



## **PASTORALISM IN ETHIOPIA: ITS TOTAL ECONOMIC VALUES AND DEVELOPMENT CHALLENGES**

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## **PART I: BACKGROUND AND METHODS**

### **1. Introduction**

#### **1.1. Background**

Ethiopia is a country of an agrarian economy characterized by high population growth, huge dependence on erratic rainfall, low agricultural productivity, structural bottlenecks and land-lockedness (PASDEP, 2005). The agricultural sector accounts for about 45% of GDP, supports over 80% of rural population and supplies 90% of the nationally exported commodities. The sector is characterized by low productivity partly due to low investment level in the sector (particularly in smallholder farmers) backward farming technologies, low farm level capacity, land degradation and recurrent drought (PASDEP, 2005 and EEA, 2005). The last few years the performance of the sector has notably improved.

Ethiopia is the richest country in the livestock inventories in Africa with the total of about 41 million heads of cattle, 25 million heads of sheep 23 million of goats 41million of chicken, 5.7million of equines (donkey, horses and mules) and 2.3 million of camels. The richness of the country is both in terms of large number and diversity of livestock population.

A recent national accounts data series provided by the Ministry of Finance and Economic Development (MOFED) shows that livestock contributes 9% to the DGP and 21% to Agricultural GDP in the Fiscal Year 2005/2006. In the Ethiopian economy, the livestock sector creates livelihood for 65% of the rural population and accounts for about 12 – 15% of the export earnings of the country in terms of live animals, meat and hides and skins exports (EEA, 2005).

Despite this large number of livestock population and its diversity, the benefits obtained from is low compared to other African countries and the world standard. For instance, the current average beef yield per animal of 108.4 kg is by far less than 121 kg for the Sudan, 130 kg for eastern Africa, 146 kg for Africa, 163 kg for Kenya, and 200 kg for the whole world (FAO STAT, 2004). In the same way, national average cow milk yield per animal for Ethiopia is estimated to be 198.6kg compared to 320.7kg for eastern Africa, 480 kg for the Sudan, 703 kg for Kenya and 2199 kg for the world (FAO STAT, 2004). The productivity problems are linked to availability and quality of feeding resources, animal breeds and type of production systems. In addition, the fact that there is a lack of proper appreciation for the sector in the including adequate account for its role and significance in the economy means negligence in terms of proper support to raise the productivity and role of this sector. Accurate livestock database disaggregated by the lowland and highland farming systems is lacking leading to a failure to properly inform policy makers to design appropriate national level livestock development strategies and policies<sup>1</sup>. One other reason is probably that policy makers have viewed livestock mainly in terms of their contributions to agricultural activities (as traction power) and hence their contribution to the livelihoods of the poor has been neglected (FAO, 2004).

Pastoral areas in Ethiopia, which cover about 0.7 million square km, are generally known as the range lands. These areas support about 9.8 million people (12% of total population of the country) of which 56 % are pastorals, 32% are agro-pastoral and the remaining 22% are urban dwellers (EEA, 2005 and Mulat, 1998).

Pastoralism relies on livestock diversity to exploit and make use of the diverse rangeland resources, and typical pastoral herds and flocks include grazing cattle, donkeys and sheep and browsing camels and goats. Pastoralism also relies on the diverse livestock products including milk, hides, meat, blood and draft power.

Although pastoralism plays significant role in the Ethiopian economy, this sector with huge economic, social and environmental roles and benefits has been largely marginalized by the development policies and strategies in the past. The vast rangeland is denied the necessary economic and social infrastructure and services as the meager development effects attained in the in the country could not be regionally balanced taking account of the needs in the low land pastoral areas. Development interventions, if they took place remained to be extractive simply by facilitating the market off-take of the livestock resource without being people and pastoral system based development intervention. Such lack of overall Pastoralism development strategies and policies emanate from the under valuation of the total economic benefits of Pastoralism.

In recent years the federal government has taken steps to bring services and development to the pastoral regions and areas of the country. The pastoralist Affairs commission of the Federal government and pastoralist development institutions and programs of the regional government are notable. Although this is so much appreciated including the impressions of pastoral communities themselves, there is still a huge task ahead to bring a sustainable development to the pastoral systems including the necessary economic and service infrastructure, environment and resources management, land rights and its management, the dynamism of the system and livelihood.

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<sup>1</sup> Currently the Ministry of agriculture and Rural Development is preparing a 20 years Livestock Master Plan for Ethiopia. The results of efforts made to raise the knowledge on pastoralism including the current study on its Total Economic Value should be able to add input and influence this kind of process.

This study, as part of the global support for the development of pastoralism, attempts to add an input and knowledge bases towards the development efforts to understand and sustain pastoralism. It tries to assess and quantify the Total Economic value of Pastoralism in Ethiopia.

The danger of undervaluation of real economic values of pastoralism is that it may wrongly lead to the tendency of gradual replacement of pastoralism by other land use systems that may be economically less feasible and may impose high costs on the environment in pastoral rangeland areas.

## 1.2 Objectives

The general objective of the study is to shed light on the total economic values (TEV) of pastoralism in Ethiopia and add to the knowledge base towards sustainable development and support for pastoralism.

### Specific objectives are to:

- Examine the direct economic contribution of pastoralism to the national economy.
- Analyze the indirect values of pastoralism (raw materials and service inputs to agriculture, tourism and other sectors).
- Examine service provisions and socio cultural values, indigenous knowledge of pastoralism
- To identify and assess the environmental values and importance of pastoralism (protecting biodiversity, preventing desertification, protecting watersheds, etc);
- Identify the major constraints and challenges facing pastoralism in Ethiopia.
- Provide policy implications based on the study findings.

## 1.3. Justification and significance of the study

There are a number of justifications to study the pastoral economic system in Ethiopia. Such a study will be significantly useful for many reasons. It will help to highlight the multiple economic values of pastoralists that inform policy makers, donors and development partners; it fills the knowledge gaps that exist in the area of total economic benefits of Pastoralism by exploring both its direct and indirect benefits; it facilitates designing comprehensive pastoral development strategies that will appreciate the social, ecological and environmental and economic values of the pastoral system and its resource basis.

## 1.4. Methodology and Data sources

### 1.4.1. Concept of Total Economic Valuation (TEV)

The valuation approach benefited from the previous work by Hatfield and Davies (2006). The concept of TEV underlies that Pastoralism is a way of life that adapts to marginal environments, characterized by climatic uncertainty and low-grade resources. It has considerable economic value and latent potential in the drylands, and is central to the livelihoods and wellbeing of millions of the worlds poor. However, the state of knowledge regarding this sector of the economy is weak.

Pastoral system is not simply a mode of livestock production, rather a complex system that needs adequate and careful valuation. They are also consumption systems that support millions of mobile pastoralists globally. They are natural resource management systems that provide a wide range of services and products that are nationally and globally valued, such as biodiversity, tourism and raw materials. There is a multiple and extensive set of values associated with pastoralism: some are tangible but many are not; some can be measured but many cannot; and those that can be measured are often underestimated.

Two broad categories of value are emphasized in this study following Hatfield and Davies (2006):

- **Direct values** consist of measurable products and outputs such as livestock sales, meat, milk, hair and hides. They 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, transport, breeding stock, etc) and complementary products such as gum arabic, honey, medicinal plants, wildlife and tourism. They 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.

Although this broad framework is adopted, valuation of the various components of the system is dictated by the availability of information and database and local context.

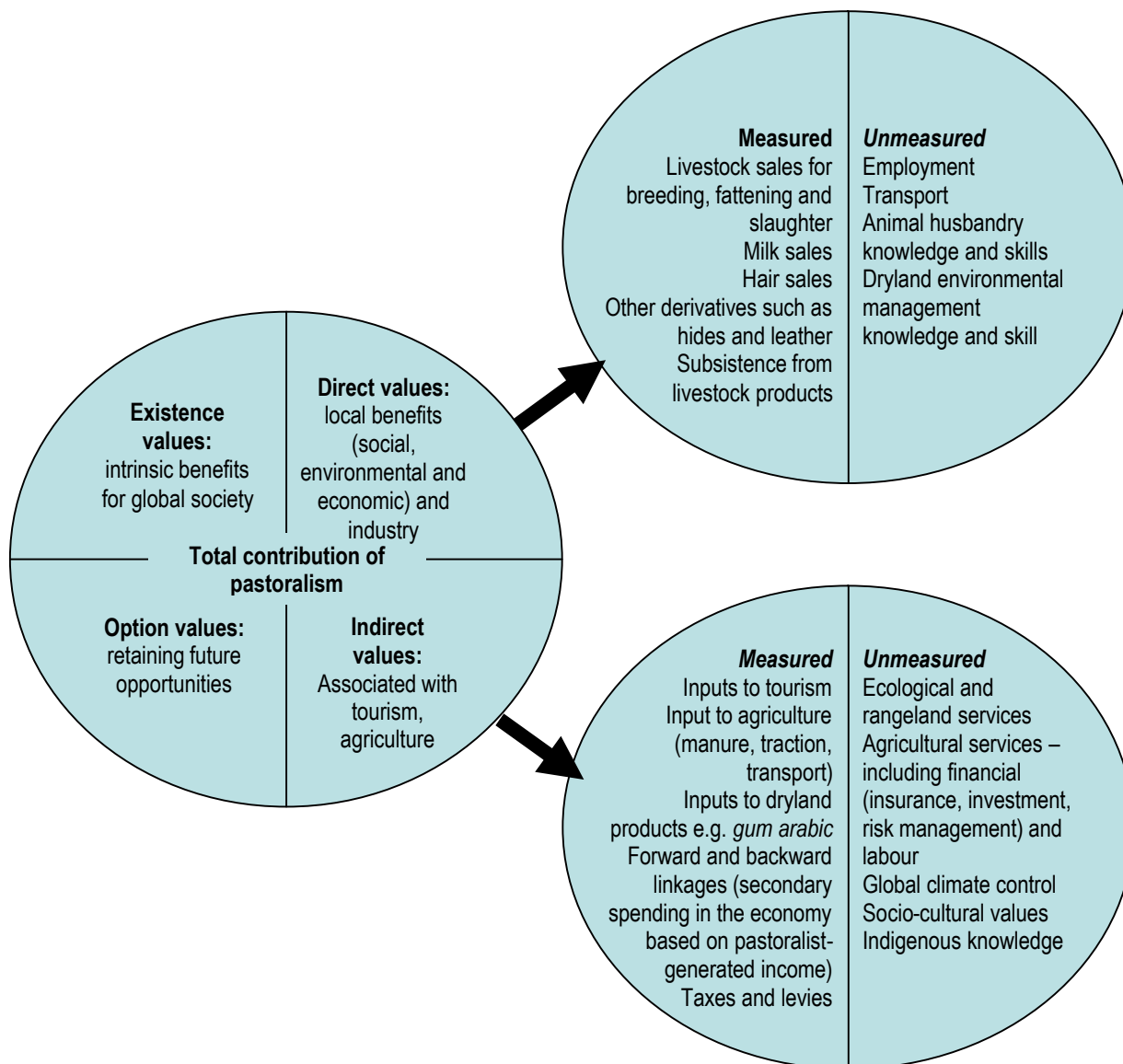
### 1.4.2. Data sources

Both primary and secondary data and information has been used in this study. The primary data was generated through participatory approaches involving pastoralist communities, actors working with them including government, NGOs, donors. A wide range of the available secondary data from the national statistics generated by the Central Statistical Authority (CSA), the Ministry of Agriculture and Rural Development (MOARD), Ministry of Finance and Economic Development (MOFED),

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market and trade data from trade and industry offices (federal, regional as well as local), livestock marketing and trade cooperatives and agencies, abattoirs, previous research documents, experiments and studies' reports, development project reports, database of the International Organizations (like FAO) are assembled to help the analysis.

Figure 1 – Conceptual representation of the contribution of Pastoralism (Hatfield and Davies, 2006)



Attendance of national meetings/workshops of key actors working in pastoral areas was made to get in-depth insights about the functioning of the pastoral system. Several key informants interviews and focus group discussions were conducted<sup>2</sup> about the socio-economic situation and rangelands management of the Pastoralism in Ethiopia.

### 1.5. Scope and limitations

In this study the extent and scope of the valuation process has been much dependent on availability of data and information. The major challenge has been the lack of accurate and sufficient national data on multiple benefits of Pastoralism. Since pastoralists are mobile, generating a reliable and complete primary data has been a difficult task although attempt was made. One of the challenges is to locate where relevant secondary data are available for this purpose. Previous study documents, project reports (like the first, second, and third livestock development projects which focused on pastoral areas) are misplaced. Inconsistency of data on same issue but obtained from different sources is another major challenge In

<sup>2</sup> The author also engaged in another study on land tenure and land use systems in pastoral areas of Ethiopia during the same period when this study was conducted.

general terms, accurate data on specific pastoral system issues are not easily available. There are some aggregate data on livestock population by types of animals, some livestock marketing and trade, estimates of cross-boarder ("illegal") livestock trades are available, although reports provide various figures even on same item. On the other hand, data are scarce when it comes to the state of condition and quality of natural resources, the contributions of pastoral communities to the maintenance of the environment, tourism economy, breeding stock and draft animal resources to the country's agriculture, etc.

