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Author contact emails: guyo.roba@ditsl.org; m.a.lelea@ditsl.org; and b.kaufmann@ditsl.org

Abstract: *Trade in livestock is the major source of income for pastoralists, traders, brokers, transporters and other actors in pastoral meat supply chains. Projects to “link pastoralists to markets” in rural northern Kenya, place an emphasis on pastoral producers without adequate understanding of other inter-related actors whose activities and relations make up the connection to primary, secondary, regional and terminal markets. In this article, sheep and goat supply chains originating in Marsabit south are analysed as a human activity system composed by the actions of supply chain actors and shaped by the relations between them. The geographically confined areas from which local markets receive the supply of sheep and goats are conceptualised as a “producer catchment area” depicted as finely branched tributaries through which livestock are moved towards terminal markets. A stakeholder analysis resulted in the identification of six categories of local traders who connect with other actors in both local and long distance supply chains to sustain the movement of sheep and goats to markets. The categories of traders are distinguished by different demands in travel, labour, working capital, risk exposures, and relations with other actors. In order to deal with variable and uncertain supply, local traders harness their social relations with other actors in the supply chain. However, local traders are at the highest risk for loss due to fluctuations in demand at the terminal market, as they depend on market information through brokers and lack relations to final customers. This research demonstrates how systematic analysis of activities performed by actors, the interconnected activities linking them, and their relationships can offer insight for improved supply chain coordination.*

4 **Keywords:** Pastoral livestock production; Goats; Supply chain; Northern Kenya; Activity links; Actor
5 network

6

1. Introduction

Rural northern Kenya is part of the Arid and Semi-Arid Lands (ASALs) where communities rely on pastoral livestock production for their livelihoods. With intimate knowledge of their rangelands, the pastoral communities manage their landscape to enhance livestock production, through strategic mobility to take advantage of patchy and ephemeral rangeland resources (Wario, et al 2016; Kratli et al. 2013).

The importance of livestock trade in light of poverty reduction and food security goals has attracted considerable academic research in northern Kenya, particularly from the 1990s onwards (Kerven 1992; Ensminger 1996; Barrett, et al 2006; Barrett et al. 1998; McPeak and Little 2006; Barrett and Reardon 2007; Mahmoud 2008; Iruata, et al. 2015; Rich et al. 2011; Bailey, et al 1999).

Although well-functioning livestock markets can offer opportunities for better returns and reduced vulnerability among pastoral households, this is not without challenges. Multiple structural issues affecting livestock trade have been identified such as high transaction costs (Barrett, et al. 2006; Bailey, et al. 1999; Ensminger 1996), information asymmetries and weak physical infrastructure (Bailey, et al 1999; Barrett, et al. 2006), and weak livestock marketing policy (McPeak 2006). Recommendations include better market coordination through improved market information on animal-characteristics (Stuth et al. 2006; Radeny et al., 2006) and timing of market days or auctions (Green et al. 2006).

These challenges and various government and international development interest to resolve them, gave way to development projects in northern Kenya to “link pastoralists to market”, particularly, in recent context of shifting donor priority away from food aid and direct-cash transfers. An example of a project with activity in northern Kenya is a USAID-sponsored development program (worth 20

1 million USD) launched in 2013, “Resilience and Economic Growth in the Arid Lands–Accelerated
2 Growth”¹.

3 However, the success of these projects to link pastoralists to markets remains limited. They tend to
4 fail in both macro and micro dimensions; from the ‘macro’ due to limited contextualisation of how
5 the livestock supply chain functions in the broader political economy, and from the ‘micro’ due to
6 lack of understanding of the specific activities of actors and relations between pastoralists and local
7 traders who shape the supply chains. The emphasis on marketisation must be embedded within the
8 broader social context in which both formal and informal exchange create an interplay of social and
9 material practices that ultimately constitute economic processes within pastoral systems (Gertel and
10 Le Heron, 2011).

11 Livestock traders play a key role mediating between the communal subsistence and market economy
12 in pastoral areas (Konaka 2001, p.63). In the past, livestock traders in Kenya were mainly from the
13 Somali ethnic group, operating in both the northern and southern rangelands. Only more recently
14 members from the local ethnic groups became traders, such as Maasai traders in Kajiado (Quarles
15 van Ufford and Zaal 2004, p.128). Based on a historical review, Quarles van Ufford and Zaal (2004)
16 found that shared ethnicity and social group among these Maasai traders are used as social and
17 cultural capital to build a trust based cattle trade network. Similarly, based on empirical research
18 with Burji cattle traders in Moyale, Marsabit County, Mahmoud (2008, 2011) found that trust is
19 leveraged in social relations to enable them cope with diverse trade risks. He identified trust-based
20 relationships, individually-based trading partnerships; informal cash transfer systems and
21 membership in livestock trader associations as strategies used by the traders. Based on
22 anthropological fieldwork with Samburu traders, Konaka (2001) differentiated ‘market traders’ who
23 are mainly from the Kikuyu ethnic group and ‘local traders’ from the Samburu. Among four strategies
24 for profitability identified among these local traders was a temporal shift between the herding and

¹ <http://acdivoca.org/our-programs/project-profiles/kenya-resilience-and-economic-growth-arid-lands-accelerated-growth>, Accessed May 13, 2016

1 trading activities to minimize losses during different climatic seasons and varied market conditions
2 (Konaka 2001). Most studies of pastoral livestock traders focus on the cattle traders, including the
3 recent study of (Little et al, 2014). Focused specifically on sheep traders in Kajiado, Mtimet et al.
4 (2014) evaluated decision-making and found that breed was considered to be the most important
5 attribute for profitability. Among their conclusions, they asserted that, “traders’ role is vital in the
6 development of the value chain” (Mtimet et al. 2014, p. 71).

7 Previous studies in pastoral regions of Kenya have focused on either a specific market or on a
8 segment of the pastoral livestock supply chain without considering the connections of the entire
9 chain. To address this gap, the aim of this paper is to examine the activity system of traders and to
10 differentiate the roles of different types of local traders in linking pastoralists to markets. We identify
11 activities entailed by each trader category and their relationships with other actors that both
12 facilitate and sustain the activities. This study lays the groundwork to show how the chain is currently
13 functioning and reveals key challenges identified by different chain actors.

14 **2. Theoretical framework**

15 For our action research to be scientifically grounded, we needed a theoretical framework that placed
16 an emphasis on the views of the people with whom we would collaborate in order to identify
17 improvements that they considered actionable in their specific context. We chose an actor-oriented
18 approach to system theory with an emphasis on the activities and relations that link different supply
19 chain actors into a functioning system.

20

21 System theory is used to analyse the interactions between parts in order to understand the relations
22 that form an entity (Von Bertalanffy 1972; Chikere and Nwoka 2015). Checkland, 1985, describes a
23 human activity system as composed of interacting activities performed by individuals and groups of
24 individuals. Human activity systems are established and maintained by human actors through their
25 activities (Argyris and Schön, 1978; Mingers, 2006; Kaufmann et al., 2013). Human activity systems
26 specific to professions in the livestock supply chain include, livestock rearing (i.e. the activity system

1 of a livestock producer), trading (i.e. the activity system of a trader), etc. A supply chain represents a
2 complex network of business entities linked across production and consumption boundaries (Liu and
3 Guan, 2014) spanning across rural and urban areas. When considering such business entities as
4 professional activity systems,, the supply chain can be analysed as a human activity system (Vrijhoef
5 and Ridder 2007; Rigby et al. 2000).

