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## THE CONTRIBUTION OF MILK TO THE PASTORALIST ECONOMY IN THE ETHIOPIAN SOMALI REGIONAL STATE

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# THE CONTRIBUTION OF MILK TO THE PASTORALIST ECONOMY IN THE ETHIOPIAN SOMALI REGIONAL STATE

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Revised Research Report

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## **Disclaimer:**

The views expressed in this report do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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## EXECUTIVE SUMMARY

Milk is recognized as a critical mainstay of livelihoods in pastoralist society, both for household consumption and trade. We estimate the value of the milk economy within one region. This study investigates the importance of pastoralism by examining the economic value of milk production, processing, and trade in the Somali Regional State of Ethiopia through original research. We surveyed 420 household heads involved in pastoralism to investigate the milk economy in Somali Region, Ethiopia. The milk sector is informal and hence does not have employment figures, especially since most participants are within the pastoralist household (particularly in the milking portion of the sector), but we estimate over 750,000 labor full-time equivalents (FTEs) are invested in the milk sector in Somali Region each year. The milk sector is 96 percent female dominated, so it diversifies the revenue-generating gender roles in rural areas and can rightly claim to offer empowerment opportunities to women. The current estimated annual value of milk production by pastoralist communities in Somali Region is an estimated 13.3 billion ETB (Ethiopian birr)/632 million USD (United States dollars) (per pastoralist household: 22,166 ETB/1,055 USD). Across the region, there are 3.9 million pastoralists in over 600,000 households, managing herds totalling about 23 million head of livestock (8.4 million TLUs (Tropical Livestock Units)). This study reveals that the production and consumption of milk by pastoralist households for local communities is a key rural livelihood strategy in Somali Region, but it has untapped potential and suffers from systemic issues that limit the economic value generation having to do with geography, transportation, scale economics in the local supply chain participants, and access to markets, technology, and information.

## INTRODUCTION

The central goal of this research is to identify the size and significance of the milk economy in Somali Region, Ethiopia in order to inform policy-making and financial design, and guide assistance to the pastoralist and milk sector across Ethiopia.

Pastoralism is a viable, vibrant, and sustainable economic system that underpins the rural economy in East Africa. It accounts for a significant share of the informal and rural economy and contributes inputs critical to the formal economy, particularly milk and meat protein. Yet its economic significance is typically understated, and its contribution undervalued (Behnke and Wolford, 2010). This poses challenges for decision-making, policy prioritization, and attracting the investments necessary to ensure pastoralism persists.

Pastoralism is a viable, vibrant and sustainable economic system that underpins the rural economy in East Africa and accounts for a significant share of the formal and informal economy at national, regional, and global levels (Davies et al., 2015). Indeed, past research estimated the total annual economic value of pastoralism in Ethiopia at 15 billion ETB (around 1.6 billion USD) (SOS Sahel, 2006). In the formal economy, products from pastoralist systems are significant too, with domestic and export sales of livestock and livestock products accounting for 12–16 percent of national Gross Domestic Product (GDP) and 30–35 percent of national agricultural GDP (REGLAP, 2012).

Milk is a key part of pastoralist livelihoods, accounting for the majority of calories for human consumption across large rangeland areas in Ethiopia. In this report, “milk from pastoralist herds” refers to milk from cattle, camels, goats, and sheep.

Ethiopia’s pastoralist areas cover 62 percent of its land mass and support 12–15 million people (Shitarek, 2012). By tribe, Somali pastoralists constitute 53 percent of the pastoralist population, followed by the Afar (29 percent) and the Borana (10 percent) The remaining 8 percent are found in Gambella, Benishangul, and Tigray Regions (Desta, 2006).

Yet data on the pastoralist economy in Ethiopia are weak, its significance is typically understated, and its contribution undervalued. Indeed, there are many dimensions of pastoralism that are invisible to standard market-based appraisals (Krätli, 2014), and many more that are only partially glimpsed (MacGregor and Hesse, 2013). To support decision-making, policy development, and the voices of the pastoralist community, we assess the

pastoralist economy in Somali Region, using the broad framework developed by IIED (Hesse and MacGregor, 2006) to assess its true contribution and look beyond the immediate benefits of livestock and livestock products.

In Ethiopia overall, the milk production system could be broadly classified into three systems: pastoralist and agro-pastoralist; mixed crop–livestock; and peri-urban and urban dairy production systems (MoA, 2014). According to the Central Statistical Authority (CSA) 2015 report, the estimate of total cow milk production for the rural sedentary areas of the country is about 3.07 billion liters. The estimate of camel milk for the same areas of the country is about 233.85 million liters. The problem with these data is that they do not show the contribution of the pastoralist sector, and they are also difficult to disaggregate. The livestock sample in this CSA report is only from sedentary areas of Somali Region, and the parameter used to estimate the total production of milk is applied to the national herd as 1.35 liter/cow/day. This indicates that the value of milk is undervalued in the national income account. Moreover, this underestimation problem is aggravated by the fact that in Ethiopia the milk consumed by pastoralists represents about 77 percent of the total milk production, and that amount is not captured by markets or statistics (Boto et al., 2012).

The Government of Ethiopia is committed to enhancing the production volumes and productivity of the milk sector in pastoralist areas. There are a number of institutions linked with pastoralism, including the Ministry of Agriculture, the Regional Agriculture Bureau, the Regional Cooperative Office, the Trade Ministry, the Ethiopian Meat and Dairy Industry Development Institute, the Ethiopian Milk Processors Association, and others.

This study contributes to this discussion by focusing on milk solely, as part of a wider program of research on the pastoralist economy that includes other inherent goods and services. It is a precursor to more in-depth research on the full TEV (Total Economic Value).



## STUDY METHODOLOGY

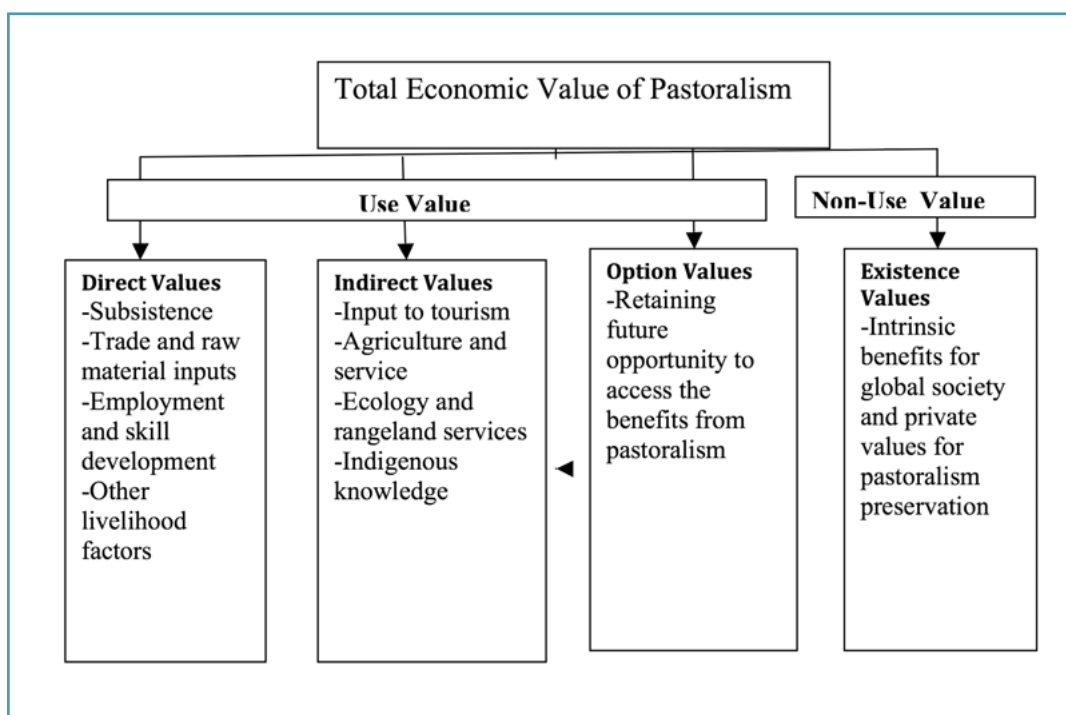
### Methodology

There are many valuable dimensions of pastoralism, some of which are invisible to standard market-based appraisals (Krätli, 2014). This implies that many of those benefits are uncounted in the official country statistics. In the literature, there are many reasons for this problem; to summarize, the three main reasons are problems related to data (data unavailability, difficulty in collection, the data's unrepresentativeness, disaggregation problems, etc.), faulty valuation techniques employed by economists, and policy constraints that are governed by misconceptions about the sector.