Despite the great role of Pastoralism in contributing economic values and services to the national economy, there is not adequate data that is disaggregated and focused on pastoral system. The national data on production, consumption and study are provided for the livestock and agriculture sector as a whole. Pastoral resource and livestock productivity figures are scanty and mere estimates. Until very recently the country's development directions and strategies were very much biased against Pastoralism. According to Behnke (2006), between 1993/4 and 1998/9 Ethiopia allocated less than only 5% of its recurrent expenditure on agriculture and less than 0.3% on livestock or 3% of the recurrent expenditure of the agricultural expenditure. There is no road, proper schooling, health service, communication and many other infrastructure and services required for development are very much at minimal level or completely absent. Hence, knowledge and database about Pastoralism is so much weaker.

## PART II. TOTAL ECONOMIC VALUES OF PASTORALISM IN ETHIOPIA

### 2. The livestock economy and role of Pastoralism

#### 2.1 The Pastoral Economy in Ethiopia

The country's livestock population is distributed over the highland and lowland areas. Of the total cattle population of the country, pastoralists own about 27 percent (over 11 millions heads of cattle), 26 percent of sheep (about 6.5 million heads of sheep) and nearly two-third of the goats' population (about 15.2 million heads of goats) (Table 2.1). All the 2.3 million heads of camels are owned by pastoralists. This reveals that the contribution of Pastoralism in the livestock population of the country is significant. In terms of distribution across administrative Regions, the predominantly pastoral Regions of Afar and Somali have the highest densities per capita.

**Table 2.1: Livestock Distribution in the Highlands and Lowlands of the Country**

Types	Number (million of heads)	Number in highlands and Lowlands (million of heads)		Share of Highlands and Lowlands (in %)	
		Highlands	Lowlands	Highlands	Lowlands
cattle	41	29.93	11.07	73	27
sheep	25	18.5	6.5	74	26
goats	23	7.82	15.18	34	66
Chicken	41	NA	NA	NA	NA
Equines	5.7	NA	NA	NA	NA
camels	2.3	0	2.3 <sup>3</sup>	0	100

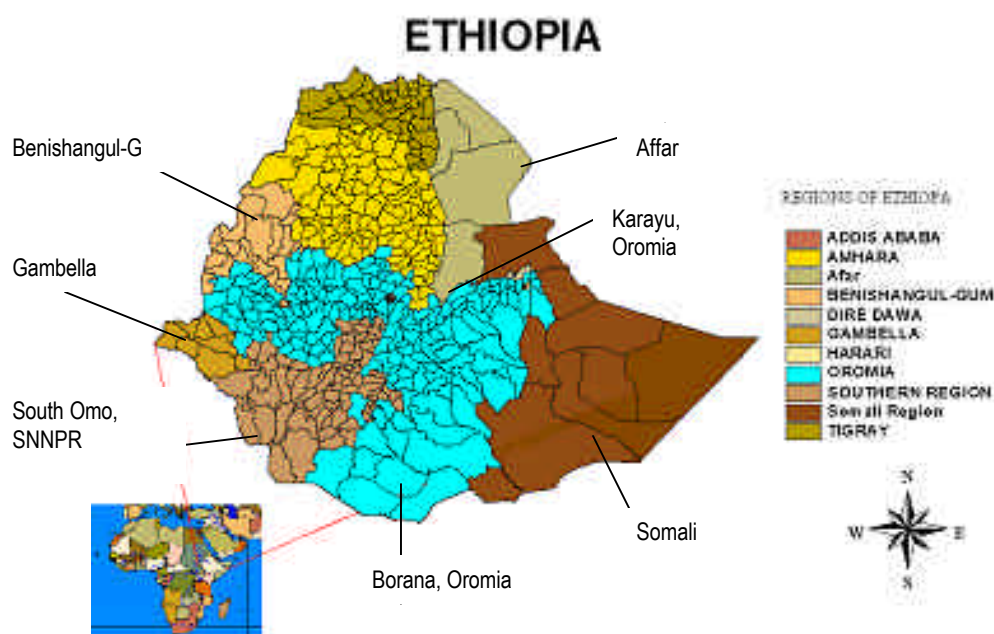
Source: EEA, 2005 (based on the available national data).

Livestock have diverse functions and services for farmers in the highland mixed crop-livestock systems as well as in the lowland pastoral production systems. As noted by Jahnke (1982) there is a clear distinction between livestock products and functions. In the lowlands of the country, which are predominantly pastoralists, livestock is the major source of food (meat, milk, eggs) and non-food items such as transport services. Livestock is also the major sources of cash income from the sales of live animals and livestock products like milk, butter, hides, skins and eggs. It is an established fact that, in addition, livestock is a measure of wealth and social status in pastoral communities.

The regional distribution of pastoral and agro-pastoral systems in Ethiopia is provided in the map shown in figure 2.1 and Table 2.2. Taking the land area under pastoral systems, Somali and Oromia Regional states take the largest share followed by Afar region.

<sup>3</sup> The big inconsistency about the number of Camel herd (2.3 million against 470, 000) shows the serious problem of database.





**Figure 2.1: Regions and locations of pastoral and agro-pastoral systems in Ethiopia.**

Pastoralists are found distributed over 122 districts of the country. More than half of the country's landmass belongs to pastoralists. Besides the mainly known pastoral regions, others like the Gambella and Benishangul-Gumuz regional states have pastoral communities although these regions at the western end of the country have predominantly a shifting cultivation agricultural system. Over 97% of the pastoral population lives in Somali, Oromia, Afar and Southern Region States (Table 2.2).

It is estimated that in a country of close to 80 million people about 9.8 million people in Ethiopia are pastoralists. The data shows that out of the total 37.9 million TLU of livestock the country owns, 9.9 million TLU of livestock are found in the Pastoral areas. It shows that the share of pastoralism in the national livestock wealth is 26%. According to this data, on per capita basis livestock ownership in pastoral areas is only 1.01 TLU. The size of the livestock and human population and the ecological significance of the pastoral areas of Ethiopia signify the importance to be given to the system itself.

**Table 2.2: The Location and size of pastoral areas in Ethiopia**

Region	Total surface area ('000km <sup>2</sup> )	Total pastoral area (km <sup>2</sup> sq.)	Pastoral districts	Human population ('000)	Livestock density (TLU/km <sup>2</sup> )
Afar	98.4	90.4	29	1301	7
Benishangul-Gumuz	48.3	8.4	3	40.6	1
Dire Dawa	1.2	1.2	1	108.6	32
Gambella	25.8	17.3	5	133.6	17
Oromia	353.0	152.1	34	4007.9	33
SNNP	112.3	30.4	6	219.7	23
Somali	325.1	325.1	44	4002.2	8
Total	956.1	624.8	122	9813.6	16

TLU = Tropical livestock unit, equal to 250 kg of live weight (Jahnke, 1982).

Source: EEA (2005)

The size of the livestock and human population and the ecological significance of the pastoral areas of Ethiopia signify the importance to be given to the system itself.

## 2.2 Livestock Numbers, Products and Consumption in Ethiopia

Ethiopia has a huge livestock population. The sector also provides livelihood for 65% of the population. In different parts of the country livestock and livestock products account for 37–87 percent of the total household cash income. However, its maximum contribution to the total GDP is about 16 percent and to the agricultural GDP is around 30 percent (EEA, 2005 and

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Ayele et. al. 2003). The latest data of 2005 shows that the number of cattle was over 38 million, shoats 26.6 million, equines 5.3 million and camels 470 thousand (Table 2.3). Although there is a general impression that the livestock feed resource availability is being under heavy pressure the data presented in this table shows that the livestock number has been growing through time. Although there is no data over long period of time that could show the situation of livestock number in pastoral areas, discussions with pastoral communities show that the livestock number has been increasing leading to some pressure on range resources<sup>4</sup>. A study by Behnke (2006) quoting Akililu (2002) reports that 'Livestock population figures are based on estimates and Ethiopia has been using a constant figure for nearly thirty years before allowing annual marginal adjustments in the last 10 years following which the cattle population officially increased by 5 million head'..

This large livestock resource, however, is not adequately productive. Database of FAO indicates that an annual figure of beef and veal production did not exceed 336 thousand metric tones, while meat/mutton from shoats total at 85 thousand metric tones only (Table 2.4).

**Table 2.3. Number of livestock in the Country (1996-2005)**

Livestock by type	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Cattle nos (,000,000)	31.2	32.6	35.4	35.1	33.1	35.4	40.6	39.0	38.1	38.5
Sheep nos (,000,000)	12.0	12.5	13.4	12.2	11.0	11.4	14.3	15.0	16.6	17.0
Goats nos (,000,000)	8.4	8.4	10.5	9.5	8.6	9.6	9.6	9.6	9.6	9.6
Horse nos (,000,000)	1.20	1.22	1.23	1.21	1.14	1.25	1.48	1.45	1.45	1.5
Asses nos (,000,000)	3.20	3.15	3.17	3.10	3.06	3.41	3.90	3.80	3.77	3.80
Camel nos (,000)	370	410	479	527	262	327	475	470	468	470

Source: FAOSTAT

The total milk production of 2.7 million MT provides a per capita milk supply of only around 20 liters per annum. There is no other better organized national data than this one that shows the level of production of livestock products. Reports also show that domestic per capital consumption is 4.60 kg beef, 2.80 kg mutton (sheep and goats), and 2.85 kg chicken. Total meat consumption per capita is 10.25 kg, while milk 14.15 liters per capita (Belachew, 2004).

**Table 2.4: Livestock Production/products in Ethiopia ('000 MT)**

Type of product	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Beef and veal	267	270	274	290	294	304	352	338	331	336
Sheep meat	36.1	36.1	36.1	36.2	36.0	37.8	47.7	49.9	55.1	56.6
Goat meat	25.0	25.0	28.0	27.1	25.6	28.6	28.7	28.7	28.7	28.7
Total milk	996.	1007	1019	1030	1366	1518	1676	1578	1582	1583

Source: FAOSTAT

## 2.3. Livestock and the Ethiopian Export Economy

### 2.3.1. Official Export of Livestock and Livestock Products

Livestock and livestock products export is among the major earners of foreign exchange for the Ethiopian economy. With notable fluctuation from years to year, the trend of livestock export has been on a rise in recent years (see Table 2.5). Export bans in relation of suspect for livestock disease in the country and region at large has been the major cause for the ban of livestock export. After lots of effort in dealing with the importing partners, mainly the Middle East countries, the demand for livestock import has been significantly rising in recent years. Over the period 2000 – 2003/4, the share of livestock in the total the foreign exchange earning was 10.7% of the total national export earning of 4.1 billion Birr (0.47 billion USD).

<sup>4</sup> The author of this report involved in two other studies that took place in pastoral areas during 2006 and 2007. This are entitled " Land Tenure and Land use in pastoral areas of Ethiopia" and " Community Based Disaster Risk Management in pastoral areas of Ethiopia"

**Table 2.5: Livestock Products Exports and Imports (1996 – 2004)**

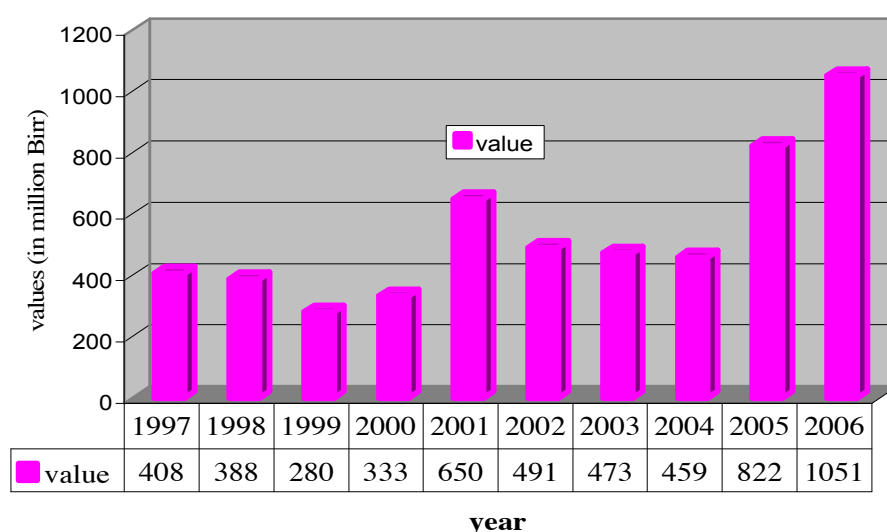
Export of..	1996	1997	1998	1999	2000	2001	2002	2003	2004
Cattle (head)	0	800	1218	549	326	44	544	2217	2000
Sheep ('000 head)	4.0	4.0	15.5	30.7	40.0	15.0	1.1	11.7	0.053
Goat meat & mutton ('000mt)	0.5	1.8	2.5	1.9	1.2	0.2	1.1	3.6	2.1
Milk equiv. imports ('000 mt)	11.8	11.8	14.0	12.9	8.3	3.8	12.7	21.4	5.6

n.r. = no records

Sources: Ethiopian Customs Authority

The total value of the export of livestock and livestock products has been increasing over time. During the last ten years, the total value increased from Birr 408 million (47 million USD) in 1997 to over one billion (121 million USD) in 2006 (see fig. 2.2). The trend of the export value of livestock has shown a rise during the last four years. The livestock sector ranks second to coffee in generating foreign exchange with the average official share of about 14 percent in the value of total export over the period 1985/86 – 2005/06 (NBE data base).

