



Determinants of quality-based payments for livestock in conflict-prone areas in Kenya

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ABSTRACT

The mechanisms influencing livestock pricing in Kenya are well studied. The determinants of quality-based payments on markets in conflict-affected areas, however, are hardly documented. In this paper, we offer a deeper understanding of transitions towards quality-based payments from the perspective of livestock buyers in the Kerio-Valley, Kenya. The location is known for protracted communal conflicts. Transcripts from qualitative interviews, focus group discussions and field notes from participant observation we coded and analysed using MAXQDA. Our data identify three broad determinants (chain organisation and financing, market system development, quality and value of livestock) relevant for the transition from traditional to quality-based payments for livestock in conflict prone drylands. We then discuss the standard definition of livestock quality by market players, the behaviours of traders, and market institutions as entry points to leverage transitions to quality-based payments in future. Also, seasonal changes and security perceptions influence the potential for introducing quality-based payments. Although limited to the Kerio-Valley, key insights we offer could apply to similar conflict-prone settings in the region.

1. Introduction

Livestock is of paramount social, economic, and cultural value to agro-pastoral communities in Kenya's semi-arid Kerio-Valley. Livestock enterprises are essential for household food security (Little et al., 2014) and human nutrition (Sadler et al., 2009). Also, animals are a source of food and cash, and they pay for dowry, gifts and fines (Lipalei et al., 2020). Although mostly informal, the livestock sector in the region employs about 90% of the population (Akoyo and Songok, 2013). Therefore, livestock is one pathway to accelerate economic development in the area, primarily through the marketing of cattle, goats and sheep (Otieno et al., 2012; De Haan et al., 2016). It is hard to imagine secure livelihoods without livestock in the Kerio-Valley.

However, economic revenues through livestock are overshadowed by long-running trans-boundary conflicts between communities in Baringo, Elgeyo Marakwet and West Pokot counties. These violent conflicts are mainly caused by the scramble for scarce livestock production resources such as fodder and water (Derbyshire et al., 2020; Elfversson, 2016, 2019; Kiptoo, 2020). Although reported as low-intensity disputes (Huho, 2012; Konrad-Adenauer-Stiftung and et al., 2016; Opongo, 2020), livestock markets closed in response to peaking conflicts

(Cheserek et al., 2012; Chebii, 2018). This limited trade in the area, then livestock prices fell while prices for imported foods and household items rose. At the same time, the increasing cultural demand for livestock fuelled cattle rustling in the Kerio-Valley. Over a period of twenty years, seasonally reoccurring conflict episodes brought economic development to a standstill (Elfversson, 2017; Kamaiyo, 2016). In July 2019, state- and non-state actors signed a peace agreement to open new development opportunities in the Kerio-Valley. The current peace process has enabled people to return to their farms. Some started to invest in cereals – particularly sorghum for food and livestock feeds – others ventured into vegetables and livestock enterprises. Then, livestock markets reopened in August 2019. As a consequence, trade set in the subsequent months.

One challenge for communities in the Kerio-Valley is maintaining the peace. As FAO (2016), we also underscore that sustainable livelihoods and economic development of communities in conflict-affected areas are essential for peace. However, such efforts call for a good understanding of economic activities of the population in the area – in the Kerio-Valley, this is livestock-related business – to devise ways of increasing their margins, utility and overall market performance for livelihood enhancement and community transformation. Also in Kenya, urbanisation, rising per capita income and dietary transitions towards more

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animal protein per capita (Thornton et al., 2009; Gerber et al., 2014; Tessema et al., 2014; Teklewold et al., 2016) offer livestock-keeping communities new market opportunities. Producing for a target market would enable livestock keepers to enter into the cash economy, which reasonably encourages specialisation and efficiency (Hauck and Rubenstein, 2017). Accordingly, livestock keeping will also be oriented towards specific wants and needs of their target buyers, who will likely reward them through paying a higher price for the better quality of livestock sold (Tessema et al., 2014; Lijalem et al., 2015). But the extent to which livestock marketing benefits sellers depends a lot on pricing. The price of any traded commodity is directly related to its utility generating attributes. Researchers have indicated that the observed market price of a live animal is the sum of the implicit costs for each quality attribute. That is, the quality attributes of a live animal determine its market price (Teklewold et al., 2009; Kassa et al., 2017). Market researchers have looked into such price building mechanisms on various Kenyan livestock markets (Barrett et al., 2005). There is also increasing international literature on quality-based payments in the livestock sector (Carlsson et al., 2007; Cornish et al., 2020). Hauck and Rubenstein (2017) even suggest shifting the research focus from conventional pastoral economics to alternative approaches that account for the links between traditional rural livelihoods, local markets and globalisation.

However, studies that put in perspective traditional livestock pricing against alternative price-building mechanisms among conflict-prone pastoral communities are still limited in the literature. Hence, the conditions under which livestock market actors would transition from traditional to quality-based payments are unknown. We assume that if livestock owners are paid a quality-based price for their animals, they would fatten their animals and supply the market with quality livestock (Ng'eno et al., 2010). The benefits of this would be three-fold. First, herders will earn more to meet their needs for food, clothes and medical bills (Opiyo et al., 2015). Second, meat processing companies will access quality animals to maximise their operational capacities. Third, the end-consumers of meat will get higher quality products.

