MARKET ACCESS AND FOOD SECURITY IN THE PASTORAL AREAS OF ETHIOPIA

Tegegne Teka and Alemayehu Azeze
Organisation for Social Science Research in Eastern and Southern Africa (OSSREA)

Abstract

Pastoralists in Ethiopia are among the food insecure groups of the country. Currently, most of these groups depend on food aid. Facing several security risks, the livelihood of pastoral nomadic groups is in a difficult situation. These risks have environmental, social, institutional and infrastructural dimensions. This study focuses on the relationship between market access and pastoral development in general and food security in particular. Based on data from eastern and southern pastoral areas, it is found that, owing to the increasing tendency in trade involvement, both internal and external livestock as well as grain marketing systems bear important implications to the development of the pastoral sector. However, the markets are poorly integrated and the benefit distribution among different agents in the marketing chain shows that it is unfavourable to pastoralists. Thus, interventions to improve market access by the pastoral groups, would require, among others, development of market infrastructure in the area and harmonization of trade policies with neighbouring countries.

1. INTRODUCTION

1.1. Statement of the Problem

Pastoralists in Ethiopia are found in the low-lying areas of arid and semi-arid lands of the country, which account for about 60 per cent of the country's landmass. They are estimated at about 12 per cent of the country's population. They depend on subsistence livestock production. They are among the food insecure groups. Currently, the life of most of these groups is sustained by food aid. Generally, facing several security risks, the livelihood of the pastoral groups is in a difficult situation. These risks, in the pastoral areas of Ethiopia, have environmental, social, institutional and infrastructural dimensions.

Environmental risks in the area primarily include drought and rangeland degradation. Security risks that arise as a result of social movements take the form of ethnic conflict over grazing land, population pressure or external intervention such as

commercial irrigation farming and park developments. Institutions and physical infrastructure are also rudimentary and hence market risk comprising all issues of price fluctuations, poor spatial integration and unfavourable terms of trade, is evident among the pastoral groups.

All sources of security risks mentioned above have important implication to the food security situation in the area. For instance, risks from environmental decline and external intervention have important implications on the production of livestock and livestock products. Social movements such as ethnic conflict increase costs of production and marketing. Similarly, market access affects income and hence the food security situation of the pastoral household.

The objective of this study is to assess the relationship between market access and the development of the pastoral sector in general and the food security situation in particular. It specifically addresses how official and unofficial markets are important for pastoralists inhabiting the eastern and southern borderlands of Ethiopia.

1.2. The Study Area

The study focuses on pastoralists and agro-pastoralists found in the eastern and southern parts of Ethiopia bordering Somalia and Kenya, respectively. The region is inhabited by the two largest pastoral groups in Ethiopia, the Somali and the Boran. The eastern part is exclusively inhabited by different clans of the Somali ethnic group. They are also found in southern borderlands with the Boran. Other small pastoral groups in the southern part include the Burji, the Gabra, the Konso and the Omotic. Similar ethnic groups also inhabit the other side of the border sharing the same language and religion.

Pastoralists rely on subsistence livestock production (cattle, sheep, goats and camels) using natural and communally-owned natural pasture. The relative importance of the herd structure is different in different places. Seasonal movements for grazing are also common. This practice transcends international boundaries. However, owing to increased privatisation of land and population pressure, these transhumance opportunities are declining. There is also increasing tendency of crop cultivation. In several places of these areas, sorghum, maize and millet are cultivated. However, food crop production in the region is very limited. Thus, maize and sorghum supplies from central highlands of the country and unofficial imports (of rice and wheat flour) through neighbouring countries meet much of the cereal requirement. Imports also include non-cereal staples such as sugar and vegetable oil.

1.3. Data and Methods of Analysis

For the eastern region the SAVE the Children UK data is used. This data includes monthly prices of sheep and goats, livestock products (milk), grain (maize, relief wheat and sorghum), other food items (edible oil, sugar) and other items (water and

fuel wood). Markets included are found in Jijiga area including Darwenaji, Hartishek, Jijiga, Kebribeyah, and Teferiber. The data series covered the period from April 1995 to December 1999. For southern borderlands, a similar data was obtained from GTZ/BLPDP (Borana Lowland Pastoral Development Program). The data series from this source covered the period July 1997-March 1999. In addition, for southern and south-eastern borderlands, part of the information collected by OSSREA in 1998 and 1999 in these areas is used. The information comprised 171 trader interviews using questionnaires, interviews with government and NGO officials working in the area and market observation at different places in the area. Interviews with key informants and market observations in the field were also made. Descriptive statistics such as correlations and coefficients of variation were used to summarize and interpret the collected information. In addition, econometric models of spatial market integration were specified and tested.

The paper is organized as follows. In section 2, we describe and analyse the livestock marketing system. The implication of the livestock marketing system on food security is presented in section 3. Section 4 presents summary and some concluding remarks.

2. THE LIVESTOCK MARKETING SYSTEM

Several interrelated factors determine market access in the pastoral areas. These include, pastoralists marketing behaviour, the performance of available market options, market channels, price fluctuations caused by seasonality in production and consumption, the spatial integration to the available market options, marketing costs and the terms of trade between pastoralists' sales and purchases.

2.1. Pastoralists' Marketing Behaviour

A predictable response of pastoralists' behaviour in keeping livestock vis-à-vis different economic conditions is important in livestock marketing. One of the commonly referred important elements of pastoral behaviour is that pastoralists tend to accumulate animals to promote prestige and protect themselves from perturbations (Coppock 1994:128). Bailey et al., (1999) also indicate that pastoralists hold animals for a multitude of reasons. According to them, in semi-arid tropical Africa, "livestock are form of productive capital providing a stream of desired goods and services, including milk, blood, manure, transport and traction. They also serve as important store of wealth and insurance, functions that are extremely important in the absence of well-developed rural financial markets and given significant covariate risk due to climate, civil unrest, and epidemiological shocks".

Given more than a few motives for livestock holding, pastoralists supply response to price incentives is said inelastic, i.e. decisions to sell are judged against several priorities in addition to price incentives. Thus, they first sell animals that do play limited role in other purposes. Due to this, older cattle and small stock (sheep and goats)

come first to the market. This is said problematic for the development of the commercial livestock industry such as ranching (Coppock 1994; Bailey *et al.*, 1999). Hogg (1996) has a different opinion, however. According to him, pastoralists are price responsive and sell livestock when they find that prices are right. He argues that earlier calculations of livestock off-take considered only official transactions, i.e. excluding the unofficial cross-border trade, which is in fact more important in the case of southern and eastern borderlands of Ethiopia.