According to Mdoe and Mnenwa (2007), the persistent undervaluation of pastoralist goods and services is associated with the use of conventional concepts of economic value, which naturally leads to a very narrow definition of benefits. They argue that economists view the value of natural ecosystems such as pastoralism only in terms of the raw materials and physical products that are generated for human production and consumption, especially focusing on commercial activities. This technique only addresses a fraction of the contribution of pastoralism to the wider economy as a component of the direct values. However, the sectors also cover many goods and services used by households as subsistence and nonmarket values, ecological functions, and non-use benefits associated with pastoralism (Mdoe and Mnenwa, 2007). Following this methodological deficiency, attempts were made by scholars in the field to overcome it.

Hesse and MacGregor (2006) developed the Total Economic Value (TEV) framework for pastoralism, specifically for Eastern Africa. See Figure 1. In this framework, the contribution of pastoralism is broadly divided into two as use value and non-use value. Use value is further divided into direct and indirect values of pastoralism. Direct values consist of measurable products and outputs such as livestock sales, meat, milk, hair, and hides. The other components of direct values also include less-easily measured values such as employment, transport, knowledge, and skills. Indirect values associated with pastoralism include tangibles such as inputs into agriculture (manure, traction, and transport) and complementary products such as gum arabic, honey, medicinal plants, wildlife, and tourism. Indirect values also include less-tangible values including financial services (investment, insurance, credit, and risk management), ecosystem services (such as biodiversity, nutrient cycling, and energy flow), and a range of social and cultural values (Boto et al., 2012). Using this framework, most empirical studies try to enumerate the direct and indirect use values of pastoralism. According to Krätli (2014), this methodology is concerned with the comprehensive analysis of these benefits. It is concerned with visibility more than with accountancy, with mapping and unfolding all avenues and categories of value rather than with building a total figure.

Based on this general framework, this study focused on the direct value of pastoralism, specifically the value of milk,



*Figure 1. Conceptual framework of the economic valuation of pastoralism.*

Source: Adapted from Hesse and MacGregor (2006).

in Somali Regional State of Ethiopia. However, there are other direct benefits of pastoralism that need to be investigated in the region, including livestock and livestock products that are smuggled to different neighboring countries and beyond. In addition, pastoralism's contribution to employment in the region and to the national economy has not been systematically studied. Moreover, the tourism potential of pastoralism and its contribution so far to the national and regional economy also need to be studied.

In Ethiopia, the contribution of pastoralism to both the regional and national economy is underestimated. First, this underestimation is related to data. The data on national livestock populations used by the CSA do not include the important pastoralist areas of Somali Regional State (Krätli, 2014). The national livestock population estimated by MoFED (Ministry of Finance and Economic Development) is based on the survey provided by CSA. Annual CSA surveys cover only three out of nine zones in the region, leaving out the pastoralist zones with higher numbers of livestock. CSA does not attempt to estimate the livestock population in these zones, which is thus completely excluded from the national estimate. Second, to determine the volume of production, MoFED used coefficients that estimate the known number of livestock. The coefficients were developed in 1980s for the national developmental plan. These production coefficients are outdated. The Behnke and Wolford (2010) study shows that these coefficients are the lowest as compared to other studies in Ethiopia. Therefore, the calculation based on these coefficients underestimates the contribution of livestock products to the national economy. MoFED currently applies a single milk output coefficient to the entire national herd. Behnke and Wolford suggest that a more accurate procedure would be to divide the different production systems (highland and lowland) and to separately estimate the mean output per head for each system (Behnke and Wolford, 2010).

The value of the milk economy is greatly underestimated, especially its contribution to household consumption and its employment contribution. In this project, the household is treated as both producer and consumer, which implies both production and consumption parameters that were used to estimate the full range of the benefits from pastoralism.

The literature on total economic valuation of pastoralism is very limited in Ethiopia in general and the study areas in particular. However, some studies are presented hereunder.

In Ethiopia, a few studies were conducted in different parts of the Somali Regional State. One of these is an SOS Sahel (2006) study that looked at the Total Economic Value (TEV) of pastoralism in Ethiopia. It adopts the TEV developed by Hatfield and Davies (2006), along with the contingent valuation technique, to value some indirect

benefits of pastoralism, specifically in Yabello, Borena, and Kereyuin. In addition, meta-analysis was also employed when data disaggregation problems existed in some sub-sectors. The results show that pastoralism has a huge value for the national economy in general and the pastoralists themselves in particular. In pastoralist areas of Yabello in Borana Zone and Karayu, it was found that 77 percent of the milk produced is consumed by the households, while 16 percent is sold and the remaining 7 percent is for other uses. Similarly, they consume 91 percent of the butter produced and sell 7 percent of it. Similarly, the Intergovernmental Authority of Development (IGAD) estimated the contribution of the livestock sector to the Ethiopian economy. According to a revised formula by Behnke and Wolford (2013), in 2009 the total value for livestock's contribution was 113 billion ETB, or roughly 11.3 billion USD at 2009 exchange rates. This is more than three and a half times greater than MoFED's original estimation.

The total direct economic contribution of pastoralism to the Ethiopian economy through the production of milk, meat, skin, hides, and so on has been estimated at 1.53 billion USD, which accounts for about 6 percent of annual agricultural GDP (Berhanu and Feyera, 2009 as cited in Kebede et al., 2015). The study by Kebede et al. (2015) shows the monetary value of camel milk consumption and sales income for pastoralists to the total annual income for camel milk traders. As calculated, the total net value and economic contribution of camel milk is found to be 7.6 billion ETB. The study by Wako (2015) estimated that camel milk production in Borana Zone is around 31.3 million liters and has a total value of 902,253 ETB/day and 329.3 million ETB/year, based on the total value of camel milk from sampled households, which is 11,739 ETB/day and 4.2 million ETB/year.

### **Milk economy**

The demand for milk in cities of developing countries increases owing to population growth, economic growth, and urbanization (Narrod et al., 2011). This increase has started to happen in Ethiopia, and in response, smallholder dairy farms are increasing in number and geographical coverage, and demands on pastoralist milk economy is growing (Mekonnen et al., 2006; Tolosa et al., 2016). Smallholders are responsible for 98 percent of the milk produced in Ethiopia. The milk flow and supply chain in Ethiopia is quite complex and in many cases still immature in terms of capacity, organization, and infrastructure (Yilma et al., 2011).

The milk economy is a major employer in the informal sector and is growing in the more formalized dairying sector. Yilma et al. (2011) estimate that dairying supports almost 600,000 on-farm jobs—a similar figure to the estimated number of female FTEs (labor full-time equivalents) in pastoralist society from the milk economy in Somali Region alone.