6

7 An actor-oriented perspective lends itself to bringing forward the views, interests and values of the
8 actors involved in a system to identify the room of manoeuvre that they perceive within the
9 structure. According to Giddens (1984), actors draw from specific structural rules and resources to
10 produce social systems. Within these, we find, for example business networks composed of actors
11 and sets of political-economic structures that influence market rules. Building on Giddens' argument,
12 Long combined structural and actor perspectives to develop an actor-oriented approach (Long 1990;
13 Long 2001), with a focus on the agency of the involved actors. An actor-oriented approach places
14 emphasis on the central role of human action and understanding of the "lifeworlds of different social
15 groups" (Long 2001, p.23), thereby drawing attention to: i) how actors are organized in social groups
16 and networks (Long 2001), ii) actor strategies and choices to interpret choices in complex
17 negotiations between individuals and groups with different interests (Long 1990), iii) the structural
18 factors that constrain or enable choices pursued by actors (Long, 1992 in Long 2001). In the supply
19 chain, each actor has a specific social-economic position, function and interest such as in their
20 production and marketing activities (Osei-Amponsah and Visser, 2016). Drawing on stakeholder
21 theory, we have differentiated actors into primary actors whose activities are directly constitutive of
22 the system (these actors have their hands on the product) and secondary actors who influence the
23 room of manoeuvre of the primary actors.

24 However, each actor operates in connection with others to create a network that defines the types
25 of relationships and exchange that emerge (Long 2001). Håkansson and Snehota (1995) have
26 connected the activity system with closely related aspects of the actor relationship across business

1 networks. They conceptualized markets-as-networks by integrating actors and activities for analysis
2 of business relationships, as three layers including: activity links, resource ties and actor bonds. Their
3 emphasis is on the importance of understanding the interconnections between the different layers
4 to explore the possibility for developing more economically effective links, ties and bonds (Ibid, p.
5 34).

6
7 Human activities can be analysed as relationally embedded within social and institutional contexts
8 (Muller and Perret-Clermont, 2014; Klein and Juhola, 2014). As a purposive system, human activity
9 systems bring to the forefront actions undertaken by people within a particular context with specific
10 motives and goals (Restrepo, et al. 2016; Argyris et al. 1985). Activity system analysis conducted with
11 participatory tools can lead to a learning process in which involved actors evaluate their practices
12 and identify ways that they can change their work to meet their goals (Yamagata-Lynch, 2010a;
13 Restrepo et al., 2016). Hence, the outcome can be applied to improve practice. As activities are
14 constitutive of systems, transformations can result from actors modifying and creating new practices
15 (Scribner, 1997, p. 16 in Yamagata-Lynch, 2010b; Kaufmann and Hülsebusch, 2016). The approach
16 also enables an understanding of the systemic contradictions and tensions which are couched in
17 social-cultural practices which can be difficult to identify and describe with other methods.

18 Against this theoretical background, understanding a supply chain requires research on a specific
19 business context, the involved actors, and how and when various activities are performed. These
20 activities are shaped by the interdependencies between activities and the relationships among
21 actors.

22 **3. Material and Methods**

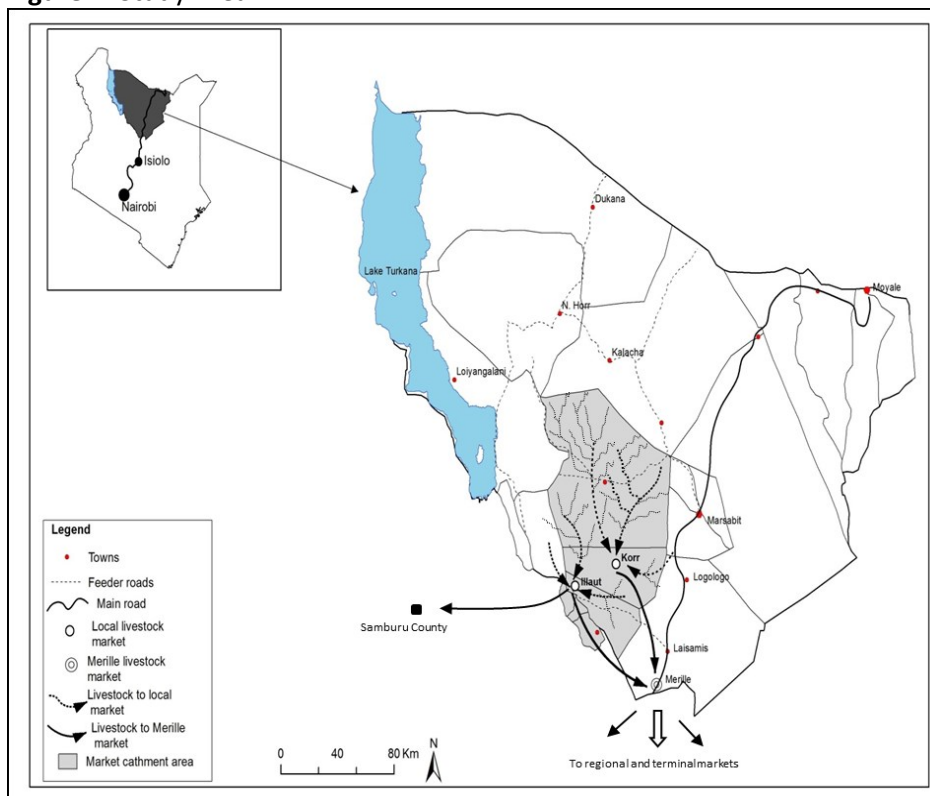
23 *3.1. Study area*

24 This research was carried out in northern Kenya, situated in the lowlands of Laisamis sub-county, in
25 the southern part of Marsabit County bordering Samburu County (Figure 1). The climatic conditions
26 in Marsabit County is characterised by bimodal rainfall, leading to four seasons: the short and hot dry

1 season, starts in January and ends with the long rainy season from March to May; the long dry
 2 season commences in June and lasts until November; followed by the short rainy season until the
 3 end of December. However, the seasonal patterns have become more erratic leading to frequent
 4 failure of rainy seasons. The area experiences an annual average temperature of 20.1 °C. (County
 5 Integrated Development Plan, 2013)

6 The new highway linking Marsabit and Isiolo towns will ease the movement of livestock to regional
 7 and terminal markets. However, the lowland roads remain unpaved and impassable for ordinary
 8 vehicles, especially during rainy seasons. Towns along the Isiolo - Marsabit highway, have more
 9 economic activity and are better connected to mobile network coverage than other towns in the
 10 region.

11 **Figure 1: Study Area**



12

13 Laisamis sub-county has a land area of 20,290.5 km² and is home for Rendille and Ariaal (bilingual in
 14 Samburu and Rendille) pastoralists who rely on livestock production. Compared to other areas in
 15 Marsabit County, the population of sheep and goats in Laisamis sub-county is relatively high with
 16 more than 450,000 (KNBS, 2010, p.391). Sheep and goats are widely traded in local markets for

1 income to meet regular household needs. Because of relatively vibrant local markets in Laisamis sub-
2 county (Chabari and Njoroge 2015, p. 36) the Rendille have high livestock sales compared to other
3 pastoral groups in Marsabit. However, until ten years ago most livestock trade in the area was done
4 by traders from the Burji ethnic group and so the increase in Rendille local traders has changed the
5 social relations in a process that is still unfolding and will be further explained in our results and
6 discussion.

