6 Livestock Production and Marketing

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The livestock sector is an important subsector of Ethiopia's economy in terms of its contributions to both agricultural value-added and national gross domestic product (GDP). Between 1995/96 and 2005/06, the livestock subsector's share averaged 24 percent of agricultural GDP and 11 percent of national GDP (Ethiopia, NBE 2006). The contribution of livestock and livestock product exports to foreign exchange earnings is also significant. The annual average revenue from livestock and livestock product exports is estimated to have been 13 percent of the annual national export earnings during the period 2000/01 to 2007/08 (Ethiopia, NBE 2008). Given Ethiopia's long, porous border, a large number of cross-border exports also go unrecorded. According to a recent assessment (GebreMariam et al. 2010), the total unofficial exports of livestock were worth twice as much as the official record of $150 million.[1] If the unofficial export figures are right, this means that the livestock sector would have accounted for about 30 percent of the country's total exports of $1.5 billion in 2008/09.

At the household level, livestock plays a critical economic and social role in the lives of pastoralists, agropastoralists, and smallholder farm households in the central highlands. Livestock fulfills an important function in helping people cope with shocks and accumulate wealth, and it also serves as a store of value in the absence of formal financial institutions and other missing markets. In smallholder mixed farming systems, livestock provides nutritious food, additional emergency and cash income, farm outputs and inputs, and fuel for cooking food. Livestock is central to support and sustain the livelihoods of pastoralists. Furthermore, available research suggests that with economic growth, consumption patterns tend to change toward high-value, high-protein foods such as those derived from livestock (Delgado et al. 1999).[2] This implies that, given the economic growth in Ethiopia and the region, the market demand for livestock and livestock products will continue to grow.

1. The official export earnings are from Ethiopia, NBE (2010), 64, Table 5.3.

2. Econometric estimates of income elasticities of demand for livestock products are presented in Chapter 7.

There is no substantive disagreement about the future growth in livestock demand and Ethiopia's potential to take advantage of this new trend. The government also appears to be convinced that the livestock subsector can play an important role in its ongoing efforts toward poverty alleviation and agriculture-led growth. Government policy has been supportive of the livestock sector through a wide range of fiscal, regulatory, and institutional policies relating to livestock production and marketing. The key policies include improving veterinary services, developing a credible certification system to avert future export bans, promoting credit access, and improving the availability of feed. The livestock subsector has also been included as one of the focus areas of the newly established Ethiopian Agricultural Transformation Agency. Some of these policy initiatives are gradually being recognized. For instance, the National Animal Health Diagnostic and Investigation Center, which was instituted under a special project as part of the government's policy focus, has recently been designated as a reference lab for the Horn of Africa by the UN Food and Agriculture Organization and the African Union (SPS-LMM 2011).[3]

However, behind all these policies are some very hard realities. Both production and marketing systems in the country suffer from serious bottlenecks and constraints. The average productivity of livestock in the country is among the lowest in the world; the ratio of livestock to humans is on a perpetual downward trend, pasturelands are declining fast, and the livestock mortality rate remains one of the highest in the region. The main objective of this chapter is to identify the major constraints to the livestock production and marketing systems in Ethiopia. The chapter begins with an overview of Ethiopia's livestock subsectors and then goes into the analysis of the production and marketing systems. Each of these three sections provides brief discussions of the key issues, which are further explored in a separate section on opportunities and policy challenges. The chapter concludes with a summary.

An Overview of Ethiopia's Livestock Subsector

Trends in the National Livestock Population

The statistics on the livestock population are controversial. The official statistics often exclude the estimates from the pastoral areas on the basis that it is difficult to implement the sampling strategy of Ethiopia's Central Statistical Agency (CSA) in those areas. Some unofficial statistics from those areas are available but are often contested. However, all sources seem to agree that Ethiopia has the largest livestock population in Africa. In 2008/09, Ethiopian seden-

3. We recognize that there is also disagreement about the government's livestock policies, especially about the motives of these policies and their impacts on Somali pastoralists (Devereux 2006, 2010). Further analysis and discussion of these issues are presented later.

tary private holdings were estimated at about 49 million head of cattle, 25 million head of sheep, 22 million head of goats, and 38 million head of poultry (Ethiopia, CSA 2008). These livestock estimates exclude pastoral areas because there are few to no official statistics for these regions.[4] Some rough expert estimates indicate that pastoral areas account for about 20 percent of cattle, 40 percent of sheep, and 40 percent of goats in the country (Jabbar, Negassa, and Gidyelew 2007). Thus, if these rough estimates are included, the national population estimates for 2008/09 will change to 59 million cattle, 35 million sheep, and 31 million goats.

The two main official sources of historical data, the Food and Agriculture Organization (FAO) and the CSA, are inconsistent as well (Table 6.1). According to FAO statistics, the total number of cattle declined slightly in the 1970s (–0.4 percent per year), followed by a small increase in the 1980s (1.1 percent per year). Since 1990, there has been a steady increase in the cattle population, with an average growth rate of about 3 percent. If the 2000–08 period is considered, the annual growth rate is calculated to be even higher, 4.2 percent.

In the cases of the sheep and goat populations, the trend was similar to that for cattle in the 1970s and 1980s. During 1990–99, the sheep and goat populations actually declined by an average of 7.3 percent. This trend reversed after 2000, and the number of sheep and goats grew by roughly 13 percent. However, the total sheep and goat populations have not yet reached their 1970–90 levels. The poultry population was more or less stable for the first half of the time period before declining rapidly in the 1990s. This decline stopped in the last decade, but the number of poultry has not completely recovered.

The next set of statistics in Table 6.1 covers 2001 to 2008/09 and is compiled from CSA *Statistical Bulletins* (Ethiopia, CSA 2001–09). Although the magnitudes are slightly different, the two datasets appear to give consistent estimates (in terms of trends) for all species except poultry, which are estimated to have declined according to the CSA statistics. Although both sources show an increase in all species except poultry, neither source provides an explanation as to what triggered that growth. In particular, even though there have been policy changes, it is unclear whether growth was a policy outcome or whether it was a result of improved feed availability due to favorable weather conditions for several years in a row.

Herd Characteristics: Spatial Distribution and Dynamics

An important part of characterizing the livestock subsector in any given country is an understanding of the herd characteristics there. Spatial aspects are particularly important in Ethiopia because of regional variations in predominant ethnic

4. Official estimates are unavailable not just for livestock but for some of the vital statistics of the country, including access to safe drinking water, marital status of household head, and educational facilities (Devereux 2010).

TABLE 6.1 Trends in average number of animals, by livestock species, 1970–2008

Source	Years	Indicator[a]	Cattle	Sheep	Goats	Poultry
FAO (various years)	1970–79	Number (millions of head)	26.2	23.4	17.3	50.7
		Growth rate (percent)	–0.38	–0.39	–0.23	0.85
	1980–89	Number (millions of head)	27.2	23.4	17.6	54.4
		Growth rate (percent)	1.05	0.36	0.40	1.40
	1990–99	Number (millions of head)	31.4	15.2	11.5	37.7
		Growth rate (percent)	1.84	–7.14	–7.54	–7.65
	2000–08	Number (millions of head)	40.5	18.5	15	35.3
		Growth rate (percent)	4.21	12.45	13.38	0.11
Ethiopia, CSA (2008)	2001–08	Number (millions of head)	42.7	20.7	17.3	36.2
		Growth rate (percent)	3.88	10.44	9.48	–0.16

[a]Indicator: Number is the annual total averaged over the time period; growth rate is calculated using logarithmic regression.

groups and agroecological conditions. In particular, livestock's role in the rural economy and livestock herd dynamics (in-take and off-take patterns) are much different in pastoralist systems than in the settled agriculture systems of the central highlands. In addition, analysis of herd dynamics also offers valuable insights about livestock mortality and profitability, as well as future prospects.