Nationally, dairy accounts for around 30 percent of animal-sourced protein intake (FAO, 2014) and 66 percent of the sheer weight of animal-based food intake, making it a large contributor to nutrient intake (Hoddinott et al., 2015). Furthermore, for pastoralists, milk is the most convenient and versatile type of food that is readily available to them (Carruth, 2014).

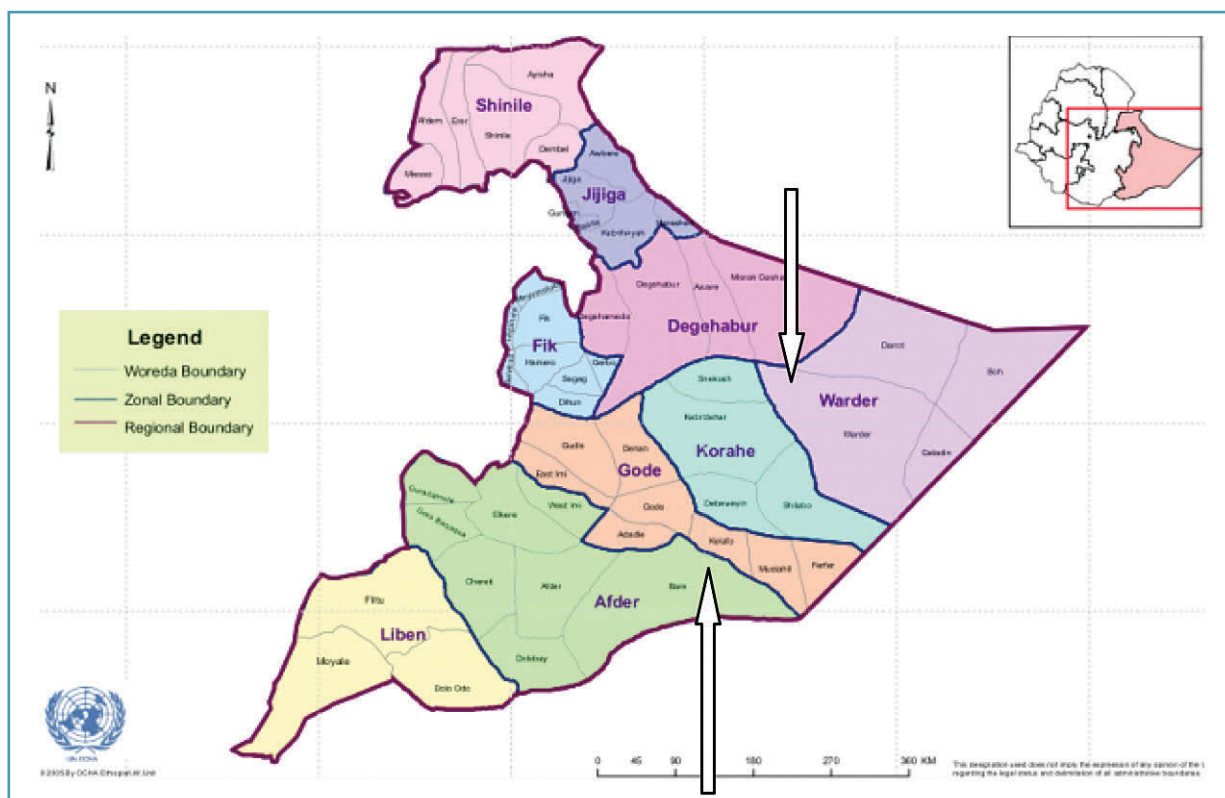
There is a strong correlation between the financial income of a household and its participation in the milk economy. Lenjiso et al. (2016) found that household income is indeed substantially higher in milk market-participating households (101 versus 49 ETB daily). This higher income of participating households is almost completely earned by selling raw milk to the market.

### Gender and milk

In pastoralist society, women are responsible for milking cows and for processing milk into butter, cottage cheese, and yogurt for household consumption as well as for the local market. The dairy market surplus has been an important source of income for Ethiopian rural women (Lenjiso et al., 2016).

Women are fully in charge of the income from local marketing (Lenjiso et al., 2016). Indeed, previous studies (e.g., Tangka, Emerson, and Jabbar, 2002) have shown that women in the central highland of Ethiopia received the total dairy income from the sale of butter in the local market.

Figure 2. Map of the study areas, Somali Region.



Source: Wikipedia (2015).

### Study areas

Somali Region is the second-largest region in Ethiopia and covers 350,000 km<sup>2</sup>. The region has 9 administrative zones, 68 *woredas* (districts), and 786 *kebeles* (wards) (BoFED, 2014). The study covers Jarrar and Shebelle Zones, with a population of 800,000, of which 80 percent live in rural households, manage livestock herds, and can be considered pastoralists. See Figure 2 for a map of the study areas.

The region is divided into two broad rainfall regimes based on the seasons of the year:

- south: receives “*gu*” rains from April to June, and “*deyr*” from October to December;
- north: receives “*dirra*” rains from March to May and “*karan*” rains from July to September.

The population can be divided into three livelihood systems (SRS, 2012; ACPA, 2014):

- pastoralism (extensive livestock rearing): 60 percent of the population;
- agro-pastoralism (extensive livestock rearing and rain-fed crop production): 25 percent of the population;
- farming (sedentary and riverine): 15 percent of the population.

**Livestock population**

According to CSA (2013) as cited in BoFED (2014), Somali Region has about 23 million head of livestock (3.8 million cattle, 8.5 million goats, 9 million sheep, and 2 million camels).

**Estimates of volume and value of milk**

Official data on milk production and consumption are missing, but it is noted by the Ethiopian Meat and Dairy Industry Development Institute (EMDIDI) that 90 percent of production and consumption exists in the informal sector. Currently, the average price paid for milk from pastoralists is 11–13 ETB/liter (BoFED, 2014).

**Sampling technique**

The study used a multi-stage sampling procedure involving a combination of purposive and random sampling. In the first step, purposively three *woredas* from each of the two zones (Shebelle and Jarrar) were selected: Adadile, Gode, and Danan *woredas* in Shebelle Zone; and Degahabur, Birkod, and Ararso *woredas* in Jarrar Zone. These two zones are pure pastoralist areas, and for this survey these *woredas* were both accessible and secure.

In the second stage, we applied multi-stage area sampling to these six *woredas* to select nineteen representative villages. Lastly, households were chosen by simple random sampling using a list of households. Our sample size is based on the following formula:

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

where  $z$  is the desired degree of confidence,  $p$  is an estimate of the population proportion, and  $e$  is the absolute size of the error in estimating  $p$  that the researcher is willing to permit. Thus, instead of using a pastoralist population proportion of 60 percent or 85 percent we use a 50 percent population proportion and a 95 percent confidence interval; i.e.,  $z = 1.96$  and an 0.05 error size were used to obtain a maximum sample size of 384. Accounting for 10 percent non-response, a sample size of 420 households was calculated. Table 1 provides evidence of the random sampling of households by *woreda*.

**Table 1. Sample selection from the six *woredas* for survey,  $n = 420$**

Jarrar Zone	Kebeles/wards	#Household	Shebelle Zone	Kebeles/wards	#Household	
Degahabur <i>woreda</i>	Cagasur	21	Adadile <i>woreda</i>	Adadile	10	
	Obale	10		Ilan	21	
	Sasamen	31		Hagere	29	
	Birkod <i>woreda</i>	Sandrixil	10	Gode <i>woreda</i>	Yahas Jable	31
		Hodale	32		Kunsen	13
		Grawo	20		Hadawe	26
		Daka Bahar	15		Hodidole	12
Ararso <i>woreda</i>	Magalaad	30	Danan <i>woreda</i>	DemberWeyne	19	
				Lamy	11	
				Cawoly	30	
Total		218			202	

### **Data collection and tools**

Collection of secondary data was started in the first week of August 2015, while the survey was conducted between August 27 and September 25, 2015. See Annex for Survey Questionnaires. Secondary data were collected from the Ministry of Trade, Common Market for Eastern and Southern Africa (COMESA), Central Statistical Authority (CSA), regional offices of the BoFED (Bureau of Finance and Economic Development), and the Regional Agriculture Bureau.