7 *3.2 Data collection*

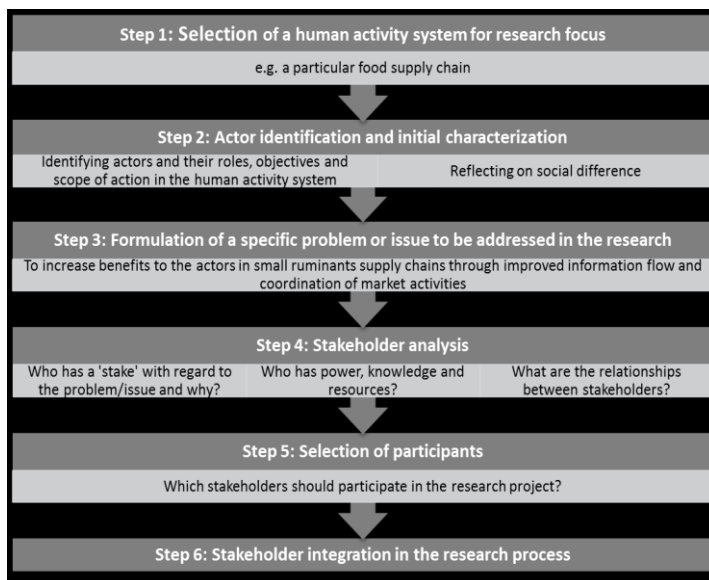
8 We collected information on the type of actors, their activities, and the relationships between them.
9 We started with data collection required for a stakeholder analysis (Lelea et al. 2014). We followed
10 the steps in figure 2, selecting first the sheep and goats supply chain as a human activity system on
11 which our study focuses, followed by identification and characterisation of primary actors who
12 perform specific functions in the supply chain. In this second step, we commenced with the literature
13 review from which we identified an initial list of 83 individuals and 19 organizations working in the
14 sheep and goat supply chains.

15 During exploratory research, July - August 2014, the names and contact details of individuals in
16 different actor groups were gathered starting with observation and initial contact at the markets. A
17 snowball technique was used to investigate other connected actors. Stakeholder identification along
18 the supply chain started from “upstream”, i.e. the pastoral producer areas and then followed
19 “downstream” up to the terminal market in Nairobi. In order to see whether important actors were
20 omitted, a meeting with 28 stakeholders that included livestock producers, local traders, local
21 butchers, local brokers and representative from livestock marketing groups, county government and
22 non-governmental organisations was conducted.

23 In the third step, in eight group meetings, we identified together with these actors specific problems
24 in the supply chains. Additionally we conducted 14 group meetings with pastoral producers to
25 identify their problems in marketing. Thereafter secondary actors with an interest and influence on

1 the specific problem in livestock marketing were identified. After the identification of the actors, the
 2 final steps were the selection and integration of participants in the research collaboration.
 3 Through this process, we identified 14 preliminary actor categories, including pastoral producers,
 4 local traders, brokers (livestock & lorry brokers), transporters, research institutions, financial
 5 institutions, county governments, Non-Governmental Organizations (NGOs), butchers, meat
 6 distributors, market committees, meat processors, meat exporters, and consumers.

7 **Figure 2: Stakeholder analysis steps**



8
 9 Adapted from Lelea et al., 2014, p. 4

10 From June 2015 until January 2016, we collected qualitative data on traders' activities and
 11 relationships. Field observation was done on 34 market days, including Korr (20), Ilaut (9), Merille (3)
 12 and Nairobi (4) markets. During the visits, observations were made about trade practices,
 13 interactions between actors and the collaboration between different traders in undertaking their
 14 activities. The informal talks with traders also helped us to understand traders' recent sales
 15 experience, and new development in the market. These observations and conversations were
 16 registered in field notes at the end of the market days.

1 Through these regular visits to local markets, we established rapport with a number of traders who
2 provided information to generate a list of 30 active traders in Marsabit South. We began our
3 interviews with full time long distance traders who were recognised in their pastoral community for
4 having a high frequency of trading activities. At a later stage, information was collected from other
5 categories of traders with whom they are linked. Overall, 20 interviews were conducted with
6 different categories of traders (Table 1), including all 14 long distance traders in Korr and Ilaut, 1
7 rearing-trader, 3 itinerant traders, and 2 inter-local market traders.

8 Interviews made use of the narrative interview structure (Schuetze, 1977; Bauer, 1996). With this
9 method, we learned the respondent's trading history as they recounted important events in their
10 trading life from the day of their entry into the trade. Thereafter follow-up questions detailed their
11 routine activities and relationships with other actors along the chain.

12 These individual interviews were complemented by three focus group discussions (FGD) which
13 brought together different traders, market officials, local brokers and livestock producers at Ilaut and
14 Korr town. In these groups, they discussed livestock marketing activities, problems and relationships
15 in their marketing chains. All group sessions and interviews were recorded with an audio recorder
16 and 15 interviews were fully transcribed.

17 **4. Results and Discussion**

18 *4.1 Characterising the sheep and goat supply chains in Marsabit south*

19 The aim of this section is to characterise the current sheep and goat supply chains in Marsabit south.
20 Within Marsabit south, two types of supply chains can be distinguished i) local chains which include
21 the local markets and their corresponding producer catchment areas and ii) the long-distance chain
22 which connects local markets to the terminal market in Nairobi. The structure of these supply chains
23 are similar to those in other pastoral areas with poor connections to urban areas (Nunow, 2000;
24 Turner and Williams, 2002). In our research, we categorised livestock markets based on geographical
25 location starting in livestock production areas with the local markets that are differentiated as

1 primary and secondary markets. Regional and terminal markets are located away from these
2 producer areas.

3 **The local chains**

4 As reported in interviews, local traders may purchase goats directly from individual homesteads in
5 villages, at water points and grazing areas. The three local markets within the administrative
6 boundary of Marsabit south include two primary markets in Ilaut and Korr, and one secondary
7 market in Merille. The primary markets are part of a 'tributary' within the producer catchment area
8 and can serve as first selling points for pastoral producers and as collection points for local traders.
9 The secondary market in Merille draws sales from a wider area in Marsabit south.

10 These local markets differ by livestock species traded. The Korr market is exclusively focused on the
11 sheep and goat trade. While the Ilaut market predominantly has small ruminants, occasionally there
12 are also cattle and camels. Cattle or camels are usually bought by pastoral producers for herd
13 reproduction and, in a few instances; local traders will acquire them to barter sheep or goats in
14 future. At the secondary market in Merille cattle, camels, small ruminants and donkeys are traded. It
15 serves as a collection point for external traders who originate outside Marsabit south to purchase
16 and transport livestock to other regional markets in Isiolo, Meru and Archers Post (within a radius of
17 300 km) or to the terminal market in Nairobi (600 km).

18 The local markets in Ilaut and Korr are held on different days, accommodating the itineraries of local
19 traders and improving the number of participating producers. The market day in Ilaut is every first
20 Tuesday of a fortnight while in Korr it is every Saturday.