We begin by analyzing the spatial characteristics of Ethiopian herds. Two points are clear from the spatial data. First, at the national level, a larger share (63 percent) of Ethiopian cattle is in the 3- to 10-year age group; of this, 36 percent are females (Table 6.2). The official sources use this categorization to reflect the fact that the cattle are more productive and valuable in this age group. However, further disaggregation by age would have helped us better understand marketing behavior and the purpose of keeping livestock. In particular, unless there were a distress sale, an optimizing household would perhaps sell a narrower age group. Also, there could be variation across ethnic groups and the use of livestock. For instance, although households in the central highlands use livestock for plowing and transporting, pastoralists do not have similar uses for livestock. The other key point we can draw from Table 6.2 is that the share of female cattle is much higher in the pastoral regions than in the highlands. The share of females is about 80 percent in Afar, 70 percent in Gambella, and 68 percent in Somali region, reflecting differences in marketing behavior and purposes of keeping cattle.

Further disaggregation of these data can offer important insights. For instance, a recent study reports that Ethiopian households in the highlands own a higher proportion of oxen because of their plowing and transportation needs (Negassa and Jabbar 2008). However, we could not compile such disaggregated data. At the aggregate level, various CSA reports suggest that the households keep older cattle for draft and breeding purposes. On the other hand, house-

TABLE 6.2 Regional distribution of cattle, by gender and age structure, 2008/09 (percent)

	Males					Females				
Region	<1 year	1–3 years	3–10 years	>10 years	Total	<1 year	1–3 years	3–10 years	>10 years	Total
National average	8.19	7.23	27.46	1.62	44.50	8.9	9.2	35.9	1.4	55.5
Afar	9.51	3.81	6.77	0.21	20.30	17.3	12.7	47.4	2.1	79.5
Amhara	6.80	7.21	34.55	2.65	51.21	7.4	7.9	31.9	1.6	48.8
Benishangul-Gumuz	8.50	7.77	25.24	2.18	43.69	10.7	9.5	34.2	1.7	56.1
Dire Dawa	10.20	12.24	12.24	n.a.	34.68	12.2	12.2	36.7	1.0	62.2
Gambella	10.76	6.92	10.00	0.77	28.45	14.6	11.5	41.5	2.3	70.0
Harar	11.37	11.36	13.64	n.a.	36.37	9.1	11.4	40.9	1.0	62.4
Oromiya	8.52	0.69	27.12	1.44	37.77	8.7	0.5	35.7	1.4	46.2
Somali region	11.94	5.32	14.68	0.11	32.05	13.4	9.2	44.4	0.7	67.6
SNNPR	8.84	6.53	20.32	0.44	36.13	10.4	10.4	42.0	1.2	63.9
Tigray	8.25	6.77	29.23	2.96	47.21	9.9	8.6	32.3	2.0	52.8

SOURCE: GebreMariam et al. (2010) using Central Statistical Agency and other sources.

NOTE: SNNPR = Southern Nations, Nationalities, and People's Region; n.a. = not available.

holds keep sheep and goats older than two years for breeding purposes only. In terms of the class composition of cattle, oxen and cows account for about 44 percent and 24 percent of cattle herds, respectively. By contrast, bulls and young animals like heifers and calves together account for only about 32 percent (Negassa and Jabbar 2008). The higher proportion of oxen confirms that the main reason for keeping cattle in the highland areas of Ethiopia is for draft purposes. This finding is consistent with the results of several other microlevel studies on the role of livestock in smallholder crop–livestock systems (Sansoucy et al. 1995).

For sheep and goats, we were unable to compile spatially disaggregated data in such detail. Some aggregate numbers are available from various CSA reports, which suggest that the age structure is very different for goats and sheep. There are three age groups for animals between birth and age two years (birth to six months, six months to one year, and between one and two years) and one for animals older than two years. According to recent statistics, 52 percent of sheep and 49 percent of goats are more than two years old. The next-largest share is under six months old, which accounts for 25 percent of goats and 27 percent of sheep. A review of the CSA reports for various years indicated that the age structure of Ethiopian livestock has rarely changed over the years. Furthermore, the breeds of sheep and goats kept by households are reported to be almost entirely indigenous. These statistics do not speak well for the government's policies about the modernization and commercialization of livestock. Given the availability of modern breeds and the government's concerted emphasis on the subsector, one would expect a significant increase in adoption of improved breeds, which apparently has not happened in Ethiopia.

Herd Dynamics

Detailed information on the in-takes and off-takes of major livestock species, known as herd dynamics in the livestock literature, is presented in Negassa and Jabbar (2008). These authors present detailed statistics on major sources of inflows and outflows of cattle, sheep, and goats for both pastoralists and the smallholders in the highlands. The majority of smallholders and pastoralists obtain cattle through births from their current herd, although highlanders also procure animals from the pastoralists. In other words, there is very little market participation, especially among the large pastoralists and large farmers. This finding is consistent with those of other studies. For example, Barrett et al. (2004) report that markets are not commonly used for restocking by larger pastoral households; poor households rely more heavily on purchases for restocking. More specifically, between 74 percent and 86 percent of the inflows of the sheep and goat populations for both production systems come from animal births. For smallholders in the highlands, purchases account for only 23 and 16 percent of the inflows of sheep and goats, respectively. The comparable estimate for the pastoralists is only about 8 percent.

There are five channels of off-takes—sales, deaths, home slaughters, gifts, and thefts—of which deaths account for the largest shares of livestock outflows in Ethiopia (Figure 6.1). Deaths represent the single largest source of livestock outflow in Ethiopia, accounting for 41 percent in the case of sheep and 47 percent each for cattle and goats. Sales are the second-largest source of outflows, accounting for 18 percent of off-takes for goats, 38 percent for sheep, and 45 percent for cattle. In the "other" category, which includes home slaughters, gifts, and thefts, goats and sheep represent a higher share because of a high share of home slaughters during Ethiopian festivals such as Fasika and the Ethiopian New Year. The reasons for and the underlying implications of such high rates of animal deaths are considered in a later section, but briefly these statistics are reflections of the weak provision of public veterinary services, the limited existence of private veterinary services, and increasing difficulties with feeds and grazing.

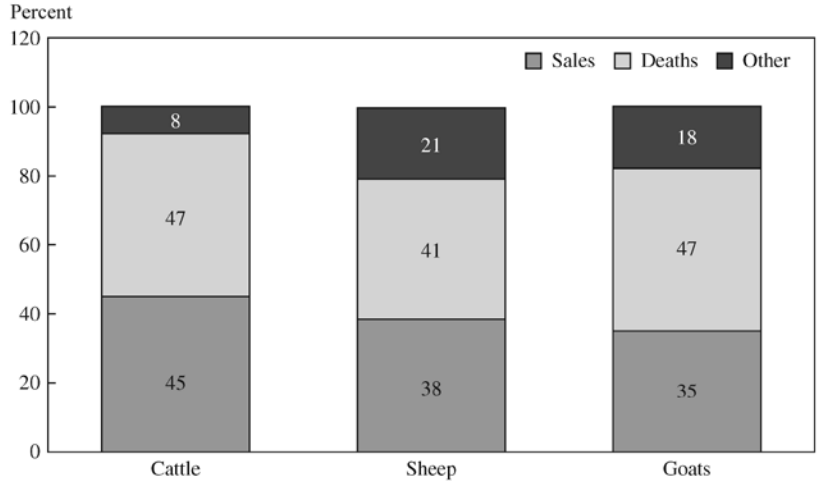
Livestock Production

Three sets of discussions are presented in this section, on (1) production organization, (2) productivity in a regional context, and (3) the underlying causes of Ethiopia's low productivity relative to other countries in the region, with a special focus on Kenya.