### **Limits to research methodology**

The scope of the research was narrow and limited to milk production and its value to producers' households and the local economy. Assessment of production volume and values for the Somali Region has relied on the representativeness of our sample, which provided robust data. A larger sample would be beneficial, owing to the differences among communities across the landscape.

### **Data analysis**

The data collected were used to generate simple descriptive statistics that were then analyzed. Simple descriptive statistics is a method of presenting summarized information that enables the authors to describe households based on characteristics and to present the results of the study in the form of frequencies, tables, graphs, and measures of central tendencies. The data were analyzed using standard software (STATA, version 13).

## RESULTS

### Household characteristics

Households in our study are 12 percent larger at 7.3 persons than the official regional average of 6.5 persons (BoFED, 2014). In the sample of 414 household head respondents, 58 percent were female, the average age was 40, and 84 percent had no education at all. See Table 2 for details.

### Milk profile

Traditional milking, especially hand milking, is practiced by all pastoralists. It varies by wet and dry season (see Table 5). To estimate the total milk production in the study areas, the following parameters were used: number of lactating animals of each species; length of lactation period; and milk yield per day per animal. These parameters were multiplied to obtain the total milk produced in the study areas:

**Total milk produced by species = # lactating animal \* length of lactation period \* milk yield per day per animal**

Our survey data in Tables 3 and 4 demonstrate our approach to developing the overall production numbers (volume per region and household) and the variation across the landscape.

Milk production varies by season, with wet season for cattle and camels having 50–100 percent greater productivity (see Table 5). Our survey also indicates higher reported production volumes than the official ones; e.g.,

wet season production for cattle is 37 percent higher compared to the national average of 1.35 liters/cattle (CSA, 2015). Yet, annual volumes of milk per TLU and household are broadly in line with other research findings (see Hussen et al., 2008; Mulugeta and Belayeneh, 2013).

Our typical household produces 8.3 liters of milk per day (3,022 liters/year), which is an average production of 1.27 liters per pastoralist household member. Of this, households sell 25 percent of this volume each day (2 liters/day, 731 liters/year), meaning the average household consumption is 0.97 liters per person per day. At the household level, income is mainly from live animal sales and milk, and although smaller in revenue, milk contributes 23 percent of total revenue from these two products. Importantly, it provides a regular income, whereas live sales are sporadic. Furthermore, the income accrues to the females in the household who are responsible for 96 percent of the labor in the pastoralist milk sector.

Forty-three percent of available time spent on milking in each household is for trade; the remainder is for household consumption (current–milk and future–cheese, etc.). The sale of milk produces revenue of 24 ETB/day (1.16 USD/day) or 8,877 ETB/year (422 USD/year). The household production of milk can be valued at 100 ETB/day (4.77 USD/day) or 36,552 ETB/year (1,750 USD/year).

From our survey, we calculate the milk production in Jarrar and Shebelle Zones at 1.2 million liters annually. See Table 3.

**Table 3. Milk production by species in the study areas, survey data, n = 414**

Livestock	Milk /day (liters)	Lactation period (days/ year)	Number of lactating animals (in survey)	Total milk production (liters)
Cattle	1.79	300	1,015	545, 055
Camel	2.25	365	582	477,967
Goat	0.59	97	2,533	144,963
Sheep	0.46	93	1,854	79, 314
Total				1,247,299

**Table 5. Milk productivity by season, liters per day, survey data, n = 414**

Season	Cattle milk/day	Goat milk/day	Sheep milk/day	Camel milk/day
Dry season	0.89	0.5	0.4	1.5
Wet season	1.84	0.75	0.4	2.25

Table 2. Household characteristics in the study areas, n = 414

Woredas	Households		Gender of respondents		Age of respondents				Education of respondents				Household size	
	Number	Female	Male	Mean	Std. Dev.	Min.	Max.	Basic	Primary	Secondary	Tertiary	None at all	Mean	Mean
Adadile	56	23 (41)	33 (59)	41.8	10.8	17	70	2 (3.5)	8 (14.2)	2 (3.5)	-	44 (78.5)	8.1	
Ararso	30	21 (70)	9 (30)	37.6	8.4	22	63	-	6 (20)	-	-	24 (80.0)	6.7	
Birkod	49	33 (67)	16 (32)	40.3	12.2	25	70	-	8 (16.3)	-	1 (2.0)	40 (81.6)	7.3	
Degahabur	139	84 (60)	55 (40)	39.3	11.7	20	78	-	16 (11.5)	1 (0.7)	-	122 (87.7)	7.1	
Danan	58	37 (64)	21 (36)	42.1	13.0	25	75	-	3 (5.1)	1 (1.7)	-	54 (93.1)	7.6	
Gode	82	42 (51)	40 (49)	39.7	10.9	20	73	2 (2.4)	13 (15.8)	4 (4.8)	-	63 (76.8)	7.3	
Total	414	240 (58)	174 (42)	40.1				(1)	(13)	(2)	(0.2)	(84)	7.3	

Note: Numbers in parentheses are percentages of respondents for each characteristic.

Table 4. Milk productivity by livestock species in the study areas, survey data, n = 414

Woredas	Cattle				Goat				Sheep				Camel			
	Lactating animals	Average lactation period (months)	Average milk/day/animal (liters)	Lactating animals	Lactating animals	Average lactation period (months)	Average milk/day/animal (liters)	Lactating animals	Lactating animals	Average lactation period (months)	Average milk/day/animal (liters)	Lactating animals	Lactating animals	Average lactation period (months)	Average milk/day/animal (liters)	
Adadile	160	9.5	1.7	379	300	3.0	0.4	107	107	12.3	2.2	107	107	12.3	2.2	
Ararso	42	10.4	1.6	149	104	3.3	0.6	18	18	12.0	2.3	18	18	12.0	2.3	
Birkod	94	9.6	1.8	371	315	3.2	0.5	62	62	12.6	2.3	62	62	12.6	2.3	
Danan	159	10.6	1.5	399	412	3.5	0.6	66	66	12.2	2.1	66	66	12.2	2.1	
Degahabur	284	10.3	1.9	881	571	3.3	0.6	150	150	12.0	2.3	150	150	12.0	2.3	
Gode	276	9.6	1.8	354	152	3.8	0.5	62	62	12.3	2.4	62	62	12.3	2.4	
Total	1,015	10	1.7	2,533	1,854	3.3	0.53	465	465	12.3	2.3	465	465	12.3	2.3	

The role of the milk sector in the economy of Somali Region is considerable. With a working age population of 2.5 million, and 7.3 members per household, each household spends on average 6.2 hours per day in milk production, processing, and trading, which is on average 0.85 hours per person. Assuming this is representative across Somali Region, 1.1 billion liters of milk are produced annually by pastoralists. See Table 6.

Table 8 shows our calculation that the typical household spends 6.2 hours each day on milk production, processing, and trade. Assuming this is representative across Somali Region’s 3.9 million pastoralists, with a working age population of 54 percent and 6.5 billion labor hours annually, we estimate the milk economy accounts for 1.6 billion hours or 25 percent of household labor, with 10 percent for sales and 15 percent for home consumption. Finally, we estimate the value of milk production to be 633 USD million annually (13.3 billion ETB/year).

**Household consumption**

Eighty percent of respondents indicated that milk is indispensable for rural livelihoods, which accords with findings elsewhere that milk is the most important nutritional resource derived from pastoralist activity (see for instance, Mdoe and Mnenwa, 2007).