The observation by Steffen *et al.* (1998), is also in line with this proposition. According to them, there are several recent changes in pastoral herd management strategy that favors market orientation as a result of increased availability of water wells in the pastoral areas and increased demand for meat in overseas markets. These changes in herd management include readily selling more of surplus males, which are not necessary for reproduction; selling more animals than putting them into traditional arrangements; keeping more milk for young calves, kids and lambs rather than relying on subsistence consumption on milk and changing the composition of herds in favour of cattle and sheep for market than goats and camels which are safer for subsistence.

Taking into account the indicators suggested by Steffen et al. (1998), a rough observation suggests that pastoralists in eastern and south-eastern borderlands (the Somalis) seem more market-oriented than the southern (the Boran) pastoral groups. This may be partly due to the differences in interactions to production and consumption markets. Pastoralists in the eastern region consume more purchased items including imported ones than their counterparts in the southern area.

2.2. Market Options

Available market options for eastern and southern pastoral groups of Ethiopia can be categorized into two major groups: domestic (internal) and external markets. Domestic markets include, intra-pastoral trade mainly for breeding stock, trade with the adjacent highland farmers mainly for drought animals; and trade with urban consumers, feedlot owners and butchers within the domestic territory. External markets include trade with official exporters and unofficial cross-border trade with neighbouring countries.

Major types of live animals traded in the area include cattle, sheep, goats and camels. The relative importance of the quality and type of the livestock traded varies depending on its origin and destination. Cattle dominate most of the livestock markets in the southern borderlands (Borana area). According to Coppock (1994:127), "the number of cattle marketed was roughly double that for goats, 8 times that for sheep and 80 times that for camels". The importance of other animals (camels and small stock) is higher in markets of eastern regions (See also Gebremariam 1996).

Intra-pastoral trades are by large conducted in livestock market centres found near the pastoralist areas. These markets are referred to as bush or local markets. The

major reason for intra-pastoral trade is to replace the breeding stock. Therefore, the preferred animals in this trade are younger and female cattle to ensure sustainable herd recovery. The peak season for this transaction is the rainy season when pasture and water availability is better. Pastoralists are reluctant to sell these groups of cattle. Their volume in the market would indicate the extent of stress among pastoral households (Coppock 1994).

The second type of domestic trade is with the adjacent highland farmers. Cattle are also more important in this market than other types of livestock. The major types of livestock traded are young male cattle for draught. The Somali pastoral groups sell to farmers in Hararghe highlands and the southern pastoral groups sell to highland farmers in Sidamo area. The third includes trade with urban consumers, feedlot owners, butchers, and official exporters. Cattle, sheep and goats are traded. But cattle are the most important especially in markets found in coffee growing areas of Sidamo, feedlot centres in Nazareth and its surroundings.

External markets are both official and unofficial (illegal). The unofficial external markets are the most important outlets rather than other options for live animals originating in eastern and southern borderlands. Despite the government's attempt to ban, several factors facilitated this unofficial trade with the neighbouring countries. One is geographical advantage i.e., proximity to the border towns of neighbouring countries. Second are cultural and ethnic ties of people living on both sides of the border. The third factor is the existence of poor interaction between the central highlands and the periphery lowlands that forced the lowlanders to use external markets both for their sales of livestock and purchases of basic items. Finally, policy related factors that were in place in different time periods such as neglect of the pastoral sector in mainstream development programs and inappropriate policies that discouraged official purchase in commercial scale for both domestic consumption and export.

In the border trade, livestock are trekked to the border towns and are sold to traders of the neighbouring countries. The border is crossed on hoof and animals sometimes seem grazing when crossing the border. Trekkers do not use major roadside routes. Instead several frequently changing routes are used to avoid customs confiscations. Once the border is crossed, motorized transport is used. All types of livestock are traded and for camels it is the only outlet.

There is no reliable information regarding the amount of the unofficial livestock flow from Ethiopia to its neighbours. Different studies indicate different estimates of livestock smuggled to the neighbouring countries annually. Estimates by Gebreselassie *et al.* (1998) show the volume of unofficial livestock trade from Ethiopia at 260,000 cattle and 1.2 million sheep and goats. Steffen *et al.* (1998), based on estimates of earlier studies, show that the livestock originating from Ethiopia and exported by Somalia through Berbera amounts to 60 to 80 per cent. Tegegne *et al.*,

(1999) estimate shows that about 35-50 thousand cattle, more than 100,000 sheep and goats and about 10,000 camels were smuggled to Kenya

Table 1. Cross-Border Markets for Eastern, Southern and South-eastern Borderlands of Ethiopia

Region in Ethiopia and pastoral groups	External Markets	Data Source
Northeast (Afar and Issa-Somali pastoral groups)	Dikel, Yebuki and Djibouti (Djibouti)	OSSREA Survey, 2000
East (Jijiga Area, Different clans of Somali)	Berbera, Borama, Bosasso Hargessa (Somalia)	Gebremariam, 1996; Steffen et al. (1998): Little, 1996; OSSREA Survey, 2000
South (Borana, Geri, Burji, Gabra and Dasenetch pastoral groups)	Mandera, Moyale, Nairobi, Ramu, and Thakaba (Kenya)	Gebremariam, 1996; Little, 1996; and Tegegne et al. (1999)
Southeast (Somali clans including Degodi, Gerimero and Marehan)	Mandera and Ramu (Kenya) Baidoa and Mogadishu (Somalia)	Little 1996; Tegegne, et al. (1999);

The importance of cross-border markets to pastoralists of eastern and southern regions could also be shown by other indicators. These include the market shed boundary between domestic and cross-border markets. The market shed boundary in these regions is found near domestic markets implying that most of the area is linked to cross-border markets. Domestic price responses to different events in external markets would also indicate the importance of the cross-border markets. For instance, the livestock embargo by Saudi Arabia in 1998 reduced livestock prices by about 79 per cent in some places of eastern border area (Ahrens 1998, see also Annex 4, Fig. 2).

2.3. Market Channels

Livestock markets in the area can be classified into bush or local markets, primary markets, secondary markets, terminal markets or export markets. All these markets are held at least once in a week. The classification is based on market participants in the trade, volume of livestock traded in a given period, and distance from pastoralist areas.

Bush or local markets are found near the pastoralist areas. Participants of these markets include pastoralists, brokers and traders. Brokers facilitate selling and buying by mediating the traders' price offer with the pastoralists' expectation. When compared to other markets, the participation of pastoralists is the highest in these markets. The transaction is cash based. Animals bought at these markets are trekked to higher level markets. Some pastoralists also move unsold animals to the next primary and secondary level markets.