Understanding the conditions for transitions to quality-based payments in traditional livestock markets is also relevant to reducing climate risks in the area. If livestock buyers pay a premium for quality animals, livestock keepers could invest these additional revenues more deliberately into strategic livestock feed reserves. Livestock keepers need such feed reserves to secure their livestock during drought. Feed options include the import of hay from outside the Kerio-Valley and irrigated fodder production in the area. All these investments require funds, and quality-based payments - as we argue in this article - could contribute the necessary financial resources.

Reinvestment decisions by livestock keepers are not the subject of the study presented in the article. Also, we do not investigate how the market potential of the livestock sector in the Kerio-Valley is hampered by inadequate livestock production conditions (Akoyo and Songok, 2013; Kamaiyo, 2016). In this article, we deliberately investigate conditions for transitioning from traditional to quality-based payments from the perspective of the livestock buyers and sector technocrats in the area. We answer the questions: Under what conditions are quality-based payments for livestock possible in conflict prone pastoral drylands? What considerations should market-led interventions of technology adoption, market system formalisation and private sector participation make for livestock in conflict prone pastoral drylands?

Finally, it is useful to highlight the practical relevance of this research. Although we are looking at one specific case, insights generated from it potentially inform similar conflict-affected settings in the Horn of Africa, East Africa and the Sahel. These areas have a relatively high degree of ecological fragility; all are semi-arid and therefore supporting pastoral or agro-pastoral livelihoods. Although market access and the development of market infrastructure differ across the regions, the evidence we generate is useful as a basis for confirmative studies elsewhere. The findings could be relevant for development of theories of change supporting peacebuilding in the area.

2. Methodology

2.1. Setting

The study took place in the Kerio-Valley, which has been characterised by cattle rustling and ethnic conflicts for several decades. This area stretches to three counties, namely West Pokot, Baringo and Elgeyo-Marakwet, with an elevation of 1000m above sea level (Fig. 1). The Valley is semi-arid, lying between Elgeyo escarpment and the Tugen Hills. It receives an average annual rainfall of 1000 mm and has an average temperature of 24 °C (Barsosio et al., 2016). The primary source of water for domestic use and watering crops and animals in the Valley is the Kerio River. Other small and seasonal streams are used mainly by traders to water animals as they trek to the market. These include Enou, Embolot, Embobut, Embo Karena, Chesegon and Lomut streams.

The Valley is home to Elgeyos, Markwets, Pokots, Tugens and Nandis, all part of the bigger ethnic group, the Kalenjin. We conducted this study among Marakwet and Pokot communities targeting eight livestock trading centres and markets including Chesoi, Chesongoch, Sambalat, Sangach on the Marakwet side and Kolowa, Chesegon, Sigor and Lomut on the Pokot side. The Marakwets are farmers growing crops such as maize, cassava, sorghum, finger millet, beans and pearl millet alongside keeping various breeds of cattle, goats and sheep. The majority of the Pokots are members of agro-pastoral communities and keep cattle, goats and sheep. Some still move their herds within the region, especially during drought.

2.2. The livestock marketing channels

From the herders' households, animals are either sold to neighbours, village aggregators, village butchers or handed over to brokers who act as selling and commission agents for the agro-pastoralists. The village aggregators buy animals in relatively small numbers, often between two or three. Together with brokers, the aggregators take animals to the village centres such as Samabalat and Sangach for sale to intermediate traders who are assemblers with more funds and capacities for bulking larger numbers of animals. These intermediate traders visit smaller livestock markets such as Chesegon, Chesoi and Chesongoch, where some sell off their animals to more prominent traders or gradually build up the herd for sale in bigger markets such as Kolowa and Lumot.

Some traders buy animals for fattening or immediate resale at the same market. Butchers buy animals for slaughter and sell the meat within villages. Also, some individual farmers and agro-pastoralists buy animals to expand their herds or for cultural ceremonies such as circumcision, wedding or funeral rites. Ownership of the cattle, goats and sheep may, in some cases, change hands two or three times before reaching Lumot, while in other cases, it may be a direct supply from herders or village buyers to the market.

Cattle transportation to the region's markets is by trekking while goats and sheep from distant places are sometimes carried on motorcycles and in rare cases on pickups or tractors. Larger traders from within the Kerio-Valley and outside buy cattle in large numbers (usually above 15 heads) from Lumot and take them to big markets outside the Valley such as Chwele in Western Kenya, Eldoret in Uasin Gishu County and Nairobi for sale to wholesalers and retailers/butchers. Therefore, besides herders, the major actors in the livestock marketing chain in the study area include the aggregators, the brokers, the traders and the butchers.

2.3. Research design and sampling

Since accurate data on the livestock buyers' preferences are unavailable, willingness-to-pay experiments were no option. Therefore, we employed qualitative in-depth interviews, focus group discussions and participant observations to explore the perspectives, opinions and behaviour of market actors and other factors which determine livestock