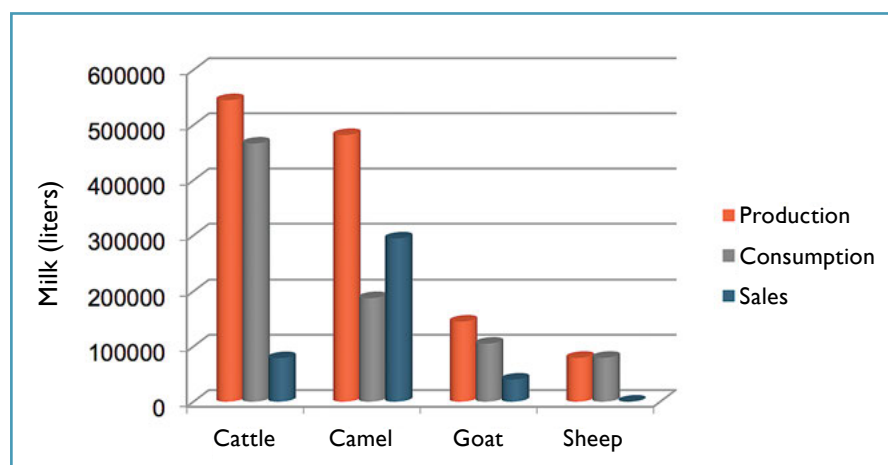
Raw milk from cattle, camels, and goats is directly consumed by pastoralist households, while sheep milk is not consumed in raw form. It is either processed to produce butter or mixed with tea. In volume and value, households consume 73 percent of milk produced, with the remainder being sold. This finding is in line with other research that shows 73 percent of milk being consumed by the household; see SOS Sahel (2006). Table 7 shows that household consumption of milk is different across livestock type, at 86 percent for cattle, 100 percent for sheep, 39 percent for camels, and 73 percent for goats.

Our survey findings are comparable with the findings of Boto et al. (2012), who report that 77 percent of milk is consumed by pastoralist households in Ethiopia. Milk consumption by type varies with its availability and a family’s age composition. The response from key informants reported that in the case of small ruminants’ milk, precedence is given to children; this made children the predominant consumers of this type of milk. During the dry season, when production is lower, the milk is consumed by the children alone. However, when there is a surplus yield, especially during the wet season, all types of milk (except sheep’s milk) is consumed by all members of the household. Often, camel, cattle, and goat milk are consumed as raw milk, while sheep milk is consumed in the form of butter or after mixing it with tea (*shaa*).

**Table 6. Milk production in the Somali Regional State**

Livestock	Milk production/day	Average lactation period	# lactating animals	Total milk production (liters)
Cattle	1.79	300 days	1,100,840	591,151,080
Camel	2.25	365 days	365,760	300,380,400
Goat	0.59	97 days	2,136,750	122,286,203
Sheep	0.46	93 days	2,082,190	89,076,088
Total				1,102,893,771

Sources: Data from survey and CSA and WB (2013).



**Figure 3. Milk production, consumption, and trade by all respondents, n = 414.**



Table 7. Pastoralist milk production, consumption, and trade in Somali Region

Livestock	Total production (liters)	Consumption (liters)	Trade (liters)	Other use (liters)
Cattle	591,151,080	505,434,173	78,623,093	7,093,812
Camel	300,380,400	117,148,356	138,174,984	45,057,060
Goat	122,286,203	89,268,927	8,560,034	24,457,240
Sheep	89,076,088	89,076,088	0	0
Total	1,102,893,771	800,927,544	226,358,111	69,521,393

Sources: Survey data and CSA and WB (2013).

In addition to home consumption, milk plays a role in the pastoralist system as barter and to strengthen the social network. For instance, in our survey, a proportion of cattle and camel milk (up to 1.2 percent for cattle milk and 15 percent for camel milk) is used for social gifts (by 50 percent of respondents) and wages-in-kind (37 percent of respondents). Milk is provided to destitute neighbors and relatives. These contributions of milk to the pastoralist community are not included in official statistics.

Milk is a significant part of household income. Sales of milk and its products and sales of live animals are the main sources of income for all respondents; a significant proportion report that milk is their primary source of income. Annually, live animal sales account for an average of 28,897 ETB (USD 1,376) for each household. But this income is sporadic, happening at certain times of the year only. For instance, during the fieldwork for this study, respondents reported that their income generated from camel milk exceeded the total income obtained from live sales of cattle and goats. The regular income earned by pastoralists is derived from milk. Over the course of a year, the typical pastoralist household in our survey obtains 8,877 ETB (USD 423) from milk, 23 percent of the combined revenue from milk and live animal sales.

The income earned from milk sales is used by households mostly to buy products from outside pastoralist areas, like grain, clothing, detergents, tea, and sugar.

#### Supply chain for milk

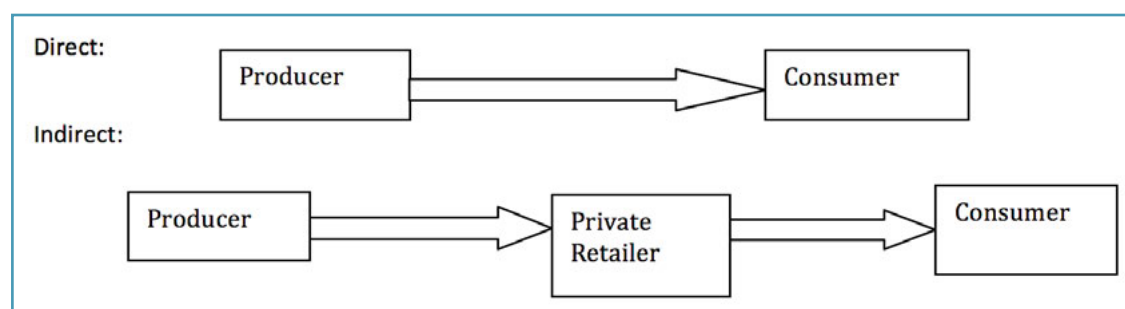
The household sells milk to the local market—either directly to the consumer (90 percent of respondents) or indirectly via private collectors who transport it to markets in nearby towns (10 percent of respondents). See Figure 4. Like most traded goods from pastoralist areas, milk is a buyers' market, and prices are low.

The supply chains are short, and value addition opportunities are minimal owing to the need for a cold chain in order to upgrade.

Private milk collectors are all women. They sell milk to the consumer in the form of raw milk or with *shaa*. In our survey, we found 60 women collectors in Hadawe *kebele* and 40 collectors around Adadile. Across Somali Region, there are 54 milk cooperatives with a membership of 1,286 (64 percent of whom are female).

The supply chain also includes suppliers of cattle feed and veterinary and other products that support milk production. It is assumed that milk production needs

Figure 4. Market chain of milk in the study areas.



services like veterinary services. Based on this assumption, the employment contribution outside the sector includes the number of veterinary service providers in the area. Accordingly, there are 125 health technicians, 41 health assistants, and only one veterinary doctor employed in the study areas. Overall in the region, there are 52 veterinary doctors, 448 health assistants, and 826 health technicians who are employed to deliver animal health services. A total of 1,326 jobs was generated by the sector through its backward linkage effects. The national Government also generates a direct income tax from these employees. The Government earns 446,160 ETB/year, 149,160 ETB/year, and 1,610,700 ETB/year in direct income tax from these professionals, respectively. Overall, 2,206,020 ETB (105,048 USD) was generated as revenue for the Government. The benefits of the employees further trickled down to the families they support.

