

Value chain analysis of the cattle trade in Moyale, southern Ethiopia

An economic assessment in Oromiya Regional State

Zekarias Bassa and Teshale Woldeamanuel

Country Report

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Drylands and pastoralism

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This is one of a series of reports synthesising the findings of field research conducted by masters' degree students at Ethiopian universities who investigated the contribution of pastoral production to the national economy. The students developed the research to complement their degree studies, with support from the International Institute for Environment and Development and Tufts University.

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Acronyms

CGIAR	Consultative Group on International Agricultural Research
COMESA	Common Market for Eastern and Southern Africa
CSA	Central Statistical Authority
EIAR	Ethiopian Institute of Agricultural Research
ESAP	Ethiopia Society of Animal Production
FAO	Food and Agricultural Organization
ILRI	International Livestock Research Institute
IFAD	International Fund for Agricultural Development
LI	Lerner Index
MC	marginal cost

Glossary

birr	Ethiopian currency. Exchange rate US\$1=18.81 birr from October 2013 (www.oanda.com) can be applied to all costs mentioned in this report.
kebele	The smallest administrative unit in Ethiopia. It is part of a woreda , which in turn is part of a zone, which is part of a region.
woreda	A third-level administrative division in Ethiopia. A woreda.

Executive summary

We undertook a value chain analysis of the live cattle trade in Moyale woreda in Ethiopia's Borana zone to identify the major actors in the chain and their functions, the role of the cattle trade in pastoralist livelihoods and the constraints to improvement. The research, carried out with support from the International Institute for Environment and Development (IIED), was part of a Masters' degree research project at the School of Natural Resource and Environmental Studies, Wondogenet College of Forestry and Natural Resource, Hawassa University, Ethiopia. The study took place in three kebeles (the smallest administrative units), which we selected using secondary data and a literature review. We collected primary data from these three kebeles through a survey of 223 pastoralists, 25 traders and 14 brokers.

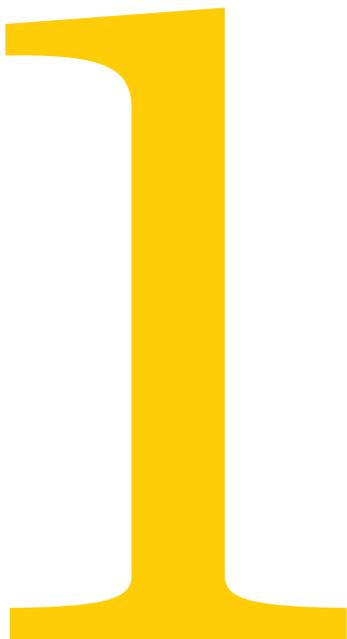
We identified the main market actors in the study area as producers, brokers, trekkers, truckers and traders, with pastoralist households supplying more than two cattle a year to market. The actors earn differing amounts from different cattle types. We found that the cattle trade supports the livelihoods of 6,727 households in Moyale and has a total economic value of nearly 44 million birr. The government collects less than 47,000 birr a year in tax revenue from the cattle trade. Most pastoralists think that tax collection is the government's only role.

We identified a range of formal and informal marketing channels. In the formal channel, producers receive a larger share of the total final price, but they sell for higher prices in the informal channel. Traders also earn a higher gross margin in the latter, and transportation costs are greater. A number of factors contribute to the continuation of the informal trade, such as entry barriers, distant marketing points, high trucking costs, seasonality of marketing, information asymmetries and unfriendly relations between actors. Brokers play a very critical role in perpetuating this situation.

As remedial measures, we anticipate that shortening the supply chain, forming cooperatives and linking producers to markets will optimise benefits for pastoralists and boost productivity. Market actors in general, and pastoralists in particular, would benefit from a stronger voice to advocate policy support for credit, the establishment of cooperatives and the development of market opportunities to optimise the use of cattle resources in the area.

Although formal cattle trading currently generates very little tax revenue, there is considerable potential for additional revenue generation through the redirection and/or formalisation of the informal route.

Introduction



1.1 Background and justification

The Borana pastoralists are known in Ethiopia as the main cattle suppliers for domestic consumption and international trade export. But the benefits they receive for their productive activities are constrained by lengthy marketing processes, high transaction costs, the informal cattle trade, over-exploitation by brokers, weak and unfriendly linkages between the major marketing actors and a lack of both market-oriented cattle production and modern cattle marketing channels. Cost-effective marketing channels and coordinated market chains are considered crucial in improving the competitiveness of cattle from pastoralist areas (Teklewold *et al.* 2009). These can reduce transaction costs among different actors along the chain.

Pastoralists in the Borana area of the Oromia region have traditionally marketed their cattle across the border with Kenya. Cattle traders who trek cattle from Ethiopia to Kenya do not pay tax to the Ethiopian government, so this is regarded as an informal market channel. Cross-border trade in pastoralist areas is critical to regional economies and to Ethiopia's national economy. But a lack of understanding of the pastoralist economy has led to the underestimation of the economic benefits that it could generate for the Ethiopian economy, and its potential for growth. For a long time, widely-held beliefs that pastoralism is an archaic, economically inefficient, chaotic and environmentally destructive form of land use have prevented policy support for pastoralism. It is only relatively recently that policymakers have realised that such views were not evidence-based, and that it would be possible to redirect revenue from pastoralism that is being lost across the border to contribute to the national economy (COMESA 2009).

For the past five years, a formal marketing channel has been developing for cattle from the Borana area flowing north to the Ethiopian capital. In this channel, traders pay taxes to the Ethiopian government and provide cattle for restocking, slaughtering and packaging by private abattoir facilities with sales to international hotels, Ethiopian Airlines, universities, supermarkets and shops, official live animal exports through the central Ethiopian markets and unofficial live animal exports (Legese *et al.* 2008). Improving both the understanding of this channel and its performance could further enhance its contribution to development in the Borana area and to the national economy.