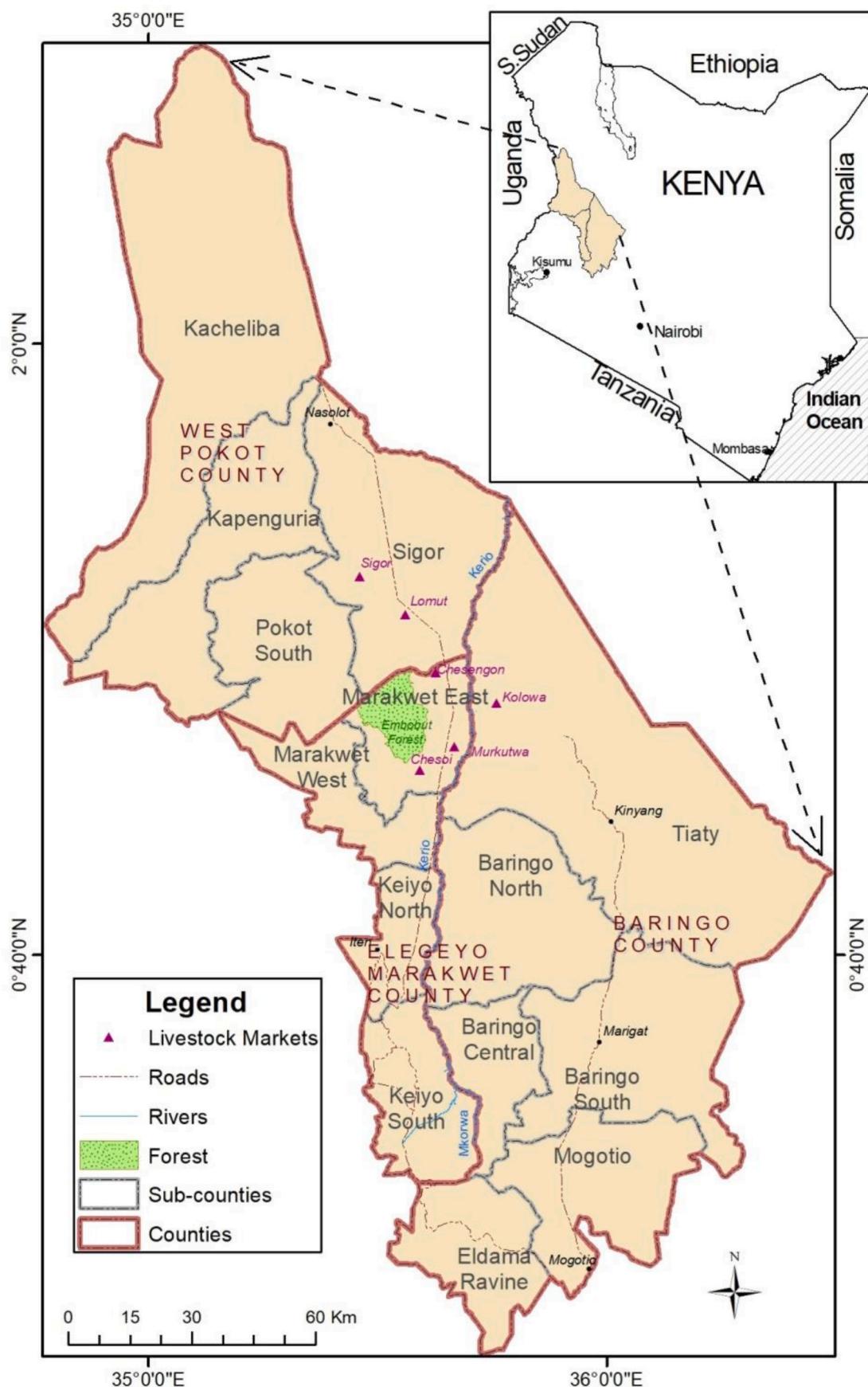


Fig. 1. Map of the study area in the North-Rift, Kenya (Geoffrey Maina, Egerton University).

price-building.

With the help of the sub-county livestock production and revenue office, we snowball-sampled 16 key informants to represent the buying perspective. These included: three livestock collectors/aggregators (bulking animals from herders and within the market for sale to distant traders), two butchers (buying live animals directly from markets for slaughter and sale of meat), seven livestock traders (buying animals in bulk and trading in markets beyond the Valley such as Eldoret town and Nairobi city), one livestock broker (acting as a livestock commission or selling agent for herders away from the markets). To gain an institutional perspective on the functioning and performance of livestock markets in the region, we purposefully sampled a sub-county revenue supervisor, a market revenue clerk and a sub-county veterinary officer. Snowball sampling and interviews yielded both common and disparate views from among the respondents, and we stopped seeking interviewees at the point of saturation.

We purposefully selected three markets for participant observations based on the size and volume of livestock trade reported by respective sub-county authorities. Chesegon market is a primary market; Kolowa is a secondary market, while Lomut is a tertiary or terminal market. Participants in the observed markets were from both Pokot and the Marakwet communities. As a means of triangulation and to deepen our understanding, we conducted three focus group discussions, each involving 5–6 key informants (ensuring a balance of broker, butcher, trader and aggregator). The focus group discussion participants were livestock buyers snowball selected from the areas where the market observations were carried out but were not individually interviewed as key informants. All the three markets observed are in West Pokot County because of foot-and-mouth disease containment measures in Marakwet during data collection. As such, this research presents the perspective of market actors in West Pokot only. We would have to repeat the same study in Marakwet to cross-check our findings.

2.4. Data collection

Interviews were conducted in November 2019 by three research assistants recruited from the community and trained for administering the interviews in either Marakwet or Pokot language. They also served as translators. After obtaining informed consent from respondents, all interviews were audio-recorded by the first author, who guided the interviews. The interviews of key market actors who were either purchasing or facilitating the purchase of live animals ran for 45 min each.

Two days of participant observations in three livestock markets were conducted, each running for 7 h between 9:00 a.m. to 5:00 p.m. at Chesegon, Kolowa and Lomut. We held informal conversations during the market observations; respective content served as additional data for this analysis.

