which

households might increase or diversify their incomes and escape from poverty. It is undeniable that credit access facilitates households' ability to participate in business activities and can also support their consumption when they face a food shortage. Thus, in our study, we found that households who have access to such services and get involved were reducing the probability of being poor by the odds ratio of 0.088.

Households' participation in local institutional arrangements, religious, cultural and social, also facilitated a reduction in poverty. As these informal social institutional arrangements are a very crucial source of cooperation among the households during the time of crisis and difficulties, it affects the consumption level of the households. In fact, these social arrangements can be visible and practiced through networks, clan arrangments and cultural and religious ties. In this study, participation in local institutions helps households to reduce the level of poverty through the challenges affecting the consumption level of households. Generally, participation in local institutions reduces the odds of being poor, with an odds ratio of 0.056; it is statistically significant variable in determining household poverty at 5 percent level of significance. Beyond the direct food and non-food supports these members get from their local institutions, this might happen because households increase their awareness about economic possibilities or enhance their skills to turn opportunities into benefits for the household, or because they are able to share experiences and learn from each other during their institutional meetings. Moreover, participation might help to develop common understandings and provide access to local sources of support or risk sharing mechanisms for household members facing crises or unfavorable situations. All of these help households to maintain or increase consumption.

3.2.3. Spatial variables

The incidence of poverty is also influenced by geographic variables. The disparities across districts and difference in proximity to the strategic market centers and the most important social services are determining factors in the incidence of poverty in the pastoral and agro-pastoral communities of Zone 1 and Zone 2. In comparison to Aba'la district, Mile, Chifra and Berhale districts are less likely to be poor while Koneba district is more likely to be poor, or more accurately the odds of being poor are greater. This might be associated with the particular nature of the district, and with various factors that can enhance people's livelihoods and improve the productivity of households. The main factors here are the infrastructural arrangements, the

particular economic activities of the district and the accessibility of different utilities and services. The proximity of pastoral and agro-pastoral areas to (physical) market centers has been found to provide pastoral people with better access to (economic) markets and thereby contribute to lowering households' likelihood of falling into poverty (Bigsten et al., 1999). In our study, the coefficient for the variable "distance to market" was found to be negative and significant at the 5 percent level. All other things being constant, a kilometer increase in market distance from the pastoral and agro-pastoral household residence, the odds of falling into poverty tends to increase by a factor of 0.011. (Again, this is a fairly modest association.) The likely explanation for this is that the nearer the household is to market places and relatively large towns, the better the access to markets (enabling people) and to public services, as well as to private service providers, and hence the lower the chance of falling into poverty. This is because proximity to major markets provides better opportunities to buy food items and sell pastoral products, with the opportunity to buy and sell a wide range of goods at more favorable prices, helping to reduce transaction costs and enhance households' chances of using the amenities that the market provides. This finding is paralleled in the work of Bigsten et al. (2003) and Kebede et al. (2005).

3.3. HOUSEHOLDS' SOURCES OF INCOME AND INCOME INEQUALITY

3.3.1. SOURCES OF INCOME FOR HOUSEHOLDS

Based on the nature of their livelihoods, the accessibility of various economic opportunities and the particular interests, preference and capabilities of people in the pastoral and agro-pastoral communities, households depend on different sources of income. We found that households participate in a range of types of employment or activities to generate income and maintain themselves. Households' choices of supplementary activities depend largely on their way of life, pastoral or agro-pastoral, with livestock keeping as the mainstay for many. Thus, households in the study area undertake pastoral activities (43.62%) as their main activity, followed by including agricultural work (29.24%), domestic activities (8.76%), employment of different forms (7.71%), daily labor (3.22%) and various retail or trade activities (2.61%).

According to Table 13, 65.45 percent of the households do not have supplementary jobs to improve their monthly or yearly income. They depend on their main activity as the principal source of their households' income, even though many would like or are looking for supplementary jobs. Only 34.55 percent of households participated in other alternative income

generating activities, which might change from time to time, and differ in the nature of the work and with the season, gender and age of household head or member. 19.61 percent of households had handicrafts as their supplementary activity to generate income, followed by trading activity of various forms (3.53%) and involvement in pastoral work (3.97%).