Production Organizations

Livestock production in Ethiopia is organized in two broad ways: in the sedentary mixed crop–livestock production system (highlands) and in the nomadic

FIGURE 6.1 Outflow of cattle, sheep, and goats, 2009



SOURCE: Constructed by the authors using data from GebreMariam et al. (2010).

pastoral production system (lowlands). However, we should note that there are variations, and in some locations a mixture of both systems is practiced. Although it does not yet appear in the national statistics, there is another less important production organization in the periurban and urban areas of major cities. Of the total cattle population, the highlands account for about 80 percent, or about 40 million head. Available statistics indicate that a highland household owns, on average, two to four cattle and four to five goats or sheep (Negassa and Jabbar 2008). Given that the rural population in the highlands is around 55 million, or about 10 million households, these statistics suggest that not all households in the highlands own livestock. Among the households that do own livestock, cattle are primarily used to provide draft power (about 45 percent) and dairy products (about 25 percent). Commercial sales and meat production are secondary reasons for herd keeping in the highlands.

Households largely rely on communal grazing and crop residues to feed their cattle, and this is becoming increasingly challenging for the highland herd keepers due to expanding crop areas and hence decreasing pasturelands. This is reflected in the recent trends in agricultural specialization in the highlands. For instance, according to CSA data, the numbers of households exclusively cultivating crops or exclusively keeping livestock are declining rapidly. In 2001–02, about 18 percent of farmers were growing crops only, but that number dropped to only 9 percent in 2008. Similarly, the percentage of households only keeping livestock dropped from 8 percent in 2001 to 5 percent in 2008. By contrast, the percentage of farmers with both crop and livestock holdings increased from 74 percent to 86 percent during the same period. Thus, farmers appear to be adapting to changes by adopting a diversification strategy that allows them to mitigate both risks of crop failure and losses of livestock.

The pastoral (lowland) livestock system is estimated to account for about 20 percent of Ethiopian cattle. With an estimated population of 10 million, pastoralists include largely nomadic communities and sedentary agropastoralists. In the lowlands, nearly all households own herds with an average of 10–15 cattle and 7–10 sheep or goats. Given that the majority of a herd is female, the main purposes of keeping a herd are considered to be the production of dairy products for household consumption and breeding. Ethiopian pastoralists are often at odds with their agropastoralist neighbors, public officials, and government policies. At the root of this conflict is a tension between protecting a unique way of life (at least for the people in power in pastoral areas) and accepting modernization. Pastoralists have limited access to the key provisions of public services. In fact, the lack of public services and infrastructure can create havoc in cases of large-scale shocks, such as the droughts in 1999–2000, which are considered to have been one of the most severe shocks in Ethiopia's history in terms of the total affected people (CRED 2011). However, it is also not clear whether modernization is compatible with this unique way of life of pastoralists, of which livestock is the central part.

This is an old debate but has drawn renewed attention in the context of recent drought-related food security problems in the Horn of Africa. A number of studies cast doubt on the viability of pastoralism as a primary livelihood system (Sandford and Habtu 2000; Sandford 2004). The basis of their arguments is the declining trend in the ratio of livestock to humans, which has reached such a critically low level that there is not enough livestock to meet the income and dietary needs of the pastoralists. Sandford (2004, 25) goes as far as to conclude that "pastoralism and agro-pastoralism, the core activities, at present no longer provide even minimal livelihoods." Devereux and Scoones (2006) differ with Sandford (2004) on the grounds that the ratio of livestock to humans may not be important for Ethiopian pastoralists (Somalis) because trade and remittances provide effective informal social protection for many families against drought and other shocks. Clearly this debate boils down to whether there should be policy interventions to expedite the process of modernization. Even if one takes the view of Devereux and Scoones (2006), a transformation of pastoralist society appears to be inevitable in the long run, but the difference perhaps would be that the process of transformation would be natural instead of policy imposed. If remittances from the diaspora are already significant, it is likely that the trend will continue, and once these people of the diaspora assimilate with the new culture—be it abroad or in an urban center within the country—it is unlikely that they will go back to pastoralism. If this process of migration continues, it will naturally change the pastoralists' livelihood as we know it today.

Leaving the previous debate aside for now, we focus on another key aspect of livestock production organization that is equally important for both highlanders and pastoralists. This has to do with ownership patterns and herd sizes at the household level, which in turn influence commercialization and modernization. Furthermore, herd size is critically important for households' ability to cope with shocks. Available studies suggest that herd recovery after a shock depends on the size of the herd before experiencing the shock (Santos and Barrett 2005). In other words, if the herd size is below some critical minimum, a climatic shock can push the household into destitution. Studying the pastoralist production system, Getachew and McPeak (2004) concluded that households with larger herds recover from shocks significantly faster than households with smaller herds; hence herd accumulation can be an effective way of reducing risks and vulnerability (Getachew and McPeak 2004).

From a policy standpoint, a fundamental challenge is to determine whether there are policy justifications that can alter the incentive structure to reach an equilibrium that represents a Pareto improvement. Table 6.3 presents some summary statistics on the livestock ownership and size of holdings of smallholders in the highlands and of pastoralists. The numbers suggest that there have been some changes in terms of livestock ownership and the sizes of livestock holdings between the rounds of surveys, one conducted in 1999–2000 and the other

TABLE 6.3 Distribution of livestock ownership, by region and species, 1999–2000 and 2004–05 (percent)

	Smallholder farmers						Borana pastoralists		
	1999–2000			2004–05			2004–05		
Number	Cattle	Sheep	Goats	Cattle	Sheep	Goats	Cattle	Sheep	Goats
0	17	69	79	20	62	67	22	80	58
1	13	3	2	11	6	4	2	2	2
2	14	4	4	15	8	6	4	2	2
3	12	4	2	14	6	4	3	2	4
≥4	44	20	14	40	18	19	69	14	34
Mean (SD)	3.7 (3.6)	2.1 (5.1)	1.5 (4.0)	3.7 (4.7)	1.9 (4.4)	2.2 (6.1)	13.1 (17.5)	2.2 (7.4)	4.7 (8.3)
Maximum	30	50	57	145	170	160	120	79	43

SOURCES: Smallholder figures based on ILRI and IFPRI (2000) and Ethiopia, CSA (2006). Borana pastoralist calculations based on GL-CLRSP (2006).

NOTE: SD = standard deviation.

in 2004–05, in the central highlands. The following changes are clear: (1) the percentage of households owning no cattle increased from 17 percent in 1999–2000 to 20 percent in 2004–05, but the households owning no sheep or goats declined by 7 and 12 percent, respectively, and (2) shares of households owning more than four animals declined from 44 to 40 percent in the case of cattle and from 20 to 18 percent in the case of sheep but showed a slight increase in the case of goats.

A more interesting comparison is between smallholders and pastoralists in the Borana area to the south near the Kenyan border. Similar to the case of smallholders, a significant proportion of pastoralists (in Borana) do not own sheep or goats. In fact, compared to households in the central highlands, a larger proportion of households in Borana do not own any cattle or sheep, although the numbers are different in the case of goats. According to these surveys, 22 percent of pastoralists do not own any cattle at all, 80 percent do not own sheep, and 58 percent do not own goats. However, the pastoralists appear to have larger herd sizes than smallholder sedentary farmers in the highlands. On average, Borana pastoralists own about 13 head of cattle and 5 head of goats, compared to 4 head of cattle and 2 head of goats for smallholder farmers. People in both systems own, on average, 2 head of sheep.