21 **The long distance chain**

22 In contrast to the traders who commonly trekked "on the hoof" (which is the term used when
23 livestock and accompanying herders walk long distances) to local markets or occasionally to markets
24 in a neighbouring county, traders taking livestock to a market requiring long distance travel usually
25 do so by truck. These traders must then have enough sheep and goats to fill a truck (150 are

1 indicated on the movement permit needed for trucking), as there is a fixed price for the permit and
 2 the lorry, irrespective of the number of animals.

3 The secondary market in Merille is used by both local traders from the producer catchment area, as
 4 well as by external traders and is an important last point in which trucks must be filled before making
 5 the 600 km journey to Nairobi. Merille has a strategic location resulting in high numbers of animals
 6 transacted at the market because i) it is easy to access with lorries along a major north-south road
 7 connecting to Isiolo and then further south to Nairobi ii) is situated at the confluence of two counties
 8 (Marsabit and Samburu) and in proximity to the dry season grazing areas.

9 **Categorising local traders**

10 The movements of sheep and goats between markets are facilitated by different categories of local
 11 traders (Table 1). These traders are differentiated based on the distances covered and their
 12 purchasing and selling points (table 1), as well as by the amount of working capital required and risk
 13 exposure influencing their strategies.

14

15 **Table 1: Categories of local traders**

Trader category	Purchasing from	Selling to	Strategy
Itinerant traders (I)	Pastoral producers at homesteads, water points or grazing areas	Local long distance traders at primary markets or external traders at the secondary market	Trek across vast areas in groups to take advantage of price differentials between local markets and pastoralist homesteads, villages or water points. In Korr and Ilaut, there are about 6-8 itinerant traders associated with each market. They also engage in barter trade when they meet a herd owner who may want to exchange, for example, a donkey for goats.
Rearing-traders (II)	Pastoral producers at homesteads, water points or grazing areas	External traders at the Merille market who generally have direct links to buyers	Buy similar sizes of immature goats at an average price during dry seasons and rear them for a period of time to sell either once or twice a year after they gain weight and mature.
Butcher-traders (III)	Pastoral producers at local markets	Households, schools and restaurants	Buy relatively few but reliable numbers of sheep and goats every market day. The 5 butchers in Korr share premises and slaughter in an organized rotation, with each butcher allocated a specific day.
Stationary traders (IV)	Pastoral producers at local markets	Long distance traders	Resell animals purchased very early on market days at a later hour in the same market. When they fail to recoup their purchase prices, they may graze the animals for a week or two before selling again in the same market.
Inter-local market traders (V)	Pastoral producers at local markets	External traders at either the Merille market or other regional markets	Take advantage of price differences between local markets. They link pastoral producers to external traders mostly in the Merille market

			or at the Lolguniani and Latakwen market in Samburu County.
Long distance traders (VI)	Pastoral producers at local markets and directly from traders I, IV & V	Nairobi traders and clients via the broker (at the Kariobangi market in Nairobi)	Depending on the season, participate in taking about 2-4 trucks per month to Nairobi from which it is expected that every third or fourth trip will bring losses. Of the total 14 long-distance traders, most work in groups of 3-4, while 3 work alone.

1

2 Although long distance traders may choose to employ strategies associated with different categories,
3 other types of traders tend to have difficulty doing long distance trade due to higher capital
4 requirements. Examples of how long-distance traders mix categories include, for example when a
5 long distance trader uses the strategy of an itinerant trader when price differences between villages
6 and local markets are attractive. While continuing long-distance trading activities, some traders may
7 also buy sheep and goats to rear as part of their herd like a rearing-trader. As some long distance
8 traders started as butchers, they then combine these strategies. Such combinations of trading
9 strategies are important for long distance traders, because of the precarity.

10 Local traders are part of an activity pattern that requires sequential coordination of activities
11 (Håkansson and Snehota, 1995, p. 5). They move animals while purchasing them at specific locations
12 (markets, water points, and homesteads) and at certain times (market days or agreed timing at fixed
13 points), thus concentrate a spatially dispersed supply. The different transactions carried out by a
14 variety of traders at the village level, local markets and the onward flow of sheep and goats to
15 regional and terminal markets is represented in Figure 3 as a finely branched net showing the point
16 at which each trader is active and the broadening thickness of the tributaries depicting the increase
17 in volume of the flow of animals from primary to terminal markets. Nevertheless, these varied
18 connections are typically abstracted as a linear chain in most livestock marketing literature (IIRR,
19 2014; Juma *et al.* 2010; Pavanello, 2010).

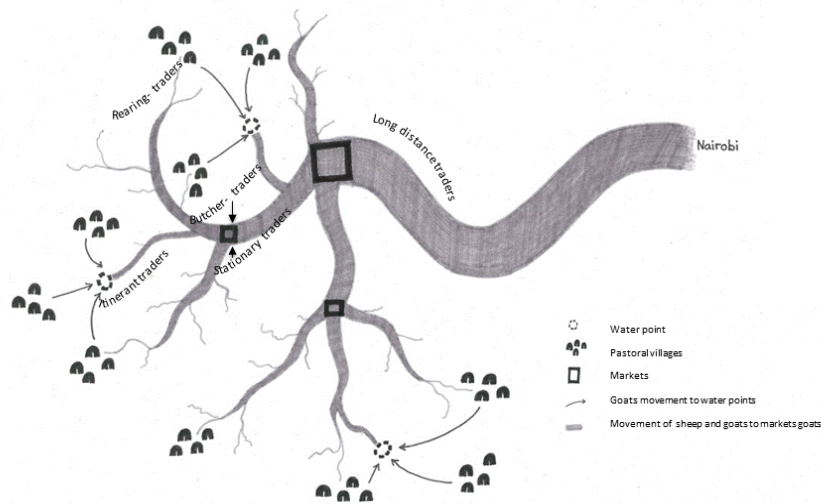
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1 **Figure 3:** Movement of sheep and goats from producer catchments to primary, secondary and
2 terminal markets



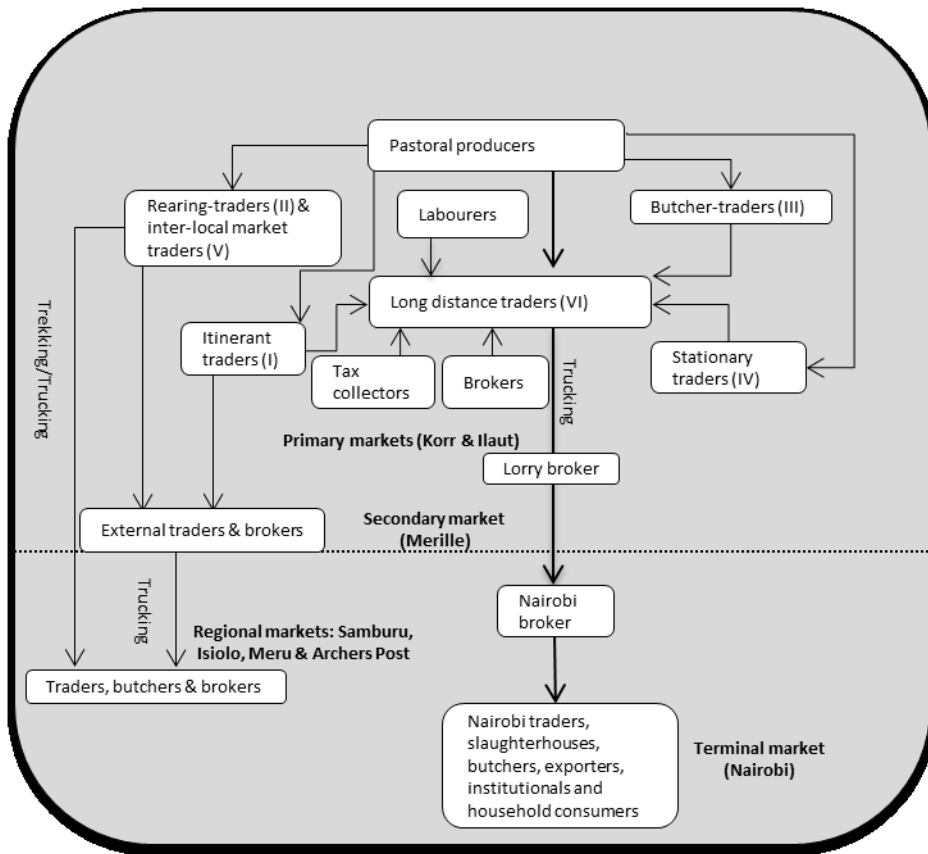
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4 *Central role of local traders in the sheep and goat supply chains*