After a preliminary examination of the data, we redefined questions through re-wording and re-ordering to improve clarity, logical question sequence and instruction adequacy. Three months later, in January 2020, we returned to the field for another round of interviews with four key informants and three focus group discussions of livestock market actors different from those interviewed in the first round but from the areas where livestock market observations were conducted. This step was aimed at increasing the data diversity and even out the environmental seasonality of the data.

2.5. Data preparation and analysis

2.5.1. Preparation of the data

All audio interview files were transcribed verbatim in Microsoft word documents. The transcripts were imported to MAXQDA version 2020 for coding and analysis. Each transcript from an interviewee was imported into MAXQDA project as a single document. The three focus group discussions (FGDs) were transcribed individually and each FGD transcript was imported into MAXQDA as a single document. Although,

MAXQDA provides an option for importing focus group transcriptions that automatically code the contributions made to the discussion by each participant, the function is only important when the researcher is interested in analyzing focus groups at the individual level (Gizzi and Rädiker, 2021). Our focus was not on respondent's individual contributions but on their views as a group and thus we did not identify contributions by participant's names in the focus group discussions. The MAXQDA project had 19 documents in the document system, 16 for the individual interviewees and 3 for the focus group discussions.

Document memos were used to describe information from the market observation that was relevant for a given transcript. Further, memos were used to highlight important contextual information of the interview or focus group discussion.

2.5.2. The coding process

Coding was done in-situ after reading three randomly selected transcripts to identify the major themes as highlighted by the respondents during interviews. The six initial top-level codes identified from the selected transcripts included seasonality, pricing method, institutional factors, cultural factors, security and convenience of purchase and marketing constraints. More top-level codes and sub codes emerged and were included during coding exercise in the MAXQDA code system. Blocks of data were coded simultaneously with codes and sub codes based on the relevance of statements to the research question. Therefore, not every part of the transcripts was coded. For intercoder consistency, after the coding exercise by the first author, the codes and sub-codes were carefully cross-examined by the second author and a few discrepancies found were discussed and rectified to ensure that codes were descriptive of data.

2.5.3. Analysis

The data was analysed using the MAXQDA code matrix browser to visualise the frequency at which codes such as security, seasons, quality definition and market institutions were mentioned by respondents. Because nodes for 19 documents would be too many to analyse at a glance, we created a code matrix of the six document groups (broker, FGDs, area technocrats, butchers, livestock traders and livestock collectors) to display nodes representing the number of times a code was assigned to a document group (Fig. 2). For each of the identified themes from the data, sample text quotes were extracted from transcripts and used to contextualise themes in the result narratives. Rather than generalizability of the findings, we aimed to scope the field to prepare subsequent quantitative studies.

3. Results

3.1. Overview

The butchers mentioned several aspects about animal health as it relates to the quality of livestock whereas area technocrats, i.e. county government employees (supervisor of revenues, veterinary officers market clerk) identified cultural beliefs as an important quality consideration. Conversely, the narratives of livestock collectors focused on security and animal transport. Animal transport was significantly mentioned by all groups of respondents.

Weighing was majorly mentioned by the broker and technocrats. Competition among buyers was largely discussed in the FGDs while seasonality and convenience of transaction were mentioned highly by livestock traders (Fig. 2).

MAXQDA's visual tool gave us considerable information about how livestock market players perceived payment for quality livestock with similarities and disparities in the data gathered from the different groups of respondents. We developed a strategy to organize and write the results using quotes and excerpts that demonstrated findings and a summary figure of top level codes and sub-codes (Fig. 3). We also included some ideas about why some narratives were given by respondent groups.

Code System	Broker	FGDs	Butchers	Area technocrats	Livestock collectors	Livestock traders	SUM
Definition of quality							10
Animal attributes	■	■	■	■	■	■	34
Animal Health	■		■	■		■	21
Veterinary/extension service				■			2
Animal breed	■	■	■	■			14
Fodder availability	■			■	■		12
skin colour		■					2
Physical integrity						■	5
Purpose of the animal	■	■					11
Cultural ceremonies							1
Cultural beliefs		■	■	■	■		21
Livestock products				■			4
Heat/trekking tolerance			■				6
Weather	■		■				16
Security							14
Raids/theft						■	13
Secure purchase							8
Buyer behaviour		■					4
Liquidity of buyers							2
Pricing method			■				15
Negotiation	■	■	■				26
Auctioning							8
Weighing			■				33
Competition among buyers	■		■	■			16
Seasonality	■		■				30
Marketing institutions							6
Convinience of transaction	■	■	■	■			36
Finance institutions		■		■			14
Animal Transport	■	■	■	■	■		45
Σ SUM	18	66	30	94	87	134	429

Fig. 2. Visualization of the codes using the Code Matrix Browser (relativized by column).

The main factors influencing quality-based payment for livestock identified from the data include the definition of quality by market players, buyers' behaviour towards sellers, and market institutions. The data also offers insights into pricing method, seasonality and security-related factors that influence quality-based payments for livestock. Fig. 3 provides an overview of the quality-based payment model we derived from the data. The following boundary conditions apply when using the model. First, the model applies to price-building from the perspective of buyers of livestock only. Second, the model is derived through data collected in a conflict-affected setting and may look different in other contexts. The model offers insights about entry points to leverage quality-based payments for livestock in agro-pastoral areas within these conditions. The following sections underpin these insights with empirical data we collected.