The next are primary and partly secondary markets that are located in urban centres.[1] In these markets, the participation of pastoralists start to decline and the transaction is with collectors (small traders) and big traders who buy animals for further re-sale. Animals bought are moved to terminals or export markets found in the neighbouring markets or highland/central part of the country.

The livestock trade is both cash and credit based. The commodity (livestock) credit arrangement is based on trust established as a result of several interactions between traders found in consecutive market chain. Suppliers are, therefore, paid after the animals are sold by the client in other markets in the next level. This type of credit is important in the borderlands where formal financial sources are non-existent particularly to the unofficial livestock trade.

The long channel involved in livestock marketing is an important constraint for spatial integration of prices. Thus, improvement measures need to consider the various levels of the market chain. These include marketing costs incurred by pastoralists, small and big traders, transporters, holding ground caretakers, feed and water providers, veterinary drug suppliers, consumers, butchers, feedlot owners and exporters. At the higher level of the market chain more and more agents are included. In the case of re-export, costs of animal health inspectors, customs operations, shipping service providers and importers are important factors to the performance of the market (Steffen *et al.,* 1998).

2.4. Seasonality of Livestock Supply and Demand

Seasonality is an important feature of pastoral production. During dry seasons, in general, market supply of livestock increases, as pastoralists tend to sell more animals. One reason is that the supply of milk declines and hence some animals ought to be sold to buy food grains. Pasture and water shortage also exert pressure on quality of the herd and the extreme case of which is mass livestock death. Despite high need to sell during the dry seasons, animals fetch lower prices per head due to poor quality. The problem is more severe among cattle and sheep than among camels and goats. Drought and degradation of the rangeland forced to change the structure of the herd in favor of goats and camels in many places. Overall, this seasonal nature of market supply, being influenced by several factors, is a challenge for the development of livestock industry in the area.

From the demand side, there are some important seasonal events both in the country and abroad. Pasture and water availability is an important factor for intra-pastoral trade; livestock destined for domestic consumption are affected by coffee harvest season in southern highlands and religious holidays in several places of the country (Tegegne *et al.,* 1999). The official and unofficial export market, particularly to the Middle East, reaches its peak during Haj and Id. During these periods, the price of an export quality sheep in Somali Region increases up to 100 per cent (Shank 1997).

Coefficients of variation were calculated for different types of livestock in different markets of eastern and southern borderlands (Annex 2). The coefficients of variation for eastern borderlands in Jijiga area show that sheep and goat prices are more volatile in markets located near the border. These markets are supplied by feeder markets found inside the domestic territory. The values also show the price risks faced by different market agents. In this regard, pastoralists and small traders tend to face lower risk but get lower prices. On the other hand, larger traders who sell at higher prices face higher risk of price variation. This is due to the fact that these two groups of agents found at different but consecutive level of the market chain incur different sunk entry (moving animals to the market) and sunk exit costs (moving animals back to pasture). Larger traders are aware of this situation and hence tend to suppress their buying prices and adjust their costs and profits targeting the minimum possible price at selling markets found in the border areas. Thus, variabilities would indicate that there exist unexpected benefits for higher-level traders. Comparing the Jijiga and Hartishek prices, the latter exhibited more peaks in different time periods (Annex 4, Fig. 2). The trend is similar but the variation between local and cross-border market prices is narrower in the case of southern borderlands (Annex 4, Figs. 3 and 4).

2.5. Market Integration

The purpose of testing market integration is to determine appropriate intervention of price stabilization. In spatially integrated markets, price movements are transmitted across markets and commodities. Therefore, price stabilization measure, when needed, at one central market, is sufficient. On the other hand, if markets are segmented, selective intervention that is appropriate to each market area is required. Markets in developing countries are suspected of fragmentation and spatial oligopoly pricing. Thus, a number of recent studies have addressed the issue of testing empirically the degree of market integration (Sadoulet and de Janvry 1995). Two techniques can be used to test the existence of spatial market integration. The simplest technique is to test the linear association using correlation.

Correlation tests of livestock prices were undertaken across the transect of livestock markets in eastern and southern borderlands. The case of southern border markets is calculated based on the GTZ/BLDP monthly data collected during July 1997 and March1999. From the southern part, Moyale (Kenya) is taken as a central market and Negelle and Dubluk (Borana area) as feeder markets to Moyale. Moyale is the largest transit site for unofficial livestock trade in the Ethiopia-Kenya border. From the eastern side, Jijiga and Kebribeyah are feeder markets to Hartishek and Teferiber markets. Darwenaji is another border market site supplied from Gursum area.

Correlation results of monthly prices and first differences are presented in Annex 1. The results show that markets in southern borderlands are not integrated to cross-border markets. However, markets in eastern borderlands (Jijiga area) are integrated to cross-border markets in Somaliland. The results are found responsive to distance.

A more powerful approach is to model price determination across markets. This takes time series econometric models and identify long run and short run impacts of the central market (deficit region) on the peripheral markets (surplus region) (Sadoulet and de Janvry 1995). According to Ravallion (1986), an econometric model of a spatial market structure is specified assuming that there is a group of local (feeder) markets and one central market. Thus, the historical price of the commodity in central market determines local price formation. Algebraically, the spatial price determination model is given by:

$Pr = Pr\ (P1,\ldots,Pn,\ Xr)$ central market price [1]

$Pi = Pi\ (Pr, Xi)$ i=1,...n feeder markets' prices [2]

where *Xr* and *Xi* are market specific seasonal and exogenous variables which affect price formation in that particular market. According to Sadoulet and de Janvry (1995), for estimation purposes, the dynamic structure of the feeder market price equations is specified explicitly, as a function of past prices with a general structure of *l* lags as follows

$$P_{it} = \sum_{j=1}^{l} \alpha_{ij} P_{i,t-j} + \sum_{j=o}^{l} \beta_{ij} P_{r,t-j} + \gamma_i X_{it} + \varepsilon_{it},\ \text{i=1,...,n} \qquad [3]$$

The hypotheses are:

1. There exists market segmentation: present and past central market prices do not influence the *i*th local market, if $\hat{a}_{ij}=0$, j=1,...*l*.

2. There is short-run market integration: a price increase in the central market is fully and immediately passed on the *i*th market if $\hat{a}_{i0}=1$, $\hat{a}_{ij}=\acute{a}_{ij}=0$, j=1,...*l*.