Going one step beyond primary production organization is the dairy sector, which lags far behind dairy organization in Kenya. The factors behind this weak performance will be discussed later; only some basic facts are presented in this section. The production and marketing of milk are primarily carried out by smallholder farmers in the highlands. There has been growth in milk production in recent years. CSA data indicate that total raw milk production grew from 0.90 million tons in 2000 to 1.3 million tons in 2008, with an average growth rate of 4.4 percent. Given a human population of about 80 million in Ethiopia in 2008/09, this level of production is indeed very low. Note that these are officially published data that did not include milk production in the pastoralist and agropastoralist areas, where milk is consumed by the households and is rarely marketed. However, there are some statistics on camel's milk, which amounted to about 0.168 million tons in 2008 and accounted for 13 percent of total milk production.

The production organization for milk processing is also dominated by smallholder farmers or smallholders' cooperatives. Depending on accessibility and distance from major towns, smallholder dairy producers typically supply raw milk to the market for immediate consumption or for further processing by dairy cooperatives or private dairy processing firms. However, there are many bottlenecks in the supply chain, which is evident from the fact that a very small share of production goes to industrial processing. A recent study reports that even in major urban markets like Addis Ababa, the dairy market is still dominated by traditional dairy processing (Francesconi 2009). According to this study, 75 percent of the marketed dairy products come from traditional

processing, 17 percent from local industrial production, and the remaining 8 percent of local demand is met through imports. In Ethiopia *traditional processing* refers to cottage processing, whereby individual farmers or cooperatives produce traditional dairy products including fluid milk, fermented or sour milk (*ergo*), and traditional cheese (*ayib*). Besides, most of the cottage dairy products are consumed on-farm or in nearby towns. Fresh fluid milk is marketed within close proximity of its production areas. These patterns demonstrate that, except for cottage butter, the marketing of dairy products over significant distances is limited due to perishability.

Livestock Productivity

All available statistics suggest that the productivity of livestock is among the lowest in the world. Average productivity numbers from the FAO are presented in Table 6.4, which shows that Ethiopia lags behind almost all regional countries, regional averages, and world averages of productivity. The most strikingly low productivity is in milk production, where Ethiopia's production of 210 kilograms per year per cow is less than a tenth of the world's productivity of 2.3 tons and about a third of Kenya's 551 kilograms.

In addition to exhibiting the world's lowest livestock productivity, more disaggregated data for recent years indicate that Ethiopia has experienced no significant productivity gains in recent years, even though its total meat production has gone up by 4.6 percent, with mutton and goat meat registering growth rates of 12 and 13 percent, respectively (Table 6.5). The total quantity

TABLE 6.4 Livestock productivity in African countries versus the world, 1999–2008

Country	Meat (carcass weight, per head per year)				Milk (kilograms per head per year)
	Beef (kilograms)	Mutton (kilograms)	Goat meat (kilograms)	Chicken (grams)	
Ethiopia	108	10	8	800	210
Kenya	146	12	11	1,204	551
Malawi	205	14	12	800	451
Rwanda	104	12	11	900	494
Sudan	119	16	13	1,000	400
Tanzania	108	12	12	909	174
Uganda	150	14	12	1,300	350
Eastern Africa	127	11	11	966	321
Least developed countries	117	13	10	950	318
World	205	16	12	1,450	2,257

SOURCE: FAO (various years).

TABLE 6.5 Livestock production and productivity, 2000, 2004, and 2008

	Total production (thousands of metric tons)				Productivity[a]			
Category	2000	2004	2008	Growth rate[b] (percent)	2000	2004	2008	Growth rate[b] (percent)
Meat	393	488	572	4.57	n.a.			
Beef	294	336	380	2.90	108	108	109	0.02
Mutton	36	60	82	12.30	10	10	10	–0.02
Goat meat	26	44	65	13.31	9	8	9	0.06
Chicken	38	47	46	0.11	1	1	1	0.00
Milk	900	1,050	1,350	4.35	207	210	211	0.61

SOURCE: FAO (various years).

NOTE: n.a. = not available.

[a]Productivity measures: meat—carcass weight (kilograms per head); milk—kilograms per head per year.

[b]Growth rate calculated over 2000–08.

of meat produced in 2008 was estimated at 572,000 tons, of which beef accounted for 66 percent (380,000 tons). In terms of production, the production of both goat meat and mutton more than doubled. Goat meat production increased from 26,000 tons in 2000 to 65,000 tons in 2008, and mutton production grew from 36,000 tons to 82,000 tons during the same period. These production numbers are quite different from the productivity numbers presented in the same table. Note that there was hardly any change in the productivity numbers obtained from the FAO. All productivity growth numbers except those for milk are at the level of two decimal points, ranging from –0.02 percent to 0.61 percent. Therefore, it is quite obvious that the growth in meat production has resulted from the increase in the number of slaughtered animals, not from an increase in productivity. Comparing the estimates in Table 6.5 with those in Table 6.1, it can be concluded that the growth in herd populations in 2000–08 was actually depleted through increased meat production in the same period.

Reasons for Ethiopia's Low Livestock Productivity

A host of factors influence livestock productivity. The most important factors include the availability and adoption of high-yielding breeds, access to veterinary services, cultural and social practices of livestock rearing, grazing, and feed supply constraints. These factors will be further discussed later in the chapter, but we would like to highlight two important points here. First, many of the factors underlying low productivity can be termed some form of market failure and hence justify policy supports. Apparently such policy supports in Ethiopia

have not fared as well as such supports in its neighbors. For instance, dairying in Kenya started at the beginning of the 20th century when European settlers introduced exotic high-milk-producing cattle breeds and other forms of exotic agriculture from Europe. There was a deliberate effort to promote the adoption of these exotic breeds under the Swynnerton Plan of 1954, which encouraged Kenyans to engage in commercial agriculture (Connelly 1998). At the time of Kenya's independence from British rule in 1963, its dairy herd had grown remarkably, to 400,000 head of exotic cattle (Muriuki 2009). Furthermore, the government subsequently introduced highly subsidized input services for animal healthcare, production, artificial insemination and bull schemes, dipping to control ticks and other ectoparasites, and training of livestock specialists. In Ethiopia there was a clear lack of such initiatives until very recently.

These realities are actually clear in recent Government of Ethiopia publications. A Ministry of Finance and Economic Development (MoFED) report highlights that there is a significant productivity difference among local dairy breeds. The milk yield for local dairy breeds is about 1.5 liters per day per cow, which is about one-eighth of the milk yield (9 liters per day per cow) for improved dairy breeds (Ethiopia, MoFED 2006). The report also shows that the difference in the length of lactation between the local and improved dairy breeds is significantly large. Similarly, there is a substantial productivity difference between local and improved poultry breeds. The local poultry breeds lay only 50 eggs per year, which is one-third the number laid by modern breeds, which lay up to 150 eggs per year. Because a majority of Ethiopian livestock consists of indigenous breeds, it is no surprise that the country's livestock productivity is so low compared to that of other countries in the region, as well as the least developed countries.

There are two major reasons why, despite the high productivity and availability of improved breeds, adoption rates are low: lack or limited availability of veterinary services and increasing problems with feeds and grazing. Summary statistics from the available CSA reports suggest that only about 26 percent of Ethiopian cattle were vaccinated during 2005–09. The percentage of sheep and goats vaccinated was much lower (12 percent). According to the same reports, fewer than half of sick cattle were even treated by a certified veterinarian. The numbers were far worse for goats and sheep: of the total diseased, only about one-fifth of the goats and one-fourth of the sheep were ever treated. Given this state of veterinary services, it is very unlikely that cash-strapped smallholders will ever make substantive investments to acquire expensive and high-maintenance improved breeds; the private sector has not filled the gap and is unlikely to evolve in the near future.