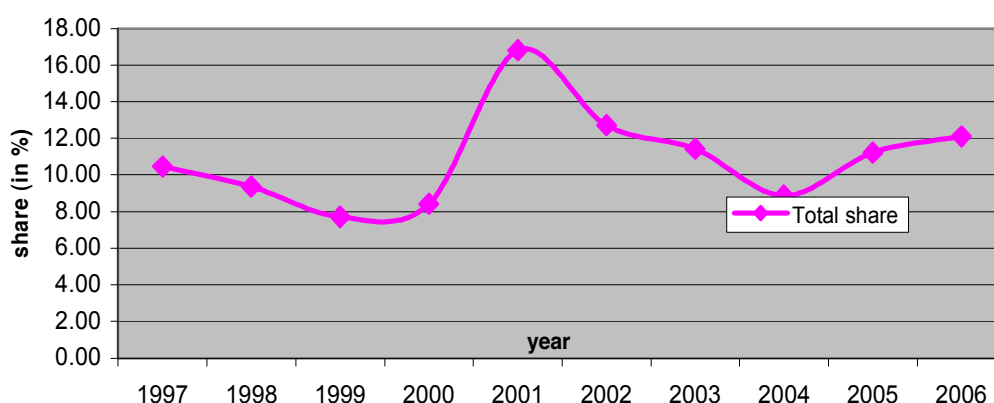
**Fig. 2.2: Total Export Values of Livestock and Livestock Products**



Source: Computed from the National Bank of Ethiopia database.

However, the share of livestock and livestock products in the total export of the country was fluctuating and declining over the period 2001-2004. The Middle Eastern countries have been a traditional export market for Ethiopian livestock, but said to have put increasingly stringent health and quality control regulations restricting exports. Hence, the export share of the livestock and livestock products has been fluctuating based on the policies and regulations of the importing countries (see figure 2.3.).

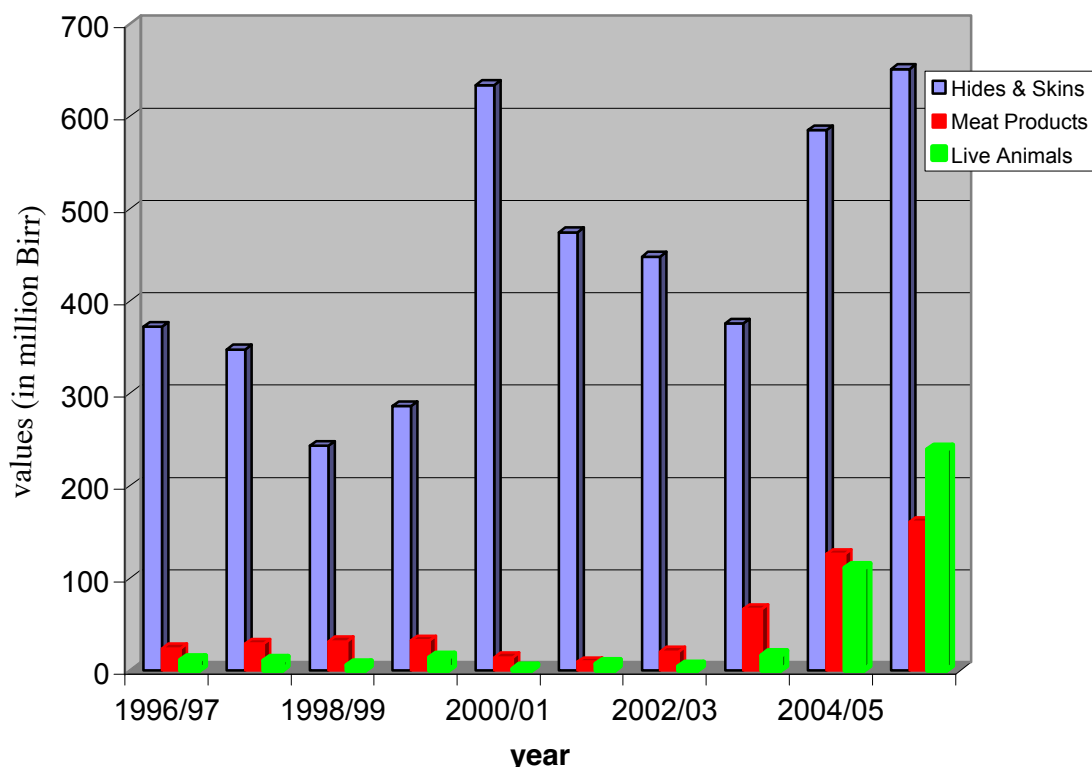
**Fig. 2.3: Trends in the share of livestock & livestock products in the total export**



Source: Computed from the National Bank of Ethiopia database

During the last ten years (1996/97 – 2005/06) the average share of the livestock sector declined to about 10.9 percent. This decline may be due to the fact that the country has diversified agricultural exports to oilseeds and some non-traditional commodities like flowers in recent years. The bigger share of the livestock export earner is hides and skin (figure 2.4)

**Fig 2.4: Export Values of Livestock and Livestock Products**



Source: Computed from the National Bank of Ethiopia database

Component wise, the average share of live animals, meat and hides and skins is 0.6, 0.9 and 9.4 percent of the total export, respectively, over the last ten years (see Table 2.6).

**Table 2.6: Share of Export Values of Livestock and Livestock Products in Total Export (in percent)**

Items/year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Average
Hides & Skins	9.54	8.40	6.68	7.24	16.39	12.28	10.82	7.26	7.98	7.50	<b>9.41</b>
Meat Products	0.62	0.71	0.87	0.83	0.37	0.24	0.50	1.29	1.72	1.85	<b>0.90</b>
Live Animals	0.29	0.26	0.16	0.36	0.04	0.18	0.10	0.32	1.51	2.75	<b>0.60</b>
<b>Total share</b>	<b>10.45</b>	<b>9.36</b>	<b>7.71</b>	<b>8.42</b>	<b>16.80</b>	<b>12.71</b>	<b>11.42</b>	<b>8.87</b>	<b>11.22</b>	<b>12.11</b>	<b>10.90</b>

Source: NBE data base

Although it is the largest contributor, the share of hides and skins in the total livestock exports has been declining over time. During the same period the share of meat products and live animals is low with the average of 8.8 and 5.6 percent, respectively. Although the share of live animals in the total livestock and livestock products export is the lowest, the trend is increasing particularly for the last two years (13.5 percent in 2005 and 22.8 percent in 2006) (see Table 2.7).

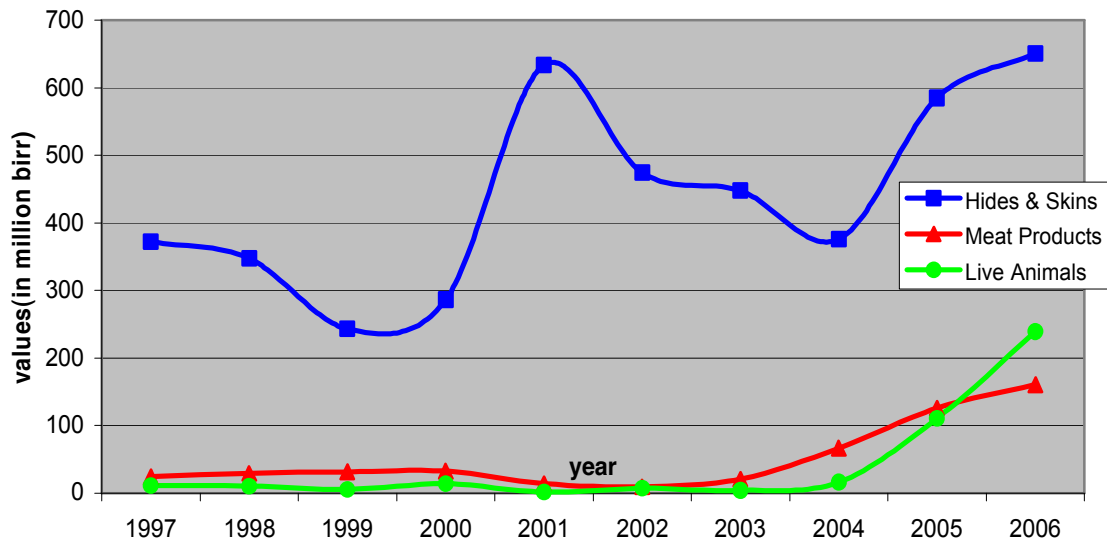
**Table 2.7: Share of the Components in Total Livestock and Livestock Products Export (%)**

Items/year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Average
Hides & Skins	91.3	89.7	86.7	85.9	97.6	96.6	94.7	81.9	71.2	61.9	<b>85.8</b>
Meat Products	5.9	7.6	11.3	9.8	2.2	1.9	4.4	14.5	15.3	15.3	<b>8.8</b>
Live Animals	2.7	2.7	2.0	4.2	0.2	1.5	0.9	3.6	13.5	22.8	<b>5.4</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Source: NBE Data Base and Own Computation

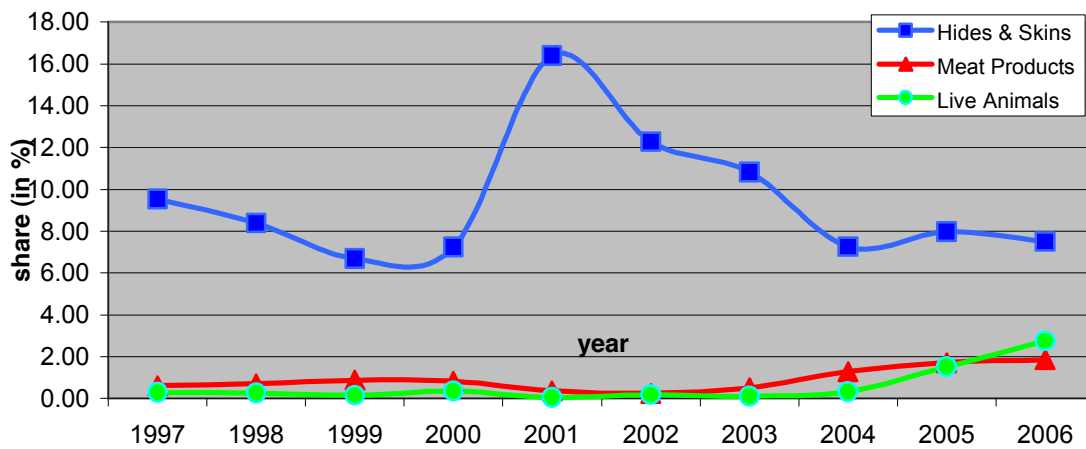
Until 2004, the export value of live animals export in the livestock and livestock products exports was very low. However, during 2005 and 2006 the export value of live animals indicated a sharp increasing (see figure 2.5).

**Fig. 2.5: Trends in the Export Values of Livestock and Livestock Products**



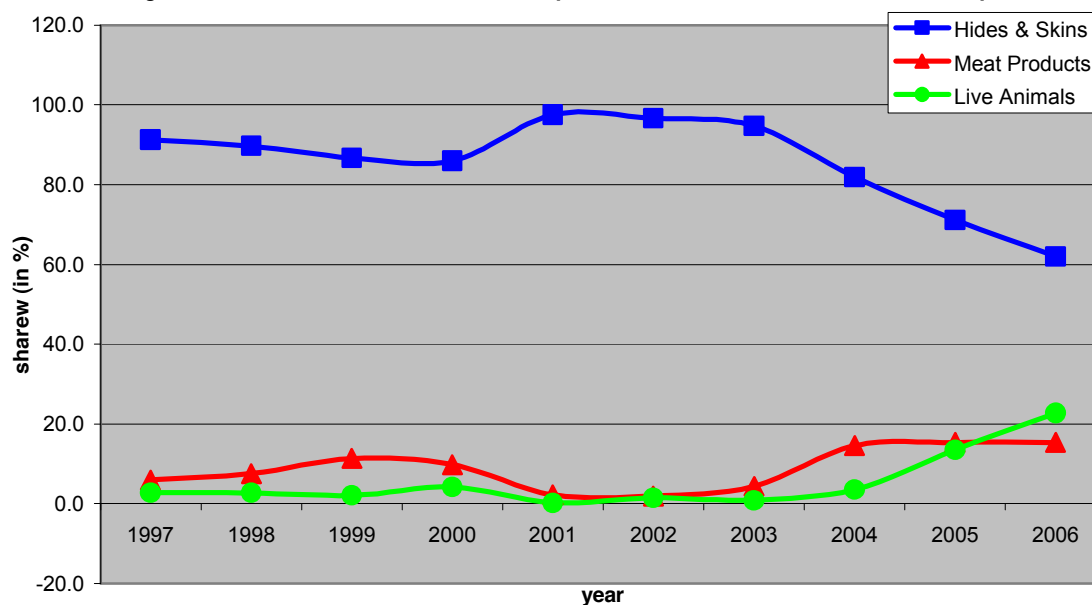
Trends in the share of each component of livestock and livestock products, the share of the hides and skins has been declining over the last five years but that of live animals and meat products has shown an increasing trend with the share of live animals shows the significant increases over the recent years (see figure 2.6).

**Fig. 2.6: Trends in the share of livestock in the total export**



Source: Computed from the National Bank of Ethiopia database

**Fig. 2.7: Trends in the share of each component of livestock in Total livestock Export**



Source: Computed from the National Bank of Ethiopia database

### 2.3.2. Unofficial Export of Livestock and Livestock Products

Pastoralism in Ethiopia provides about 90% of the legal livestock exports in live animals. At the same time it is also the pastoral sector which is subjected to the unofficial cross-boarder trade of livestock. A large number of livestock is annually taken to Somalia, Djibouti and Kenya across the Ethiopian boarder. Some of the major reasons for practicing 'illegal' cross-boarder trade are lack of facilitated access to infrastructure that would link to the central markets, failure to make adequate efforts to integrate the pastoral market systems to the central economy,<sup>5</sup> inability of the central market prices to be attractive enough for the pastoralist to bring their livestock to the central markets and disincentive from tariffs and taxes paid in several points in the routes to the central markets in the country. A study report by Yacob Aklilu (2002) shows that Fees and taxes incurred en-route to DebreZiet Slaughter House (near Addis Ababa) from pastoral areas of Dolo Odo (Somaile), Yabello (Borana) and Jigiga (Somalie) were 57 and 34 birr; 59 and 18 birr; 121and 20 birr, respectively, per head of cattle and shoats.