3. There is long-run market integration: a permanent price change in the central market is fully passed over time to the feeder markets, but potentially through lagged effects. Solving equation [3] for the long-run equilibrium change dP_i due to a change dP_r in the central market price gives:

$$dP_i = \sum_{j=1}^{l} \alpha_{ij} dP_i + \sum_{j=0}^{l} \beta_{ij} dP_r \ \text{ or } \ dP_i = \frac{\sum_{j=0}^{l} \beta_{ij}}{1 - \sum_{j=1}^{l} \alpha_{ij}} dP_r$$

The corresponding test for long-run market integration is thus: $\sum \alpha_{ij} + \sum \beta_{ij} = 1$

If there is only one lag, the feeder market price equations simplify to:

$$P_{it} = \alpha_i P_{i,t-1} + \beta_{i0} P_{rt} + \beta_{i1} P_{r,t-1} + \gamma_i X_{it} + \varepsilon_{it} \qquad [4]$$

which can be written in first differences as:

$$\Delta P_{it} = (\alpha_i - 1)(P_{i,t-1} - P_{r,t-1}) + \beta_{io}\Delta P_{rt} + (\alpha_i + \beta_{io} + \beta_{i1} - 1)P_{r,t-1} + \gamma_i X_{it} + \varepsilon_{it} \quad [5]$$

Equation [5] relates the change in local price to past spatial price differentials, the current change in central market price, past central price, and market specific exogenous variables. To reduce the problem of multicollinearity the difference equation [5] is estimated (rather than the price equation [4]). The tests of market integration (in equation [5]) are then given as:

Segmentation: $\hat{a}_{i0} = \hat{a}_{i1} = 0$
Short-run integration: $\hat{a}_{i0} = 1$, $\hat{a}_{i1} = \acute{a}_i = 0$
Long-run integration: $\acute{a}_i + \hat{a}_{i0} + \hat{a}_{i1} - 1 = 0$

To test the above hypotheses on livestock prices across markets, adequate time series data was collected only for eastern markets by SAVE the Children UK. Among these markets we selected Jijiga and Hartishek based on distance. However, due to large missing values in data series collected at Jijiga town, Kebribeyah remained to be the next possible option. Livestock bought at this market are trekked to Hartishek for onward resale. Hartishek is one of the most important livestock route to Somaliland and ultimately to Saudi Arabian markets. Before the 1998 livestock embargo by Saudi Arabia (in normal years), about 800,000 animals (70% small stalk, 20% cattle and 10% camels) used to pass annually through Hartishiek (Ahrens 1998:6). The results are given by tables 2 and 3.

Table 2. Regression Results for the Determination of Male Goat Price in Kebribeyah

Variable Description	Var. Symbol in Eq. 5	Coef.	Std. Error	T	Sig.
Past price differential (between Kebribeyah and Hartishek)	$P_{i,t-1}$-$P_{r,t-1}$	-0.546	0.129	-4.245	0.000
Change in log of Hartishek goat price	ΔP_{rt}	0.392	0.115	3.413	0.001
Lagged Hartishek Price	$P_{r,t-1}$	-0.287	0.090	-3.185	0.002
Constant		3.309		3.153	0.003

RSq.=0.343, R_Bar Sq=0.306, F=9.068(0.000).

Table 3. Regression Results for the Determination of Male Sheep Price in Kebribeyah

Variable Description	Var. Symbol in Eq. 5	Coef.	Std. Error	T	Sig.
Past price differential (between Kebribeyah and Hartishek)	$P_{i,t-1}$-$P_{r,t-1}$	-0.479	0.123	-3.886	0.000
Change in log of Hartishek goat price	ΔP_{rt}	0.411	0.112	3.664	0.001
Lagged Hartishek Price	$P_{r,t-1}$	-0.139	0.072	-1.928	0.059
Constant		1.592	0.851	1.870	0.067

RSq.=0.324, R_Bar Sq=0.285, F=8.312(0.000).

Similar to correlation tests, regression results show that there exists weak spatial integration between livestock market centres in eastern borderlands. Hence, feeder market prices respond, but weakly, to past price differentials, change in prices of the boarder market and its own market past prices. Accordingly, market segmentation is rejected, i.e., $\hat{a}_{i0}$ and $\hat{a}_{i1}$ have non-zero values.

The result further shows that the performances of goat and sheep prices are similar. Taking into account the distance involved between these two market centres, it is difficult to conclude that the same performance holds for a number of livestock markets that are located very far from the border areas. As indicated earlier, animals sold at these border markets are transported to Hargessa and finally to Berbera for re-export to the Middle East (Steffen et al., 1998). A complete analysis of spatial market integration, therefore, needs to investigate the relationship between domestic prices and prices in Hargessa and Berbera.

2.6. Marketing Costs

The structure of marketing costs could suggest intervention areas and priorities at various levels required to minimize costs and improve the integration across markets in the area. In Table 4, we compare marketing costs in eastern and southern routes destined to Jeddah, Saudi Arabia and Nairobi, Kenya, respectively. Due to absence of data on the same type of livestock, the comparison is between cattle and sheep. Therefore, only the percentages are considered to provide a rough indication on the importance of the various elements of marketing costs.

Table 4. Marketing Costs and Profits from Unofficial Trade of Export Quality Livestock from Southern and Eastern Ethiopia to Kenya and Somaliland, Respectively

Cost Item	Cattle from Ethiopia to Kenya Negelle to Nairobi Based on Tegegne et al, 1999		Sheep from Ethiopia to Saudi Arabia through Somaliland Based on Shank, 1997	
	Birr	% of selling Price	Birr	% of selling Price
Purchasing price	950	43.98	150	42.86
Market Fees, feed, water, veterinary drugs	25	1.16	4	1.14
Brokerage Fees	30	1.39		
Transport				
Trekking	25	1.16	10	2.86
Truck	355	16.44	4	1.14
Shipping	-	-	42	12.00
Port Tax (Berbera)	-	-	49	14.00
Death loss (5%)	108	5.00	18	5.00
Total Costs	543	25.13	127	36.28
Selling Price	2160	100.00	350	100.00
Gross Profit	1617	74.86	223	63.71
Net Profit	667	30.87	73	20.86

Transport cost is the most important in both cases. The second important component is loss due to quality deterioration, death, theft and disappearance in the bush. Ahrens (1998) estimates these losses to be up to 5 per cent of the total value. These losses are incurred due to inconvenience in transportation arrangements. These would include long distance trekking to use unofficial routes that are beyond the reach of customs controllers in the border area. This also increases the number of losses due to theft and disappearance in the bush. After the border is crossed, poor facilities in motorized transportation will also contribute to quality deterioration.

The broker charges both the seller and the buyer. The role of the broker is to facilitate the price negotiation and is paid when the transaction is effected. Live weight-based selling and buying is almost non-existent. Therefore, in the absence of standardization and the importance of personal judgment, the use of brokers to facilitate the negotiation is vital. In some cases, brokers also ensure that the seller is a legitimate owner of the animal, i.e. that the animal was not stolen.