Poor availability of feed and grazing, which is often communal or communally administered and exhibits a strong seasonality due to weather conditions, constrains the adoption of improved breeds. A recent study suggests that

grazing and green fodder are the predominant sources of livestock feed, exceeding 80 percent, in the pastoralist regions of Afar and Somali lands (GebreMariam et al. 2010). The same is true in the agriculturally backward regions of Gambella and Benishangul-Gumuz. Communal grazing as a source of livestock feed has begun to decline in recent years, especially in the highlands, where crop cultivation is becoming increasingly intensive. Another major source of feed is crop residues, which account for about 27 percent of the total national livestock feed consumption (GebreMariam et al. 2010). Industrial by-products and grain-based feed are small shares of the national total.

Recent survey data show that the increasing scarcity of pastureland and grazing has resulted in a sharp increase in livestock feed prices in recent years. Table 6.6 is constructed based on two rounds of surveys conducted by the Sanitary and Phytosanitary Standard and Livestock Meat Marketing Program implemented with technical support from Texas A&M University. The estimates suggest that the price of the second-largest source of livestock feed (bale hay) quadrupled in nominal terms between 2004 and 2008. The prices of grain-based feed and industrial by-products, used for commercial livestock, have also increased three- to four-fold. True, these numbers overstate the price growth, especially because of high inflation during 2007–09. However, the magnitudes remain high even after deflating them by the appropriate consumer price indexes. In real terms, prices have increased by 82 percent for bale hay, 113 percent for wheat chaff, and 25–37 percent for the other sources. Thus, without implying any attribution, one can argue that the unavailability of feed can be an important reason for both the low body weight and the high mortality of livestock.

TABLE 6.6 Increases in livestock feed prices, by feed type, 2004–08

	Nominal prices (ETB per ton)			Real price (2006 price)[a]		
Feed type	2004	2008	2008 price as a percentage of 2004 price	2004	2008	2008 price as a percentage of 2004 price
Cottonseed	800	2,200	275	1,065	1,334	125
Noug cake	800	2,300	288	1,065	1,395	131
Wheat (grade-2)	600	1,800	300	799	1,092	137
Wheat chaff (grade-2)	300	1,400	467	399	849	213
Bale hay (teff or grass)	300	1,200	400	399	728	182

SOURCE: Nominal numbers are from SPS-LMM (2004, 2008).

NOTE: ETB = Ethiopian birr.

[a]Deflated by the December consumer price index of the respective year, with December 2006 = 100.

Livestock Marketing

Domestic Marketing

Many smallholder farmers and pastoralists in Ethiopia do not participate in the livestock market, and for those who do, the size of transactions (sale or purchase of cattle, sheep, or goats) has been found to be very small (Table 6.7). The numbers further suggest that most household livestock production is ultimately consumed within the household. For example, the CSA data for 2004/05 indicate that about half of the households neither sold nor bought cattle, while 43 percent and 50 percent of the smallholder farmers neither sold nor bought sheep or goats, respectively. Borana pastoralists were even less likely to participate in markets, with nearly 47 percent not engaging in cattle sales or purchases and 72 percent choosing not to engage in sheep sales or purchases. However, numerous studies have shown that the domestic market for livestock, even at such a small scale, is substantial and is in fact growing, due in part to greater consumption of livestock products in urban markets such as Addis Ababa.

Barrett et al. (2004) indicate that when pastoral households in Ethiopia participate in livestock markets, they do so in relatively small volumes and at varying rates over time. In pastoral areas livestock is sold to meet family cash needs to purchase food and clothes and to meet educational and medical expenses (Hurissa and Jemberu 2002; Gebremedhin, Hoekstra, and Jemaneh 2007). Barrett et al. (2004) discussed several reasons for the limited nature of market off-take from the pastoral areas. First, with banking services largely lacking there are few investment opportunities in the pastoral areas, making live animal herd-building the primary means of storing wealth. Second, because most of

TABLE 6.7 Distribution of livestock producers, by market participation regime and species, 2003 or 2004–05 (percent)

	Live animal species		
Market participation regime	Cattle	Sheep	Goats
Smallholder farmers (2004–05)			
Sales only	22	26	27
Purchases only	16	23	18
Sales and purchases	12	8	5
No sales and no purchases	50	43	50
Borana pastoralists (2003–05)			
Sales only	47	18	25
Purchases only	2	6	7
Sales and purchases	4	4	2
No sales and no purchases	47	72	66

SOURCES: Negassa and Jabbar (2008). Smallholder figures based on CSA (2006). Pastoralist calculations based on GL-CLRSP (2006).

the resources required for livestock production are free, pastoralists have limited demand for cash income. In the event that pastoralists need cash income, the need is usually met by selling a few animals, and even then, animals that are less productive in terms of milk and breeding. Pastoralists' market participation is also limited by other factors, such as high transaction costs. Given their distance from markets, there are a number of intermediaries that require payment for their services, which erodes the profits from selling animals (Devereux 2006). For instance, Umar and Baulch (2007) detail how transaction charges are not limited to transport alone but also include local taxes and the costs of holding, fodder, and water while a buyer is found. For small-scale traders with little working capital, accessing markets is particularly difficult unless they are willing to operate on a credit-based system with local traders or cooperatives (Umar and Baulch 2007; GebreMariam et al. 2010; Hashi and Mohamed 2010). Therefore, pastoralists are more inclined to build larger herds and flocks for cultural prestige, to accumulate wealth or pay dowries (social functions), and as drought-coping mechanisms than to build a large herd for increased commercial off-take.

These findings are reinforced with data from three regions in the highland areas of Ethiopia (Tigray, Amhara, and Oromiya) indicating not only that the net commercial off-take rate of cattle was low but also that the bulk of this net commercial off-take was of low-quality cattle, such as culled draft oxen (Negassa and Jabbar 2008). Oxen accounted for 62 and 75 percent of the gross and net commercial off-take for cattle, respectively, while the off-take rates for calves and heifers were found to be negligible. Cattle sales, then, can be considered as an input to crop production in the mixed crop–livestock production systems of Ethiopia rather than as an output of a livestock production system. More than 70 percent of the net commercial off-take for sheep and goats was in the form of males for smallholder sedentary farmers. For Borana pastoral production systems, the net commercial off-take was totally in the form of male sheep and goats.

Both sedentary farmers and pastoralists appear to be unwilling to part with either young or productive animals, implying that the market is supplied with a surplus of aged male animals rather than younger animals that can be fattened and either processed or sold to export markets. In a survey of over 2,500 animal transactions in nine small ruminant markets in eastern Ethiopia, Ayele et al. (2006) found that about half of the sheep and goats were marketed at or under the age of 15 months. The same study also indicated that about 57 percent and 55 percent, respectively, of the sheep and goats marketed had bodies in good condition, while the remainder had bodies in poor condition at the time of sale.

In an analysis of the livestock value chain, GebreMariam et al. (2010) described how the irregular interaction of both pastoralists and highland smallholders with markets undermines the effectiveness of both traders and livestock cooperatives who supply export markets and large-scale domestic feedlots.

When supplies of animals are erratic and strongly dependent on seasonal events, traders are unable to rely on a stable volume of animals and are forced to trade in small volumes, lowering their market power. Additionally, because of their small scale, the lack of working capital limits the degree to which these small businesses can expand (GebreMariam et al. 2010).

The expansion of medium- and small-scale trading businesses is also constrained by an inadequate supply of feed, water, and land. Although the feedlot industry has grown in recent years and is increasingly playing a role in livestock fattening for markets, it remains a dichotomous system, with large-scale feedlots purchasing livestock in high volumes for domestic urban markets and export markets while smaller backyard operations supply local markets and butchers. For smallholder farmers, limited grazing land in the mixed farming system means that livestock production could be improved only through intensification and better integration of crop and livestock production practices. Thus, for larger feedlots securing land with access to water and credit to cope with increasing feed costs remains a priority.