5 Local traders occupy a central position in these trade networks in order to mobilise the movements
6 of sheep and goats from producers to consumers. Figure 4 is illustrative of connections between
7 actors in the local chains and the link between primary, secondary, and terminal markets.

1 **Figure 4: Sheep and goat supply chains in Marsabit south**

2



3

4 Figure 4 shows the positions of different traders and their connections to other actors. The
 5 information in this figure complements the findings discussed in table 1. Pastoral producers interact
 6 with all the different types of traders. A long distance trader commissions a lorry broker to organize
 7 transportation. Upon delivery, a Nairobi-based broker organizes the final sale to different clients.
 8 However, the situation differs when pastoral communities have better connections to urban
 9 consumers. For example, the Maasai pastoralists from Kajiado who are relatively near Nairobi have
 10 more transportation options including refrigerated trucks and links to butchers and abattoirs (Zaal
 11 and Ton 1995)

12 **4.2 Activities of local traders**

13 In this section, we present common activities undertaken by local traders in the six categories and
 14 highlight differences among them. The activities are listed according to the stages of their tasks and
 15 sub-activities are explained using quotes from the traders (
 16 Table 2).

1
2

Table 2: Description of the activities of local traders

Stage of Activity	Description of Sub-Activities	Trader categories
Purchase	Choosing the purchase area: <i>"When I purchase, I talk to people to get the information I want e.g. when I hear that there is a Manyatta [village] that doesn't have food and would likely sell their goats², I rush there"</i> (IT81, llaut).	I&II
	Assessing the quality and quantity of goats on offer: <i>"First, I make a market lap and get the information..."</i> (IT81, llaut).	I-VI
	Selecting sheep and goats: <i>"I usually look for the goats I want, assess their sizes, collect them together and call the owners to agree on the price"</i> (IT81, llaut).	I-VI
	Bargaining: <i>"I bought my first goat from a lady seller with an opening offer of 2700 Ksh. but I offered 1700, and then I moved up to 1800, and then she also dropped to 2500. Then I moved up again to 2000 for my final offer but she was not content. I told her I will add 100 on top and I walked away. Then she called me back and I bought the goat at 2100"</i> (L45, Korr).	I-VI
	Branding the animal and leading it to a separate pen in the market: <i>"We mark the goats as we purchase them..."</i> (L45, Korr).	III-VI
	Paying tax collectors.	I-VI
Movement & herding	Trekking 'on the hoof' to a collection point: <i>"...My colleague buying in the llaut market engages a herder who will trek the goats for one day to reach Korr and we pay him an agreed sum for the service on arrival"</i> (L45, Korr).	I, II, V & VI
	Herding and watering at the collection point, awaiting market days or transportation: <i>"As I buy, there is a herder who grazes them in the fields until we fill the lorry"</i> (L46, Korr).	I, II, V & VI
	Trekking the sheep and goats to the markets in Merille and Samburu County: <i>"After getting the required number of goats, I sometimes trek from Latakwen to Merille... which is 4 days of walking."</i> (IT81)	I, II & V
Transport	Contacting a Marsabit-based lorry broker: <i>"The lorry broker organises for us by telephoning the lorry owner or driver who just returned from their trip"</i> (L45, Korr).	VI
	Contacting end buyers or brokers, <i>"We have a common broker and every trader communicates with him so he knows when they are on their way for prior arrangements"</i> (L47, Korr).	VI
	Acquiring transit and health permits for the transportation: <i>"We ask the lorry owner to get the permit for transporting the goats to Nairobi and also pay for the health permit issued by the veterinary officer"</i> (L45, Korr).	VI
	Hiring sand loaders: <i>"When the lorry arrives, we engage two people who will put a small amount of sand in the lorry and we pay them a fixed amount for the labour"</i> (L45, Korr).	VI
	Calling a Nairobi based broker to inform him about travel plans.	VI
	Engaging a 'specialized' herder to watch over the animals in transit: <i>"There is a herder who will be with the goats until we reach Nairobi market. We usually pay him fixed amount"</i> (L45, Korr).	VI
Sale – at the Merille market	Contacting buyers in Merille prior to travel: <i>"I sell my goats directly to one client in Merille - a Burji trader. I call him and when he says, "Yes", I make a personal visit to the market to cross-check prices and also to show the sizes of my goats to him. Then I come back and trek to Merille"</i> (RT11).	I, II & V
	Assembling goats in one location supervised by traders.	I, II & V
	Negotiating with buyers and concluding the sale (occasionally through a local broker).	I, II & V
	Paying tax collectors.	I, II & V
Sale – at the Nairobi market	Paying market entry fee	VI
	Engaging a broker: <i>"After offloading the goats at the Nairobi market, we have a broker who helps us sell them. We pay him a fixed amount after the final sale"</i> (L45, Korr).	VI
	Organising with the broker to hire a herder: <i>"If we haven't sold the goats by evening, we get a shelter where we pay an overnight fee per goat and the following day the goats have to be grazed by a paid herder"</i> (L45, Korr).	VI
	Reconciling accounting with the broker and confirming payment of funds prior to return travel: <i>"After I have counted the total sales, I sit with my broker to know my expenses, and then I give the broker and any person I have traveled with, their respective cash until I am through with all the deductions. After that, I either deposit my balance in M-Pesa or travel back with it"</i> (L46, Korr).	VI

3

² The pastoral producers and traders use the term goats to refer to both sheep and goats.

1 Activities of local traders are linked to those of other actors in the supply chain. 'Primary actors' are
2 presented along with interconnected activities (Table 3) that are embedded in the wider activity
3 pattern spanning several actors (primary and secondary) in the supply chain. The activity links show
4 both sequential and parallel activities that can be explored as part of a larger series of activities
5 necessary to enhance supply chain coordination (Håkansson and Snehota, 1995). Activity linking can
6 be strengthened through reciprocal adjustment of activities to strike an economically advantageous
7 position (Håkansson and Snehota, 1995, p. 60).