Other groups of costs such as feed, water, veterinary drugs are important at higher level of markets when animals are moved for onward resale. Absence of holding facilities along cross-border trade routes has important implications to the peromance of these costs. Past pastoral development projects constructed holding facilities following the domestic routes only.

In Table 3, we see that the marketing cost structures of the two destinations are similar. However, since most of the animals smuggled to Somalia (Somaliland) are exported to the Middle East, it is important to identify other cost items by pushing the destination further to these places. Hence, other costs such as shipping, port taxes and veterinary inspections as well as port rejections due to poor quality are important cost components. Therefore, the performance of the export infrastructure in Somalia would influence the price received by different agents found at all levels including traders and pastoralists in Ethiopia.

3. IMPLICATIONS ON FOOD SECURITY

Food security among the pastoral households is production- and trade-dependent. This relationship is presented in a framework (Fig. 1[2]). Accordingly, pastoralists need to keep livestock for milk and meat consumption. In addition, pastoralists need to be involved in trade to sell part of their animals and purchase food. This is particularly important to smooth consumption during the dry season when milk production declines. Pastoralists would also reduce climatic and disease risk from increased involvement in livestock trade. This would reduce high livestock mortality rates (Bailey *et al.*, 1998). In Fig. 1, the relationship is implicit in the causation that runs from saving and investment to physical resources.

Live animals sale is the major source of cash income. However, with increased urbanization in the area, poor pastoral households are also involved in milk trade. Tegegne et al. (1999) indicated that pastoralists found near the Ethiopia-Kenya border sell milk in Kenyan border towns including Mandera, Moyale, Ramu and Thakaba. Regarding crop production, some agro-pastorals cultivate food crops mainly along the river basins.

Incomes from non-pastoral employment are rare. The few activities available in eastern and southern pastoral areas include selling of fuel wood, charcoal and Arabian gum. Some, especially in eastern border area, do participate in contraband import trade. Because of lack of alternative means of employment and lax in customs control, many people are joining this contraband trade. This is also partly facilitated by the unofficial livestock export to the neighbouring countries.

Proceeds of marketed surplus and income from off-farm activities add up to total cash income. Part of the total cash income goes to savings and non-food expenditure and part of it is used to buy food. In a given period, the food security status of pastoralists is given by own production of milk and meat, food purchase, stocks and food transfers.

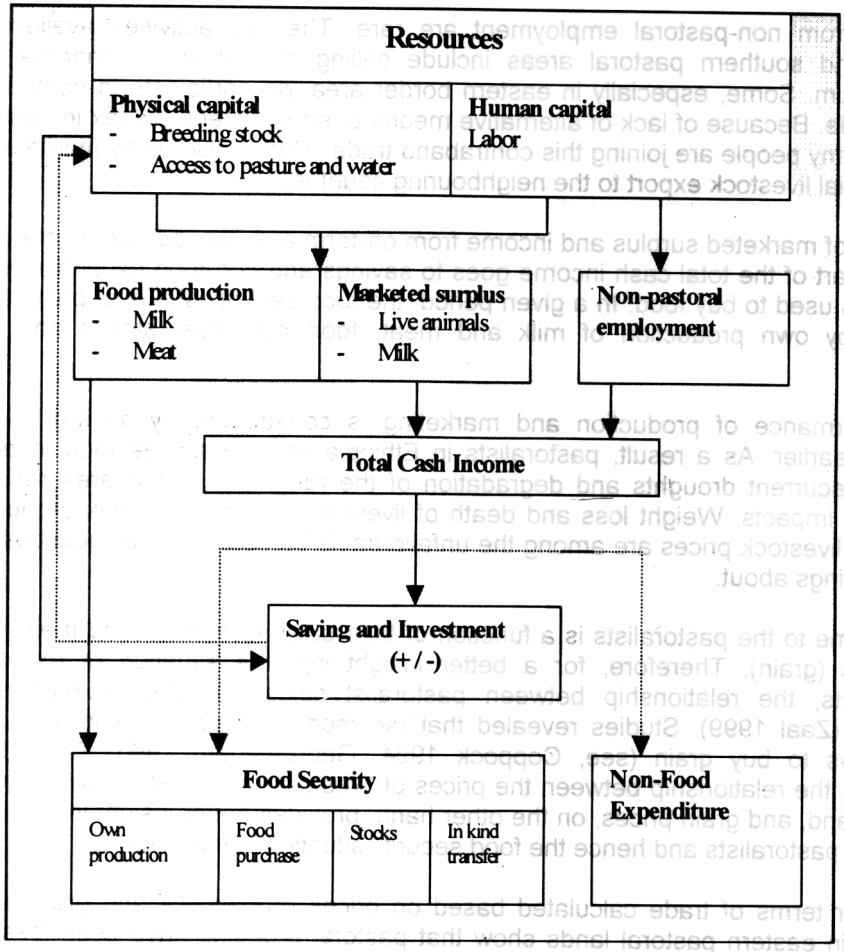
The performance of production and marketing is constrained by several factors indicated earlier. As a result, pastoralists in Ethiopia are among the food insecure groups. Recurrent droughts and degradation of the rangeland in the area result in disastrous impacts. Weight loss and death of livestock, reduction in milk production and fall in livestock prices are among the unfavourable immediate consequences that drought brings about.

Real income to the pastoralists is a function of their sales (livestock) and their major purchases (grain). Therefore, for a better insight into the situation of exchange entitlements, the relationship between pastoralist sales and their purchases is important (Zaal 1999). Studies revealed that the most important reason for selling livestock is to buy grain (see, Coppock 1994; Gebremariam 1996; Zaal 1999). Therefore, the relationship between the prices of livestock and livestock products, on the one hand, and grain prices, on the other hand, provides better insight into the real income of pastoralists and hence the food security situation in the area.[3]

The barter terms of trade calculated based on prices of livestock and grain prices collected in eastern pastoral lands show that pastoral products have been less and less paying against purchases of basic items (Annex 3). The two most important grain used by pastoralists in eastern borderlands are maize and rice. Although pastoralists grow some maize, it is not enough to cover their requirements. Therefore, most of their needs are met by purchases from central parts of the country. Rice is unofficially imported from Asian countries through Somalia. Annex 3 compared the value of livestock (sheep and goats) and milk in terms of maize and rice. The values show that, during 1995-1999, there is a general terms of trade decline in all sample markets

except little improvement in 1997. For instance, on average, in the five markets, one export quality male goat used to fetch more than 100 kg of maize. After five years, in 1999, the same item could only be exchanged for less than 50 kgs. During the same period, the price of sheep declined from 39 to 31 kgs of rice.