Different estimates are given for the data on the size of illegal livestock exports from Ethiopia. During 1976, the Ethiopian government reported the estimated Birr 50-250 million illegal exports of cattle, sheep, goats and camels in its World Bank development loan application. The estimates of the concerned ministries indicated the exports of 1.1 million animals excluding camels valued at US\$ 120 million (FOB) in 1983. The World Bank's 1987 report estimated the unofficial exports of 225,000 cattle and 750,000 sheep and/or goats and 100,000 camels. The basis of these estimates is not very clear (Ayele et. el, 2003). The recent report by Ministry of Finance and Economic Development in 1998 indicated the illegal exports of 260,000 cattle and 1.2 million sheep and/or goats. In 2001, Belachew and Jemberu estimated unofficial exports of about 325,000 cattle, 1.2 million sheep and/or goats and 16,000 camels (see Table 2.6).

**Table 2.8: Estimates of number of unofficial livestock exports**

Sources	Reference period	Cattle (head)	Shoats (head)	Camel (head)
Concerned ministries 1983 <sup>a</sup>	1981/82	225,450	758,200	na
AACMC 1984	1983/84	55,000	330,000	na
Ministry of Foreign Trade 1987	1985/86	260,000	1,200,000	na
FAO 1993	1987/88	150,000	300,000	na
World Bank 1987	1987	225,000	750,000	100,000
MEDaC 1998	1998	260,000	1,200,000	na
Belachew and Jemberu 2002	2001	325,000	1,150,000	16,000

Source: Ayele, et. el. (2003).

<sup>5</sup> In one recent meeting (October 2007) that has discussed on Livestock Trade in Ethiopia, a participant (pastoralist) who came from Southern Ethiopia commented saying that: "Ethiopia/ the highland has never been our trading partner".

### 3. Total Economic Values of Pastoralism in Ethiopia

#### 3.1 Valuation and the Ethiopian Context

Following the framework provided in the project design as discussed in section 1.4.1, attempt has been made to assess/value the economic values of Pastoralism in the Ethiopian context. As indicated above the degree of success in this respect depended much on the data availability and quality.

**Table 3.1 Realized assessments / value estimates for Pastoralism in Ethiopia**

Direct values		Indirect	
Measured	Unmeasured	Measured	Unmeasured
Livestock sales (off-take) value	Employment	Input to agriculture: (Draft power, and manure)	Ecological and rangeland services
Milk sales	Animal husbandry and rangelands management skill	Inputs to tourism	Agricultural services – including supply of breeding stock
Off-take values of hides and skin		Some dry lands products (incense and gums)	Socio-cultural values: Indigenous knowledge
Subsistence value of milk for pastoralists			

Other inputs of Pastoralism to the informal or formal economic activities and their business and economies are well appreciated and recognized although these could not be quantified for lack of data and the system to estimate them. The domestic economies of agro-processing, butchers, traders, transporters, are much dependent on pastoral inputs.

The value of breeding stock supplied from the pastoral areas to the highland agriculture is important. For that matter, the known breeds of cattle (like Borana) and goats and sheep are found in the pastoral production system. Particularly, the Borana cattle breed has contributed a significant value for the breeding program and cattle productivity improvement in the country. However, there is no suitable database that helps to value the role of breeding livestock in this manner.

The environmental and ecological significance of the drylands and pastoral system is immense. Various plant and animals species are found in the dryland ecologies. Particularly, the low lands and rift valley areas of Ethiopia which are predominantly inhabited by pastoral systems harbor lots of wild animals and endemic bird species that attract some tourist revenues. There is no sufficiently compiled and disaggregated database of the tourist economy that helps to value the share of Pastoralism based on the bio-diversity resources.

The indigenous practices of rangelands resource management – pasture, browsing plants and bushes and water has been widely described. It is these practice that keep the livestock system and livelihood of the pastoral population.

Mobility is the prime feature that characterizes Pastoralism in Ethiopia, as also elsewhere. Mobility is the art of rangelands management, and adaptation to temporal and spatial resource dynamics in the system. By moving across time and space, pastoralists effectively utilize resource and maximize the productivity. It is also a way of coping with the risk<sup>6</sup> and variability in resource bases due to weather variations in space. The value-add of mobility of pastoralists may be captured by looking at their contribution to the livestock and product supply during the different months of the year as compared to the relatively immobile highlands livestock agricultural system. Unfortunately, there is no adequate database that provides the seasonal/monthly livestock market data differentiated by the lowlands and highlands.

Pastoral communities are quite appreciated for their indigenous institutions and their management. Before they were weakened by external interventions, they used to serve the purpose of planning, enforcing and managing the rules of resource and land use, mobility and settlement patterns, disaster and risk mitigation, conflict management and resolution<sup>7</sup>. In his recent book entitled 'Decisions in the Shade' Marco Bassi (2005) described that among the Borana certain fields of human activity are strictly regulated. These relate to, for instance, the utilization of natural resources, in particular the traditional wells. Such areas of regulation are distinguished by name such as *addaa-seera bisaanii* (laws concerning water resources), in the case of Borana communities. These indigenous institutions and their knowledge bases is valued for its contribution to the very survival of the pastoral system, adaptation, resilience, under difficult ecology and environment conditions.

<sup>6</sup> A pastoralist elder once commented about the unsuitability of an attempt to settle pastoralist. He said: "we can settle only when the government or its agencies could give us a mobile farm land so that we also move it to cope with the risk of water shortage as we do with our cattle, sheep, goats and camel".

<sup>7</sup> A study done for SOS-Sahel and Save the Children Initiative in Ethiopia (2007) indicates that customary institutions exist at three levels. These are overall customary jurisdiction over the land, social and cultural issues; those in the middle with the critical responsibility of regulating seasonal access to grazing and water; and those at the local level of grazing and water management.



Besides the efforts made to quantify some of the direct and indirect benefits/ economic values of Pastoralism in the Ethiopian context, the attributes of Pastoralism briefly discussed above are highly acknowledge and meant to qualitatively add to the total value of Pastoralism in the country.

### 3.2. Approaches and assumptions adopted in valuation

One major challenge in this research has been the lack of a national data disaggregated by the type of farming systems in the livestock sub-sector i. e the highland mixed crop-livestock farming system and the low land pastoral and agro-pastoral farming system. Nevertheless, a very careful and the necessary effort was made to base the estimations on the available secondary data, relevant literature, pervious studies, and experts guesses. An extensive review of and reference to various reports and studies made on the pastoralism and range lands became useful in taking assumptions and deriving the necessary coefficients as regards the share of pastoralism in the national livestock economy.

Following the principle of Total Economic Valuation the approach of Benefit Transfer has been employed to infer/use some coefficients from the existing studies in similar environments or contexts and adapting them to the context under investigation (Hatfield and Davies, 2006).

The necessary base information and database that helped the estimation and valuation of pastoralism is summarized in as shown in Table 3.1. Once the necessary database is acquired, the estimation and computation of the total economic value of pastoralism followed the framework provided as per the project design agreed.

Ethiopia has a large livestock sector. According to the a recent data series of the Ministry of Finance and Economic Development of Ethiopia (MOFED), the real GDP for the year 2005/6 was 93.5 billion Birr (10.7 billion USD), out of which the share of livestock sector is 9% or 8.3 billion Birr (954 million USD). Agriculture, Hunting and Forestry together take share of 43%.

**Table 3.1: Summary baseline data and estimates on pastoralism Categorization of pastoralism**

Factor	Number
<b>Summary data:</b>	
Land in country	1.13 million km <sup>2</sup>
Drylands in country	(60 % of national landmass); (678,000 km <sup>2</sup> )
Pastoral land	(51% national landmass); (624800 km <sup>2</sup> )
Pastoral population	9,813,600 (MOARD, 2004)
Density pastoral land	(16/km <sup>2</sup> )
Number of cows	8,310,427
Pastoral owned cows on drylands	(20%)
<b>GDP</b>	93.55 billion Birr (2005/06), MOFED
Contribution of livestock sub-sector	10.29 billion Birr
Contribution of the Agriculture sector	40.27 billion Birr
<b>Pastoral production:</b>	
Milk – national and significance of pastoralism; per capita consumption and significance of Pastoralism	(2.7 billion liters); %; 14.5 liters per annum per capita; % 41% from pastoralism, (camel 114.8 million liters)
Meat – national and significance of pastoralism; per capita consumption and significance of Pastoralism	586,000 Tones; %; 10.25kg per annum per capita; 150000 MT (pastoral/lowlands); (Camel, 3120 MT)
Hides – national and significance of pastoralism	15,400 MT; 390 million Birr Pastoralism
<b>Export of live animals</b> – national and significance of pastoralism	41565 (official); 90% pastoralism, cross boarder /un official, 1,476,000 animals, value = 1,242,000,000 Birr (Pastoralism 100%)
Export earnings – national and significance of Pastoralism	4,069.90 million Birr; livestock 10.7%, pastoralism (unofficial export, via Somali and Moyale (1.58 billion Birr)
<b>Other indirect values:</b>	
Tourism – GDP contribution and other data	6.13 billion Birr; only 2 national parks are out of lowlands. 50% lowlands (3.06 billion Birr)
Agriculture – GDP contribution and other data (draft power)	40.3 billion Birr (45% of national); pastoral land contribution 20% of 14 million working age cattle for ploughing (2800000 cattle); estimated value = 1.15 billion Birr
OTHER – gum and incense production	National (3,457,000 Birr); pastoralism/dry lands (100%)
Fisheries: national; Pastoralism/lowlands	National production 95,000 MT; lowlands 47,000 MT

Note: Current official exchange rate is 1 USD = 9 Eth. Birr.

It is necessary to reassess the national livestock and human population database in the pastoral areas upon which this valuation is based. The national livestock size in TLU is estimated to be 39,700,000 out of which the pastoral areas share 9,996,800 (25%). The national statistics on the livestock size in Ethiopia is very loose, it is more so when it comes to the pastoral livestock population. Different reports provide different figures. According to the MOA (2000) out of the total estimated livestock population of the country, the pastoral areas constitute approximately 30% of the cattle, 52% of the



sheep, 45% of the goats, and 100% of the camels. Bruck (2004) reported that a recent livestock population estimates obtained from the pastoral areas raise these figures to 49% of the cattle, 47.5% of the sheep, 51.5% of the goats, 100% of the camels and 12.9 % of the equines. The estimate of the pastoralist population provided by the MOARD (2004) is **9,813,600** while other reports commonly indicate 12-15 million (Alemayehu, 2006). Here a multiplier of 1.22 to 1.53 is implied. Referring to Bruck (2004), the share of Pastoralism in total cattle and shoats populations is larger i. e. 49.50%, 51.50%, 47.50%, respectively, for cattle, goats and sheep, instead of the lower value reported by others, as 30% for cattle, 45% goats and 52% for sheep. It shows that pastoral livestock size (cattle, camels, and shoats) is underestimated by a factor of 1.33 if the percentage shares are applied to the latest figures of FAOSTAT (2004). Using the multipliers of the livestock population, it is possible to correct the understated values of Pastoralism. i.e. by multiply by the factor. This will be done later in the process of valuation.

### **3.3 Assessing the Direct Economic Values of Pastoralism**

**Direct values** of pastoralism consist of measurable products and outputs such as livestock sales, meat, milk, hair and hides. Employment, transport, knowledge and skills are less easily measured values included in this category. Data on the quantity of sheep hair produced, especially from the pastoral production system is not available<sup>8</sup>. Hence, it is not included in this valuation.

Livestock in the pastoral areas are the major source of food (milk and meat) and income, as well as a source of employment. There is no compiled data which shows the share of the pastoral system in the contribution of the livestock sector to the national economy. It is known that the large share of supply to exportable cattle and shoats come from the pastoral areas. However, if equal contribution from the highlands and low lands (simply taking the size of the livestock) is assumed, the value of pastoralism for the National GDP is 2.59 billion Birr (0.28 billion USD). According to some estimates the country losses/unaccounted for value of unofficial cross-boarder trade amounting to 138 million USD (1.24 billion Birr) per year. This value is almost a hundred percent share by the pastoral areas of the country whereby livestock is exported to the neighboring countries like Djibouti, Somalia, Kenya and the Sudan. If the value of cross-boarder trade is added to the official GDP, then the contribution of pastoralism will rise to 3.8 billion Birr (0.43 billion USD) per annum. This shows the share of pastoralism in the Agricultural GDP stands at 10%. Similarly, this figure shows the contribution of Pastoralism to the total national GDP of 4.1%. According to some other reports (e.g. Haramata, 2006), in Ethiopia economists suggest that pastoral production accounts for almost 20% of Ethiopia's GDP. Similarly, Hatfield and Davies (2006) reported a rough estimate that shows the share of pastoralism in agricultural GDP of 35% in Ethiopia. It is difficult to explain why so much variation between the different authors. It may be possible that there could be differences in the components of the Pastoralism are valued, the national data used in estimation, and underlying assumptions. Looking at the role of Pastoralism in the national livestock export, guesses may put the share of Pastoralism on the higher side.