This paper presents a synthesis and discussion of key findings on pastoralist cattle value chains in the Borana area. The study took place with support from IIED as part of a Masters' degree research project at the School of Natural Resource and Environmental Studies, Wondogenet College of Forestry and Natural Resource, Hawassa University, Ethiopia. The research findings provide updated scientific information for pastoralist sector development and the development of policies that will optimise both production and productivity.

1.2 Objectives

The study's overall objective is to undertake a value chain analysis of the cattle trade in the pastoralist area. Its specific objectives were to:

- understand the core functions and main actors in the cattle trade value chain
- estimate the economic value of cattle trade in the area
- identify major constraints and opportunities in the cattle value chain, and
- estimate the market margin in the cattle trade.

1.3 Value chain analysis

The livestock value chain can be defined as the full range of activities required to bring a product – for example, live animals, meat, milk, eggs, leather, fibre or manure – to its final consumers, passing through the different phases of production, processing and delivery. It can also be defined as a market-focused collaboration among different stakeholders who produce and sell value-added products (IFAD 2007). Our value chain analysis of the cattle trade provides up-to-date information and identifies opportunities and challenges for producer communities, which can help improve productivity.

We used the Lerner Index (LI) to analyse the value chain. This index describes a firm's market power (Elzinga and Mills 2011), defining the degree of monopoly in the market according to the difference between the firm's price (P) and its marginal cost (MC) at the profit-maximising rate of output. According to Lerner, a bigger difference between P and MC means greater monopoly power. It is defined by the equation:

$$L = \frac{P - MC}{P}$$

where: P = market price set by the firm and MC = the firm's marginal cost.

The Lerner Index ranges between zero and one.

- When $P=MC$, the $LI=0$. The firm has no pricing power and there is perfect competition.
- LI closer to one indicates the higher mark-up of price over marginal costs, and hence market power for the firm (Ariss 2010).
- $LI=1$ indicates a monopoly where there is only one firm.
- If there are a very small number of firms, this is referred to as an oligopoly.

The Lerner Index is an inverse measure of competition – in other words, a greater Lerner Index means lower competition (Pruteanu-Podpiera *et al.* 2007).

In this study, we use the Lerner Index to examine the market chain that brings livestock from Moyale to export through informal channels.

Methodology

2

2.1 The study area

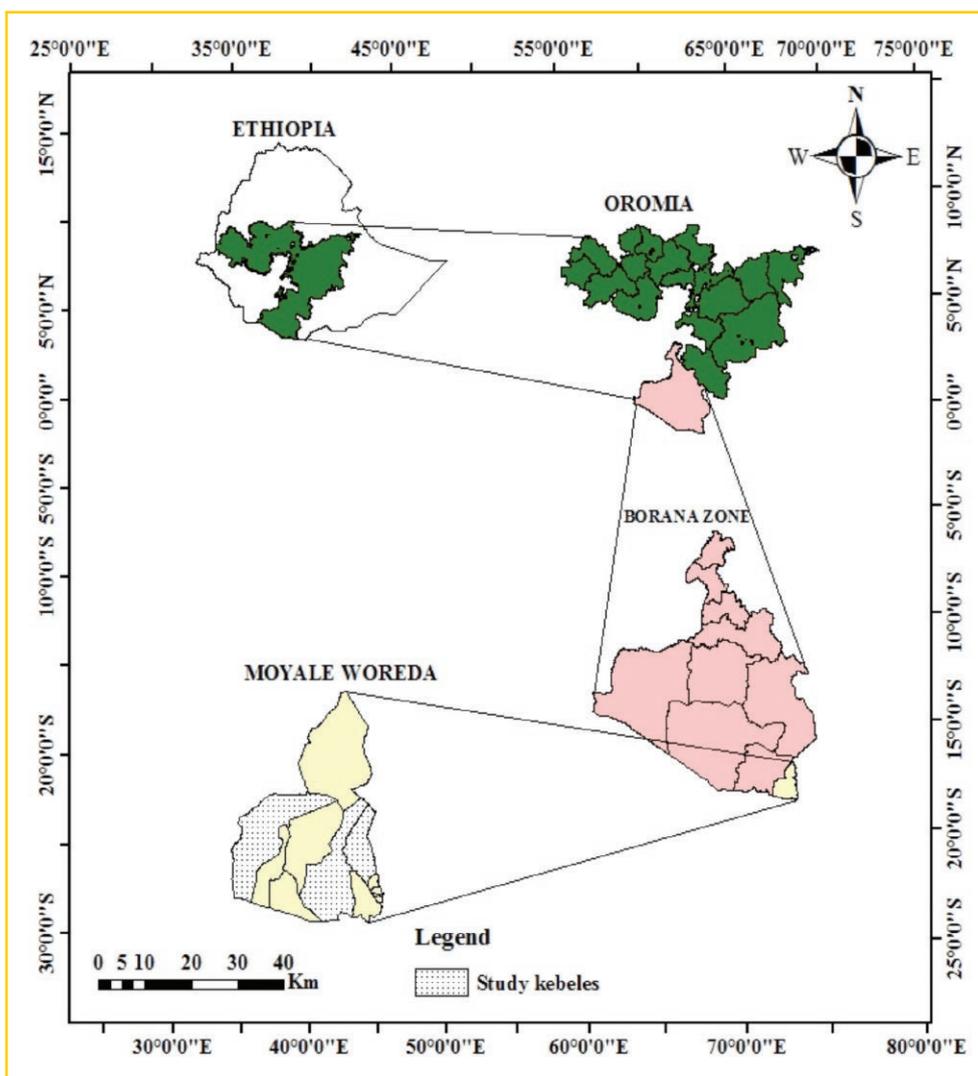
The Borana administrative zone is in Oromia Regional State, about 570km south of Addis Ababa. The capital of Borana zone is Yabello. The zone is made up of 13 *woredas* (districts) and includes two agro-ecological zones: the semi-arid lowlands to the south and the more humid lands at higher altitudes to the north (Teklu and Tebikew 2014).