8 Currently, coordination of activities are formalised by trading at agreed upon locations and times on
9 market days. Other additional and strategic coordination is not institutionalised, but mainly depends
10 on personal arrangements of individual actors. However, according to traders, linking purchasing
11 activities with sales would improve their decision making at purchase, because if the requirements of
12 the terminal market clients were known at the time of purchasing livestock, they could undertake
13 their activities efficiently and profitably.

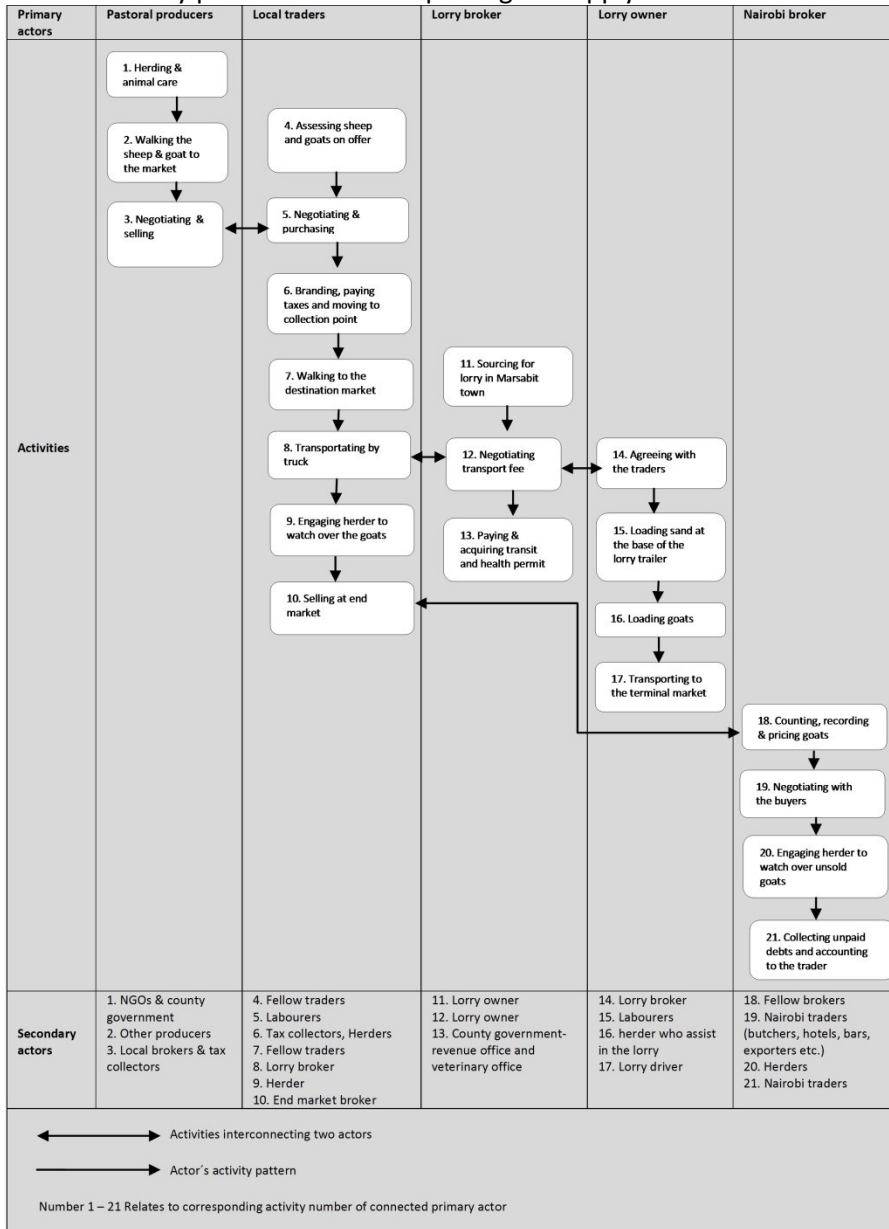
14 In the absence of fixed contracts, there is short time validity of market information due to day to day
15 price fluctuations at the terminal market. As it takes a minimum of five days to amass sufficient goats
16 to fill a lorry along with the necessary permits, traders are subject to risk.

17 Despite the vast area, varying and unreliable offers, fluctuation of profits, and additional
18 uncertainties and risks (such as droughts, epidemics and insecurity), the local traders manage to up-
19 hold their trading activities, which is effectuated by relationships they have with other actors.
20 However, their ability to continue is threatened by the strain of these fluctuations.

"I go and find there are no buyers in the market, so I am forced to sleep several days around the marketplace incurring costs such as paying accommodation fees at the lodge, grazing charges for animals to stay overnight, animal feed while waiting for the market and so many other petty costs. In such a situation, the expenditure is high. I was saying to myself, if I could have any other option such as another job, I could have left this business. But this is the only option I have so I am still in this business..." (L47, Korr).

21

1 **Table 3: Activity pattern of the sheep and goat supply chains**



2

3 The strength of activity links directly influences the performance of the overall supply chain. As the
 4 efficiency of two actors (companies) in a relationship are inter-dependent influencing both of their
 5 profit margins (Håkansson and Snehota, 1995), in the example of local traders tightening either
 6 transportation or information exchange links can lead to mutual benefit. Therefore, the focus of
 7 table 3 is to establish activity interlinkages between the actors in the supply chain. This is an
 8 important step for improving the room of manoeuvre of the involved primary actors. The secondary
 9 actors whose activities influence the primary actors are indicated in third row of the table.

10

1 4.3 Actor relationships

2 In this section, we analyse the relationships between different local traders and actors in the sheep
3 and goat supply chains. The interconnected activities (Table 3) span those in the producer catchment
4 area until the Nairobi broker. Respective relationships are built over time, the strengths of which
5 have an implication on the quality of interconnected activities. Below, the different relationships
6 between local traders and other actors are explained.

7 *Local traders – Pastoral producers*

8 The relationship between a local trader and a pastoral producer may start on a market day with a
9 bid, counter bid and final offer. Since most producers repeatedly come to the same market over the
10 course of a year, they develop preferred contacts with particular traders. Relationships might
11 develop such that on a market day, a pastoral producer might contact a particular local trader to be
12 considered for an early sale. Outside market days, this relationship can be used by the traders when
13 sourcing for more goats to fill a truck. This relationship can be vital in a context of a spatially
14 dispersed goat supply and scarce supply information.

15 This relationship can go beyond merely a market transaction when other types of ‘emergency
16 support’ are offered. When a strong relation is built up, a trader can advance credit to a pastoral
17 producer. This applies when the producers have their herd located in distant dry season grazing
18 areas. In such circumstances, the trader might lend the producer cash to be reimbursed later with an
19 equivalent number of sheep or goats. Due to close clan or tribal ties, such borrowing is based on
20 trust and may involve clan elders to assure recovery.

“In the past, we used to only sell to external traders [from non-Rendille ethnic groups], often with many challenges - language barriers, limited room for bargaining better prices. Now, with the entry of Rendille traders, we have leeway to push them to give us better offers since they understand our background situations. Even in the case that our animals are far away and we have pressing need like medical, we can get a loan from traders from our village and pay them back later. This was not possible before” (FGD with producers, Namareii).