#### **Milk production and valuation**

The major sources of a direct value of pastoralism in Ethiopia are milk and meat. Milk is the major product that is produced and largely consumed by the pastoral communities themselves. The recent agricultural sample enumeration data from 2001/02 shows that in the major pastoral areas in Ethiopia almost three-fourth of the milk produced by pastoralists is consumed by the households themselves (Table 3.2). This is nearly confirmed by a sample survey of 237 pastoral households interviewed in Yabello, Borana zone and Karayu pastoral communities. The sample survey data shows that 77% of the milk produced is consumed by the households while 16% is sold. Similarly, they consume 91% of the produced butter and sell 7% of it. However, in terms of volume of production the survey did not yield convincing figures (over estimation) hence, not presented in this report. Other studies have attempted to generate data on milk production by pastoral communities. Based on data gathered through focus group exercises in study communities, Davies and Bennett (2007) estimated potential energy yields of milk the study areas in Afar region. They found that total milk energy available for the year 2000 was 24.5 Mcal, 12.7 Mcal, 6.5 Mcal, for rich, average and poor households in the communities, respectively.

This information clearly shows that the major product of pastoralism is less integrated with the agricultural products market. Although pastoralists derive their food mainly from the livestock products they produce, lack of product market integration is a major cause for underdevelopment and use of the pastoral resources.

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<sup>8</sup> In some parts of the country's highland areas, sheep hair is used for carpets and limited raw materials for manufacturing products.

**Table 3.2: Milk utilization in pastoral areas of Ethiopia**

Pastoral Areas	Amount home consumed (%)	Amount Sold (%)	Others including in-kind wage (%)	Home consumed butter (%)
Afar	83.34	10.12	6.53	74.6
Somaile	67	28		50
Borana	59	13	21.21	
South Omo	84	7.08	9.16	
average	73.34	14.55	12.3	
This study (sample survey)	77	16		

Source: CSA data sample enumeration, 2001/02: reported 2003

Milk produced in the pastoral areas of Ethiopia is largely consumed by the producer households themselves. This is because of many reasons. First of all, milk is the major source of household food in pastoral areas. Consumption of grain and other purchased food items is a relatively recent event for pastoral communities<sup>9</sup>. Secondly, there is no adequate infrastructure including transport and market facilities, milk maintenance equipments that would help to bring to the distant markets. During the wet months of ample pasture and water, pastoralists produce surplus<sup>10</sup> milk than consumed by households. During these months, it is witnessed that a lot of milk is offered to roadside for sale. However, milk off-take is limited for there is no facility to transport milk from these remote areas although there is milk scarcity and high demand in urban centers. If milk is sold, it is to the near by and rare, poorly developed urban centers. Pastoralists also sell, to a limited extent, some dairy products like butter. Pastoral areas are the least accessed regions in the country. Few major roads pass through the pastoral areas like the one which runs from Addis Ababa through Afar to the Djibouti port, from Addis Ababa in the South to Moyale at Kenyan border, from Addis Ababa through Nagellee Borana down to Dollo at the junction of the Ethiopian, Kenyan and Somalia boarders. It takes hundreds of kilometers for the pastoralist communities to take their animals to the market routes. Live animals have to be tracked many kilometers and days to reach the market centers. For instance, Davies and Bennett (2007) reported that as markets are sparse in Afar region pastoral communities are served by only one formal market in Ayssaita and three other informal markets. However, for many communities, visiting the formal market at Ayssaita entails a roundtrip in excess of 300 km which limits the frequency of visits.

The third reason for the low milk sales by pastoralists is cultural reason. Taboos that stem from belief govern community practices. As with many other aspects of traditional communities, milk selling is considered as a taboo. However, due to changes and dynamism in the livelihood needs of pastoral households taboos that hinder market integration and product sales will be changed. Improved market access for pastoralists rests on better interventions as also noted by authors who have analyzed the livelihood and market system of pastoralists<sup>11</sup>.

The problem of Agricultural data inconsistency and reliability in Ethiopia is a general truth. Also lack of systematically disaggregated agricultural data by the highland mixed farming system and pastoral system is another problem. In fact, the recent National Agricultural Sample Enumeration program of the 2001/2002 has been one of the comprehensive efforts made at agricultural data generation in the country. Although the survey reports have provided figures on the size of livestock and products at the national level, by regional states, zonal and even woreda/district levels, still there is no data which provides for the 'highland/agricultural' zones and the 'low land pastoral' zones as such. One needs to compile such data looking at each and every district known to be pastoral areas. There are two regional states - Afar and Somali – which are purely pastoral areas while there are parts of Oromia, SNNPR, Gambella and Benishangul-Gumuz states which have significant areas under pastoral and semi-pastoral system. This kind of approach in data generation might involve slight errors (under or over estimations). Nevertheless, there is no other option than relying on this national data set.

The secondary national data is compiled only for the total number of dairy cows. Hence, data for the pastoral areas has to be collected from the sample enumeration data of 2001/02 for the pastoral and ago-pastoral areas of the country as shown in table 3.3. According to the 2001/02 national survey (CSA, 2003), there were over 8 million heads of dairy cows, and 675732 dairy goats. Given the national total number of female cattle aged between 3 and 10 years of old, which is over 14.4 million heads, this number of milking cows means that in general 58% of the female cattle are dairy cows. A total of 1.6 million milking cows exist in pastoral areas. This accounts for 20% of the figure for national dairy cows. It may be possible that this number underestimates the size of cattle used for milk production in pastoral areas. The number of milking animals depends

<sup>9</sup> In fact in some pastoral communities reliance on grain food is becoming common. As noted by Davies and Bennett (2007) many pastoralists do not have sufficient animals to be 'purely pastoral' and have become increasingly dependent on grain as a part of their diet.

<sup>10</sup> From the study in Afar region of Ethiopia, Davies and Bennett (2007) estimated that, taking a demand of 839,500 kcal of milk energy per capita per annum, the amount of excess milk energy available (above that required) was 193% for the rich households and 16% for the average households. On the other hand, the poor households have a milk deficit of 52%.

<sup>11</sup> Despite the prioritization of milk for consumption within pastoral production systems, market access determines pastoral poverty to some extent and the sale of livestock assets could be facilitated through improved transportation, market chain regulation and more transparent price fixing (Davies and Bennett, 2007).

on the herd structure in the pastoral communities and this varies from place to place depending on the importance of the different livestock types, cattle, small ruminants or camel.

The number of milk camels was 160246, a 100% of these being in the pastoral areas. The total number of camels reported is 447,872 while those aged 4 years and above used for all purposes (meat, milk, transportation, draught and other) are 326,150. The data shows that only 49% are used for milk production.

The estimation of milk production from pastoral areas is, therefore, based on the national secondary data of milking cows compiled from the pastoral regions and zones. The FAO statistics (2006) for the Ethiopia national milk production shows a total cow milk production of 1,450,000 MT for the year 2001 and 1,679,000 MT for the year 2004 and of 1,500,000 MT for the year 2005. On the other hand, the National Agricultural Sample Enumeration data of 2001/2002 gives a total milk production of 2,591,187 MT.

**Table 3.3. Number of milking Cows and Camels Reported (National Agricultural Sample Enumeration of 2001/02)**

Pastoral regions and areas	Number of Dairy cows <sup>12</sup>
Afar	82,708
Somalie	131,694
SNNPR, total	3,751,933
SNNPR, pastoral areas	239,322
Oromia, total	5,979,929
Sub-total, Oromia pastoral +agro-pastoral areas	1,196,277
Total milking cows in pastoral areas	1,650,001
Total number of milking cows, national	9,307,582
Total number of dairy cows, national	8,310,427
Share of pastoral areas (%)	20%
Total number of milk camels (No)	160,246

Source: own computation based on the national statistics.

For the same year 2001/2002, there is a discrepancy of 1,141,187 MT. One can imagine the difficulty of basing estimations on the national statistics that involves significant inconsistency reported by different statistical agencies. Nevertheless, the estimation in this study is not in a position to avoid such data weaknesses as there is no other option at hand. Hence, valuations are made bearing in mind this difficult database conditions.

A total of 974 million liters of cow milk is produced in pastoral areas. To this, 114 million liters of camel milk and 11.9 million liters of goat milk is added. This makes the total volume of milk production in pastoral areas 1.1 billion liters. In the Borana zone of Oromia alone 131,139,565 liters of cow milk was produced according to the Agricultural Sample Enumeration (2001/02) survey data.

Taking the national milk production of 2.7 billion liters, Pastoralism contributes 41% of the national milk production (Table 3.4). A previous study by Jahnke (1982) provides a general indication that in the tropical African countries 63% of the ruminant milk production (cattle, goats and sheep) comes from the arid and semi-arid areas which are predominantly the pastoral areas.

It is necessary to isolate the livestock products for subsistence (home use) from the sales/market value. About 807 million liters of milk is consumed by the pastoralists at home. Considering a pastoralist population of 9,813,600 (MoARD, 2004), this amounts to over 2.2 million liters a day and 0.23 liters per capita per day. This may appear to be low for the pastoralist households whose major source of food is milk. On the other hand, there is a fact that these days there is large variation in the milk production and productivity of the pastoralist communities in the country. In some places like Karayu communities in the upper and middle Awash River valley areas, the resource shrinkage has led to severe resource/pasture constraint for the livestock production.

Pastoralists themselves admit that their milk production has much declined compared to the 'old and good days' as a result of many factors that affected the productivity of range land resources – pasture and water. At the national average price of milk the subsistence value of milk is 1.94 billion Birr (215,330,249 USD) per annum. The price used for valuation of total milk is 2.40 Birr per liter, compiled for the pastoral areas. During the year 2004-2005, the national average milk price was 2.45 Birr/liter.

<sup>12</sup> The Central Statistical Authority survey defines 'milking cows' as cows actually milked during the reference (survey) period while 'dairy cows' are type of cows use to give milk previously and/or provide milk currently or have never given milk before and pregnant now. The later does not include heifers.

**Table: 3.4. Milk production of the pastoral regions and areas of Ethiopia (2001/02 survey)<sup>13</sup>**

Items	Quantity
Afar Region, milk production (liters)	42,200,000
Somali Region, milk production (liters)	47,700,000
Oromia pastoral areas, milk production (liters)	217,275,591
SNNP pastoral areas, milk production (liters)	667120048
Milk from cow, total pastoral areas (liters)	974,295,639
Camel milk (liters) <sup>14</sup> *	114,864,928
Goat milk (liters) <sup>15</sup> *	11,935,000
Total milk production from Pastoralism ((liters)	1,101,095,567
Total national milk production (liters)	2,717,986,928
Share of Pastoralism (%)	41
Milk consumed at home by pastoralists (%)	73
Milk consumed at home by pastoralists (liters)	807,488,434
Consumption value at an average national price (Birr)	1,937,972,241
Milk sold out by pastoralists (%)	15
milk sold out by pastoralists (liters)	160,209,405
Sales value at an average national price (Birr)	384,502,572
Other local uses of milk by pastoralists (%)	12
Volume of milk for other uses by pastoralists (liters)	135,434,755
Value of milk for other uses by pastoralists (Birr)	325,043,411
Total value of milk for pastoral subsistence economy (Birr)	2,263,015,653
Value of milk for market (local or other)	384,502,572
Total milk value from Pastoralism (Birr)	2,647,518,225
Total milk value from Pastoralism (\$)	294,168,692

Source: authors' own computation.

About 15% of the milk production is sold to the market, valued at 384 million Birr (37 million USD) per annum. Close to 120 million liters of produced milk (12%) is used for other local uses including by-products production processing and payments as in kind wage. This amount is valued at 287 million Birr (31 million USD). The total subsistence value of milk production is valued at 2.26 billion Birr per annum (246 million USD). Including the other uses at local level and sales, the total value of milk production from pastoral areas reaches 2.65 billion Birr per annum (294 million USD).

#### **The value of meat/livestock sales hides and skin off-take and subsistence meat**

The other pastoralist product assessed for direct economic contribution is the production of meat or the sales of livestock. Productivity of meat production in arid and semi-arid pastoral areas (Jahnke, 1982) is 16.3 kg /TLU of mixed herd. Given the estimated pastoral herd size (9.8 million TLU) in Ethiopia, the total meat production is estimated at 162,948 MT. This figure closely matches with a recent study report by Diao et al. (2004) which indicates that the lowland zones/pastoral areas produce 150,000 MT of meat (bovine meat, mutton and other meats all together) This amounts to 29% of the 580,000 MT of meat production at the national level.

Although subsistence use of meat is also important for pastoralists, there is no adequate data to reflect such value. Although there has been some surveys conducted in the pastoral communities, these could not yield reasonable data set on volume of subsistence of livestock products. Even if, they give some indications, the figures may not be a representative one for the large pastoral communities with diverse cultural background. The National Agricultural Sample Enumeration of 2001/02 says nothing about the magnitude of livestock products consumption by the rural agricultural and pastoral households. It only mentions the percentage of livestock products (milk, butter, beef, mutton, eggs, etc) consumed or sold to the market. The later does not help in terms of quantified amount of products consumed by the households. As there is no sufficient data on the amount of meat consumed, the skin and hides used, and animal blood consumed by the pastoral households, this report is forced to refer to a national per capita consumption of livestock products, as the only available option. National per capita consumption may not give a true picture, but is thought to at least capture some part of the value rather than complete

<sup>13</sup> Milk production data in the pastoral areas is compiled from the National Agricultural Sample Enumeration data (2001/02) (CSA, 2003). The national milk production figure is obtained from the FAOSTATA and updated by the CSA data regarding camel milk.