Moyale woreda is 770km south of Addis Ababa, has an area of 14,810km² and is divided into 18 associations, two of which are in Moyale Town (Desta *et al.* 2008). Moyale Town is split between two countries and straddles two of Ethiopia's regions. The larger part is in Ethiopia's Oromia and Somalia regions and the smaller part in Kenya. It is a busy market for the informal and formal trade of food commodities and livestock (FAO 2013).

The livestock population in Borana zone has been estimated at around 1,048,909 cattle, 396,819 sheep, 989,691 goats and 62,789 camels (CSA 2012). In Moyale woreda, the pastoralist development officers estimated the livestock population in 2014 at 52,280 cattle, 58,860 goat, 14,095 sheep, 17,185 camels, 4,626 donkeys, 21 mules, 3 horses and 17,606 poultry. Our study found that there are no cattle market cooperative organisations in the woreda.

In 2005,¹ the government collected less than 47,000 birr in tax revenue from the cattle trade in Moyale woreda. Due to the informality of the sector, only a small proportion of the total number of cattle marketed from and in the area contributed to this income. The tax income collected from the formal cattle market varies across the seasons (see Figure 2). In 2005, the least tax was collected in August (489 birr) and the most in April (9,668 birr). Average monthly revenue from the cattle market was 3,894 birr. Cattle are marketed every day except Sunday.

Figure 1. Map of the study area



¹ In this section, we refer to the Ethiopian calendar year 2005, which spans the Gregorian calendar's 2012 and 2013. So 2005 refers to 2013 in the Gregorian calendar.

Figure 2. Exit tax revenue from cattle, 2005 EC/2013



2.2 Data collection

We used both secondary and primary data in this study. Journals, books, proceedings and publications from the Central Statistical Authority (CSA) and Ethiopia Society of Animal Production (ESAP) provided key secondary data. Primary data sources included interviews with pastoral households, traders, brokers and key informants. We collected data in the field between 1 October and 20 December 2013.

Through our literature review, key informant interviews and field visit assessments, we identified the main market chain actors operating at district level as Moyale Woreda Pastoralist Development Office and Moyale Woreda Pastoralist Cooperatives Office. We purposely selected and interviewed 25 traders and 13 brokers.

We used a two-stage sampling technique to select pastoralist households for interview, first selecting the representative kebeles – Maddo, Mado Miggo and Laga Sure – and households from these using a preliminary assessment of basic information about the woreda.

We determined sample sizes that were proportional to the total number of households in the area (after Yount 2006):

- 100 per cent for populations of 0–100 households
- 10 per cent for populations of 101–1,000 households

- 5 per cent for populations of 1,001–5,000 households
- 3 per cent for populations of 5,001–10,000 households, and
- 1 per cent for populations of more than 10,000.

Based on this technique, we interviewed 100 households from Maddo, 63 from Mado Miggo and 60 from Laga Sure. This represented 10 per cent of all pastoralist households in the three kebeles. We prepared and pre-tested structured and semi-structured questionnaires for pastoralists, traders and brokers operating in the market chain in the area.

Our study used descriptive statistical analysis to define the mean, mode, percentage and standard deviation of the important economic variables we collected on the households. We developed flow diagrams of the market chains showing how the market channels operate and identifying the strengths and weaknesses along the chains. We used Statistical Packages for Social Science (SPSS version 20) and Excel 2007 for a descriptive statistical analysis of the cattle trade's market margins in the various marketing. We used the Lerner Index to measure the market power of traders and determine whether the woreda's cattle market is monopolistic or competitive in nature.

Results and discussions

3

3.1 Roles of the main actors

Our study identified a number of roles in the cattle marketing trade for pastoralists, brokers, traders, hotel and restaurant owners, tax collectors, trekkers, truckers and consumers.

Pastoralist communities rear livestock, moving from place to place in search of pasture and water for their animals. Herding livestock is their primary economic activity. Some of their main duties and responsibilities, as identified by pastoralist households, include:

- supplying healthy and quality cattle at good selling prices (66 per cent)
- price-setting (19 per cent)
- providing market information (1 per cent)
- cooperative formation (1 per cent) and
- giving information on selling prices and setting the price for cattle (14 per cent).

Brokers are intermediaries between buyers and sellers in the cattle trade. Pastoralist households recognised the main functions of brokers as:

- facilitating the market processes – providing market information and creating agreement between producers and traders (20 per cent)
- communicating between sellers and buyers (35 per cent)
- setting prices (25 per cent)
- providing market information (13 per cent)
- running for their personal benefits (2 per cent)
- doing what is ordered by traders (3 per cent), and
- supplying cattle (2 per cent).

Small traders usually collect cattle from bush markets to sell on to medium and large traders. They may or may not have their own capital for marketing process. Their main functions include purchasing, price setting, giving final price, trekking, controlling the marketing process and providing market information. They usually buy cattle from pastoralists at the bush markets and sell to butchers, medium and large traders.

Medium traders buy cattle from small traders, brokers and pastoralists and sell them on to large traders who export formally and informally. Their purchasing capacity and price determination role is relatively higher than that of small traders and pastoralists, as they have their own and other large traders' capital for cattle marketing. Some of their main functions include buying, price setting and providing market information. They play a

more prominent role in determining prices than brokers, small traders and pastoralists do, but have less influence on this than large traders do.

Large traders usually buy cattle from small traders, brokers and medium traders to sell in both the formal and informal market. They sometimes give capital to other traders to buy cattle on their behalf. Some of their main functions include buying, price setting, market searching, controlling marketing processes, providing market information and exporting – both formally and informally. Large traders usually use trucks for transporting cattle and other actors consider them the ultimate source market information.

Tax collectors are individuals assigned by the government to collect taxes. Cattle taxation is the main duty and responsibility of the Moyale woreda's Trade and Revenue Authority. Their main functions, according to eight per cent of the pastoralists we interviewed, are collecting taxes, creating awareness, controlling illegal trade, providing market information and resolving conflicts between market actors. The remaining 92 per cent only recognised their tax collecting function, indicating that the cattle marketing system in the area is not functionally linked with governmental organisations.