**Table 13: Households' main and supplementary employment**

List of activities	Main activity		Supplementary activity	
	Freq.	Percentage	Freq.	Percentage of households
Pastoral	1,001	43.62%	91	3.97%
Agro-pastoral	671	29.24%	18	0.78%
Housewife	201	8.76%	46	2%
Daily labor	74	3.22%	32	1.39%
Skilled labor	9	0.39%	3	0.13%
Animal trading	12	0.52%	2	0.09%
Retail trade	60	2.61%	81	3.53%
Handicrafts	6	0.26%	450	19.61%
Employee	177	7.71%	2	0.09%
Tailor	2	0.09%	2	0.09%
Student	29	1.26%	23	1.0%
Shepherd/herder	3	0.13%	26	1.13%
Armed (police, soldier ...)	3	0.13%	1	0.04%
Maid	3	0.13%	15	0.65%
Retired	1	0.04%	-	-
Unemployed	43	1.87%	1,502	65.45%
Other	-	-	1	0.04%
Total	2,295	100	2,295	100

Source: SPIDA survey, 2017

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As the income of the household is directly related to the type of work that the household is involved in and the (relative) returns from that work, the highest share of income will be received by those in the sectors with the highest percentage of participation and rate of pay or returns. The major share of monthly income of the households came from the agricultural sector (33.82%), followed by the sale of livestock (29.67%), non-farm or non-pastoral work (9.57%), the sale of animal products (7.07%), the productive safety net program (5.16%) and participating in trading activities (4.28%).

Support from family and relatives also constituted 3.62 percent of households' income. Seasonal and permanent employment of household members in different sectors of the local economy made up 2.95 percent of the income of households. Aid from NGOs, government, and support given by local communities together provided 3.58 percent of the monthly income of households. But, more than 60 percent of the yearly income of the households is generated from three fairly "traditional" employment categories. The highest share of the yearly income of households came from the sale of livestock (32.45%), followed by the income from the agriculture (22.99%) and the sale of animal products like butter, butter, hides, and skins, as well as honey (9.7%).

Graph 2: Monthly and annual source of income of households
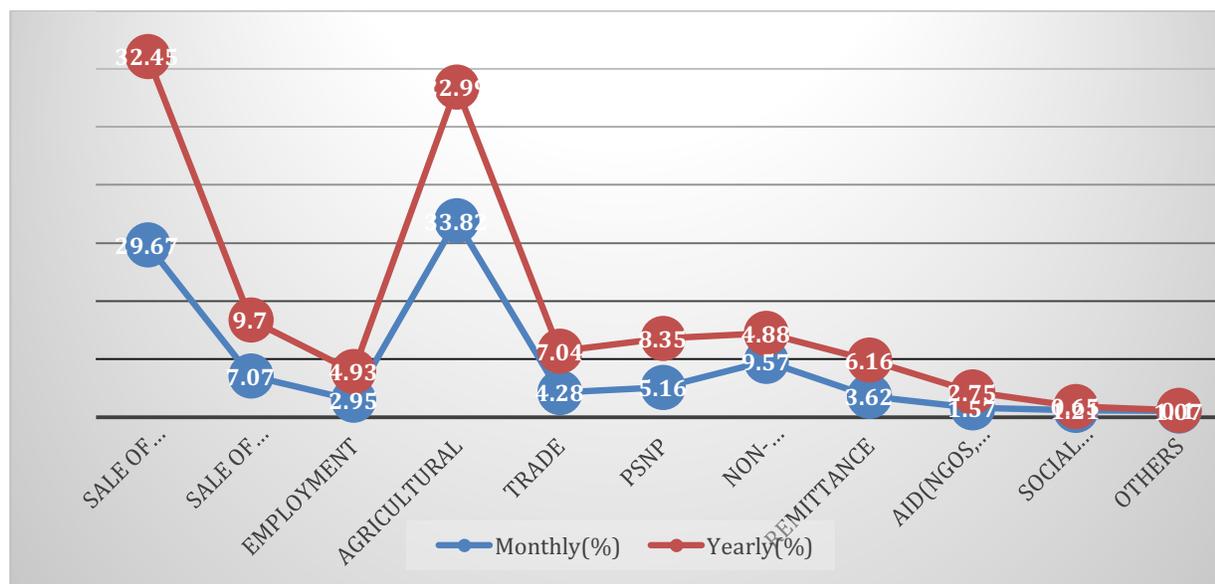
Source: SPIDA survey, 2017