21 In the local chain, pastoral producers and different categories of traders share ethnic identity. This is
22 a rather recent development, as up to around the year 2005, trade in the area was dominated by
23 Burji traders from Marsabit central. The change is explained by local traders as now being able `to

1 benefit their own people', a sign of ethnic and sometimes even clan-based solidarity. Belonging to
2 the same community also increases the options for recourse when a problem arises. The practical
3 possibility of connections from the actors' networks combined with a strong bond based on common
4 ethnic identity helps them to manoeuvre in the challenging terrain. Ethnicity and trust were also
5 central to traders' livestock trading strategies in other research (Quarles van Ufford and Zaal, 2004;
6 Quarles van Ufford, 1999).

7 However, relationships are not always positive despite common ethnic identity. Some producers
8 perceive the relation to be exploitative and describe local traders as manipulating prices and working
9 in groups to reduce the prospect of better prices at local markets. Recently as the number of local
10 traders increased, external traders ceased coming to the Ilaut and Korr markets.

"During wet seasons, we have the choice of postponing sales but in dry seasons, we are under pressing need to sell. In such situations, there is naturally a high supply of sheep and goats in the local market, with only few local traders. This results in traders giving low prices... or declining to buy from us altogether. Since we have a pressing problem that cannot wait, we finally sell at the terms favourable to local traders..."
(Producer, Namarei).

11 *Long distance traders – Itinerant traders*

12 Long distance traders develop relations with itinerant traders who sell high numbers of sheep and
13 goats in the local market or at their homestead. Establishing relations with itinerant traders is
14 beneficial to long distance traders because they can quickly amass the required animals and thus
15 reduce the effort and time needed to fill a lorry. Long distance traders seldom depend on brokers at
16 local markets for information on who is willing to sell. Maintaining regular contacts with a group of
17 itinerant traders, results in established relations whereby the long distance traders can contact the
18 itinerant traders before market days to view the animals and make early purchases. This is common
19 especially when the latter has a reputation for selling a high quantity and quality goats. Through this
20 relationship, the trader can pass information regarding the types of goats to be bought by the
21 itinerant trader for a subsequent market day. However, the increase in the number of local markets
22 and regularly occurring market days has reduced the reliance on itinerant traders. Itinerant traders
23 also prefer selling on market days to improve chances of profitable sales by choosing between
24 different traders.

1 *Long distance traders – Butcher-traders*

2 Local traders have established reciprocal relationships with local butchers who slaughter sheep and
3 sell to pastoral households in and around towns. For instance, when a long distance trader learns
4 that there are low prices in the terminal market, he may make choice to leave some animals with the
5 butcher to slaughter and receive the money after the meat is sold. Also, in a situation where an
6 animal has been injured during loading and is unlikely to reach the terminal market alive, the local
7 traders will sell through the local butcher. The butcher can benefit from this relation by occasionally
8 asking the long distance trader to transport sheep and goats to the Nairobi market and sell them on
9 their behalf. This is done to diversify the butcher's business.

10 *Long distance traders – Labourers*

11 Some activities of long distance traders require additional labour in which the required labourer can
12 be recruited through relatives (or extended kinship), traders, producers, or tax collectors. The level of
13 trust required to select a suitable person depends on the task. For instance, selecting the person to
14 trek animals requires a high degree of trust. In such a case a member of the extended family or
15 someone from the same clan is selected. In contrast, when activities are performed in the presence
16 of traders such as in the markets, then a lower degree of trust is required and the person can be
17 recruited from any available assistant at the market. Generally, the ease of building relationships at
18 the local chains between different actors and the local traders within local chains ease their purchase
19 activities.

20

21 *Long distance traders – Lorry broker*

22 Long distance traders must establish and maintain relations with a lorry broker or lorry driver who
23 are important links to lorry owners that are all based in Marsabit town. All long distance traders
24 establish relationships with a lorry broker who performs paid specialised services such as providing
25 information on available lorries, transport fees, lorry drivers and then establishes prior agreements

1 with lorry owners for transport from the local market to Nairobi. The lorry broker may also organise
2 for the required transit- and animal health-permits when this is not done through the lorry owner.

“First I purchased goats from the Korr market and the number was insufficient to fill a truck. So I went to the llaut market to buy more. After I had acquired the number that is equivalent to one truck, I communicated with a lorry broker in Marsabit town to order a lorry and permit to transport the goats” (L47, Korr).

3 Alternatively, some traders establish relationships with a lorry driver after repeated engagements
4 and this established relations have an organisational advantage to the trader to respond in time
5 when information about ‘good prices’ is communicated by brokers based at the terminal market in
6 Nairobi.

7 *Long distance traders – Nairobi brokers*

8 The Nairobi brokers mediate transaction between sellers and buyers. They act as an intermediary to
9 negotiate the sale of animals directly with the clients, i.e. without active involvement of the trader.

10 This relationship offers the following advantages i) the wide client base of the Nairobi broker to
11 realise fast sales and thereby avoid additional costs to the trader ii) follow up on debts in a situation
12 where some customers only pay the deposit for the sale and the balance is to be remitted later.

“Even when he gives some goats to a buyer before they are paid, that is none of our business, and it is him to deal with it because there are some buyers who fear carrying money to the market. They will agree with the broker and the money will eventually reach me” (L47, Korr).

13 The importance of the broker in establishing creditworthiness or reliability of the customer is also
14 documented in other studies (Mahmoud 2008; Cohen 1965; Hill 1966). Cohen (1965) describes
15 brokers as both insurer and risk taker in complex cattle markets characterised by variability in buyers.
16 They guarantee eventual payment because even in situation of default by the buyer, they will take
17 responsibility for paying the traders. Furthermore, interacting with multi-ethnic clients can pose
18 language barriers and expose local traders to greater risks because they are outside of the regional
19 network of long distance traders.

20 Therefore, for long distance traders, it is currently inconceivable to sell sheep and goats without
21 engaging a broker in Nairobi because the buyers in Nairobi are ‘simply faceless’ to the traders from
22 the study area. All long distance traders from Marsabit south recruit the same broker because the
23 contact is passed through positive referral from one trader to another. This broker from Marsabit

1 County is given preference because he 'shares a common region of origin'. When a long distance
2 trader visits the market for the first time, they prefer to be accompanied by an experienced trader
3 who will make an introduction to the broker.

4 *Local traders – Secondary actors*

5 The regulatory requirements associated with the long distance movement of livestock expose long
6 distance traders to secondary actors such as law enforcement officers and tax collectors.
7 Transportation of the sheep and goats with the lorry is always done during the night. However in
8 Kenya, transportation of animals between 6pm and 6am is forbidden by law, under legal notice 119
9 of 1984. If animals would be transported as per the law, the arrival time would be outside the market
10 hours and, combined with more than 10 hours of travel and high day-time temperatures, sheep and
11 goats could become weak or some might even die. As it is better to offer the animals for sale in
12 Nairobi during the more vibrant early morning market, and it is better to sell the animals while they
13 are still 'fresh', before their appearance is diminished due to different climatic conditions and lack of
14 proper forage, the traders are then obliged to pay bribes of non-negotiable sums to police at multiple
15 road check points in an 'institutionalized' manner. The prohibition of night transport is an important
16 factor contributing to losses and systematically disadvantages traders from Marsabit. This practice is
17 aptly described by a trader as, "libations for the grave", ascribing a kind of inevitability to the cost by
18 associating it with the Rendille belief that an offering is necessary whenever you walk by your
19 ancestral graves. Although almost every trader transporting livestock to Nairobi expressed being
20 burdened by the bribery costs, it is generally acknowledged that this is the most feasible option until
21 the law is changed to allow night travel. Also Mahmoud, (2008) identified police tipping at all
22 checkpoints as a salient cost facing long distance cattle traders.