Fig. 1 Production, Marketing and Food Security in the Pastoral Areas of Ethiopa



In Annex-4, terms of trade between livestock and maize is calculated for three markets in southern pastoral area. The data used here by Tegegne *et al.* (1999) has been compiled by GTZ/BLDP during 1997-1999. Overall, the terms of trade show improvement from during 1997 and 1998 and again a decline from 1998 to 1999. In 1998, livestock prices declined in many parts of Eastern Africa as a result of the

embargo. However, unlike markets in Jijiga area, the terms of trade between livestock and grain (maize) in this area were favourable when compared to the 1997 values. Several reasons might have contributed to this performance. One is that the southern part is nearer to the grain producing highlands than the eastern part. In addition, relief aid operation in response to localized droughts is more organized in these areas. The other possible factor is that most of the livestock sold from southern borderlands are for consumption in Nairobi. But most of the animals trekked to Somalia are re-exported to the Middle East.

In general, the terms of trade show that there is a decline in eastern and southern pastoral lands. The situation, however, is different in different parts. While livestock markets are relatively more integrated in eastern borderlands, the terms of trade decline is worse when compared to the southern area. This suggests that interventions aimed at improving pastoralist's real income need to consider favourable market access to both their sales and purchases.

4. CONCLUSIONS

The study is about market access and food security in pastoral areas of Ethiopia. It is found that, with increasing tendency in trade involvement, both livestock and grain marketing systems bear important implications to the development of the pastoral sector. In the eastern and southern borderlands, external markets are more important than those of the domestic options. However, the markets are poorly integrated and the benefit distribution among different agents in the marketing chain is unfavourable to small traders and pastoralists.

Several factors appear relevant in the performance of livestock prices in the area. These include high transport costs, lack of market information, seasonal variation in quality of livestock and insecurity. The other important factor influencing the performance of livestock prices in the area is the livestock embargo by ultimate importing countries in the Middle East. These countries ban livestock imports from East Africa when there are indications of Rift Valley Fever in the pastoral areas. This epidemiological shock affects both the official and unofficial trade with a consequent substantial drop in the livestock prices.

The importance of the unofficial cross-border markets and at the same time skewed benefit distribution in favour of agents in the upper ladder would suggest intervention to improve spatial integration of local markets to border markets. The establishment of official trade would require, among other things, negotiations with neighbouring countries regarding the benefit distribution, the involvement of both countries' traders in the business, and currencies. In the case of Somalia (Somaliland) the negotiation would also include the use of its ports by Ethiopian exporters. However, the absence of recognized government in Somaliland and insecurity in the region remain to be major constraints for some time.

NOTES

[1]The distinction between primary and secondary is ad-hoc. But in most cases, follow the previous administrative structure of the country: Wereda and Awraja or sub-district and district, respectively (Gebremariam 1996).

[2] Some of the causal links indicated in the framework are based on Chavas *et al.* (1999). ***Livestock Trade and Food Security in the Kenya/Borderlands.*** Mimeograph. Binghamton, NY: Institute for Development Anthropology.

[3] The barter terms of trade compares only unit prices and hence fail to capture wealth effect. In this regard, the TOT doesn't indicate the amount of livestock sold. More insight would have also been provided if the analyses were made in terms of calories (Zaal 1999).

REFERENCES

Ahrens, Joachim D. (1998), Cessation of Livestock Exports Severely Affects the Pastoralist Economy of Somali Region. Addis Ababa: Emergencies Unit for Ethiopia, United Nations Development Program.

Bailey, DeeVon, C.B. Barret, P.D. Little and F. Chabari (1999), Livestock Markets and Risk Management Among East African Pastoralists: A Review and Research Agenda, GL-CRSP Pastoral Risk Management Project (PRMP), Technical Report 03/99, (http://glcrsp.ucdavis.edu/project_subpages/PRMP_folder/PRMPPrpt4.html)'.

Chavas, Jean-Paul, Michael Roth and Alex Uriate (1999), Livestock Trade and Food Security in the Kenya/Borderlands. Mimeograph. Binghamton, NY: Institute for Development Anthropology.

Coppock D. Layne (1994), The Borana Plateau of Southern Ethiopia: Synthesis of Pastoral Research, Development and Change, 1980-1991. ILCA (International Livestock Centre for Africa), Addis Ababa, Ethiopia

Desta, Solomon (1996), Past and Present Pastoral Development Interventions in Ethiopia, in Sue Edwards, and Tafesse Mesfin, (eds.) Conference on Pastoralism in Ethiopia: Full Papers. Addis Ababa: Ministry of Agriculture.

Fafchamps, M. and S. Gavain (1998) 'The Determinants of Livestock Prices in Niger', **Journal of African Economies,** 6(2): 366-405.

Gebremariam, Sentayehu (1996), Livestock Marketing in the Pastoral Areas of Ethiopia,' in Sue Edwards, and Tafesse Mesfin, (eds.) Conference on Pastoralism in Ethiopia: Full Papers. Addis Ababa: Ministry of Agriculture.

Gebreselassie, Nega, Solomon Desta and Simeon K. Ehui (1998), A Review of Economic Contribution of Pastoral Production Systems to the National Economies in Sub-Saharan Africa. Paper presented at the Workshop on A Network for the Promotion of Rational Use of Rangelands and the Development of Fodder Crops in the Context of the Regional Action Program to Combat Desertificatiion in Africa, International Livestock Research Institute (ILRI) Addis Ababa, Ethiopia. 4-7 August.

Hijort af Ornäs, A. (ed.) (1992). ***Security in African Drylands: Research, Development and policy.*** Research Program on Environment and International Security, Uppsala University, Uppsala.

Hogg, Richard. (1996), Government Policy and Pastoralism: Some Critical Issues in Sue Edwards, and Tafesse Mesfin, (eds.) Conference on Pastoralism in Ethiopia: Full Papers. Addis Ababa: Ministry of Agriculture.

Little, Peter D. (1996), Cross-Border Livestock Trade and Food Security in the Somalia and Northeastern Kenya Borderlands. A Research Report of the BASIS-CRSP and OSSREA Project on Cross-Border Trade Food Security in the Horn of Africa, Binghamton, NY: Institute for Development Anthropology.

OSSREA (2000), OSSREA Survey 2000. Unpublished. Addis Ababa.

Ravallion, Martin. (1986) 'Testing Market Integration,' ***American Journal of Agricultural Economics***, 68(1).