Trekkers transport cattle from one point in the cattle marketing system to another. Traders confirmed that they use trekkers to transport cattle from the bush markets to the terminal market and trucking centres. All the traders employ at least two and at most five individuals as trekkers, paying them 50 birr to transport oxen, 40 for cows and bulls, and 30 for heifers and calves. Pastoralists consider their main function as transporting cattle on foot.

Truckers also transport cattle from one point in the cattle market system to another. They have multidirectional channels in Moyale woreda, transporting cattle to Nairobi in Kenya and Addis Ababa, Adama and Modjo in Ethiopia. The costs are higher for the Kenya route, at 85,000–120,000 Kenyan shillings (about 18,240–25,750 birr).² Vehicles on the Kenya route can carry between 14 and 20 cattle units. In comparison, costs within Ethiopia are lower, at 6,500 to 10,000 birr Moyale to Addis Ababa, Modjo and Adama. The trucks on the Ethiopia route are also smaller, carrying 8 to 12 cattle units. Pastoralists considered the truckers' main functions as transporting cattle using vehicles, loading and unloading.

Hotels and restaurants buy oxen and bulls for slaughtering from medium and small traders and brokers. They slaughter the animals, cook them and serve them as meals to their customers. Hotels and restaurants are considered relatively new market actors,

² www.oanda.com Exchange rate for November 2013.

which have developed as a result of migration and resettlement into the area. Their main function in the cattle trade includes buying beef cattle, price setting and trekking.

Consumers buy and slaughter beef cattle for festivals and other informal institutional occasions. There are various categories of consumer in the area: festival and non-festival; religious and non-religious. Their main functions are buying and slaughtering cattle for holidays, religious-based ceremonies and weddings.

3.2 Socioeconomic characteristics of the main actors

Pastoralist households

The average age of the pastoralist household heads was 42, with an age range of 20–81. The majority of sampled cattle producers were of active working age: 96.9 per cent were aged 20–65; only 3.1 per cent were over 65. This differs from previous research, which found that only three-quarters of pastoral household heads were of working age (Desta *et al.* 2011).

The family size distribution (see Table 1) shows that the average family size among Moyale pastoralists is seven, slightly smaller than previous research, which had reported a mean family size of eight among pastoralist households in the Borana area (Worku *et al.* 2014). Our study found that family sizes ranged from 2 to 25 members, with the majority being medium and large families of 4–10 people. Less than 10 per cent of households had small (2–3) or very large (11–25) families.

Most (81.2 per cent) sampled household heads had no formal education (see Table 2), whereas 18.8 per cent (less than one-fifth) had attended formal education. This is very different from previous research, which found that 41.7 per cent of Borana pastoralists had attended formal education (Tolossa *et al.* 2014).

The majority of pastoralist households reared four to 43 cattle (see Table 3). Only 2.69 per cent had 44 cattle or more. These households were considered to be rich. Households with four to 12 cattle – almost half of all households – were considered poor. Another 1.35 per cent did not have own cattle (very poor) and 7.62 per cent had only one to three cattle, and were considered destitute. These findings contrasts to previous observations, which found that seven per cent were rich, 10 per cent medium, 17 per cent poor and 66 per cent were destitute (Gemtessa *et al.* 2006).

Table 1. Family size of sampled producers

GROUP	FREQUENCY	%	CUMULATIVE %
Low family size (2–3)	21	9.4	9.4
Medium family size (4–6)	93	41.7	51.1
Large family size (7–10)	92	41.3	92.4
Very large family size (11–25)	17	7.6	100
Total	223		

Source: Own survey 2014

Table 2. Education level of pastoralist household head

CATEGORY OF EDUCATION LEVEL	FREQUENCY	%	CUMULATIVE %
Did not attend formal education	181	81.2	81.2
Primary school (1–4)	18	8	89.2
Secondary school (5–8)	20	9	98.2
High school (9–10)	4	1.8	100
Total	223		

Source: Household survey 2014

Table 3. Cattle ownership and wealth classification

CATTLE OWNERSHIP		WEALTH CATEGORY	FREQUENCY	%	CUMULATIVE %
AVERAGE OWNED	RANGE				
0	0	Very poor	3	1.35	1.35
2	1–3	Destitute	17	7.62	8.97
8	4–12	Poor	101	45.29	54.26
28	13–43	Medium	96	43.05	97.31
50	44–56	Rich	2	0.90	98.21
>=85	62–109	Very rich	4	1.79	100.00

The functions of household members in cattle marketing varied according to the division of tasks within the household and for reasons associated with gender, personality, holidays and similar issues. The husbands did all the marketing in 56 per cent of pastoralist households, the wives did it all in three per cent, whoever owned the cattle did it in 35 per cent of households, and in 6 per cent, the husband and wife shared the task.

According to the pastoralists we interviewed, cattle play a variety of roles in their livelihoods, particularly as:

- insurance for disaster (3 per cent)
- income and livelihood base (35 per cent)
- capital for other sector investment (3 per cent)
- input, capital, insurance and livelihood income base (36 per cent)
- social heritage capital, income source and livelihood base (15 per cent), and

- insurance for disaster, income and livelihood base (8 per cent).

Forty-two per cent of pastoralists listed drought as an obstacle to their livelihood and improved agricultural and natural resource management technologies as an enabler. Sixteen per cent cited recurrent and heavy tax as an obstacle and awareness creation as an enabler. Seventeen per cent mentioned disease and parasites as obstacles and expansion of veterinary services as an enabler. A quarter identified clan as an obstacle and security as an enabler.

Cattle traders

We interviewed 25 traders. On average, their families had 7.56 members. The mean age of cattle traders was 39.44 years, with ages ranging from 23 to 60 (see Table 4). All the cattle traders were therefore of active working age, and energetic enough to carry out cattle marketing activities. They were also all male, suggesting that gender is a leading determinant of entrance into the cattle trade.