Formal Export Markets

The rapid growth in demand for meat products in the world represents a potential opportunity for livestock-rich countries like Ethiopia. From 1970/71 to 2007/08, the share of livestock and livestock products in the total value of exports was about 13 percent, fluctuating between 12 percent and 16 percent for different periods (Table 6.8). However, it is important to note that hides and skins accounted for most of these export earnings (77 percent), signifying that Ethiopia has thus far failed to take advantage of increasing demand and its comparative advantage as a livestock producer. The annual export volume of live animals and meat and meat products averaged 6.6 million tons and 19.6 million tons, respectively, with coefficients of variation of 145 percent and 384 percent, respectively. These high coefficients of variation indicate that there is high interyear variability in the volume of meat exports, which is likely attributable to a series of stringent health and quality control regulations restricting exports (SOS Sahel Ethiopia 2008).

Ethiopia suffered the sad consequences of these strict quality and safety regulations when the Arab States of the Persian Gulf imposed a ban on all livestock imports from the Horn of Africa in 1998 and 2000. These bans resulted in a halving of total livestock exports in 1998 and in a near-collapse of the pastoral network of traders and businesses operating to move animals between the Horn of Africa and Saudi Arabia (Umar and Baulch 2007; Devereux 2010). Based on computable general equilibrium modeling results, Nin Pratt et al. (2004) estimate that there was a total loss of $136 million, which was equivalent to 36 percent of the Somali region's GDP and a reduction in producers' income of 50 percent relative to a typical trading year in the past. This loss of income, as well as the collapse of livestock prices relative to cereals, not only adversely

TABLE 6.8 Export volume and value of major livestock exports, 1970–2008

	1970–80		1981–90		1991–2000		2001–08		1970–2008	
Indicator	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Live animals										
Mean volume, value	6,734	139	6,721	53	1,131	10	14,616	98	6,706	73
Growth rate (percent)	–28.0	–8.1	11.5	3.3	10.2	17.0	193.2	140.0	–2.6	–4.1
Export share (percent)	n.a.	3.1	n.a.	2.0	n.a.	0.3	n.a.	1.4	n.a.	1.8
Meat and meat products										
Mean volume, value	67,180	78	1,476	16	905	19	4,049	80	19,566	46
Growth rate (percent)	–45.2	–27.0	–13.2	–17.6	75.6	91.0	54.2	55.2	–5.9	–1.5
Export share (percent)	n.a.	1.8	n.a.	0.6	n.a.	0.6	n.a.	1.2	n.a.	1.1
Hides and skins										
Mean volume, value	12,624	410	9,585	338	6,958	361	12,786	644	10,302	422
Growth rate (percent)	3.8	3.9	0.1	1.2	5.5	10.8	7.1	–1.2	–0.2	1.4
Export share (percent)		9.3		12.8		10.6		9.4		10.2
Share of livestock in total exports (percent)		14.2	n.a.	16.0	n.a.	12.0	n.a.	12.0	n.a.	13.0

SOURCE: Based on raw data from the National Bank of Ethiopia.

NOTES: Volume is expressed in metric tons, value in millions of Ethiopian birr. n.a. = not available.

affected households' consumption but also forced many of them to deplete their herds rather than slip into poverty and destitution.

Things have improved since then, and the total livestock exports have gradually increased, as has the livestock population. However, there are indications that Ethiopia has not yet been able to take full advantage of these improved conditions. Let us consider some recent export numbers obtained from the Ethiopian Custom Authority. Table 6.9 summarizes these numbers by livestock species, total export value, and country of destination from July 2007 to June 2008. The main live animal species considered include cattle, sheep, goats, and camels. During this one-year period, the total value of animals exported was $40.6 million, more than 80 percent of which came from cattle and camels, with cattle accounting for about half of the total export value. Looking at each destination country's share in total export value, Yemen turns out to have been the largest trade partner, accounting for 26 percent of the total live animal export value, followed by Djibouti (19.5 percent) and the Kingdom of Saudi Arabia (16.7 percent). However, one study suggests that exports to Djibouti and Yemen as well as Somalia and Sudan are typically rerouted to other Persian Gulf nations in order to circumvent import restrictions from the Horn (Hashi and Mohamed 2010). It also argues that Yemen and Djibouti import live animals at low prices from Ethiopia, fatten them, and then export them to the Persian Gulf states, enabling these countries to generate value addition. This is perhaps why export prices are often lower than Addis Ababa prices. For example, domestic cattle price data suggest that in August of 2010 grade-1 cattle were selling for ETB 14,450, roughly equivalent to $870, which was more than three times higher than the export price of cattle in 2008/09 calculated by the Ethiopian Custom Authority.[5]

Informal Export Marketing

Recent studies have also estimated that over 300,000 head of cattle and over 1 million head of sheep and goats were exported through informal trade in 2001 (Belachew and Eshetu 2002), primarily destined for Middle Eastern markets via Djibouti and Somalia. Little (2005) estimates that, of the animal trade coming out of the ports of Somalia, as much as 50–60 percent is sourced through informal trade from Ethiopia. Additionally, the strong demand for livestock in Nairobi, where prices can be as much as 25 percent higher than in neighboring countries, also attracts approximately 40,000 cattle annually sourced from Ethiopia through informal trade (Little 2005).

The informal trade of livestock and livestock products has a strong history founded on clan-based linkages and a strong regional trade relationship with the Middle East. With trade in the region largely unregulated and contractual

5. These data are published by a joint project of the US Agency for International Development and the Government of Ethiopia (available at http://www.lmiset.net).

TABLE 6.9 Value and share of exports of live animals from Ethiopia, by destination, 2007–08

	Cattle		Camels		Sheep		Goats		Others		Total	
Country	Value	Share	Value	Share	Value	Share	Value	Share	Value	Share	Value	Share
Djibouti	1.01	5.1	5.78	42.9	0.77	13.5	0.22	19.2	0.12	23.0	7.90	19.5
Somalia	2.87	14.4	0.03	0.2	n.a.	0.0	0.00	0.0	0.00		2.90	7.1
Sudan	3.19	16.0	0.71	5.3	n.a.	0.0	0.00	0.0	0.09	16.8	3.99	9.8
Yemen	10.48	52.5	0.03	0.2	0.06	1.0	0.09	7.7	0.00	0.6	10.7	26.2
Kingdom of Saudi Arabia	0.11	0.5	0.93	6.9	4.81	84.7	0.80	68.3	0.12	23.4	6.77	16.7
United Arab Emirates	2.30	11.5	2.35	17.4	0.02	0.4	0.06	4.9	0.18	35.5	4.73	11.6
Egypt	0.00	n.a.	3.63	27.0	n.a.	0.0	0.00		0.00	n.a.	3.63	8.9
Jordan	0.00	n.a.	0.00	n.a.	0.03	0.4	0.00		0.00	n.a.	0.03	0.1
Other	0.00	n.a.	0.00	n.a.	n.a.	n.a.	0.00		0.00	0.6	0.00	0.0
Total	19.95	100.0	13.47	100.0	5.68	100.0	1.17	100.0	0.51	100.0	40.6	100.0
Share (percent) each animal	n.a.	49.0	n.a.	33.0	n.a.	14.0	n.a.	3.0	n.a.	1.0	n.a.	100.0

SOURCE: Authors' calculations based on Ethiopian Custom Authority data.

NOTES: Value is expressed in millions of US$, share in percent. n.a. = not available.

arrangements missing, traditional clan-based trade offers both a sense of security to buyers and sellers of livestock and a means of settling differences. For traders and those who trek livestock to markets and across borders, clan-based relationships provide a means of safe passage to central markets through distant lands and help guarantee access to pasture and water (Umar and Baulch 2007). With little operating capital, limited insurance, and the high frequency of raids or conflict, many pastoralists are reluctant to leave these arrangements and enter into the formal sector. Additionally, the complexity and costs of obtaining permits to perform livestock transactions, as well as government regulation and seizure of Somali currency within Ethiopia, have caused many traders to avoid places where trade is heavily regulated (Devereux 2006) and to rely on informal trade to move livestock.