Sadoulet, E. and A. de Janvry (1995). ***Quantitative Development policy Analysis.*** The Johns Hopkins University Press.

Shank, Robert (1997). Livestock Marketing and Cross-Border Trade in the Southeast of Ethiopia. Addis Ababa: Emergencies Unit for Ethiopia, United Nations Development Program.

Steffen, P., A.H. Shirwa, M.G. Kayad, and S.I. Addou (1998), The Livestock Embargo by Saudi Arabia: A Report on the Economic, Financial and Social Impact on Somaliland and Somalia. Famine Early Warning Systems-Somalia.

Tegegne Teka, Alemayehu Azeze and Ayele Gebremariam (1999), Cross-Border Livestock Trade and Food Security in Southern and Southeastern Borderlands of Ethiopia. OSSREA Development Research Report Series no.1, Addis Ababa, Organization for Social Science Research in Eastern and Southern Africa.

Zaal, F. (1999), Pastoralism in a Global Age: Livestock Marketing and Commercial Activities in Kenya and Burkina Faso. Amsterdam, Netherlands: Thela thesis.

ANNEXES

ANNEX-1: CORRELATION RESULTS OF LIVESTOCK PRICES IN PASTORAL AREAS

Annex 1 Table 1: Correlations of Male Sheep Prices in Jijiga Area

	Hartishek	Kebribeyah	Teferiber	Darwenaji
Kebribeyah	.762**			
Teferiber	.667**	.814**		
Darwenaji	.752**	.777**	.815**	
Jijiga	.330*	.256	.092	.091

N=51 for Jijiga town and 57 otherwise.

Annex 1 Table 2 Correlations of Male Goat Prices in Jijiga Area

	Hartishek	Kebribeyah	Teferiber	Darwenaji
Kebribeyah	.649**			
Teferiber	.711**	.749		
Darwenaji	.679**	.677	.690**	
Jijiga	.275	.444**	.377**	.031

N=49 for Jijiga town and 57 otherwise.

Annex 1. Table 3. Correlations of Export Quality Cattle Prices in Borana Area

	Moyale	Negelle
Negelle	.291	
Dubluk	.358	.593**
	21	21

Annex 1. Table 4. Correlations of Male Goat Prices in Borana Area

	Moyale	Negelle
Negelle	.219	
Dubluk	-.173	-.081
N	21	21

* correlation is significant at 0.05 level.

** correlation is significant at 0.01 level;

ANNEX 2. ANNUAL AVERAGE PRICE OF LIVESTOCK, MILK AND GRAIN IN JIJIGA AREA, 1995-1999 (IN SOMALI SHILLINGS)

Annex 2. Table 1. Price of Male Goat per Head

Year	H/Shek	K/Beyah	T/Ber	D/Naji	Jijiga	Average
1995	150,692	119,333	133,806	125,833	95,557	126,025
	(0.19)	(0.15)	(0.22)	(0.13)	(0.10)	(0.14)
1996	132,021	122,500	110,420	107,875	102,274	115,018
	(0.18)	(0.14)	(0.26)	(0.20)	(0.08)	(0.17)
1997	135,583	125,290	130,938	99,375	117,278	121(,693
	(0.18)	(0.15)	(0.28)	(0.20)	(0.17)	(0.20)
1998	96,854	99,667	89,873	78,250	104,286	93,786
	(0.24)	(0.23)	(0.26)	(0.15)	(0.15)	(0.18)
1999	123,488	99,542	106,833	87,765	90,183	101,562
	(0.33)	(0.21)	(0.31)	(0.35)	(0.07)	(0.24)

Values in brackets are coefficients of variation calculated from monthly prices.

Annex 2. Table 2. Price of Male Sheep per Head

Year	H/Shek	K/Beyah	T/Ber	D/Naji	Jijiga	Average
1995	161,456	135,847	148,750	142,694	117,482	141,246
	(0.21)	(0.15)	(0.18)	(0.14)	(0.08)	(0.14)
1996	151,885	144,313	150,729	135,458	117,340	139,945
	(0.11)	(0.13)	(0.22)	(0.16)	(0.11)	(0.11)
1997	165,417	147,517	148,125	131,313	146,584	149,018
	(0.13)	(0.11)	(0.22)	(0.16)	(0.11)	(0.11)
1998	115,354	110,417	118,958	103,125	138,917	117,354
	(0.33)	(0.30)	(0.23)	(0.17)	(0.15)	(0.21)
1999	137,688	108,042	122,646	109,875	119,108	119,472
	(0.31)	(0.19)	(0.20)	(0.28)	(0.16)	(0.21)

Values in brackets are coefficients of variation calculated from monthly prices.

ANNEX 3. TERMS OF TRADE BETWEEN LIVESTOCK AND GRAIN

Annex 3. Table 1. Terms of Trade: Male Sheep to Maize

Year	H/Shek	K/Beyah	T/Ber	D/Naji	Jijiga	Average
1995	96	130	125	97	93	106
1996	94	116	97	82	77	92
1997	104	115	97	83	98	100
1998	55	67	60	58	92	65
1999	50	44	43	39	50	45

Values are in kilograms of maize.

Annex 3. Table 2. Terms of Trade: Male Sheep to Rice

Year	H/Shek	K/Beyah	T/Ber	D/Naji	Jijiga	Average
1995	45	40	42	43	22	39
1996	40	33	37	34	23	30
1997	47	35	40	36	34	39
1998	32	26	34	27	32	31
1999	40	27	34	28	27	31

Values are in kilograms of rice.

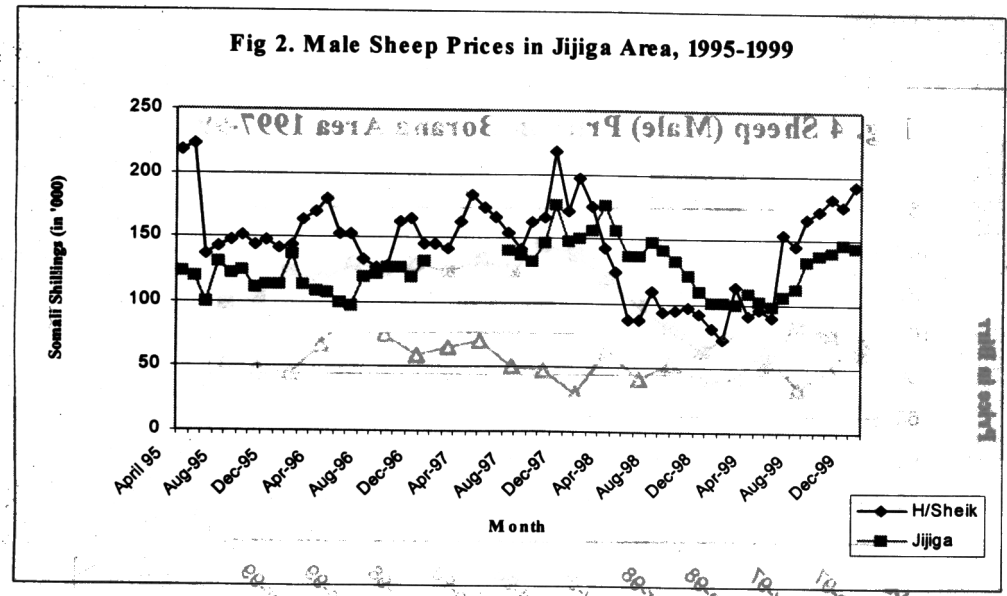
Annex 3. Table 3. Terms of Trade Between Livestock and Livestock Products and Maize in (Price of Some Selected Livestock and Milk in Maize for Selected Markets) in Southern Pastoral Area