Table 4. Socioeconomic characteristics of traders

SOCIOECONOMIC VARIABLES	STATISTICAL PARAMETERS (N=25)			
	MINIMUM	MAXIMUM	MEAN	STANDARD ERROR OF MEAN
Education level	0	10	3.60	0.69
Age	23	60	39.44	1.75
Family size	4	14	7.56	0.59
Trading experience	2	20	7.64	1.10

Source: Household survey 2014

Table 5. Years of schooling (traders)

CATEGORY OF SCHOOLING YEARS	FREQUENCY	%	CUMULATIVE %
Not attended formal education	9	36	36
Primary school (1–4)	5	20	56
Secondary school (5–8)	9	36	92
High school (9–10)	2	8	100

Source: Own survey 2014

Table 6. Experience of cattle traders

NUMBER OF YEARS TRADING	FREQUENCY	%	CUMULATIVE %
2–5	13	52	52
6–9	3	12	64
10–13	4	16	80
14–17	3	12	92
18–20	2	8	100

Source: Own survey 2013

Thirty-six per cent of the cattle traders are illiterate, 20 per cent had attended primary school (grades 1–4), 36 per cent junior school (grades 5–8) and 8 per cent high school (grades 9–10) (see Table 5).

The traders we interviewed each have between two and 20 years experience, with a mean trading experience of 7.64 years. More than half (52 per cent) only have two to five years' experience (see Table 6).

Almost all traders in the area use trekkers for transporting cattle. Each trader has at least two trekkers, four at most. The mean number of trekkers they use is three.

Brokers

We interviewed 13 brokers, who confirmed that they collect different levels of income from brokering sales of different cattle types. See Table 7 for the mean fees they earn for facilitating ox, cow, bull, heifer and calf sales. They also earn different levels of income from different market actors. The survey indicated that brokers collect payment for their role in the cattle marketing process from both the seller and the buyer. On average, they collect 47 birr from the producer plus 96 birr from the trader. They earn 20–80 birr from producers whose cattle they sell, and 50–250 birr from traders.

Most (86 per cent) of the interviewed brokers have faced conflicts – with other brokers (43 per cent), pastoralists (43 per cent) and traders (14 per cent) – over their fees. When conflicts arise between brokers and others, elder traders, other brokers and pastoralists resolve the problem. Establishing personal relations with pastoralists and traders is one of the best conflict resolution mechanisms for brokers as they can resolve their own conflicts in a sustainable way before they arise.

3.3 Cattle market channels

A marketing channel is the sequential arrangement of various marketing intermediaries involved in the movement of goods from producers to formal and informal exporters. We identified two types of cattle marketing channels in the area: formal and informal. When traders pay taxes, they are in the formal market channel. But when they trek cattle from Ethiopia to Kenya without paying tax to the Ethiopian government and using informal (unknown) routes, we refer to this as an informal market channel.

A market channel could be defined by its marketing points (destination of the commodity) and market chain actors. We identified the following marketing points as part of the formal market channels: from the bush markets to Moyale, Dubuliq, Mega, Yabello, Harro

Table 7. Brokers' income from market process, in birr

CATTLE TYPE	STATISTICAL PARAMETERS (N=14)			
	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
Ox	20	200	75.00	68.69
Cow	20	300	72.86	68.99
Bull	20	200	65.71	44.50
Heifer	20	100	58.58	25.07
Calves	20	60	43.57	10.08

Source: Household survey: 2014

Bakko, Hiddi, Dillo, Elewaye and Adama. Informal market channels include from the bush markets to Moyale, Gurmessa, Gambo, Minyata and Nairobi.

We can use information about main actors and their function to identify the economical market chain and levels of market share, competition, pricing strategies and market efficiency.

3.3.1 Formal cattle marketing channels

Formal market channels in the area include those that:

- pass along the marketing routes from Moyale to central Ethiopia towns
- export cattle officially
- are used by value-adding actors who are involved in meat production, beef cattle fattening and transporting cattle from pastoralist areas to other indoor vicinity destinations – for example, festival consumers, pastoralists and butchers.

Channel 1: Pastoralists → brokers → small traders → formal exporters

Some five per cent of marketed cattle (mainly bulls) pass through this channel. The formal exporters in this chain come mainly from central Ethiopia. This is a newly developed market channel, as a result of recent infrastructural development and improved security. Traders buy and collect cattle from different market points.

Channel 2: Pastoralists → brokers → formal exporters

About two per cent of cattle (mainly bulls) pass through this channel. The formal exporters are from central Ethiopia towns such as Adama, Debrezeit, Modjo and Addis Ababa, as well as other places. This is another

recent channel in the area; with more attention it could help boost cattle production and productivity.

Channel 3: Pastoralists → other pastoralists

Pastoralists sell around 12 per cent of the cattle (mainly calves, heifer and bulls) through this channel, which pastoralists mainly use for restocking. It usually takes place in the bush markets. Pastoralists trade along friendship, kinship and neighbourhood lines. This chain's main aim is to replace aged cattle.

Channel 4: Pastoralists → broker → festival consumer

Some 14 per cent of all cattle sales (mainly bulls and oxen) pass through this, one of oldest informal institutional-based channels. Producers sell cattle to other producers, consumer traders, urban dwellers and newcomers from surrounding highlands who buy cattle for festival consumption. The main festivals in the area are: new year, religious festivals and wedding ceremonies, which all play a significant role in the cattle marketing system.

Channel 5: Pastoralists → broker → butchers

This newly adopted value-addition channel was formed as a result of smuggling and the settlement of people from other areas. Around 15 per cent of cattle are marketed this way, and these are mainly bulls and oxen.

3.3.2 Informal cattle marketing channels

Informal market channels do not pay taxes to Ethiopian government. Since the cattle that pass along these routes are unknown and unofficial, such channels are also referred to as illegal channels. Due to proximity and history, more cattle pass through these channel than the formal ones.

Channel 1: Pastoralists → brokers → collectors → informal exporters

This market channel has a long history in the woreda. Indeed, five to ten years ago, it was the only route for selling cattle. Our study found that almost half (46 per cent) of all cattle are sold this way. All types of cattle are sold through this channel: ox, cow, bull, heifer and calf.

Channel 2: Pastoralist → collectors → informal exporter

Pastoralists sell around four per cent of cattle directly to collectors, bypassing the brokers. Almost all types of cattle are sold this way.