<sup>14</sup> The data from FAOSTAT provided during 2004 indicates only 22,450,000 litres of milk from camel.

<sup>15</sup> An estimated 70% of the goat milk comes from the low land pastoral areas as highlanders rarely use goats for milk production.

exclusion for lack of appropriate data. The national average per capita consumption of beef and mutton is 4.6 kg and 2.8 kg per annum. For the estimated total population of pastoral areas (**9813600 people**) this gives an annual consumption of 72,261 MT of meat (does not include chicken as its consumption is not common in many pastoral communities). At the current price of 30,000 birr/MT of meat this amount of subsistence meat is valued at 2,178,619,200 birr (242,068,800 USD).

However, for this purpose of economic valuation the annual off-take (no) of 644,000 cattle 9,000,000 shoats and 100,000 camels from pastoral areas was used. The national off-take value data do not, however, allow for the subsistence economy and the consumption and exchange of livestock within the pastoral community. Marketed off-take is only part of the total herd off-take and it undermines the importance of livestock consumed in the subsistence economy, whether slaughtered for home consumption or religious ceremonies, or exchanged within the community.

Studies show that the annual off-take of cattle is 7%, goats 7%, sheep 7% and camels 4.5% (Belachew, 2004 and others). A national data by MOFED (2005/6) provides that the national livestock off- take value was 2.7 billion Birr; value of milk and products being 3.8 billion Birr.

56% of the cattle, 46% of the sheep, 22% of the goats and 70% of the camel off take from pastoral areas is for the domestic market while the rest goes to the official export and unofficial cross-border trade.

**Table 3.5. Value of livestock off-take from pastoral areas of Ethiopia**

Type of livestock	Number of herd (mill.)	Asset value (mil. Birr)	Off-take (%)	Off-take value, meat ( mil. Birr) <sup>16</sup>	Value of subsistence milk (mil. Birr)	Value of sold milk (mil. Birr)	Value of subsistence meat (mil. Birr)	Off-take, hides & skin (mil. Birr)	Total value (mil. Birr)
Cattle	9.2	18400	7	1288					
Sheep	12.5	2500	34	850					
Goats	14.1	2820	34	958.8					
Camels	2.3	4140	4.35	180.					
Total	38.1	27,860		3276.89	2,263.7	384.5	2,178.6	390.64	8,494.3
Total (mill. USD)				364.10	251.52	42.72	242.07	43.40	943.8

Source: Own computation.

The total livestock wealth owned by the pastoralists in Ethiopia is estimated to be **27.86 billion Birr** at the current livestock average market price. The livestock off-take from pastoral areas is valued in terms of sales for meat production and export (live animals and meat) and hides and skin production from the domestic slaughter. Hence, using an average national price<sup>17</sup>, off-take value for meat is valued at 3.3 billion Birr per annum while for hides and skin is valued at 390 million Birr. These off-take values together amount to 407 million USD per annum. Hides and skin is an importer foreign exchange earner for the country. In 2005/06, 15,400 MT of hides and skin was exported from Ethiopia earning 651,074,000 Birr. Taking a rough estimate of 60% of the cattle for domestic and export slaughter comes from the pastoral areas, the share of off-take value for Pastoralism will be 390,644,250 Birr a closely similar figure of the above estimate.

Part of the livestock off-take from the pastoral areas goes to the unofficial cross-boarder trade. The yearly size of the unofficial cross-border livestock trade is estimated at 326 thousand cattle, 1.15 million sheep and goats and 16,000 camels. The value is estimated at 138 million USD per annum.

Taking all the direct values of the pastoral products together, it is estimated that the direct economic values from Pastoralism equals to **8.49 billion Birr (943 million USD) per annum**. This is a conservative estimate of the direct values of Pastoralism in Ethiopia given the inconsistencies and inadequacies in some of the data base.

The final direct economic value of pastoralism is arrived at by considering the factor of multiplier for the human population as discussed in section 3.2 above. This will also help to take care of the values from the less pastoral regions like Gambella and Benishangul-Gumuz whose pastoral population and livestock data is not clearly available, as there are also shifting cultivation farming systems in these areas, particularly in the case of the Benishangul-Gumuz region.

<sup>16</sup> This includes the estimated un-official cross-boarder trade from the pastoral areas. This amounts to 138 million USD or 1,242,000,000 Eth. Birr.

<sup>17</sup> The average livestock price used for valuation is (Birr) 2,000 per head for cattle, 200 for shoats, and 1800 for camel.

**Table 3.6. Estimates of total direct values from Pastoralism in Ethiopia (adjusted by both the population and livestock factor/multiplier of 1.3)**

Item		Value in US Dollar
Estimated total pastoral population (No)	12757680	
Total direct values (billion Birr)	11.04	1.23 Billion
Per capita per annum (Birr)	866	96
Total grazing and browse area under Pastoralism (ha) <sup>18</sup>	55440000	
Direct value per hectare (Birr)	199	22

Source: own computation

Considering the multiplier factor for human population (1.3) will increase the population to 12.5 million (which falls within the range quoted by others as 12-15 million)<sup>19</sup>. Considering the multiplier factor for livestock (1.3) will increase the estimated direct value to 11.04 billion Birr (1.23 billion USD) or 866 Birr (96 USD) per capita per annum.

The direct economic value of Pastoralism is also related to the area of land under pastoral system in the country. On average the land under grazing and browsing in pastoral areas is estimated to be 55,440,000 hectares. If the estimated direct economic value is divided by this area, it gives a value of 199 Birr (22 USD) per hectare per annum.

### 3.4 Assessing the Indirect Economic Value of Pastoralism

In this section, some of the indirect values of pastoralism in Ethiopia are dealt with. **Indirect values** associated with pastoralism include tangibles such as inputs into agriculture (manure, traction, transport) and complementary products including gum arabic, honey, medicinal plants, wildlife and tourism. They 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. In this study the economic valuation process faced still much more challenges due to the thin database and information availability regarding these elements of the system.

The contribution of pastoralism to agriculture in terms of draft power, tourism and wild life, manure for land fertilization and incense and gums to a limited extent are captured. The existence of other inputs is duly acknowledged.

#### Value of Draft power for farming

A report by the Ethiopian Economic Association (EEA, 2005) indicates that about 59% of the 10 million crop farmers in the country keep 14 million working age cattle used for ploughing and threshing, while the rest (42%) do not have oxen. Also Pastoralism contributes to 20% of this draft power. In terms of animals this equals to 2,800,000 cattle (oxen).

Livestock contribution to farm income in the highland is 24% and this increases to 30% when draft power and manure utilities are included. There is no data on the draft power alone. Hence, in this study a simple guess of a 50% share of this effect for draft power is assumed. This will mean an increase of household income by 3% due to draft power. The average real farm household income during the year 2004/5 was 9545 Birr. Considering a total of 10 million farming households, the contribution share of draft power will be 5.7 billion Birr; and 572,700, 000 Birr (63 million USD) is due to contribution of draft power from Pastoralism.

**Table 3.7. Estimated input of Pastoralism to agriculture in draft power**

Input to Agriculture:	Quantity
Real per capita income/consumption expenditure, highland (Birr), 2004/05	1909
Average household size (No)	5
Total household income (Birr)	9545
Pastoralism contributes to highland draft power (%)	20
Draft power contributes to household income (%)	3
Total number of crop farmers (No)	10,000,000
Total value-add by draft power to rural household (Birr)	5727000000
Total value by the Pastoralism to draft power value-add (Birr)	572700000
Total value by the Pastoralism to draft power value-add (USD)	US\$63,633,333

Source: own computation.

<sup>18</sup> Ethiopia's grazing and browsing lands under pastoralism is estimated to be 53680000 to 57200000 hectare.

<sup>19</sup> A recent study by Diao et al. (2004) has considered the low land population to be 13,676,000 when analyzing the Agricultural Growth Options and Investment Strategies in Ethiopia.



A factor of the livestock population may also be applied to the number of draft oxen supplied to the highland areas from the pastoral low land areas. As the demand for draft power and cattle fattening in the highland areas is increasing, it is more likely that the supply of young animals for breeding stock and draft power will increase from the lowland pastoral areas. In this case the value of draft power can be estimated to reach 744,510,000 Birr

### Tourism industry

Although the lowlands and rift valley region of Ethiopia support the large share of the tourism economy in Ethiopia, there is no well organized database that shows the role of these areas. In fact, out of the 9 national parks, only 2 are not in the dry lands areas of Ethiopia. The total area under the national parks and games which are found in the low land areas is estimated at 466,640 hectares (Bruck, 2004). See annex table 2.

As shown in figure 2, the national parks, game reserves, and sanctuaries are predominantly in the rift valley arid and semi-arid pastoral areas of the country.

In the absence of data that shows the share of pastoral in the tourist economy (in spite of parks and games being in pastoral areas), a rough assumption of 50% of the total earning from tourism comes from the low land areas is considered in this study



Figure 2: Map of Ethiopia: parks, game reserves and wild life sanctuaries in the pastoral areas

There are cultural and historical tourist sites in the northern parts of the country which also attract lots of tourist. Taking the GDP contribution of the tourism sector, the value share of pastoral areas will be 3.06 billion Birr (340 million USD) per annum. The tourism industry is reported to contribute 4.5 % to the national GDP.

Table 3.8. The estimated contribution of Pastoralism to Ethiopian Tourism industry

Item	Quantity
Tourism (GDP value), value (%)	4.5
Value of tourism industry (Birr)	6,133,600,000
Assumed share of the lowland pastoral areas (%) <sup>20</sup>	50
Estimated share of lowland pastoral areas (Birr)	3066800000

Source: own computation

<sup>20</sup> Out of Ethiopia's national wild life games and parks, only two are not in the lowland pastoral areas. While such areas are visited by mostly nature lovers, most of the tourists also visit the historical sites in the northern part of the country.

### The Value of Manure Production

Although manure from livestock production in the pastoral areas is not commonly put for farmland fertilization it is also used for keeping the fertility of pasture lands or some limited cultivation in semi-pastoral areas. There are different approaches used to value livestock manure. Soil nutrient values estimation, valuation of incremental crop production due to soil fertilization using manure are among the options. However, the valuation also needs a complex and careful procedure as the nutrient content of manure depends on the type of livestock considered including type of feed they fed on, and nutrient release and wastage largely depends on the management of manure in its liquid or dry form.

As manure in pastoral system is not applied to crop production, except limited use in agro-pastoral areas which could even be constrained by moisture availability, in this study the valuation through value of crop production is not possible. Valuation of soil nutrient aspects of manure is not convenient either as the quality and amount of nutrient depends on manure management, whose information is not readily available. Although the pastoral land fertilization of manure is evident, there is no experimental data that provides the pasture land yield due to manure utilization/application.

Hence, due to these very reasons the only option is to take the value of manure provided in the national account. Referring to Jahnke (1982), a TLU of livestock produces 3000 kg of DM manure. The 9.9 million TLU of livestock in pastoral areas produces **about 30 million** MT DM of manure. The national account of 2005/6 reported by (MOFED) shows that the value of manure/animal dungs production was 902,182,000 Birr. Taking a share of Pastoralism in the national livestock size (265) and assuming no difference in the amount and quality of animal manure produced in the low land and highlands gives share of Pastoralism that equals to 237,966,570 Birr. If the factor for livestock size (1.3) is also applied here the value of manure will increase to 309,356,542 birr (\$34,372,950).

### Production of incense and gums

The dry land areas have also another important value generating resource which is incense and gums. The pastoral communities protect these trees partly as a feed for browsers and also since these trees generate income for households by producing gums and incense. Although there is a large potential of benefiting from **incense and gums** resources in the lowland areas, the country generates a limited amount of income, 3,457,000 Birr per annum, from this resource. A 100% of this can be attributed to the drylands. Proper technical support and training on the production, quality maintenance and marketing for the pastoral communities and other agencies would increase the benefits that that can be earned from this resource.

**Table 3.9. Summary of indirect measurable values of Pastoralism in Ethiopia**

Item	Amount
Value of manure production (Birr)	309,356,542
Incense and gums production (Birr)	3,457,000
Draft power contribution to agriculture (Birr)	744,510,000
Tourism value (Birr)	3066800000
Total (Birr)	4,124,123,542
Total (\$)	458,235,949

Source: own computation

The total sum of measured indirect values of Pastoralism including values from draft power, manure production, tourism and incense and gum equals 4.12 billion Birr (over 485 million USD) (see Table 3.9). This amount is almost as much as the direct values of Pastoralism. In fact due to data limitations, many of the possible indirect values of Pastoralism could not be captured in this study

### Combining the direct and measurable indirect values

Adding the direct value to the indirect measurable values estimated above gives a total value of 15 billion Ethiopian birr per annum. This amounts to about 1.6 Billion USD (see Table 3.10). This is a very significant value of Pastoralism as a major economic and livelihood system of the national economy. The estimated value amounts to 16% of the National GDP and 38% of the agricultural GDP reported in the year 2005/06 (MOFED). In the year 2005/06, national GDP was 93 billion Birr while that of agricultural sector was 40 billion Birr. When this estimated value is related to the estimated total areas of land under Pastoralism, it shows a per hectare value of 274 Birr (or 30 USD).

This value can, be said, is even a conservative estimate given the many inconsistencies and inadequacies of the available national database as regards the pastoral system.