### Challenges in the milk sector

Milk production depends on a number of factors such as feed availability, water, veterinary services, and breed. In the study areas, 77 percent, 20 percent, and 2 percent of the respondents identified feed shortage, water shortage, and disease outbreak respectively as major livestock production constraints prevailing in the area. Specifically, 55 percent and 48 percent of the households recognized water and fodder shortage respectively as major bottlenecks of milk production. The other main constraint found in the study areas is lack of access to extension services.

Across Somali Region, information on animal production has been delivered to pastoralists through the extension service of the Bureau of Agriculture (BoA) through 548 animal health posts, 32 animal clinics, and 1,040 health technicians and animal health assistants (BoFED, 2014). However, in the study areas only 47 percent of respondents report receiving animal extension service.

### Employment in the milk sector

Pastoralist household employment is significant, with 99 percent of respondents using only family labor for milking. Ninety-six percent of milking and 100 percent of marketing are undertaken by women. The total time spent in various activities per day was converted to man-equivalent days by assuming eight working hours. A man-day of work is defined as the amount of work that can be carried out by an adult in an eight-hour working period; i.e., 8 hours per day.

From our survey, we calculate that the typical household spends 6.2 hours each day on milk production, processing, and trade. Assuming this is representative across Somali Region's 4.5 million pastoralists, with 54 percent of the population of working age and 6.5 billion labor hours annually, we estimate the milk economy accounts for 1.6 billion hours or 25 percent of household labor, with 10 percent for sales and 15 percent for home consumption. In terms of FTEs (labor full-time equivalents), the milk sector accounts for over 750,000 FTEs.

**Table 8. Milk production, processing, and trade: time spent, typical pastoralist household, in minutes (mins.)**

Type	No. typical household	Total	Traded	
		Time spent (mins.), milking and processing	% milk traded	Time spent (mins.), sales and marketing
Cattle	7	101	13	13
Goat	25	55	7	4
Sheep	19	51	0	0
Camel	5	40	46	18
Selling/marketing		124		124
Total per household/day (mins.)		371		160
(hours)		6.2		2.7
Hours per person/household/day		0.85		0.4 (43% of total)

Source: Survey data, 2015.

### Constraints

The respondents indicated that the main constraints to milk sales are small herd size, limited interest in selling milk, lack of access to market, price fluctuations, and distance to the market. Our survey shows most pastoralist households travel long distances to sell milk in the market, with 57 percent travelling more than five kilometers.

**Table 9. Milk economy, typical pastoralist household**

	No. owned	Milk produced (liters)	% sold	Volume sold (liters)	Price (ETB/liter)	Income sales (ETB)	Revenue milk (ETB)
Cattle	7	1,317	13	171	11.69	2,001	15,391
Goat	25	350	7	25	12.72	312	4,454
Sheep	19	192	0	-	12.72	-	2,437
Camel	5	1,164	46	535	12.26	6,564	14,271
Annual total		3,022		731		8,877	36,552
Daily total		8.3		2.0		24.3	100.1

## RECOMMENDATIONS

In order to develop the milk sector in Somali Region and support pastoralist livelihood development, we suggest the following:

- Improve animal health extension to increase the production of milk to reach the target set by the Government's Growth and Transformation Plan.
- Improve transportation opportunities from pastoralist areas to markets.
- Investigate and promote value-addition activities.
- Support external private sector participation in the milk sector.
- Account for the benefit the sector provides to the national economy through better data collection.
- Consider expanding exports directly to the relatively wealthy Middle East markets.
- Design and trial appropriate milk collection strategies that are compatible with pastoralist mobility.

Gender-sensitive policy and initiatives are critical. Increasing opportunities to market milk outside the immediate rural market has been shown to increase the

income of pastoralist households but has a regressive impact on the income controlled by females in the household (Lenjiso et al., 2016). The strong correlation among livestock health, household consumption, and returns on female labor is not a new finding, but we recommend greater focus on enhancing the efficiency of household production first. For instance, there is currently a window of opportunity for improving technology adoption in the dairy sector. The benefits are potentially very large. Milk yields of domestic Ethiopian breeds range from 15 to 25 percent of the yields obtained by foreign breeds and hybrids (Gebremariyam et al., 2010; Hoddinott et al., 2015). Indeed, white revolutions in other countries relied in part on improved small-scale technologies, new systems for the supply chain, and new forms of industrial association particularly cooperatives (Hoddinott et al., 2015). Milk quality incentives should be introduced in Jimma, and investments should be made in knowledge transfer, training, milk collection systems, and a central milk quality lab (Tolosa et al., 2016).

Ethiopia's public sector agricultural bodies have historically under-invested in the livestock sub-sector, which has received just a small percent of the total budget, despite contributing significantly to agricultural GDP, nutrition, raw materials for industry, and wider economic growth.

## CONCLUSIONS

The survey shows the critical role milk plays in the pastoralist economy for household calories, steady income, barter, and female employment and empowerment. It clearly has potential to earn more revenue for pastoralist livelihoods, but challenges including distance to market, low prices, and lack of technology all conspire to limit growth. The full value of milk in Somali Region is estimated to be over USD 637 million per year, accounting for 750,000 FTEs (mostly female).

## REFERENCES

- Aged and Children Pastoral Association (ACPA). 2014. Annual Report in Somali Regional State. Federal Democratic Republic of Ethiopia Registration No. 0358. [www.agedandchildren.org](http://www.agedandchildren.org).
- Behnke, R., and G. Wolford. 2010. The Contribution of Livestock to the Economies of IGAD Member States. Study Findings, Application of the Methodology in Ethiopia and Recommendations for Further Work.
- Behnke, R., and G. Wolford. 2013. The Contribution of Livestock to the Ethiopian Economy. IGAD.
- BoFED. 2014. Ethiopia Somali Regional State: Bureau of Finance and Economic Development. Demographic and Socio Economic Indicators. BoFED, Addis Ababa.
- Boto, I., J. Edeme, and I. Lopes. 2012. Pastoralism: New Challenges and Opportunities for Pastoralism in the Context of African Countries. Briefing. Brussels.
- Carruth, L. 2014. Camel Milk, Amoxicillin, and a Prayer: Medical Pluralism and Medical Humanitarian Aid in the Somali Region of Ethiopia. *Social Science & Medicine* 120: 405–412.
- Central Statistical Agency (CSA). 2015. Livestock and Livestock Characteristics. Agricultural Sample Survey 2014/15 (2007 E.C.) Report.
- CSA, and World Bank (WB). 2013. Ethiopia Rural Socioeconomic Survey (ERSS). Survey Report.
- Davies, J., R. Ouedraogo, N. Hagelberg, and M. L. Fuller. 2015. Sustainable Pastoralism for the Post 2015 Agenda. Brief for GSDR 2015.
- Desta, S. 2006. Pastoralism and Development in Ethiopia. *Economic Focus* 9 (3).
- Food and Agriculture Organization of the United Nations (FAO). 2014. Nutrition: Post-2015 and SDGs: Nourishing People and Nourishing the Planet. FAO and the Post-2015 Developmental Agenda Issue Papers. <http://www.fao.org/documents/card/en/c/6842398a-8468-4494-ae08-299f726b591f>. Accessed February 12, 2015.
- Gebremariam S., S. Amare, D. Baker, and A. Solomon. 2010. Diagnostic Study of Live and Beef Production and Marketing. Report for Agricultural Transformation.
- Hatfield R., and J. Davies. 2006. Global Review of the Economics of Pastoralism. IUCN, Nairobi.
- Hesse, C., and J. MacGregor. 2006. Pastoralism: Drylands' Invisible Asset?: Developing a Framework for Assessing the Value of Pastoralism in East Africa. International Institute for Environment and Development (IIED).
- Hoddinott, J., D. Headey, and M. Dereje. 2015. Cows, Missing Milk Markets, and Nutrition in Rural Ethiopia. *The Journal of Development Studies* 51 (8): 930–958.
- Hussen, K., A. Tegegne, M. Y. Kurtu, and B. Gebremedihin. 2008. Traditional Cow and Camel Milk Production and Marketing in Agro-Pastoral and Mixed Crop-Livestock Systems: The Case of Mieso District, Oromiya Regional State, Ethiopia. Project Working Paper 13. International Livestock Research Institute, Nairobi.
- Kebede, S., G. Animut, and L. Zemedu. 2015. The Contribution of Camel Milk to Pastoralist Livelihoods in Ethiopia: An Economic Assessment in Somali Regional State. IIED Country Report. IIED, London. <http://pubs.iied.org/10122IIED>.
- Krätli, S. 2014. If Not Counted Does Not Count? A Programmatic Reflection on Methodology Options and Gaps in Total Economic Valuation Studies of Pastoral Systems. IIED Issue Paper. IIED, London.
- Lenjiso, B. M., J. Smits, and R. Ruben. 2016. Transforming Gender Relations through the Market: Smallholder Milk Market Participation and Women's Intra-household Bargaining Power in Ethiopia. *The Journal of Development Studies* 52 (7): 1002.