3.2. Definition of quality

The definition of quality by buyers influences quality-based payment for livestock. Our data shows that buyers define quality in terms of three parameters: animal attributes, then weather and trekking-tolerance of the animal, and finally, the purpose of the animal being purchased. These quality definitions are location- and profession-specific. For instance, during market observation in Kolowa, we noted that the butchers were more interested in the animal's weight. In contrast, those who were purchasing to fatten or multiply were interested in animals with superior breeding and fattening characteristics. Therefore, to them, features such as age and breed were important.

The data provide evidence that animal-related visual attributes such

as age, fatness (whether or not there are visible signs of ribs), the animal's health judged by the smoothness of the fur, and completeness and health of the udder influence payment for quality.

'Body features of the animals such as teeth determine the price. Broken or missing teeth indicate an old animal which is going direct for slaughter as it cannot graze well to gain weight, so the price will be low'. (Collector, Male)

Also, weather-related considerations influence quality perceptions. Our data suggest that traders pay more for livestock with high weather and trekking-tolerance. In an interview, one trader in West Pokot revealed how to recognise the durability of livestock:

'I prefer animals with a white coat because they are able to withstand hot weather'. (Trader, male)

Large and heavy animals, animals with long hooves and those partially or entirely blind, cannot trek to grazing lands or the market quickly and therefore attract a low price from the buyers. Additionally, interviewees highlight that Jersey or Friesian breeds cannot tolerate the long walk to the market under high temperatures. Interviewed buyers were unwilling to pay a high price for them but preferred crossbreeds. One collector emphasised during the interview:

'The crossbreeds do well in our area because they are tolerant to the climate and they grow big'. (Collector, male)

The data reveal that institutional factors influence payment for quality. Traders complain about the low quality of animals they get in

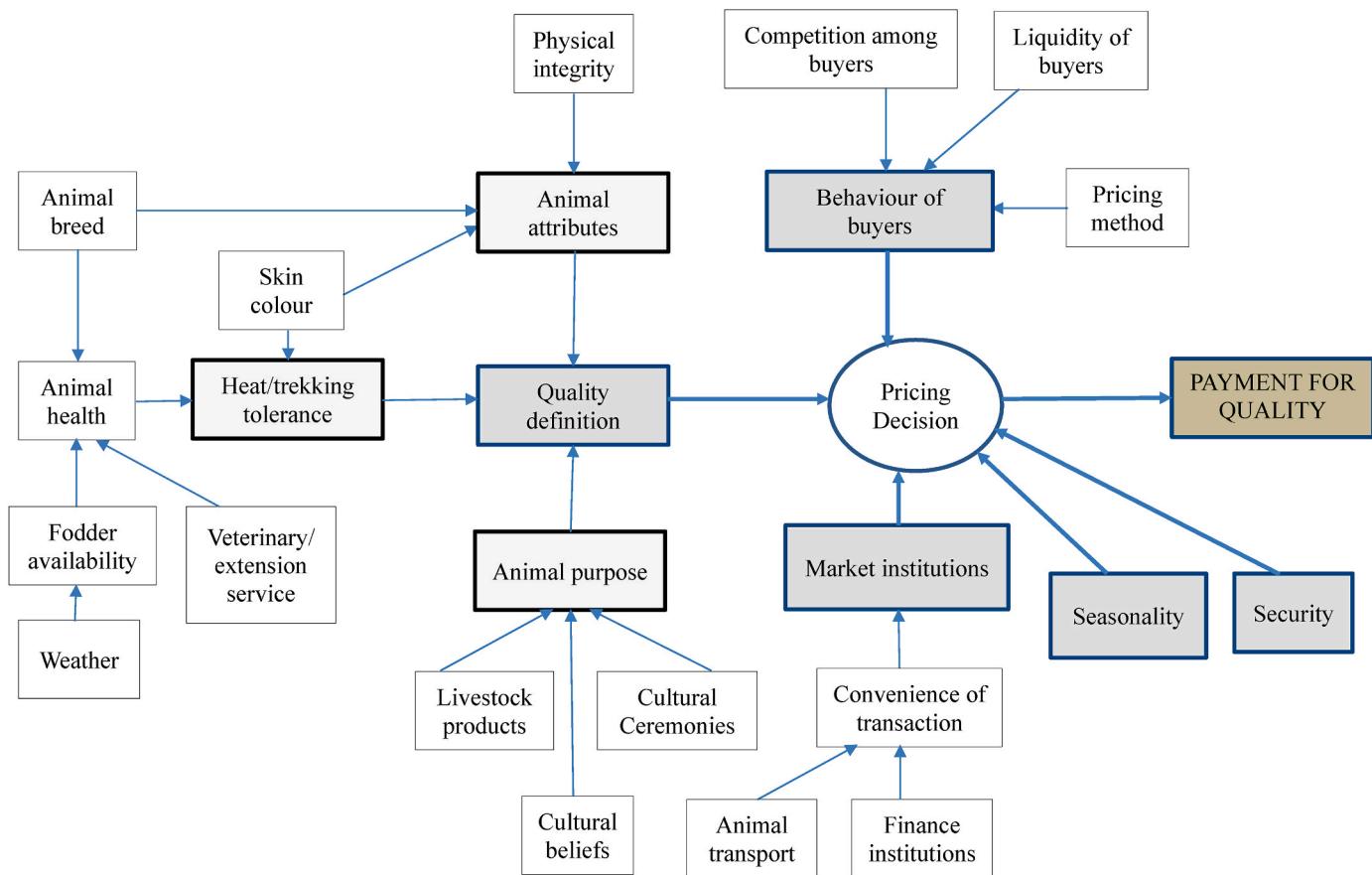


Fig. 3. Model grouping factors affecting payment for quality live animals based on data collected.

the Kerio-Valley, yet they know that breeds could be improved through research, and they get better quality animals for which they would be willing to pay a better price. Narratives linked the 'absence of dams' and 'the poor state of roads' to the 'corruption of some political officials'.