**Table 3.10. Estimates of total direct and measurable indirect values from Pastoralism in Ethiopia**

Item		Value in US Dollar
Total direct values (Birr)	11,042,590,000	1,226,940,000
Total measurable indirect values (Birr)	<b>4,124,123,542</b>	<b>458,235,949</b>
Total measurable values (Birr)	15,166,713,542	1,685,175,949
Total pastoral population (No)	12,757,680	
Per capita per annum (Birr)	1,189	132
National GDP (2005/06) (Birr)	93549095078	10394343898
Percentage of National GDP	16%	
Percentage of Agricultural GDP	38%	
Total grazing and browsing area under Pastoralism (ha) <sup>21</sup>	55440000	
Direct value per hectare (Birr)	274	30

Source: own computation

#### **Other indirect values of Pastoralism not measured**

There are other values of Pastoralism that could not be measured for lack of data. Investments in agro-industries like the export abattoirs using cattle, shoats and camel depend largely on the pastoral livestock supplies. There is a potential and upcoming investment in bio-fuel projects in the low land and warm areas of Ethiopia.

Other inputs from Pastoralism to agriculture include the young animals (for breeding) supplied to the highland areas. There are some important indigenous breeds of livestock with remarkable features; the lowland breed of cattle (e.g. Boran) and Sheep (e.g. Somali black headed) are often regarded as superior in terms of size, durability, and productivity and/or consumer preferences. (Alemayehu, 1984d ?). Example, the Borana breed in Ethiopia is used in cross breeding activities in livestock development. Hence, the increase in meat and milk production from the cross-bred animals is highly valued. It is possible to consider the number of cross-bred animals with Borana breed, the incremental milk and meat valued at average price. However, such disaggregated data could not be easily found. The livestock genetic resource pool of the lowland pastoral areas of Ethiopia is well recognized (see Annex table 1).

#### **Forward and backward linkages to the economy**

The multiplier effects of Pastoralism in the entire economy are obviously acknowledged. Based on the result of this valuation and using the standard multiplier of 1.8, it is estimated that the direct value of Pastoralism (12% of GDP) with forward and backward linkages to the wider economy is 21%.

#### **The Environmental Importance of Pastoralism**

The very existence of Pastoralism adds a lot of values to the environment. Although these values may be difficult to measure given the current scope of technical knowledge and methods, the existence of such benefits to the environment can be appreciated. The maintenance of the range lands surely contributes to the ecological balance. Among other environmental roles of Pastoralism is the maintenance of bio-diversity. Animal feces during mobility help to transmit plant seeds and multiplication.

If the current land use changes, the vegetation, the biodiversity and the water cycle system will be disrupted and destroyed. The pastoral communities are very careful in maintaining the existence of the diverse plant and animal species in their territory. They co-existed with their ecology because they need the natural environment for their livelihood (grass, water, firewood, medicinal plants, etc).

Livestock husbandry has contributed to the important effect of soil nutrient recycling through feeding on plant species and inputting the residues/manure to the range lands. The vegetation in pastoral areas also plays an important role in capturing carbon, one of the environmental roles. If the grassland and vegetation disappears due to other land uses, such important ecological and environmental value of Pastoralism will not be there. The effect will be serious consequences for humanity including the expansion of desertification.

The drylands areas are also known for their immense bio-diversity wealth. The rangelands are areas of large wildlife diversity of mammals and birds which are potentially resources for tourist attractions.. As discussed above, most of the Ethiopian national parks, wildlife hunting areas and game reserves are located in the pastoral areas the testifying the importance of the nature of the environment in relation to wild life diversity and potential tourist activities.

Pastoralism is praised for maintaining the livestock wealth under environmental conditions of risk and uncertainty using traditional adaptation and management strategies. By doing so the system adds important value by using the resources effectively.

#### **Socio-cultural values of Pastoralism**

Pastoral communities are quite appreciated for their indigenous institutions and their management. Before they were weakened by external interventions, they use to serve the purpose of planning, enforcing and managing the rules of resource and land use, mobility and settlement patterns, disaster and risk mitigation, conflict management and resolution. These

<sup>21</sup> Ethiopia's grazing and browsing lands under Pastoralism is estimated to be 53680000 to 57200000 hectare.

indigenous institutions and their knowledge bases is valued for its contribution to the very survival of the pastoral system, adaptation, resilience, under difficult ecology and environment conditions. Pastoralists have, over generations, developed a good natural resources and livestock management systems. These practices are governed by complex and interesting local institutions which develop laws and rules to abide by. The knowledge and skill acquired pass to generations through such local institutions. For instance the deep-well water resources management and grass lands conservation, wet and dry season grazing and settlement rules and the institutions in Borana pastoralists in Ethiopia are commonly appreciated, documented and acknowledged (see Bassi, 2005).

### **Values of mobility**

Mobility is the prime feature that characterizes Pastoralism in Ethiopia, as also elsewhere. Mobility is the art of rangelands management, and adaptation to temporal and spatial resource dynamics in the system. By moving from place to place between seasons pastoralists effectively utilize resources and maximize the productivity. By moving from place to place searching for water and feed, pastoralists make it possible for year round livestock supply to market while the highland livestock production systems largely constrained by feed shortages during dry seasons. It is also a way of coping with the risk<sup>22</sup> and variability in resource bases due to weather variations in space. The value-add of mobility of pastoralists may be captured by looking at their contribution to the livestock and product supply during the different months of the year as compared to the relatively immobile highlands livestock agricultural system. For instance, Pastoralism should be recognized for supplying livestock for export markets as well as the domestic beef industry during the year. Unfortunately, there is no adequate database that provides the seasonal/monthly livestock market data differentiated by the lowlands and highlands.

## **3.5 Contingent Valuation Methods: Pastoralists Perception of Economic Values**

### **Data Sources, Designing of Survey Questionnaires and Elicitation Format**

In the course of this study a Contingent Valuation method was applied taking a sample of 237 pastoralist households drawn from the Southern Ethiopia Pastoralist areas (Yabello in Borana) and Fantalle district of East Shewa zone in upper Awash river rift valley area (Karayu pastoralist communities). Both locations are in Oromia Regional State of Ethiopia. The primary data utilized in this study were collected from randomly selected households. These 38% from Fantalle (62%) from Yabelo, in Borana Zone. Of the total sampled households, about 77% are male-headed households and the remaining 23% are female-headed. Some more information that characterizes the sample pastoral households are provided in the Annex.

The survey questionnaire elicited data on demographic characteristics of respondents, socio-economic variables, level of education, livestock of surveyed households and pastureland related information. Besides the survey questionnaire contains binary referendum style CV followed by open-ended questions in which respondents were asked whether they are willing to pay and the maximum amount (if they agree to pay) for maintenance of pasturelands under existing and improved scenarios.

Designing CV survey questionnaires usually includes detailed description of the good under consideration and its possible substitutes and hypothetical circumstances under which the good is made available to users; questions that elicit WTP/WTA of the respondents for a proposed change; payment vehicle and respondents' socio-economic and other relevant variables.

Generally, there are four types of value elicitation formats, namely, open-ended; bidding game; payment card and dichotomous or discrete choice formats. Each format has its own advantages and disadvantages (Haab and McConnell, 2002). This study employed binary referendum style elicitation format followed by open-ended value elicitation questions

### **CV Survey Scenarios**

In the survey, respondents were asked for the use value of rangelands lands like for grazing and watering livestock. The scenarios were clearly presented to them. They were provided with detailed descriptions of the good being valued (i.e., pastureland). The discrete CV questions were asked with open-ended follow up questions for various uses of pasturelands under two scenarios: the existing scenarios and improved scenarios. In this simple exercise, the issue is about conservation of the pasturelands. The enquiry presented was open-ended. Respondents were simply given alternative payment systems: in money or in-kind (livestock) or in Labor Day. Respondents were given alternatives not all or any of the two at a time. The alternative, say, "if you pay only in monetary term, what is the max?" This is one scenario. Alternatively, "if you pay only in-kind, what is the max number of livestock are willing to pay per year?". So, this way complication was avoided. Each respondent considers all aspects and gives different responses and I that is there is different Labor Day for many respondents. Hence, it is possible to aggregate money across households or labor across households.

Existing scenarios refer to pasturelands without introducing any change in size, quality and reliability of the resources under existing institutional setups that govern pasturelands. In this case, respondents were asked binary CV questions to see whether they are willing to pay for the existing resources without any improvement. They were also asked the open-ended questions to express their maximum WTP for these resources. The main objective here is to know how pastoralists value the existing natural resources (pasturelands in this case) without proposing any change (i.e., without proposing any improvement).

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<sup>22</sup> A pastoralist elder once commented about the unsuitability of an attempt to settle pastoralist. He said: " we can settle only when the government or its agencies could give us a mobile farm land so that we also move it to cope with the risk of water shortage as we do with our cattle, sheep, goats and camel"

Under the second (improved) scenario, respondents were asked whether they are willing to pay for the improvement of pasturelands resources and the maximum amount they are willing to pay for the improvement in terms of quality and reliability of these resources keeping size of pasturelands constant. The detailed scenarios were presented to the respondents about what to improve, how to improve and the level of improvement (see the survey questionnaires). With regard to the 'pastureland improvement scenario, the possible intervention practices were explained in the questionnaire. For instance, avoiding or removing unwanted bushes which are currently challenging and degrading the range lands. There are such practices currently supported by some NGOs in order to rehabilitate the pasture lands by clearing the bushes and allow grass to grow well.

### **Sampling Technique and Field Survey Procedures**

The study areas, Karayu district in the central east and Borana zone in the south of Oromia region, are selected based on various criteria such as location (i.e., inclusion in the pastoral areas) and long history of pastoralism in these areas. However, time and budget has limited expansion of the survey to other Regional States of Ethiopia which have also pastoral communities.

Once the study areas are identified, different kebeles in these areas were selected for the study. These kebeles were stratified into a number of *ollaas/Kaloos*<sup>23</sup> from which 237 households were selected using simple random sampling. Number of households to be selected from each *ollaa/ kaloo* was determined based on the rule of proportional stratification sampling. Thus, the study combines both simple random sampling and stratified sampling techniques to select the sample households. Finally, the data were collected from the head of sampled households using CV survey questionnaire that employ face-to-face (or direct personal interview) data collection techniques.

Intensive trainings and orientation was given to enumerators so that they could grasp the objective of the survey and detailed questions in the survey questionnaires. After the training, the survey was implemented where 8 field workers participated in the survey.

### **The CV survey Results**

The data collection was successfully completed with a relatively small number of invalid responses (about 17% protest zeros). The protest-zeros of about 17% cannot make much difference. Protest-zeros do not mean that the pasturelands have no values. The selected pastoralist community households were presented with simple and limited scope questions about the pasturelands resources they are using. First, what a household head (interviewee) is willing to pay in terms of money, in-kind (like livestock) or in labor input contributions (not all or any of the two at a time) in order to conserve the existing pastureland resources they depend on. Second, what a household head (interviewee) is willing to pay in money, in-kind (livestock) and labor input contributions to improve the productivity of the existing pastureland resources they depend on.

In decision making, economic agents, who are rational, take into account all the budget constraints (both money and time). Because agents are thinking about their income in responding to WTP related questions. Since pasturelands are basis of their life, the pastoral communities allocate more time to preserve existing resources. Since pasture lands are integral parts of their lives, the community members may not need free times to improve pasture lands. There are many pastoralists moving with their herds from place to place, so some individuals can work on the improvement. They prefer improving pasture lands to doing something. They can compare alternatives. Individuals can involve in improving pastures by keeping overgrazing from outsiders, unnecessary tree cutting, etc. In this respect, the amount of labour days individuals are willing to input can be said within a reasonable range.

The sample households estimate the current value of their livestock holding at 3.57 million Birr. If this value applies for the total pastoral households population it amounts to **26.87 billion Birr (3.18 billion USD)**. This value interestingly coincided with the stock value estimated using the national statistics presented above i.e. 27.86 billion Birr.

In the sampled areas of both central eastern and southern low lands of the country, pastoralists are willing to pay some positive amount of money in order to conserve the existing pasturelands. Mean and total Maximum Willingness to pay by the pastoral households to conserve the Existing Pasture lands is Birr 148.13 and Birr 10,221 per year, respectively. The average WTP is estimated based on the responses obtained from the open-ended elicitation method. The mean and total labor contribution of pastoral households to protect existing pasturelands is about 52 and 9,594 days per year (See Table 3.11). Respondents are given alternative modes of payments (not required to pay in more than one mode of payment). Multiplying the mean willingness to pay by the estimated number of pastoral households (1.9 million), gives us the total value per year, which is about Birr **281.2 million birr (31.2 million USD)** in order to conserve the existing pastoral lands. Alternatively, Pastoral households are willing to contribute some amount of livestock in order to conserve existing pasturelands. Pastoral households are also willing to contribute some positive amount of money in order to improve the existing status of pasturelands. The average WTP was estimated based on the responses to open-ended questions.

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<sup>23</sup> Kalo is a unit in a kebele that constitutes different households using common grazing lands.

**Table 3.11: Total and Average WTP in Money and Labor input**

Summary Measures	Contribution in Money (Birr/year)	Contribution in Labor (in labor day/year)
Scenario I: maintenance		
Average	148	52
Total	10221	9594
Scenario II: Improvement		
Average	133	53
Total	9070	10812

Source: sample survey

In this WTP survey study, the objective is basically to indicate one aspect of the values of pastoralism and, hence, it does not represent the total value of pastoralism. The average and total maximum amount of money that the pastoral households are willing to pay per annum is Birr 133 and 9,070, respectively, to improve the existing pasturelands. Given the total pastoral households (about 1.9 million), the total amount of money pastoral households are willing to pay for the improvement of the existing pasturelands is **253 million birr (28.1 million USD)** per annum. Aggregation was made based on the sample. Since the percent of protest-zeros is less than 20%, the total value may not lead to significant change or difference. Given, the percent of protest, the value is not inflated as such.