Meat Exports

It can be argued that Ethiopia would benefit more from exporting meat than from exporting live animals, because there are several problems in exporting live animals. First, there is a limited marketing infrastructure, including feeding and watering facilities en route to the live animal export markets, which results in high transaction costs and reduces the quality of live animals upon arrival in destination markets. Second, live animal exports have also been observed to enhance the chances of disease transmission, and as a result, the export of live animals has frequently faced bans by importing countries whenever there have been animal disease outbreaks within Ethiopia or bordering countries. Furthermore, the live animal export trade from Ethiopia is observed to be very seasonal, usually concentrated around the time of religious celebrations in Middle Eastern countries, while the meat export trade could be a year-long activity, providing year-round employment.

The export of meat also offers opportunities for value-addition in the country of origin, which increases the levels of employment and income and maximizes the number of people participating in and benefiting from value-adding activities. Meat exports also have the potential to generate increased tax revenue for the government from various services, processing, marketing, and other associated activities catering to the preparation of meat for export. Meat by-products such as hides and skins could also be key sources of revenue through further processing and manufacturing within the country or through direct exports of raw or semi-processed hides and skins. Other by-products, such as offal, left in the country could provide less expensive sources of protein for domestic consumers or could be export items by themselves.

Opportunities and Policy Options

There has been a growing consensus that, with increasing economic growth and urbanization, the demand for livestock will continue to grow and that animal

products will rapidly become major sources of protein (Delgado et al. 1999; Hall, Ehui, and Delgado 2004; Seré et al. 2008). According to available projections, Africa is currently at a net deficit, with very low productivity, and the situation is likely to get worse in the coming decade (World Bank 2008). Of course these projections are based on several assumptions, including an assumption about the level of policy emphasis. This suggests that the evolving trend presents an opportunity in global markets for the livestock-rich and smallholder-dominated African countries in terms of both growth and poverty alleviation. Additionally, as pointed out earlier, there is a rising (and unmet) domestic demand for dairy products. Close to 70 percent of per capita daily calorie intake in a typical African country comes from cereals; livestock accounts for only around 5 percent. Animal products continue to provide less than 5 percent of the protein consumed in Ethiopia, mainly due to low income and religious considerations.[6] A recent survey shows that more than 90 percent of the surveyed households expressed a willingness to consume more livestock products if they could afford them (Negassa 2009), implying that the potential to expand domestic livestock consumption is high.

There are three other sources of growing domestic demand for livestock products. First, malnutrition is one of the most serious public health problems in Ethiopia. Estimates from the recent Demographic Health Survey indicate that 47 percent of children in the country are stunted, 38 percent are underweight, and 11 percent are wasted.[7] The government intends to take action by supporting local production and the use of complementary blended food similar to corn soy blend, which requires milk powder as an ingredient. How much additional demand this can generate is a subject for further research. However, given that the livestock market is plagued with various sources of market failure, introducing government-supported feeding programs as part of the social safety net would not only be a justified intervention but would also provide a much-needed initial boost to the dairy sector in the country. Second, urbanization has accelerated in the country in recent years, and supermarkets, albeit at a smaller scale, are sprouting up in cities and urban centers. If this trend continues, as it has in many other developing countries, a food service sector will grow with greater domestic demand. Again, the exact nature and magnitude of potential additional demand is unknown, but the trends are obvious, and identifying policy options to expedite this trend should be on the policymakers' radar. Given the historical neglect of the subsector in Ethiopia compared to Kenya and other developing countries, there are clear opportunities to bring about change by ramping up policy interventions. In this section we highlight some of those interventions, but we begin by assessing the costs of doing nothing.

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6. The fasting practice of the Orthodox Christian Church, which is followed by the majority of the Christians in the country, prohibits consuming livestock products.

7. These statistics are cited by a local newspaper (*The Reporter,* December 26, 2009).

Some Arithmetic of Livestock Mortality

There are theoretically justifiable reasons for policy interventions in the Ethiopian livestock subsector. Weak institutions, inadequate provision of public goods, information asymmetry among market actors, and the unaffordability of veterinary services due to high transaction costs—all qualify as sources of market failure and can serve as an undisputed rationale for public policies. However, another more appealing dimension of policy justification is the cost of not doing anything. We have made a modest attempt to get at this issue, and a summary of the results is presented in Table 6.10, which is constructed using off-take data from the CSA, export data from the Ethiopian Custom Authority, and price data from the Ethiopian Livestock Market Information System. The first three panels (six rows) of the table show the off-takes of cattle, sheep, and goats by major channel. The bottom two panels (eight rows) present the valuation of off-takes at export and market prices, respectively. As indicated earlier, deaths account for the largest share of off-takes for all three species, with cattle and goats accounting for 47 percent and sheep accounting for 41 percent.

TABLE 6.10 Livestock off-takes and valuation, by species, 2007–08

		Off-take channel			
Species, value	Category	Sales	Deaths	Other off-takes	Total
Cattle	Head count (millions)	4.0	4.2	0.7	8.9
	Share in total off-takes (percent)	45	47	8	100
Sheep	Head count (millions)	5.24	5.66	2.90	13.8
	Share in total off-takes (percent)	38	41	21	100
Goats	Head count (millions)	3.29	4.42	1.69	9.4
	Share in total off-takes (percent)	35	47	18	100
Value at export price (millions of US$)	Cattle	957	1,005	168	2,130
	Sheep	199	210	109	517
	Goats	134	178	69	381
	Total for all three species	1,290	1,393	345	3,028
Total value at Addis Ababa price (millions of US$)	Cattle	3,503	3,678	613	7,794
	Sheep	339	358	185	882
	Goats	256	341	132	729
	Total for all three species	4,098	4,378	930	9,406

SOURCE: Authors' calculations based on Central Statistical Agency data.

NOTES: Export price per head is calculated from Custom Authority data by dividing export value by total number of animals exported. The Addis Ababa price is taken from http://www.lmiset.net, August 2011, for grade 1 of each species.

Using available data, we calculated the value of the deaths of these animals, and the numbers are striking. At export prices, the total costs of animal deaths for 2007–08 are estimated at about $1.4 billion, with cattle alone accounting for $1.0 billion. When these animals were valued at the August 2011 market price for grade-1 cattle, the value of dead animals for that year almost quadrupled, to $4.4 billion.

Just how large are these estimates? To put the magnitudes in perspective, let us consider a few examples. The Productive Safety Net Programme (PSNP) of Ethiopia, which is the largest program of its kind on the continent except in South Africa, costs about $300 million and serves almost 8 million poor beneficiaries. This means that, had Ethiopia prevented the deaths of the three species considered, the associated savings would be great enough to fund about 5 programs equivalent to the size of the PSNP if the dead animals are valued at the export price and about 16 programs if they are valued at the Addis Ababa grade-1 price. Similarly, the country receives about 500,000 tons of food aid a year, which, if valued at the 2009 US Gulf price, is worth about $100 million, which is miniscule compared to the savings that the country could generate by preventing animal deaths. True, these valuations are approximate, and we do not have as a counterfactual the costs of saving those animals. However, this much is obvious from the official statistics: very little is done to decrease mortality. During 2005–09, only 26 percent of the Ethiopian cattle and 12 percent of the goats and sheep were vaccinated; fewer than half of the sick cattle, one-fifth of the sick goats, and one-fourth of the sick sheep received veterinary services. According to the government's livestock master plan (2008), total spending (salary plus drugs, equipment, and overheads) per animal is about ETB 1, compared to the recommended spending of ETB 31 per animal. Thus, one can argue that investments in preventing mortality would likely yield high dividends.