The income households got from their participation in the Productive Safety Net Program makes up an 8.3 percent share of the yearly income of households in the study area – a substantial share.

As stated above and clearly shown in Graph 2, there are big differences between the dominant sources of monthly versus annual income. The highest annual income comes from the sale of livestock, while the highest monthly income comes from agriculture. This might be due to the fact that the former includes all transitions carried out over the whole year of the study period, whereas the monthly income estimates focused only on the month when the data was collected. Or else the data might indicate the continued centrality of pastoral livelihoods and incomes. Whatever the case, there is a high degree of "lumpiness" in both of these income sources, with sales coming at particular times of the year, rather than steadily throughout the year. This poses challenges in terms of consumption smoothing over the course of the year.

Table 14: Households' average monthly and yearly income (Birr/household)

Type of income source	Monthly Income (Birr)	Mean Yearly Income(Birr)
Sale of Livestock	418.06	3,635.05
Sale of animal products	99.65	1,086.53
Employment	41.59	552.27
Agricultural	476.57	2,576.09
Trade	60.37	788.8
PSNP	72.71	935.68
Non-pastoral/farm	134.9	547.07
Remittances	50.9	689.66
Aid (NGOs, government)	22.1	307.75
Social support (Community)	17.1	72.58
Others	15.05	11.48
Total	**1,408.98**	**11,203.9**

Source: SPIDA survey, 2017

Thus, from all sources of income, Table 14, the mean monthly income of households is Birr 1,408.98. The split is as follows: agricultural sector (Birr 476.57), the sale of livestock (Birr 418.06), non-farm/pastoral income (Birr 134.9) and the sale of animal products (Birr 99.65). Households have a mean yearly income of Birr 11,203.9 and the mean income deviation is Birr 72,291.04. The maximum income difference between the households is as follows: from the sale

of the livestock (Birr 3,635.05), farm income (Birr 2,576.09), the sale of animal products (Birr 1,086.53), income from participating in PSNP (Birr 935.68) and income from trade (Birr 788.8). These are the five most important sources contributing to the yearly income of households.

3.3.2. INCOME INEQUALITY

Ensuring an equitable distribution of income among households has been seen as critically important by many LDC governments. Poverty reduction efforts are even more worthwhile if they have the power to address income inequality and bring the about fairer distribution of income in which welfare of the society as a whole is maintained. As the income sources of households and the amounts they receive by activity or per specified time period differ, income inequality, as measured by the Gini coefficient, will certainly not be perfectly even and will be different from the level indicated by the equal distribution line.

Income inequality in the study area was analyzed using the commonly used, established measure of income inequality, the Gini coefficient.