*"We start our journey, when we reach first police checkpoint, we have to pay something small at
the barrier, from that place onwards we have to pay that amount at each barrier we
encounter..." (L45).*

23 The number of pastoral producers selling regularly at the local markets has increased. This change
24 has led to the emergence of another secondary actor, the Livestock Marketing Associations (LMAs)
25 who manage the local markets. The LMAs collect tax per head of sheep and goats sold and remit 70%

1 of money to the County Treasury while the County government provides necessary travel permits to
2 transport goats to Nairobi or to other regional markets. According to local traders and pastoral
3 producers, the activities performed by these two actors are disconnected from the shifting cycles of
4 profit and loss that characterise their trade. The nearly unilateral imposition of tax for each goat or
5 sheep exchanged by sellers and buyers at local markets, in addition to the high fee for issuing travel
6 documents, is not connected to price fluctuations that make the sheep and goat trade precarious.
7 The centralised organisation for issuing these documents further deepens the weak relationships
8 between local traders and county government departments.

9 *Collaboration between local traders*

10 Trader to trader collaboration plays an important role in the organisation of the sheep and goat
11 trade. Whereas the purchase activities at the local markets are mostly performed by traders
12 individually, the movement of animals to a long distance market is mostly done jointly. The
13 collaboration is established out of practical convenience and necessity such as in case of limited
14 working capital. Organising to sell sheep and goats at the Nairobi market requires that a long-
15 distance trader has between 300,000 – 400,000 Ksh. (approximately 3000-4000 Euros) of working
16 capital per trip. As sheep and goats are usually bought on a cash basis, and the working capital is
17 typically raised jointly by 2 - 4 traders per lorry.

*“We still need other traders to help us fill the lorry... [because] the transportation is costly and
hard on us... so we increase the capacity to 160, 170, 180 goats... if there are fewer goats, it
becomes costly” (L48, Korr).*

18
19 Through collaboration between traders, the costs which must be paid in advance such as a deposit
20 for the lorry and the salary for the herder who will supervise the goats *en route* can be shared.
21 Traders share costs according to the number of sheep and goats they contribute to a lorry. Joining
22 efforts to purchase animals reduces the time needed to fill a lorry.
23 Long distance traders will also collaborate by sharing market information. Traders might call each
24 other from the Nairobi market to share information about number of lorries in the market, prices
25 and the demand situation. This is then used to cross-check the information obtained from the

1 Nairobi broker. Traders also help each other at the local market by offering 'peer review' to estimate
2 sheep or goat purchase prices, in order to avoid over pricing that would increase their likelihood of
3 selling at a loss in the terminal market.

4 In the study area, the upcoming traders who are constrained by limited working capital but who aim
5 to trade in the Nairobi market seek mentorship from experienced long distance traders. The 'new
6 trader' can add his goats to the herd of an experienced trader. In such collaboration, the new trader
7 benefits from the contacts, experiences and knowledge of the established trader, while the new
8 trader provides labour during transport so that they can reduce costs together. This is similar to
9 cattle traders from northern Kenya, where larger traders partner with new entrants who begin as
10 apprentices and help procuring cattle. The new trader benefits from guidance and trading tips from
11 the experienced trader (Mahmoud, 2008, p. 571).

12 Among itinerant traders, collaboration is mainly sought when goats are trekked to a secondary
13 market, usually involving a 3-4 days of travel. Combining their animals eases trekking and also
14 reduces risks related to predators and robbery along the way. Secondly, they also collaborate to
15 boost their bargaining power by strategically selling their goats together in the market to attract
16 buyers interested in large sales.

17 *3.4 Gaps in relationships and implications for producers and local traders*

18 Because of the intermediary role of Nairobi-based brokers discussed above, long distance traders
19 have no direct link to end buyers. This gives the broker a powerful position. A similar finding was
20 highlighted by Watson and Binsbergen (2008) who argued that because of the dominance of the
21 brokers, the Nairobi market is difficult to penetrate by traders from pastoral regions. The missing
22 relationship between the long distance traders and the clients in Nairobi also results in a lack of
23 knowledge regarding supply specifications, such as 1) the range of prices disaggregated for different
24 types and sizes of goats or sheep 2) available buyers and their specific demands, from which to
25 select, 3) specifications regarding the type of goats, sizes and other attributes preferred by end
26 consumers, and 4) alternative market outlets in Nairobi or other urban centres.

1 Currently this knowledge is partly with Nairobi brokers who never divulge it to local traders because
2 of the obvious implications to their businesses. Due to this gap, a mismatch between the types of
3 sheep and goats delivered by traders and the demands of the market are likely to happen. To hedge
4 themselves, long distance traders often revert to transporting a mix of different types and sizes of
5 sheep and goats. While this is an important buffering strategy to save them from severe losses, it
6 simultaneously limits potential profits.

7 The second gap is between the local traders and Non-Governmental Organizations (NGOs) that
8 conduct projects on “linking pastoralists to markets”. Most investment was directed towards building
9 market structures, offering financial grants and capacity building to the LMAs for managing local
10 markets. Local traders articulated that they are not informed about upcoming projects with potential
11 benefits to their trading business.

12 The third gap is between local traders and the Marsabit county government. The county government
13 executes projects to improve livestock marketing. A recent example is the establishment of a
14 slaughterhouse near Marsabit town as part of a strategy to supply meat to both national and
15 international markets. Despite their central role in the supply chain, local traders and producers were
16 not adequately involved or consulted in the crucial planning stages meaning that the perspectives of
17 those currently active in the system get overlooked.

18

19 **Conclusion**

20 As rural livelihoods in northern Kenya depend on the trade of sheep and goats, local traders perform
21 a vital function to link pastoral producers to markets. This analysis shows that trade is sustained by a
22 diverse set of local traders who play different roles in the finely-branched supply chain that
23 streamlines the supply towards diverse local, regional and terminal markets. In this marginalised vast
24 rural area characterised by varying sheep and goat supply, local traders harness their relationships to
25 primary and secondary actors to up-hold their trading activities in uncertain ecological and economic
26 contexts.

1 Activity analysis revealed activities which can be considered for improving the supply chain
2 coordination. Currently there are no established contracts with agreed upon prices between the
3 traders and end buyers and there is also a lack of prior information about the types and numbers of
4 animals demanded at the terminal market. This means that the traders have to manoeuvre in a
5 terrain characterised by uncertainty in profit margins and potential high operating costs. Given that
6 animals have a 'limited shelf life' in the urban environment, major losses occur when they cannot be
7 sold immediately. After being taken out of their rearing environment, their appearance diminishes
8 due to different climatic conditions and lack of proper forage reducing their potential sale price.
9 Simultaneously, their up-keep in Nairobi leads to high costs.

10 In order to make quick sale, local traders rely on their relationship with a Nairobi broker who has a
11 broad client base. However in the absence of alternative contacts, they are at the mercy of this
12 broker. A high extent of collaboration between local traders with regard to organisational,
13 informational and financial issues as well as their attitude of ethnic solidarity leverage some
14 advantage but may not be enough to continue fulfilling their role of linking pastoralists to the market
15 in the long term.

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