Channel 3: Pastoralists → brokers → informal exporter

Pastoralists sell around two per cent of cattle to brokers, who sell them on to informal exporters from Kenya. Two-thirds of cattle sold this way are heifers, cows and bulls; one-third are oxen and calves.

The pastoralists we interviewed gave different reasons for using the informal cattle trade in the area, including currency and price difference, the distance to markets in central Ethiopia route and proximity to the Kenya route, brokers' interference, recurrent tax and a lack of control on border cattle trade. This implies that a malfunction in the local market system in the area leads pastoralists to participate in the informal cattle trade.

It is clear that brokers are highly influential in the woreda's cattle market chain: 81 per cent of the producers we interviewed market their cattle through brokers. Only 19 per cent sell directly to traders and other pastoralists. We also found that more than half of all respondents' cattle passes through informal channels, causing the country to lose foreign currency. The remaining cattle are used for restocking, local consumption at festivals, religious ceremonies and weddings, formal export and butchers' meat production. The cattle market chain's complicated and lengthy routes skew the market toward informal trade, as pastoralists rely on brokers. We believe that there is a need for systematic intervention to minimise unnecessary lengthy market channels and the influence of brokers.

3.4 Economic value of live cattle trade

There are 20,322 pastoral households in Moyale woreda; 33.1 per cent of these participate in the cattle market. This means that 6,727 households depend on the cattle trade for their livelihood. With an average family size of seven, we calculate that 47,086 people directly depend on the cattle trade for their livelihood.

Market actors get different prices and profit margins for different cattle types. Although the selling price is higher in formal channels, the economic value added in the informal cattle trade is more than twice as high as in the formal trade (see Table 8).

We estimated the economic value of cattle traded in the pastoralist area by adding the terminal or bush market price to the cost of trading in terms of trekkers, truckers and tax and multiplying this by the mean number of livestock traded per household. We then calculated the total economic value of the cattle trade in the woreda by multiplying the total economic value of the formal and informal markets by the average number of households that depend on the cattle trade (6,726.58).

Our calculations are below:

$$\text{Formal channels: } 6,726.58 \times 2,563.68 = 17,244,798.61 \text{ birr}$$

$$\text{Informal channels: } 6,726.58 \times 3,965.45 = 26,673,916.66 \text{ birr.}$$

If we add these together, we calculate that the formal and informal cattle trade in the woreda has a total economic value of 43,918,715. The government currently collects less than 47,000 birr in tax. This represents just 0.107 per cent of the total value of the trade.

Table 8. Market value per pastoral household of cattle export trade through formal and informal route

Cattle type	Mean cattle sold per year A	Mean bush price B	Mean terminal price C	Broker costs D	Trekker costs E	Trucker costs to formal route F	Trucker costs to informal route G
Ox	0.28	6,272.16	6,758.94	75.00	50	1,000.00	2,500.00
Cow	0.23	4,428.5	4,582.45	72.86	40	888.89	2,058.84
Bull	0.68	4,160.13	4,497.02	65.71	30	800.00	2,333.33
Heifer	0.65	3,640.26	3,767.22	58.58	30	800.00	1,944.44
Calf	0.13	1,942.78	2,199.29	43.57	20	571.43	1,590.91
Sum	2.57	20,443.83	21,804.92	315.72	170	4,060.32	10,427.52
Mean	0.51	4,088.77	4,360.98	63.14	34	812.06	2,085.50

Cattle type	Tax in formal H	Tax in informal route* I	Total economic value per household through formal market J = A*B+D+E+F+H	Total economic value per household through informal market K = A*C+D+E+G+H+I	Value added in formal market L = D+E+F+H	Value added in informal market M = D+E+G+H+I
Ox	10	25	2,891.20	4,552.50	1,135.00	2,660.00
Cow	10	25	2,030.31	3,260.66	1,011.75	2,206.70
Bull	10	25	3,734.60	5,522.01	905.71	2,464.04
Heifer	10	25	3,264.75	4,516.71	898.58	2,068.02
Calf	10	25	897.56	1,975.39	645.00	1,689.48
Sum	50	125	12,818.42	19,827.27	4,596.04	11,088.24
Mean	10	25	2,563.68	3,965.45	919.21	2,217.65

* They do pay some taxes on this route, but not all the taxes that the Ethiopian government would like to collect from them.
Source: Own survey, 2014

3.5 Lerner Index

The computed value of the Lerner Index for cattle in the formal marketing route was 0.82 (Table 9). This is indicative of an oligopoly market structure, in which neither the pastoralists, formal traders nor the informal traders have control.

In a free market economy, the Lerner Index would be closer to zero to achieve the $P=MC$ condition associated with a free market. In a monopoly, the index would be 1.

We expect prices to reflect the opportunity cost of selling live cattle at the farm gate and the terminal market. The monopoly power in this case lies with the traders and brokers, who are at the beginning and end of the chain. Since the pastoralists depend on cattle for their livelihoods and do not have access to reliable market information, we noted that traders and brokers take advantage of the market information to exploit the producers through under-pricing. This finding is in line with previous research (Onyango 2013).

Table 9. Lerner Index for traders in the formal route

MARGINAL MARKET COST CATTLE FOR TRADER								
Cattle type	Average terminal price	Broker	Tax	Trekking	Trucking	Total	Lerner Index calculation	Lerner Index
Ox	8,153	75	10	50	1,000	1,135.00	$8,153 - 1,135 / 8,153$	0.86
Cow	5,676	73	10	40	889	1,012	$5,676 - 1,012 / 5,676$	0.82
Bull	5,479	66	10	30	800	906.00	$5,479 - 906 / 5,479$	0.83
Heifer	4,344	59	10	30	800	899.00	$4,344 - 899 / 4,344$	0.79
Calves	3,064	44	10	20	571	645	$3,064 - 645 / 3,064$	0.79

Source: Own survey 2014

Discussion

4

Our study findings show that the cattle trade plays a highly significant role in the livelihoods of market actors. We believe that pastoralists in particular need strong policy support to ensure optimal use of the cattle resource in the area. Producers face a number of market chain constraints, including:

- long market channels
- brokers' interference
- disease and parasites
- clan conflicts and unfriendly relations between market actors
- illegal trade
- lack of reliable market information
- recurrent tax
- infrastructure problems, and
- initial capital shortage.