Graph 3: Lorenz curves by districts
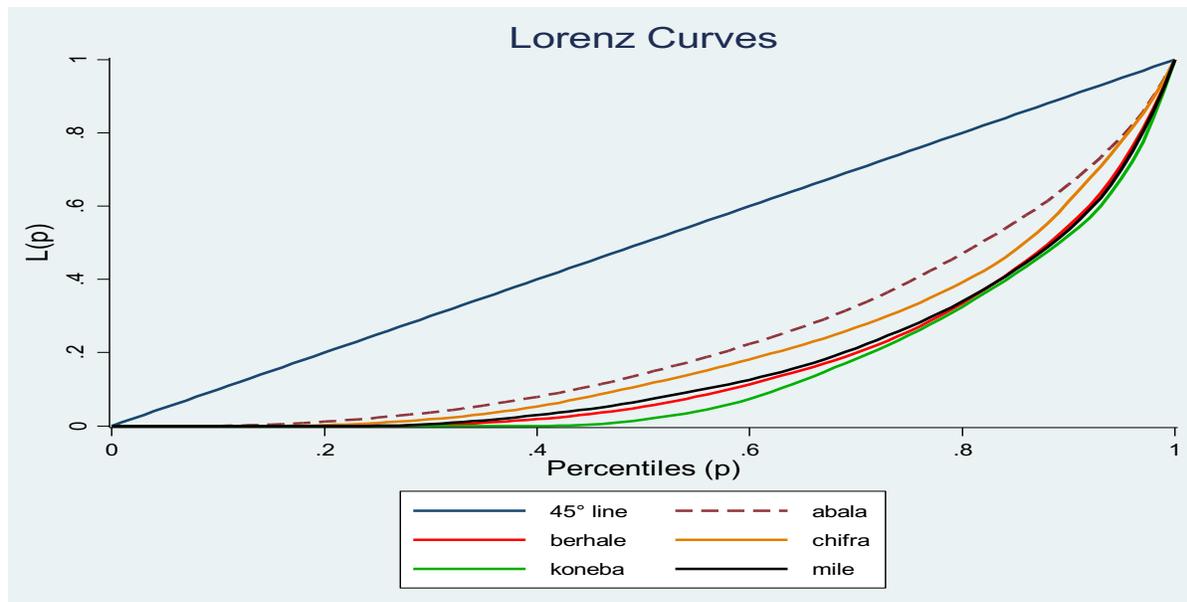
Source: SPIDA survey, 2017

As depicted in Graph 3 above, the income inequality in the study area is 0.592. This general Gini index is evidence of the existence of a high level of inequality among households. There was no major difference in the Gini index across the two study zones (Zone 1 and Zone 2 of the Afar

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region). Households in Zone 1 had an inequality level of 0.588 and Zone 2 had somewhat higher Gini index of 0.599. In this study, we found a relatively lower Gini index, compared to other districts, in Koneba district (0.433), followed by Mile (0.56) and Aba'la district (0.566). The highest income inequality (0.618) was found in Berahle district, followed by Chifra district within the index of 0.581.

Except for Koneba district, with a Gini index below the level of fifty percent, all the districts have a Gini index of more than fifty percent, which is recognized as indicating an unfair distribution of income. In spite of the highest incidence of poverty, Koneba district is characterized by a relatively lower Gini index. And this more even distribution of income might reduce the complexity of implementing poverty reduction interventions in the district, not least by simplifying targeting.