'The multiplication centre called Chesongoch multiplication centre releases good goats which can grow up to 30–40 kg; amongst our local breeds, you cannot get such. The only problem is that we do not have access to these goats. One time we bought a goat from there which weighed 40 kg. Our own breed of goats only ranges between 7–20 kg'. (Butcher, Male)

From the perspective of livestock traders, veterinary and extension services in the area are inadequate. This inadequacy hinders disease prevention and exposes the area to recurrent disease control quarantines. They called for an increase in these services to train farmers on the best animal husbandry practices, enhance surveillance and vaccination against trans-boundary diseases to prevent these diseases. This, the traders said, would reduce the rampant quarantines that disrupt animal trade, lowers their capital and sometimes forcing them out of business.

'Another challenge which has now become a challenge of every year in this place, at least there is a disease which can come like foot and mouth disease and that foot-and-mouth can take like three to four months then those three to four months you have started eating the capital because there is no business taking place' (Trader, Male)

A final cluster of variables defining livestock quality in the perspective of buyers we derived from conversations relates to cultural ceremonies such as weddings, burials and circumcision. All these ceremonies have unique quality criteria for the cattle, goat or sheep required. For example, traders noted that such seasonal cultural circumstances influence price building.

'In the August of an even year like 2020, a quality bull which fetches a high price is uncastrated, black in colour with both horns complete, both eyes, ears and other external body parts intact'. (Trader, Male)

Bulls black in colour fetch high prices on the market in Chwеле in western Kenya where – in that month – 12-year old boys of the Luhya community are circumcised, and such black bulls are a prerequisite for the ceremony. For a wedding or a burial of a respected senior male community member, the male goat slaughtered should not be castrated.

Further, cultural beliefs also influence quality-based payments for livestock. For instance, traders indicated that they would pay more for un-castrated bulls because it is believed that un-castrated animals weigh more than those not castrated. For this reason, during our market observations, we saw no bullocks or wholly castrated goats and sheep. The few goat and sheep castrates partially castrated by removing only one testis. The community believes that when only the right testis is removed, the animal will sire female offspring, whereas if only the right testis is left, the animal will sire male offspring.

3.3. Behaviour of buyers

The behaviour of buyers influences livestock prices. Our data show that interviewed buyers maintain secrecy, possibly to preserve their position as the sole custodians of market information (e.g. prices, supply and demand of live animals). At the sheep and goat markets, sellers were organised in groups, and they seemed to be pulling off combined efforts to ensure that their animals sell for a better price. Family members accompanied some sellers to lower the risk of exploitation by buyers. When the animals arrived at the market, buyers rushed to pick large animals from the new arrivals. They would ensure that they pull away the seller from the crowd to secretly engage them in a price negotiation

through whispers and hand signs. When an agreeable price is reached, buyers pay privately. Our data also show that sellers do not trust their bargaining power against that of buyers. For example, at Lomut cattle market during the field visit, a male seller felt that the buyer cheated him. He then sought help from one of the traders who negotiated with the buyer. In a few minutes, the transaction was closed.

The pricing method is another factor that influences quality-based payments. In the markets as well as in the community, animal prices are determined through negotiation or auctioning. Though negotiations, there is an agreement reached by both the buyer and seller, the usually low bargaining power of herders/sellers hinders payment for quality. For example, one male trader said "during negotiations the farmer may hit you, or you hit the farmer hard". Our data shows that those interviewed do not mind how 'good an animal is', but instead, it is the convincing power of the trader that matters.

There are also issues that buyers shared that make auctioning ineffective in determining the prices of animals. For instance, the auctioneer sets the asking price and determines the final selling price. In a normal market situation, the buyers who befriend the auctioneers communicate with them by using hand gestures to stop them from raising the price. In essence, it is the buyers who determine the price and rarely the auctioneer. One aggregator remembered a day in Chesoi market when a bull that everyone thought could sell for at least Ksh. 62,000 (\$ 620) was sold at only Ksh. 42,000 (\$ 420), still due to buyers controlling the price. To this, aggregators responded with a demonstration and took their animals back home.

The remedy to the situation would be weighing animals to determine the price, which is not presently practised in the study area. Nonetheless, butchers on the Marakwet side of the Valley expressed optimism to use weighing scales. This would enable them to know the actual live weight of animals and reduce the losses they make when they overestimate animals' weight during price negotiations.

'Sometimes, we overestimate the price because we are not able to determine the exact weight. So, it is better to use a kilo (weighing scale) so that we measure exactly'. (Butcher, Male)

'Weighing is very good; it will even motivate farmers to feed their animals well because they know that they will get more money'. (Sub-County veterinary officer)

'When there is weighing, between the buyer and the seller, there is no loser; both are winners'. (Sub-County revenue supervisor)

Market traders we interviewed expressed concerns about; i) herders knowing their profit if they weigh; ii) how weighing scales would be repaired if they became faulty, and iii) not account for internal organs which meat inspectors could condemn due to parasite infestation. In Pokot, perceptions changed. Pokot buyers take price negotiations while selling animals to be part and parcel of their culture. Our data shows that weighing animals is outside their cultural boundaries.