Ethiopian government policy has focused on developing the formal channel as the preferable marketing channel because it offers a higher share of the total final price to the producers and generates tax revenues that the government can use to benefit pastoralists. Pastoralists get a higher price for cattle traded in the informal route and the added value is also higher for cattle sold through this channel. In Section 3.4 we calculated the total economic value of cattle traded through the formal market channels as more than 17 million birr and the informal market channels as more than 27 million birr.

Our study found that brokers distort the market at all the chain terminals. We observed a large number of brokers whose involvement makes it is very difficult to set efficient market prices and obtain timely and reliable market information. Brokers hold much-needed information so they can maximise their commissions, creating a monopoly market structure, which violates the principle of equity between traders and pastoralists. As a result, the larger share of market gains remains with the end-of-chain traders, denying pastoralists a chance to realise economic gains in cattle production.

To ensure pastoralists make a larger profit through formal channels, it will be necessary to either change the behaviour of the brokers or evade their influence altogether by setting up marketing cooperatives for producers. Creating a formal export channel through the existing informal route with Kenya is another option to be considered. Our study findings call for systematic government intervention to improve producers' links to markets and thereby improve their livelihoods.

Conclusions

5

Our study calculated the total economic value of the cattle trade through informal channels from Moyale woreda to Kenya to be well in excess of 27 million birr, while the value of livestock traded through formal channels is 17 million birr. The government collects less than 47,000 birr (just over 0.1 per cent) in taxes from this trade. If the government increases the revenue it collects, it could improve pastoralists' livelihoods by reinvesting some of these revenues into the trade to improve the provision of infrastructure, capital and market information.

Improving the links between producers and markets could involve formalising the informal channels, organising producers' cooperatives and adjusting the practices which allow brokers to perpetuate the oligopolistic market structure.

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Appendices

Appendix 1: Questionnaires for cattle marketing chain survey: pastoralist

General information

1. Name of respondent
2. Total family size of household: _____ Male: _____ Female: _____
3. Education level of household head: _____ years
4. Respondent age: _____
5. Gender of household head: _____
6. Name of enumerator: _____
7. Zone _____ woreda _____ kebele _____

Production and marketing: producer: cattle dynamics and cattle ownership in 2013/14

1. Local cattle owned: _____ cow _____ ox _____ bull _____ heifer _____ calf _____
2. Cattle sold: cow _____ ox _____ bull _____ heifer _____ calf _____
3. Cattle bought: cow _____ o _____ bull _____ heifer _____ calf _____

Economic value cattle trade for producers

1. Did you participate in cattle market last year?
 1. Yes
 2. No
2. If **yes**, in which market type?
 - A. Formal
 - B. Informal
 - C. Both
3. Which marketing system did you usually participate in?
 1. Formal
 2. Informal
 3. Both
 4. Before informal, but now formal
 5. Other _____
4. What is the main reason for informal cattle marketing in the area?
 1. High and recurrent tax
 2. Lengthy cattle marketing channel
 3. Foreign currency and price difference
5. Where did you sell your cattle last year?
 1. Farm gate
 2. Local or primary market
 3. Secondary market
 4. Terminal market
 5. Other _____
6. Was the selling price different at different marketing centres?
 1. Yes
 2. No

7. If **yes** to Q6, what was the bush market price for:
1. Cow _____ 2. Bull _____ 3. Heifer _____
 4. Ox _____ 5. Calf _____
8. If **yes** to Q6, what was the territory market point price for:
1. Cow _____ 2. Ox _____ 3. Heifer _____
 4. Bull _____ 5. Calf _____
9. Was there a difference in the marketing cost of cattle for different actors in different marketing centres?
1. Yes 2. No.
10. If **yes** to Q9, how much did you pay the following for farm gate sales?
1. Brokers _____ 2. Tax _____ 3. Trekkers _____
 4. Truckers _____ 5. Other _____
11. If **yes** to Q9, how much did you pay the following for sales at secondary markets?
1. Brokers _____ 2. Tax _____ 3. Trekkers _____
 4. Truckers _____ 5. Other _____
12. If **yes** to Q9, how much did you pay the following for sales at terminal markets?
1. Brokers _____ 2. Tax _____ 3. Other _____
13. What are the main constraints on the cattle trade in the area? _____
14. What would you suggest as remedial measure for problems raised? _____

Main actors and their function in cattle trade

1. Who are the main cattle marketing actors?
1. Pastoralists 2. Brokers/middlemen 3. Government bodies
 4. Traders 5. Trekkers 6. Truckers
 7. All 8. All but 5 & 6 9. Others
2. What is the pastoralist's main function in cattle marketing?
1. Cattle supply 2. Price setting
 3. Telling initial selling price of cattle 4. Other _____
3. What is the main function of cooperative cattle marketing association in the area?
1. Price setting 2. Market searching 3. Market information provision
 4. Pastoralist cooperative formation 5. Nothing _____
4. What is the main function of trekkers and truckers in cattle trade? _____
5. What are brokers' main duties and responsibilities in the market chain?
1. Price setting 2. Market information provision
 3. Facilitating marketing
 4. Contacting traders and pastoralists
6. What are tax collectors' main duties and responsibilities in the cattle market chain?
1. Market information provision 2. Tax collection
 3. Awareness creation 4. Controlling informal trade
 5. Other _____

7. What are the main duties and responsibilities of small/medium/big traders?
- | | |
|--------------------------------------|---------------------------------|
| 1. Price setting | 2. Market information provision |
| 3. Purchasing and providing currency | 4. Other _____ |