Chart 4: Gini index on the basis of household, community level, and geographic variables
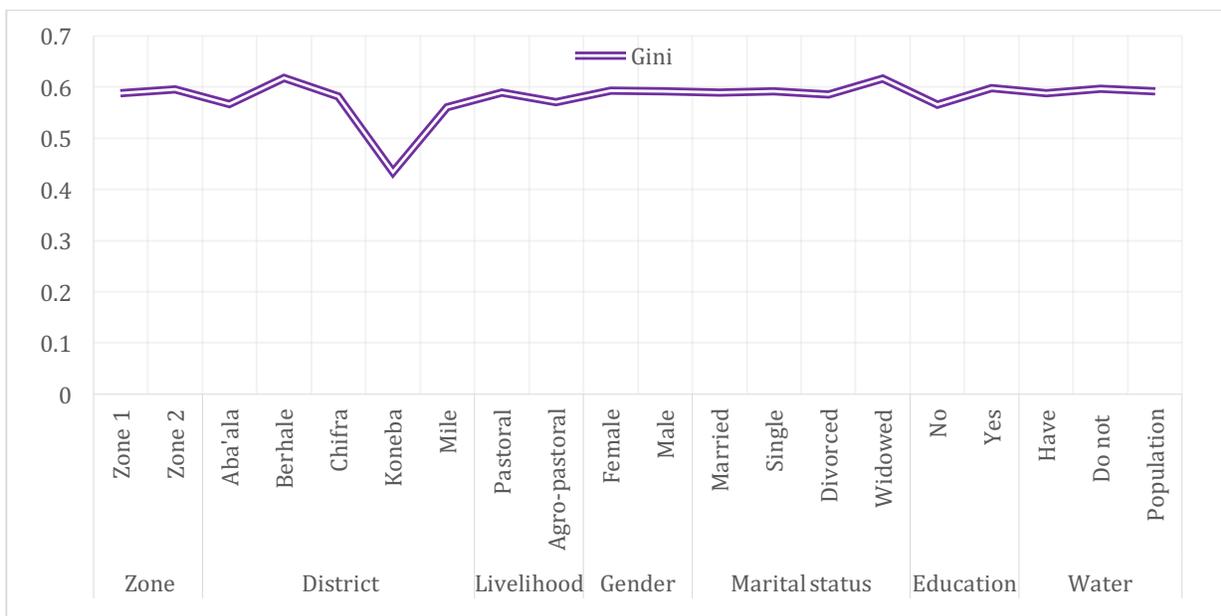
Source: SPIDA survey, 2017

Even though our study showed the existence of high-income inequality in the study area, we did not find significant differences in the index among or between the households based on some household level and community level variables. However, there was one exception to this. Widowed households were characterized by a high level of poverty and also suffered from a high level of income inequality (0.616).

CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS

4.1. CONCLUSIONS

A high incidence of poverty and an alarming degree of income inequality are widely considered to be features of households in the pastoral and agro-pastoral communities of Afar Region. Our survey confirmed this. 47.6 percent of households are living below the poverty line (Birr 389) with a poverty gap index of 0.178 and a poverty severity index of 0.092. So poverty is not only widespread, but also deep. The high magnitude of overall poverty in the pastoral communities is caused by a set of inter-related factors, including low levels of productivity, climatic vulnerability and remoteness from economic centers. Major factors are high transportation costs and high transaction costs associated with higher local prices for manufactured goods and non-food expenditures. Food-poor households constitute 33.7 percent of the households and these are situated 11.4 percent below the food poverty line, with a squared poverty severity index of 0.054. The level of poverty varies across districts. Koneba district features the highest incidence of poverty (0.584) and the lowest percentage of poor households was found in Mile (0.24), with slightly higher levels in Chifra (0.256) and Berahle (0.268). The percentage of poor households in the distinct pastoral and agro-pastoral communities differs with the livelihood systems prevailing in these communities, and according to the degree to which households pursue different economic as well as social activities. There is a high incidence of poverty in the pastoralist communities (35.6%) and 38.5 percent of the mobile pastoralists have higher food poverty compared with non-mobile households.

The incidence of poverty also varies with household characteristics. Households with married household heads are characterized by a high level of poverty (0.434), stemming from their large family sizes. Poverty also depends on the single-family source of income and the lack of supplementary jobs to bolster family incomes. Female-headed households have a significantly higher poverty level (0.372), relative to male-headed households. 35.6 percent of Productive Safety Net Program non- participant households and 32 percent of the participant households are living below the food poverty line. No statistically significant relationship was found between poverty and households' access to social services, such as education and health or with access to potable water. But, a strong association was found between poverty and access to or use of credit facilities. 34.1 percent of those who did not use credit facilities were living in poverty, with significantly lower poverty among active users of credit.

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The incidence, depth and severity of household poverty in the pastoral and agro-pastoral communities of Zone 1 and Zone 2 of Afar Region are affected by a set of factors. A logistic regression with survey data identified a set of statistically significant determinants of poverty (at different levels of significance): the sex of the head of the household, family size, the presence of remittances; the educational level of household head, participation in the social protection program (PSNP), participation in local intuitions, distance to market centers, the number of household members participating in alternative employment and income generation, geographic location and access to credit services.