Commodities	Negelle Market			Dubluk Market			Moyale-Kenya Market		
	July-Dec. 97	Jan-Dec.98	Jan. - Sept. 99	July-Dec.97	Jan-Dec.98	Jan. - Sept.99	July-Dec.97	Jan-Dec.98	Jan. – Sept.99
One Bullock	576	792	695	869	1149	807	959	1310	700
One Male Goat	52	57	42	102	106	66	105	184	81
One Female Goat	54	62	41	88	92	51	89	155	70
One Cup of Milk	n/a	0.63	0.6	0.79	0.7	0.56	N/a	0.92	0.55

Source: Tegegne et al (1999) based on GTZ/BLPDP, unpublished data. Values are in kilograms of maize.

ANNEX 4 PRICE TRENDS IN EASTERN AND SOUTHERN PASTORAL LANDS

Fig 2. Male Sheep Prices in Jijiga Area, 1995-1999



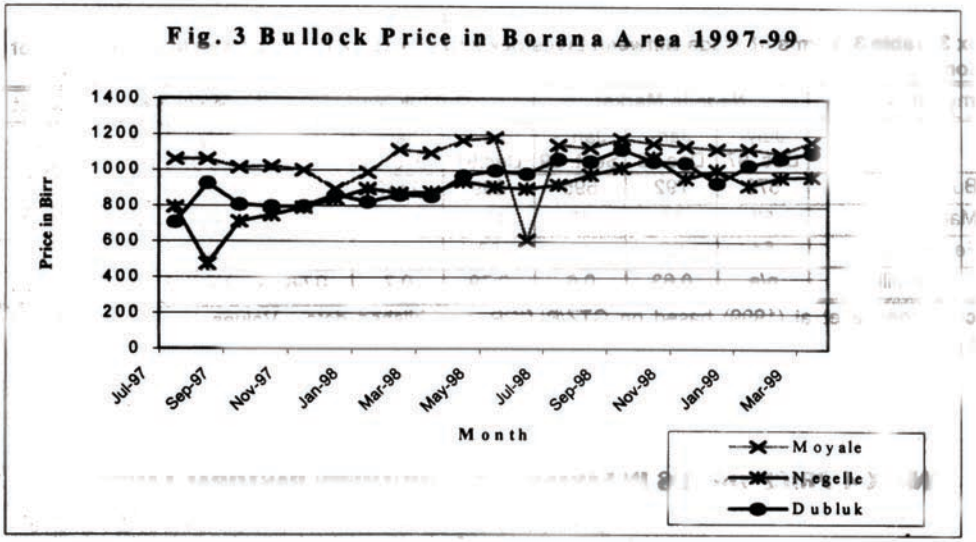


Fig. 3 Bullock Price in Borana Area 1997-99
Price in Birr
1400
1200
1000
800
600
400
200
0
Jul-97
Sep-97
Nov-97
Jan-98
Mar-98
May-98
Jul-98
Sep-98
Nov-98
Jan-99
Mar-99
Month
Moyale
Negelle
Dubluk

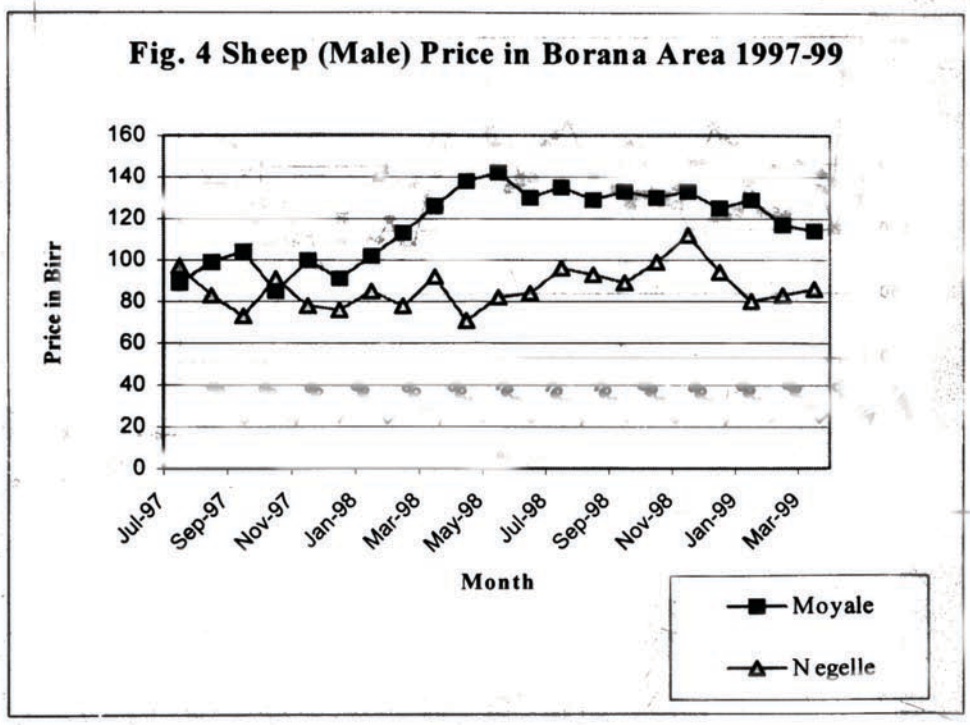


Fig. 4 Sheep (Male) Price in Borana Area 1997-99
Price in Birr
160
140
120
100
80
60
40
20
0
Jul-97
Sep-97
Nov-97
Jan-98
Mar-98
May-98
Jul-98
Sep-98
Nov-98
Jan-99
Mar-99
Month
Moyale
Negelle