In fact in this experiment the sample is not a representative one. It was simply meant to estimate the total value of the pastoralism. Increasing the sample size in order get a representative figure would have needed more budget.

The result of this experiment, albeit presented with a limited scope for exploration of the many aspects of Pastoralism and its values, gives a clue that they attach a big value to it. Although the amount they are willing to pay is much lower compared to the valuation discussed above, it can be reasonably considered as an order of magnitude in the eyes of the pastoralists themselves. It gives a lesson that pastoralists, can clearly value Pastoralism, if sufficient time is taken to present the details of the values, if attributes, services and roles of the system are presented and discussed with them by taking a much larger sample and representation of geographical diversity. If they understand all values of pastoralism (use and non-use values), they can pay more compared to what they are now willing to pay. Still, the decision is made subject to their budget constraints (income in this case). They will not pay more than their income.

This exercise was not extended to analysis of the factors of WTP. The main interest was not to know the factors that affect WTP; rather the objective is to estimate the value that respondents attach to pasturelands. It is possible to run probit model and see factors that affect WTP. We estimate the WTP based on open-ended respondents- not based on the probit model estimated mean WTP. Theory suggests that the former is less than the latter (Haab and McConnell, 2002). Thus, overestimation was minimized by using open-ended results.

## **4. The Development Challenges of Pastoralism in Ethiopia**

### **4.1 Environmental Challenges**

A lot of researches, reports, conferences and workshops have widely documented and discussed about the growing environmental challenges of pastoral system in Ethiopia. Among the major difficulties the system has been facing is the recurrent drought with its devastating effects on the rangelands, livestock, and the general livelihood of pastoralists. In some areas of the pastoralist communities, on the other hand, floods have been disastrous. In fact, drought being a natural shock that have been occurring in the past, the aggravating factor for drought incidence in Ethiopia has been lack of proper management of the natural resources, and lack of disaster oriented development strategy and policy in the areas which are prone to such natural shocks like drought.

The global climate change and resulting unfavorable weather pattern is also a great worry for the sensitive pastoral ecologies. The increasing population and livestock pressure coupled with the disruption of the traditional management system and alternation of land uses has also led to significant rangelands degradation. Other major cause of the rangelands degradation and loss of productivity is the impact of bush encroachment that reduced rangelands utility. For instance, an estimate by ILCA (1993) shows area affected by bush encroachment in the Borana rangelands is about 40% (Bruck, 2004).

### **4.2 Policy and Strategy Challenges**

It is only very recently that Pastoralism in Ethiopia tends to attract adequate policy and development strategy attention. The system was marginalized throughout the history. Although there were some development interventions they remained to be simply extractive without considering a holistic development for the pastoral communities.

Land tenure system and recognition of the customary tenure vis a vis increasing land demands for alternative uses has put Pastoralism under pressure. Michele Nori (undated) noted that at the Global Pastoralists Gathering held in Turmi, Ethiopia in 2005, it is clearly unsurprising that the main concern for all pastoralists relates to the rights and encroachment of their lands, perpetuated by external, non-pastoral groups and interests. Shortages of grazing land, conflict over resources and encroachment by cultivation are among the challenges.

Although government has designed development program and strategies, it is not yet clear what the future development vision and direction will be. Very recently the discussion and argument around resettlement of pastoral communities is becoming an issue.

### **4.3 Basic Services and Infrastructural Challenges**

Remoteness characterizes Pastoralism in Ethiopia whereby road and communication infrastructure is at low level. Unbalanced development services, poorly developed market and urban centers, lack of market information, unharmonized cross-boarders trade are the major bottlenecks to the pastorals development. Access to education, health and other social services is in general at low level. It is within the circumstances of these challenges that Pastoralism strives to create value and livelihood of millions of people.

### **4.4 Recurrent conflicts and threat to livelihood**

The prevalence of conflicts among the Ethiopian pastoral communities also characterizes Pastoralism. Conflicts largely stem from resource competition where the traditional tolerance, sharing and conflict resolving mechanisms fail to mediate the competition. Not only do conflict lead to disasters that include lose of life and asset, they also contribute to inefficient range lands resource use by hindering the traditional management and mobility.

## **5. Concluding Remarks and Policy implications**

### **5.1 Conclusions**

The major objective of this study is to shed light on the total economic values (TEV) of Pastoralism in Ethiopia and add to the knowledge base towards sustainable development and support for Pastoralism. The study is interested in the application of the concept of Total Economic value to explore, identify and value the direct and indirect, measurable as well as the non measurable values of Pastoralism with the aim of laying a strong base for lobbying and advocacy for sustainable development of Pastoralism. Given this objective, however, what is achieved in this report is the assessment of the direct and indirect values of Pastoralism in Ethiopia, while the aspects of option and existence values could not be addressed.

While the direct and indirect (measurable) values have been estimated as far as the national statistics and available knowledge is available, the non measurable but important values have are acknowledged and qualitatively presented.

The result of the study clearly shows that Pastoralism has a huge value for the national economy and the pastoralists themselves. Such a huge economic value is undermined because of many reasons including the lack of appropriately disaggregated database that reflects the system itself. Above all, the marginalization for Pastoralism in terms of access to basic social and development services has hindered the realization of the huge economic value.

With careful identification and analysis of the available data, information and knowledge this study estimates that the total economic value of Pastoralism in Ethiopia is in Billions of Birr. It is appropriately estimated, within the bounds of the available data, that the total direct economic value per years amounts to 11.04 billion Birr (1.2 billion USD) or 866 Birr (96 USD) per capita of the pastoral population per annum. To this, the indirect but measurable economic values of Pastoralism including values from draft power, manure production, tourism and incense and gum amounting to 4.12 billion Birr (458 million USD) per annum is added. The total measurable direct and indirect values equal to **15 billion Birr (1.6 billion USD) per annum**. When this estimated value is related to the estimated total areas of land under Pastoralism, it shows a per hectare value of 274 Birr (or 30 USD).

This value amounts to 16% of the national GDP and 38% of the agricultural GDP of the year 2005/06. Based on the result of this valuation and using the standard multiplier of 1.8, it is estimated that the direct value of Pastoralism (12% of GDP) with forward and backward linkages to the wider economy is 21%.

This is a significant value that Pastoralism is contributing to the national economy beyond supporting the life of pastoralists themselves. A more in-depth analysis based on more refined and systematic database can always be useful to value and understand the role of Pastoralism for the pastoral communities, the environment and the national economy at large.

## 5.2 Policy Implications

Based on the findings of this study, the following policy implications/way forward can be drawn:

- 1) The undervaluation/underestimation of the economic, social and environmental role of Pastoralism stems from the lack of appropriately collected, organized and assembled database. Hence, adequate attention should be given to the proper collection and compilation of the data and knowledge on Pastoralism.
- 2) A well integrated and holistic approach of the valuation of Pastoralism should be developed to capture the real economic value of Pastoralism (the direct and indirect values, as well as existence and option values in the national accounts).
- 3) Pastoral development policies and strategies (such as range resources management and development, development infrastructure and services provisions) should be based on a sound knowledge of the current and potential, quantified and appropriately acknowledged total economic values of Pastoralism. The result of this study clearly shows that there is a huge economic, social and environmental benefits that can be generated by sustainably managing Pastoralism and its resource basis.
- 4) In order to benefit from the huge economic, social and environmental values of Pastoralism that are discussed in this study and documented many other studies done already, appropriate measures and support mechanism like proper rangelands use policy, rehabilitation of the pasture, water and vegetations, avoiding improper uses like crop cultivation, etc) must be in place to alleviate the real challenges that are threats to the very survival of Pastoralism.
- 5) Appreciating the livestock husbandry of the pastoral communities that has managed to adapt the system and livestock use to multiple purposes, it is recommended that Pastoralism should also be seen as a diary system, although current focus of development intervention seems to be entirely on marketing of animals for meat.
- 6) In order to maximize the livestock and rangelands productivity the culture and techniques of mobility should be protected and promoted (supported). There is ample indigenous knowledge of why and how to organize and manage mobility.
- 7) At the center of Pastoralism are the indigenous institutions (structures, rules and regulations) that government and help to manage the range lands utilization. The traditional institutions have been eroded due to many interventions including the modern system of administrative rules and structures. For sustainable Pastoralism the positive aspects of traditional institutions and knowledge system need to be rehabilitated<sup>24</sup> and be supported in a way they will be harmonious with the modern system of governance system and structures.

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<sup>24</sup>In a recent community Development intervention supported by the Oxfam International Group in Ethiopia, the target communities in Dirree district of Borana zone emphasized that they need to rehabilitate the traditional institutions and rules which are important for maintenance and sustainable use of the range lands resources and improvement of their livelihood. The communities noted that due to the disruption of such institutions, rules and regulations the range lands resources became vulnerable to the various degradation factors; and their livelihood is subjected to and disaster risks. The community based project, has thus supported the interventions like the rearrangement of settlement patterns, traditional community safety net mechanism, community early earning systems, and maintenance of the deep water wells (*eellas*) (For detail refer to project evaluation report :Oxfam Canada, December 2007, Addis Ababa).

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## Annex

**Table 1: Recognized indigenous cattle breed types in Ethiopia**

Breed Group Name	Breed Name	Synonyms	Distribution	Population Estimate	Breed status
Small East African Zebu	Hammer	NA	South Omo Zone	NA	Unknown
	Jijiga	NA	Somali Region, Jijiga area	100000	Not at risk
	Mursi	NA	South Omo Zone	NA	Unknown
	Ogaden Zebu	Lowland Zebu	Somali Region, Ogaden area	NA	Unknown
Sanga	Aliab Dinka	NA	Gambella Region along the border with the Sudan	NA	Unknown
	Anuak	Abigar	Gambella Region and adjoining areas in south-western Ethiopia	548600	Not at risk
	Danakil	Adal, Afar, Kereyu, Keriyu	Northeastern Ethiopia (Tigray, Wollo), and parts of Djibouti and Eritrea.	NA	Not at risk
	Raya-Azebo	Galla-Azebo	Parts of Tigray and Wello east of Lake Ashenge	NA	Not at risk
Large East African Zebu	Arsi	Arusi	Highlands of Arsi, Shewa, Bale, Sidamo and Hararghe	2012000	Not at risk
	Ethiopian Boran	Borana	In the southern rangelands with the Borana pastoralists	1896000	Not at risk
	Murle	NA	Western Gambella, on the border with the Sudan	NA	Unknown

NA= Not Available.

Source: DAGRIS (2004).

**Table 2: The recognized indigenous goat breed types in Ethiopia**

Breed Group Name	Breed Name	Synonyms	Distribution	Population Estimate	Breed status
Short-eared Small-horned	Long-eared Somali	Digodi, Melebo, Boran Somali, Benadir, Gigwain	Rangelands of the southern Ogaden, Bale, Borana and southern Sidamo with the Somali and Borana pastoralists.	1500000	Critical
	Short-eared Somali	Ogaden, Mudugh, Dighier, Abgal, Issa-Somali, Bimal	Northern and eastern parts of Ogaden, and around Dire Dawa	1500000	Critical
	Western Lowland	Shankila, Gumuz	Lowlands of western Ethiopia (Metekel, Assosa and Gambella)	400000	Critical
	Woyto-Guji	Woyto, Guji, Konso	North Omo, South Omo, Sidamo, Borana	900000	Critical
	Afar	Adal, Assaorta, Denakil,	Afar Region and parts of Eritrea and Djibouti with the Afar pastoralists	1000000	Critical

Source: DAGRIS (2004).



**Table 3: The locations and area under national parks and sanctuaries**

Region		Area (ha)
I Afar		
1.1	Awash National Park	7560
1.2	Yangudirassa national Park	47310
1.3	Alaidege Wildlife Reserve	18320
1.4	West Awash Wildlife Reserve	17810
1.5	Gewane Wildlife Reserve	24390
1.6	Mille Serdo wildlife Reserve	87660
1.7	Gewane Controlled Hunting Area	59320
1.8	West Awash Controlled Hunting Area	91360
Sub-total		353,730
II Southern Nations Nationalities and Peoples Region		
2.1	Omo National park	40680
2.2	Mago National park	21620
Sub-total		62,300
III Gambella		
3.1	Gambella National Park	50,610
Sub-total		<u>50,610</u>
Total		466,640

Source: Bruk Yemane. 2003.

**Table 4: Livestock ownership of the sampled households by types**

Types of Livestock	mean	Sum	max	min
Ox	12	1159	900	1
cow	17	3612	2000	1
bull	3	247	15	1
calf	9	1601	950	1
sheep	10	1518	120	1
goat	11	1921	200	1
donkey	2	219	7	1
horse	4	16	7	1
mule	1	11	1	1
camel	4	415	20	1
beehive	6	31	10	3
chicken	6	132	25	1

Source: sample survey

**Table4: Estimated Values of Currently owned number of livestock (in Birr)**

Types of Livestock	Average	Total sample	maximum	minimum
Ox	4433.506	341380	57500	200
cow	7077.473	1316410	50000	500
bull	7258.023	624190	221000	160
calf	1771.387	242680	22000	100
sheep	1125.687	147465	7000	90
goat	1428.264	211383	9000	90
donkey	1121.25	98670	5250	140
horse	2386.667	7160	4000	760
mule	1318.818	14507	2000	7
camel	7511.842	570900	51000	30
beehive	350	1400	1000	50
chicken	39.05882	664	200	6
Total	3710.383	<b>3,576,809</b>	221000	6

Source: sample survey