In the pastoral and agro-pastoral communities of Afar Region, households are engaged in three major occupations or economic activities, providing the bulk of their incomes: pastoral incomes (43.62% of households), agro-pastoral incomes (29.24% of households) and domestic work (8.76% of household members). Pastoral incomes are clearly the mainstay for the largest share of the population. The mean monthly income of households is Birr 1,408.98 and the annual income of households is Birr 11,203.9. These incomes are generated from the sale of livestock (32.45%), agriculture (22.99%), the sale of animal products (9.7%), participation in the PSNP (8.35%) and local trade or trading activities (7.04%). Together, incomes from livestock and livestock products make up just over 40% of incomes.

There is a startling level of income inequality in the study area, with a Gini coefficient greater than 50 percent. The wide income inequality in the pastoral and agro-pastoral communities is reflected in a Gini index of 0.592 for the area as a whole, but this varies in magnitude by location or district, by marital status and by some community variables. The unequal distribution of income was found in Berahle district (0.618) and the lowest Gini index in Koneba (0.433). In addition, widowed heads of household were found to have a high Gini index (0.616).

4.2. POLICY IMPLICATIONS

Our findings point to a set of recommendations for policies and program implementation:

- The expansion and intensification of family planning programs at the grassroots level should be given serious consideration, as family size has been shown to be a major factor in the incidence of poverty in Afar Region.

- Policies and programs should place greater emphasis on serving female-headed households in order to improve the nutritional status of households and help them overcome poverty, in

light of the relative disadvantage revealed here. This should involve actions that ensure a greater access and participation in decision making for women.

- Efforts should be made to promote a culture of saving, creating awareness around the issue and investigating the development of suitable new financing modalities. Our study presents evidence on the importance of credit facilities in potentially enabling people to escape from poverty, and savings are the other side of the coin. In line with this, it is important to investigate suitable ways of developing alternative income sources in the pastoral communities, given the evidence presented here that significant numbers of people are seeking but cannot find alternative employment.

- Poverty reduction could be more effective with community targeting and geographic targeting. PSNP beneficiaries are less likely to be poor than non-participants. And targeting within communities is important given that the poorest of the poor need to be identified and given specific support. But, we have seen that poverty in Afar Region varies greatly with geographical location. Thus, poverty alleviation measures must be carefully designed and targeted so that the regional budget is distributed so as to maximize poverty reduction in the highly vulnerable areas.

- It is worth considering if development interventions could integrate pastoral areas more closely into the wider economy, with rural community roads to marketplaces, reducing transaction costs and the cost of living for people in Afar Region while also promoting longer-term economic benefits.

- Microfinance products tailored for pastoral communities and suitable for Muslims could enable people to make productive investments, to increase productivity and to increase and diversify incomes. Following a careful analysis of options, policymakers should take steps to encourage this. As we have shown, there is a statistically significant variation in the level of poverty among households based on their access to and use of credit outlets. Moreover, households' participation in non-pastoral/farm activities offers a way out of poverty, and enhancing access to credit services is important in this.

- Strengthening local institutional arrangements should be given priority. This would entail support for training and operational manuals as well as more effective modalities for participation in a safety net program, which in turn could improve effectiveness in implementation. Pastoral households exhibit strong cooperative behavior, with cohesive

kinship networks and strong social capital, and here we have seen that households' participation in local institutions helps to reduce poverty.

- Finally, a broadening of scope and coverage is recommended. Although non-beneficiaries of the safety net program were found to be more likely to be poor, a significant number of participants are also poor. Given the breadth and depth of poverty revealed here, there is a strong case for strengthening and expanding the coverage of the PSNP in order to reduce the overall level of poverty in Afar region. The longer term, developmental, aims of the PSNP would be well served by a broadening of scope. Hence, providing supplementary outlets targeting non-beneficiaries and involving the majority of beneficiary family members would promote wider poverty reduction and, ultimately, the escape from poverty.

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