Perception of market actors

1. Have you ever faced conflicts with other market actors?
- | | |
|--------|-------|
| 1. Yes | 2. No |
|--------|-------|
2. If **yes**, with which market actors, mostly? _____
3. Who is responsible for marketing cattle in your household?
- | | | |
|----------------|--------------------------------|--------|
| 1. Husband | 2. Wife | 3. Son |
| 4. Daughter | 4. Anybody who owns the animal | |
| 5. Other _____ | | |
4. What is the main role and function of cattle for pastoralist livelihoods in Moyale woreda?
1. Input for agriculture
 2. Insurance for disasters (drought and famine)
 3. Source of income and livelihood base (milk and milk products)
 4. Capital for other sector investments
 5. Other
5. What are the main obstacles and enablers in cattle marketing?
1. Import ban (rules and regulations)
 2. Security (clan conflict)
 3. Drought, famine and flood (improved agricultural and natural resource management technologies)
 4. Tariff/tax (awareness creation)
 5. Disease and parasite (veterinary service expansion)
 6. Other _____

Market channel of cattle

1. What were pastoralists' outlets for cattle marketing in the last year?
1. Domestic market (for consumption)
 2. Domestic market (restocking other pastoralists)
 3. Supplying ELFORA slaughter and packaging house and other private abattoir facilities in Nazareth, Modjo and Debre Ziet for export to the Gulf States, Egypt, Congo-Brazzaville or elsewhere
 4. Supplying international hotels, Ethiopian Airlines, universities, supermarkets and shops
 5. Official live animal exports through the central Ethiopian markets
 6. Live cattle exports to Kenya and other areas
 7. Other _____

2. Which of the following is an enabler for the optimal use of cattle resource in the area?
 1. Disseminating cattle information, setting up pastoralist-centred market chains
 2. Product differentiation to create niche market
 3. Linking cattle producer with market
 4. Strong and friendly relations among chain actors
 5. Reduced tax fees on sale or slaughter
 6. Cattle promotion alliance with fair trade chain
 7. Adequate demand and ability to expand to match increased demand
 8. Training and extension service improvements
 9. Road networking, secure and adequate access to basic inputs with coping mechanisms for natural disaster and price shocks
 10. Policies and strategies to enhance the ability of pastoralists market agents to compete in cattle product market
 11. Standard and branding mechanisms to identify high quality cattle and products
 12. Cooperative formation
 13. Training and extension service improvement
 14. Other

3. What are the main cattle market routes from pastoralist areas to Addis Ababa, Mojo or Adama?
 1. Purchasing centre _____
 2. Collection centre _____
 3. Loading and unloading centre _____

4. What were main cattle market channels from pastoralist areas to Nairobi?
 1. Purchasing centre _____
 2. Collection centre _____
 3. Loading and unloading centre _____

5. What are the average sale prices of cattle you sold last year?

1. Ox _____	2. Cow _____	3. Bull _____
4. Heifer _____	5. Calf _____	

6. Whom determines the selling price?

1. Trader	2. Broker	3. Pastoralist
4. All market actors in negotiation	5. Other _____	

7. How you do transport your cattle?

1. Trekking	2. Trucking/vehicle	3. Both
-------------	---------------------	---------

8. What are the transportation costs, per head of cattle?
 1. Trekking _____
 2. Trucking _____

Appendix 2 . Cattle market chain analysis of pastoralist's area: trader questionnaire

General information

1. Name of respondent _____
2. Education level _____
3. Age _____
4. Gender _____
5. Family size
 1. Male _____
 2. Female _____
 3. Total _____
6. Name of interviewer _____
7. Education level _____
8. Specialisation _____
9. Respondent's role in cattle marketing:
 1. Producer seller
 2. Rural collector
 3. Small or medium trader
 4. Butcher
 5. Restaurant owner
 6. Informal exporter
 7. Formal exporter
 8. Other _____
10. How long have you been operating this business? _____ years
11. Do you run this business alone or in partnership?
 1. Alone
 2. With a partner
12. Why did you first engage in this business?
 1. Family occupation history
 2. High profit expectation
 3. To accumulate capital
 4. Other (specify) _____
13. What was the source of your initial (start-up) capital?
 1. Gift
 2. Credit
 3. Money saved from other business
 4. Family capital
 5. Other (specify) _____
14. How much was your initial capital? _____ birr
15. How much capital do you have by now? _____ birr
16. Why do you think there is a cattle export route through Kenya?
 1. Difference in exchange rate
 2. Difference in price
 3. Heavy tax and weak controlling mechanisms in domestic market
 4. Geographical proximity of Kenya
 5. Other _____
17. Which are the main routes of cattle market you use?
 1. Dubulik – Moyale – Gambo – Nairobi
 2. Dubiliki – Yabello – Addis Ababa
 3. Both
 4. Other

18. What were your preferred cattle types to trade and how many did you buy last year?
1. Ox _____ 2. Cow _____ 3. Bull _____
 4. Heifer _____ 5. Calf _____ 6. Total bought _____
19. What was the average buying price for cattle in 2005³?
1. Cow _____ 2. Ox _____ 3. Heifer _____
 4. Bull _____ 5. Calf _____
20. What were the cattle marketing costs for:
1. Trucking _____ 2. Trekking _____
 3. Tax _____ 4. Other _____
21. How much did you pay a broker for:
1. Cow _____ 2. Ox _____ 3. Bull _____
 4. Heifer _____ 5. Calf _____
22. How did you transport your cattle?
1. Trekking 2. Trucking 3. Both
23. How much were your transport costs for:
1. Trucking _____ 2. Trekking _____
24. Where did you transport cattle to? _____

³ This is 2005 in the Ethiopian calendar, equivalent to 2013 in the Gregorian calendar.

⁴ 2013 in the Gregorian calendar.

Appendix 3 TAX Authority: Cattle and product market information from tax collection centres

1. Daily cattle exit tax per cattle unit _____
2. Income collected in tax from cattle market in Moyale Arbale in the last twelve months (2005 EC)⁴: _____ birr

This is one of a series of reports synthesising the findings of field research conducted by masters' degree students at Ethiopian universities who investigated the contribution of pastoral production to the national economy. The students developed the research to complement their degree studies, with support from the International Institute for Environment and Development and Tufts University.

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