'Price negotiation for animals is part of our culture, it is what we have known since childhood, and we have never seen anyone weigh animals'. (Trader, male)

Finally, capital inadequacies due to limited access to reliable and affordable credit hinder traders' potential to pay for quality animals.

'Another challenge is lack of capital, I can even be able to buy 20 heads of cattle, but my capital cannot afford me. Though at least banks are assisting us, the only problem is that the interest is high. We should be assisted with low-interest rate loans'. (Trader, Male)

3.4. Market institutions

The convenience of the purchase matters to buyers. Interviewees indicated that they would pay more if they find a herder selling many

animals or if the animals are brought to them near the market. This is because it would reduce the time and transport cost they incur while traversing villages looking for animals to buy.

Marketing constraints, such as transport infrastructure and logistical issues, influence payment for quality. The primary means of transporting cattle to the market is trekking. Lorry owners are hesitant to involve their trucks in the transportation of animals owing to the difficulty in the navigation of some parts of the Valley due to the rough roads, especially during the rainy season when the roads become muddy, slippery and in worst cases, blocked by mudslides. Therefore, in most cases, services of animal chasers ("musowos" in Marakwet) are sought to take animals to the market. A trip from Lumot to Eldoret (approximately 200 km) takes about three to four days. This exposes animals to risks ranging from getting lost, falling sick, involvement in accidents such as falling off the steep slopes, being knocked by vehicles and sometimes animals dying during transit. Even when animals finally make it to the market, they are exhausted, often fractured, or lost weight. This reduces the price and profit made by traders due to lower weight and fractured or bruised part being condemned by meat inspectors. Buyers stated that when they are buying, they account for all these risks and thus could pay more to the herders if the transport improves and can take animals to the market using lorries.

'The main challenge is the transport from Tot to Kolowa, if we get lorries to transport goats from the market; I am very willing to pay more to the farmers'. (Butcher, female)

In the livestock markets, the payment mode was cash only and no credit or MPESA (i.e. mobile money). This was because the sellers had an urgent need for cash, and part of the buyers in the market were brokers who were buying from herders for immediate resale. Also, our data shows that market actors – especially herders – do not trust MPESA. They claimed buyers would dupe them with empty MPESA messages that did not credit their accounts with money, and MPESA has high transaction costs and accessibility issues.

3.5. Seasonality

Seasonality affects market forces of demand and supply of animals and thus influences the prices of animals. For instance, buyers indicated that in January, schools open, and there is usually a drought between February through March, which leads to scarcity of fodder and water. Therefore, during this period, they pay less for animals because animals are not fat, and there is a rush by herders to sell animals to avoid animal deaths and pay school fees for their children. Some collectors stated that these are the months when they buy animals for fattening and selling in the future.

'Prices are low when schools open; that is when we take advantage of it'. (Collector, Male)

'Actually, in these months in the 1980s, we used to call for Harambee to help animals to stand in the morning because they would be weak. You know those days there was no feed conservation like now when farmers are making silage and grind maize stovers to feed animals throughout the year'. (Sub-County Veterinary officer)

Between April and June, the region receives the first rainy season, the goats tremble (shiver), which negatively affects the quality of chevon. Goats' meat in these months will be soft but not tasty. Also, farmers put most of their time and finances into crop production for buying seeds and other production inputs, so the demand for meat decreases drastically.

'The three months are terrible for me; I sometimes wish that I could just do away with the business. I usually use the money from other months to run the business in these months'. (Butcher, Male)

Between Augusts to December, there is sufficient pasture and water, the quality of animals improves, and herders are hesitant to sell their animals. When Christmas approaches, the demand for live animals outstrips supply, and therefore traders pay more money for the animals.

'The price I pay depends on the market price, if the market price is high, I too will pay more to the seller'. (Trader, Male)

3.6. Security

Our data highlights that the security of animal purchase mediates the willingness of livestock buyers to consider quality-based payments for livestock. In the Kolowa market, traders shared that the improvement in the market's security situation brings more players and pushes up the price; this enables them to pay more for quality animals because they are sure that they will reach the market, get buyers and make a sale. Traders described instances where they lost money due to purchasing stolen animals or animals sold without the consent of a spouse.

'A man may sell you a cow without informing his wife; when on the way to the market, the wife comes and says, we have not agreed with that man to sell this cow and going back to the man he has used the money. He either gives you less, or you lose all the money. So, to avoid such problems, you inform the wife early that I am coming home to buy that bull'. (Trader, male)

Cattle theft through raids was reported as a factor that was not only

affecting livestock marketing but also the whole livelihood system of pastoralism. We observed that the issue of security in the study area was very delicate and hardly any respondents were willing to expansively comment on it. The interviews with some respondents revealed that cattle raids that sometimes turned into deadly conflicts negatively impacted on their way of life. For instance, after the 1992 clashes with the Pokots, the Marakwets decided to abandon cattle and concentrate on farming as opposed to agro-pastoralism.

'Marakwets after 1990s, they did away with keeping animals completely. There are households in Marakwet side that do not even own even one goat leave alone cows. There are very many households without a cow. My own family, we have never owned a cow when I was growing up here even up to today' (collector, male)

Households that continued keeping cattle in Elgeyo Marakwet County are being discouraged by theft and their herds are continuously diminishing.