- MacGregor, J., and C. Hesse. 2013. Pastoralism: Africa's Invisible Economic Powerhouse? *World Economics* 14 (1): 35–70.
- Mdoe, N., and R. Mnenwa. 2007. Study on Options for Pastoralists to Secure Their Livelihoods: Assessing the Total Economic Value of Pastoralism in Tanzania.
- Mekonnen, H. M., K. Asmamaw, and J. F. Courreau. 2006. Husbandry Practices and Health in Smallholder Dairy Farms near Addis Ababa, Ethiopia. *Preventive Veterinary Medicine* 74: 99–107.
- Ministry of Agriculture (MoA). 2014. Livestock Master Plan. Roadmaps for Growth and Transformation. Developed by the LMP team for the Ministry of Agriculture, Livestock Resources Development Sector.
- Mulugeta, A., and A. Belayneh. 2013. Reproductive and Lactation Performances of Dairy Cows in Chacha Town and Nearby Selected Kebeles, North Shoa Zone, Amhara Region, Ethiopia. *World Journal of Agricultural Sciences* 1 (1): 008–017.
- Narro, C., M. Tiongco, and R. Scott. 2011. Current and Predicted Trends in the Production, Consumption and Trade of Live Animals and Their Products. *Revue Scientifique et Technique* 30: 31–49.
- Regional Learning and Advocacy Programme (REGLAP). 2012. REGLAP Achievements, November 2012.
- Shiterek, T. 2012. Prevalence of Bovine Tuberculosis in Pastoral Cattle Herds in Oromiya. Report.
- Somali Regional State (SRS): Multi-Agency DEYR/KARAN. 2012. Seasonal Assessment Report. [www.humanitarianresponse.info](http://www.humanitarianresponse.info).
- SOS Sahel. (2006). Pastoralism in Ethiopia: Its Total Economic Values and Development Challenges.
- Tangka, F. K., R. D. Emerson, and M. A. Jabbar. 2002. Food Security Effects of Intensified Dairying: Evidence from the Ethiopian Highland. International Livestock Research Institute.
- Tolosa, T., J. Verbeke, S. Piepers, M. Tefera, Y. Getachew, K. Supré, and S. DeVliegher. 2016. Milk Production, Quality, and Consumption in Jimma (Ethiopia): Facts and Producers', Retailers', and Consumers' Perspectives. *Preventive Veterinary Medicine* 124: 9–14.
- Wako, G. 2015. Economic Value of Camel Milk in Pastoralist Communities in Ethiopia. Findings from Yabello District, Borana Zone. IIED, London.
- Yilma, Z., G. B. Emannuelle, and S. Ameha. 2011. A Review of the Ethiopian Dairy Sector. Ed. Rudolf Fombad, Food and Agriculture Organization of the United Nations, Sub Regional Office for Eastern Africa (FAO/SFE), Addis Ababa.



## ANNEX

## Survey Questionnaires

The purpose of this survey is to gather information on the livestock byproducts of milk and hides and skins in Ethiopia's Somali Regional State. The survey is used for research entitled "Total Economic Value of Pastoralism in Somali Regional State." The results from this survey will help the Government (both regional and federal) in developing policies that best serve the interests of livestock producers, traders, and consumers. The answers you give to the following questions will be kept confidential.

## Only for Supervisor:

Staff	Name	Signature	Date		
			DD	MM	YY
Enumerator					
Supervisor					

Response status: Completed .....1

Questionnaire's status	Code
_____	_____

Partially completed .....2

Not at all .....3

Refused .....4

## Section I: Household General Information

1. Name of the household head \_\_\_\_\_

2. Zone of household \_\_\_\_\_

3. *Woreda* of household \_\_\_\_\_

4. *Kebele* of household \_\_\_\_\_

5. Sex of the household head

1. Male  2. Female

6. Age of household head \_\_\_\_\_ (years)

7. What is education level of the household head?

1. Basic education  2. Primary level  3. Secondary level   
4. Tertiary level  5. None at all

8. Household Size

1. Male \_\_\_\_\_  
2. Female \_\_\_\_\_  
3. Total \_\_\_\_\_

## Section II. Livestock Population and Ownership

Code	Livestock type	1			2			3			4
		What is the grand total of livestock owned by household?			How many livestock for milk are owned by the holder?			How many livestock for meat are owned by the holder?			How many livestock that have given milk for the last 12 months are owned by the holder?
		Total	Male	Female	Total	Total	Male	Female	Total		
1	Cattle										
2	Goat										
3	Sheep										
4	Camel										

Code	Livestock	5			6			7			8
		How many livestock were slaughtered in the last 12 months?			What is the average number of months during which livestock are actually milked?			What is the average lactation period of livestock in months?			What is the quantity of milk produced per day per livestock in liters?
		Total	Male	Female	Months	Months	Months	Liters			
1	Cattle										
2	Goat										
3	Sheep										
4	Camel										

Code	Livestock	9			10			11			12
		What is the number of livestock that died from disease during the last 12 months?			What is the number of livestock that died for other reasons during the last 12 months?			What is the amount of livestock sales during last 12 months?			What was the total amount of money (in birr) obtained from sales of livestock during the last 12 months?
		Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1	Cattle										
2	Goat										
3	Sheep										
4	Camel										

		15				
Code	Livestock	For what purposes are you rearing livestock? (Use 'X' mark)				
		1. Sales of live animals	2. Livestocks products	3. Social value	4. Savings purposes	5. Other (specify) _____
1	Cattle					
2	Goat					
3	Sheep					
4	Camel					

13. How do you identify your animals from others' animals?

1. Brand marks using red hot iron  2. Modern branding techniques like ear notching   
3. Using paint  4. Other (specify) \_\_\_\_\_

14. What are the major livestock production problems in your area

1. Feed shortage  2. Water shortage  3. Disease outbreak  4. Market   
5. Other (specify) \_\_\_\_\_

### Section III: Production and Consumption of Milk by Household

1. What is/are sources of food for your family? (Rank in the order of importance.)

1. Milk \_\_\_\_\_  
2. Meat \_\_\_\_\_  
3. Grain \_\_\_\_\_  
4. Others specify \_\_\_\_\_

2. What is the source of income for the household? (Rank in the order of importance.)

1. Milk \_\_\_\_\_ 2. Meat \_\_\_\_\_  
3. Hides and skins \_\_\_\_\_ 4. Milk byproducts \_\_\_\_\_  
5. Live animal sales \_\_\_\_\_