Other Key Policy Issues

The Ethiopian livestock subsector is far below its production potential. Thus, a lot needs to be done to make the system efficient and equitable along the value chain. Improvements in production, marketing, and processing can add large value gains not only in terms of income but also with respect to improving food security and reducing poverty and vulnerability. Many of the issues came up in the preceding sections, but some of them warrant attention with respect to prioritizing policy. In particular, we would like to highlight the needs for (1) introducing a cohesive and coordinated policy and institutional environment, (2) improving the livestock information systems, (3) addressing the feeding and grazing issues, and (4) improving dairy and other processing.

Ethiopia has lagged far behind Kenya with respect to policy attention to the livestock subsector. Over the past three decades, the majority of livestock development projects in Ethiopia have been donor driven. Although many of these projects added some localized value, almost all of them lacked sustain-

ability and local ownership. On the part of the government, a lack of coordinated effort toward livestock sector development becomes clear when one looks at the livestock mandates within the ministries. There is no single agency or institution within the Government of Ethiopia to exclusively oversee livestock development (GebreMariam et al. 2010). Things are very different in Kenya, where livestock development policies predate the country's independence. Not only does Kenya have a dedicated ministry, called the Ministry of Livestock Development, but also there are a host of other agencies and departments supporting the livestock sector.[8] Among others, they include the Kenya Dairy Board, Kenya National Artificial Insemination Services, the Kenya Veterinary Vaccines Production Institute, Kenya Cooperative Creameries, and the Kenya Veterinary Board. True, one can argue about the efficiency of these public and semipublic agencies, but there is no denying that this wide range of agencies and departments reflects a clear commitment to livestock development that has historically been missing in Ethiopia.

Limited information has also long been a serious constraint on the Ethiopian livestock subsector. To address this deficiency, there have been some initiatives in the past; the most recent has been a government project with technical support from Texas A&M University and financial support from the US Agency for International Development. The underlying idea is to technologically link various actors in the value chain with regional and national institutions. This is a good step forward, but more should and can be done. To mitigate information asymmetry across market actors, the government should set up secured market locations where trade takes place on a daily basis (or on preset dates). These locations could then be linked with other central locations by displaying information from the central markets through price tickers. The Ethiopian Commodity Exchange has already set up such price tickers for coffee in various markets in coffee-growing regions. Therefore, future efforts will involve extending the current infrastructure to livestock market locations.

Feeding livestock is increasingly becoming a challenge for Ethiopia due to rapid population growth, expansion of croplands, and the high frequency of climatic shocks. Therefore, the country will have to find ways to develop alternative feeding arrangements. Such alternatives will likely play important roles not only in improving the supply of feed but also in generating demand. Commercial feedlots, in particular, have the potential to increase the livestock supply through improving animal nutrition and hence increasing the value of animals. Commercial feedlots can also help improve consistent supply with predictable quality. It is also envisaged that commercial feedlots can generate other beneficial effects; they can (1) serve as aggregators for smallholder farmers in their vicinities, (2) help local businesses such as private animal health service providers and forage seed distributors, (3) serve as consistent sources

8. For a brief but useful discussion, see van der Valk (2008).

of demand for animal fattening, and (4) demonstrate high-productivity feed crop cultivation and provision of stable demand for feed crops and crop residues grown by smallholders.[9]

For the livestock subsector to be efficient and competitive, both dairy and meat processing have to improve. Increasing the production and export of live animals or meat is directly correlated with improvement of dairy productivity. However, although there has been some emphasis on dairy cooperatives, the government has done little to improve the dairy sector in comparison to the dairy sectors of Ethiopia's neighbors. As shown in Table 6.4, milk production per cow per year in Ethiopia is 210 kilograms, which is lower than the East African average of 321 kilograms per cow per year and the least developed countries average of 318 kilograms per cow per year. Another example from Kenya can provide further insight. Smallholders in Kenya own about 62 percent of the dairy animals, almost all of which are some form of improved breeds (21 percent exotic crosses, 41 percent Zebu and other crosses).[10] By comparison, most of the Ethiopian dairy animals, except those of periurban cooperatives, are local breeds. Can similar rates be achieved for Ethiopian smallholders? Answering this question is beyond the scope of this chapter, but we have not come across any project or public documents showing that there have been deliberate policy actions to achieve this objective. Given that livestock development has become an important focus of the Ethiopian Agricultural Transformation Agency, one can only hope that a well-planned initiative will be undertaken in the near future.

Conclusions

The livestock subsector plays a significant role in the Ethiopian economy at both the national and the household level. Its contributions to both agricultural value-added and national GDP are substantial. At the household level, livestock plays a critical economic and social role in the lives of pastoralists, agropastoralists, and smallholder farm households. Livestock fulfills an important function in coping with shocks, accumulating wealth, and serving as a store of value in the absence of savings (financial) institutions and factor and output markets. In the case of smallholder mixed farming systems, livestock provides nutritious food, additional emergency and cash income, means of transportation, farm outputs and inputs, and fuels for cooking food. In the case of pastoralists, livestock represents the primary means to support and sustain their livelihoods. Improving livestock production and marketing is therefore critical to enhancing livelihoods and to alleviating poverty in Ethiopia.

9. These issues are further elaborated in GebreMariam et al. (2010).
10. These numbers are from page 12 of the van der Valk report (2008).

The total number of livestock in Ethiopia is the largest in Africa. However, the number of livestock at the level of the individual smallholder farmers and pastoralists remains very low. Besides the small herd size, the livestock subsector is characterized by multispecies and multipurpose activities, very low levels of productivity (the current level of livestock productivity in Ethiopia is one of the lowest in the world), less commercially oriented production systems, low commercial market off-takes, inadequate production and marketing infrastructure, and inadequate services, institutions, and support systems.

Though still in their infancy, some developments have been observed in recent years with respect to the emergence of new commercially oriented livestock production systems. Private-sector entries and capital investment into meat, dairy, and poultry farms have increased substantially over the past several years. However, the emerging commercially oriented livestock sector is constrained by lack of feed, improved breeds, and adequate support services (veterinary, extension, credit, information, and so on). Overall, the transformation of the livestock sector has been limited, suggesting the high potential for expanding the role of livestock in smallholder livelihoods and income.

To seize this opportunity the Government of Ethiopia must take action. First, a coordinated agriculture policy is needed that specifically deals with livestock, including a single agency or institution that manages livestock development. Moreover, institutional capacity is needed to push the livestock agenda forward. Second, the private sector's capacity to reliably deliver the required quantities of live animals and meat of a quality agreed upon by importers must be strengthened. In this regard, some of the major challenges are related to animal mortality, disease outbreaks, food safety, and sanitary standards. These challenges clearly signal the need for policy and investment to introduce veterinary services and the need for the government to work closely with export partners to develop a set of standards for food safety quality and implement them at the national level. Additionally, the provision of adequate high-quality feed through commercial feedlots must be explored in order to ensure improved animal health and to capture the value-added, which thus far has been done in neighboring countries such as Djibouti and Yemen. Ethiopia lags far behind developing countries in both meat and dairy processing. Investments in these sectors are critical for the country to be competitive in the global market. Finally, information asymmetries must be overcome to link the various actors in the value chain. Through the provision of technological infrastructure, market locations should be developed to increase fairer commodity exchange and improve information flows.

In general, the exploitation of Ethiopia's huge national livestock resources for national growth and poverty reduction requires the reorientation of the livestock production and marketing systems, investment in research and development to improve livestock productivity and increase marketable surpluses (in

terms of quality and quantity), effective value chain coordination and development, reliable input and service provision, and improvement in policies.

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