3. Do you think that your family's life depends on livestock milk?

1. Yes  2. No

4. Is milk production is the same in all seasons?

1. Yes  2. No

5. If your answer in Q4 is "No," how much milk are you producing per day in wet season? (in liters)

1. Cattle milk per cow/day \_\_\_\_\_ 2. Camel milk per camel/day \_\_\_\_\_  
3. Sheep milk per sheep/day \_\_\_\_\_ 4. Goat milk per goat/day \_\_\_\_\_

6. How much milk are you producing in dry season? (in liters)

1. Cattle milk per cow/day \_\_\_\_\_ 2. Camel milk per camel/day \_\_\_\_\_  
3. Sheep milk per sheep/day \_\_\_\_\_ 4. Goat milk per goat/day \_\_\_\_\_

7. How much milk have you used for home consumption?

1. Cattle milk per individual/day \_\_\_\_\_ 2. Camel milk per individual/day \_\_\_\_\_  
3. Sheep milk per individual/day \_\_\_\_\_ 4. Goat milk per individual/day \_\_\_\_\_

8. Do you purchase milk for household consumption?

1. Yes  2. No

9. If your answer is “Yes” to Q8, how much do you purchase?

1. Cattle milk per day \_\_\_\_\_ 2. Camel milk per day \_\_\_\_\_  
 3. Sheep milk per day \_\_\_\_\_ 4. Goat milk per day \_\_\_\_\_

10. Out of total milk production, how much of milk is for sale?

1. Cattle milk per day \_\_\_\_\_ 2. Camel milk per day \_\_\_\_\_  
 3. Sheep milk per day \_\_\_\_\_ 4. Goat milk per day \_\_\_\_\_

		11		
Code	Livestock	For what purposes do you use milk other than consumption and sales, if any remains? Give amounts in liters.		
		1 Social gifts	2. Wage in kind	3. Other (specify) _____
1	Cattle			
2	Goat			
3	Sheep			
4	Camel			

12. Do you process the milk at your home?

1. Yes  2. No

13. If the answer to Q12 is “Yes,” how many minutes do you spend in milk processing?

1. Minutes per cattle milking \_\_\_\_\_ 2. Minutes per camel milking \_\_\_\_\_  
 3. Minutes per sheep milking \_\_\_\_\_ 4. Minutes per goat milking \_\_\_\_\_

14. Who is engaged in milking and related activities?

1. Men  2. Women  3. Children

15. How many minutes spent per livestock per milking?

1. Minutes per cattle milking \_\_\_\_\_ 2. Minutes per camel milking \_\_\_\_\_  
 3. Minutes per sheep milking \_\_\_\_\_ 4. Minutes per goat milking \_\_\_\_\_

16. Do you employ any labor for milking activities?

1. Yes  2. No

17. If the answer to Q16 is “Yes,” how many laborers have you employed for these activities?

Specify \_\_\_\_\_

18. How much do you pay for the labor as wage? If any, specify \_\_\_\_\_

19. Do you have accessible animal extension services in your area?

1. Yes  2. No

20. What are the major constraints to milk production? Rank them.

1. Water \_\_\_\_\_ 2. Fodder \_\_\_\_\_  
 3. Marketing \_\_\_\_\_ 4. Shortage of rangeland \_\_\_\_\_  
 5. Veterinary services \_\_\_\_\_ 6. Other (specify) \_\_\_\_\_

#### IV: Market and Marketing of Milk

1. Do you sell milk and milk products?
  1. Yes
  2. No
  
2. Where do you sell livestock milk? \_\_\_\_\_
  
3. To whom do you sell livestock milk?
 

1. Directly to consumers _____	2. Local market traders _____
3. Cooperatives _____	4. Main market traders _____
5. Exporters _____	6. Private collectors _____
7. Other _____	
  
4. What is the selling price in the market during the wet season? (in birr)
 

1. Cattle milk/liter _____	2. Camel milk/liter _____
3. Sheep milk/liter _____	4. Goat milk/liter _____
  
5. What is the selling price in the market during dry season? (in birr)
 

1. Cattle milk/liter _____	2. Camel milk/liter _____
3. Sheep milk/liter _____	4. Goat milk/liter _____
  
6. For what purpose do you use the money you earn from milk sales?
 

1. _____	2. _____
3. _____	4. _____
  
7. How long a distance do you travel to sell milk in a day?
  1. Less than 5 km
  2. 5–10 km
  3. More than 10 km
  
8. How many minutes do you spend on milk-selling activities? \_\_\_\_\_
  
9. Who among your household members is engaged in selling milk?
  1. Men
  2. Women
  3. Children
  
10. Do you think that the amount of milk that you produce per day is enough for selling?
  1. Yes
  2. No
  
11. If the answer in Q10 is “No,” what are the main reasons for the answer? Rank them.
 

1. Low herd size _____	2. Poor management _____
3. Low market price _____	4. Less interest in selling milk _____
5. Lack of access to market for milk _____	
  
12. In your opinion, what should be done to improve livestock milk in your area?
   
\_\_\_\_\_
   
\_\_\_\_\_
   
\_\_\_\_\_
  
13. What are the main milk marketing problems in your areas? (Rank in order.)
 

1. Price fluctuation _____	2. Lack of accessible market _____
3. Lack of market information _____	4. Lack of storage facility _____

**V: Marketing of Hides and Skins**

1. Do you sell hides and skins?
  1. Yes
  2. No
  
2. For what purpose you use hides/skins?
  1. Household use
  2. Sales
  3. Gifts in kind
  4. Wages in kind
  5. Other \_\_\_\_\_
  
3. If for sale, to whom do you sell hides and skins?
  1. To private collectors
  2. To cooperatives
  3. To local craftsmen
  4. Other \_\_\_\_\_
  
4. If your answer to Q2 is for sales, what is the price per piece?
  1. Hide of cattle price/piece \_\_\_\_\_
  2. Hide of camel price/piece \_\_\_\_\_
  3. Skin of sheep price/piece \_\_\_\_\_
  4. Skin of goat price/piece \_\_\_\_\_
  
5. Do you get hides/skins marketing information in your area?
  1. Yes
  2. No
  
6. If your answer to Q5 is "Yes," what is the source of information?
  1. Extension workers
  2. From friends
  3. Media
  4. Other \_\_\_\_\_
  
7. What are the major constraints in the hides and skins market? Rank them.
  1. Price fluctuation \_\_\_\_\_
  2. Lack of transportation facilities \_\_\_\_\_
  3. Lack of market \_\_\_\_\_
  4. Lack of market information \_\_\_\_\_
  5. Lack of facilities \_\_\_\_\_
  
8. Do you treat the hides and skins before you sell them?
  1. Yes
  2. No
  
9. How do you see the hides, and skins' value to your household?
  1. Important \_\_\_\_\_
  2. Waste material \_\_\_\_\_

***Thank You for cooperation!!!***



## ANNEX 2

### Interview Guide for Key Informant Interviews

The enumerator/facilitator starts by recording the venue and date of meeting, the identity of the group (e.g., village/chief's name under which the group falls, suburb, etc.). He/she then asks questions to enable the informant to engage in discussion on the following themes:

Introduction: Thank you for your willingness to take part in this interview. The purpose is to explore in depth the perceptions regarding the importance of milk and hides and skins in this area.

1. What is the role of milk to your family?

Probes

- Who do you think is doing milking activities?

2. How do you manage milk production?

Probes

- How do you see the seasonal variation of milk production?

3. How do you manage milk consumption?

Probes

- Who consumes more in the household? Which type?
- What factors affect milk consumption at home?

4. How do you see the importance of hides and skins to households in this community?

5. For what purpose does the community use hides and skins?

Probes

- Where do you sell it?
- To whom do you sell it?

6. What are the major challenges to the hides and skins sector?

7. Let's summarize some of the key points from our discussion.

8. Is there anything else?

9. Do you have any questions?

***Thank you for taking the time to talk to us!!***