'Also there was a lot of theft, people were refusing to buy animals from Marakwet, they say that may be these ones are from Pokot, even there is once 56 cows were sold at Murukutwa, recovered at Iten and all were taken to Pokot and traders lost millions of money. They were told all these cows were stolen'. (Sub-County revenue supervisor)

This is a classic example of the negative impact of raids on pastoralism, it increases suspicion that degenerates into conflict prompting some sections of the population to abandon pastoralism and livestock

Table 1
Conditions for transition from traditional to quality-based payments for livestock.

Category	Variable	Traditional price building	Quality-based payments	Conditions for quality-based payments
Chain organisation and financing	Value chain organisation	Relies on a network of intermediaries (brokers) in the livestock value chain	Engage few, dedicated actors in the livestock value chain	Herders organize in producer groups and perform bulk livestock trade operations to improve their bargaining power and forge direct market linkages
	Finance and liquidity	Traders have limited capital and limited access to formal credit	Enable adequate capital and access to formal credit by traders	De-risking livestock trade through credit guarantees and insurance to encourage lenders to increase the portfolio allocations and lower interest rates for livestock traders.
Market system development	Formalising price building	Prices are determined through negotiation and auctioning	Prices are determined through the weighing of animals.	Training traders on the benefits of using a weighing scale, a policy guideline on the use of weighing scales in the live animal trade.
	Price guarantees	Unstable livestock prices over time (seasons) and quality of livestock	Stable prices over time and quality of live animals.	Support fodder intensification initiatives, construct dams and irrigation schemes to even out seasonal supply rigidities of live animals and stabilise prices
E-Commerce Transaction/ Payment mode		Transactions require the physical presence of the parties involved and livestock, MPESA is not acceptable by the herders citing trust, accessibility issues as well as transaction costs.	Transactions can be performed without the physical presence of parties involved, and livestock, Modern Payment Systems such as MPESA are acceptable	Financial and telecom companies should be supported to enhance their coverage and entrench online communication and mobile transactions in the community
	Market information	Lack of information by herders on supply, demand and prices of livestock	Quality information access by herders regarding supply, demand and prices of livestock	Devise and implement strategies to relay quality market information to herders through the improved spread of telecommunication network
Market Infrastructure		Markets are distant from the herders coupled with inferior modes and means of transport. Most animals are taken to the market by trekking on foot	Better modes and means of transport such as using tailored trucks to transport live animals to the market	Improve roads through grading and tarmacading to encourage truck owners to engage in the live animal transportation business in the region
	Contractual arrangements	Thrives on social relationship and trust as opposed to contractual arrangements between trading parties	Characterised by contractual arrangements between trading parties	Capacity building of herders through training on how to trade through contracts. Enforce adherence to contractual obligations, build trust among trading parties
Quality and value of livestock	Security perception	Unreliable security and convenience of purchase. Theft of animals from stocking yards or en route to market	Greater security and convenience of purchase such as bulk purchases without the risk of theft	Support sustainable peacebuilding initiatives through the promotion of livelihood diversification and resilience projects and working with community leaders.
	Livestock traits	Non-standardised live animals coupled with breeds of low economic potential	Superior purposefully selected breeds with trade grades and standards of live animals	Improved breeds adapted to the rangeland environment
	Social relations	Cultural beliefs on issues such as herd size and castration influence prices	Prices depend mainly on the quality (weight and health) of livestock being sold	Sensitise the community on the benefits of herd size reduction and promote weighing as a price determination method of live animals

trade. During the participant observations, we learned that the Baringo County Government recruited two security officers to serve the market. Occasionally, the Kolowa ward chief is present to intervene in any animal ownership disagreements in the market. Also, to ensure the security of animal purchases, when a transaction is made, the buyer takes personal details from the sellers' identity card to ensure that he/she can be traced should there be an issue pertaining ownership of the animal.

4. Discussion

Table 1 presents three broad determinants (chain organisation and financing, market system development, quality and value of livestock) relevant for the transition from traditional to quality-based payments for livestock in conflict prone dryland tropics. The extent to which this transition takes place, however, depends on the congruence among the key determinants. In the remainder of this chapter, we discuss important levers with potential for barriers and enablers for initiating the transition to quality-based payments of livestock.

First, there is a need for creating opportunities for behaviour adaptation of livestock buyers. Weighing animals as an alternative price determination mechanism is such an example of behaviour adaption. Quantitative studies in Brazil and the United States of America confirmed that live weight is the most important determinant of cattle price (Danielce et al., 2020; Mitchell et al., 2018). Therefore, weighing can enable producers to get fair value for their investment in the value chain. On the one hand, livestock sold securely and conveniently through weighing can attract quality-based payments by butchers. Butchers are receptive to weighing livestock potentially because they are already using weighing scales in their businesses. On the other hand, aggregators are sceptical about embracing weighing; arguing that they do not have weighing-scales and that maintenance and repair may not be within their reach (Tebug et al., 2016). Consequently, interventions to promote quality-based pricing of livestock through weighing should consider the preferences of the various value chain actors and the cultural setting of the community.

Second, dealing with insecurity and other marketing constraints is vital in paying a better price to sellers. Still, transaction cost varies between the groups of buyers. Therefore, price variation may occur depending on a specific buyer's priorities and goals (Smith, 2020). Literature is replete with studies that describe the effect of a conflict situation on livestock prices in pastoral communities. Insecurity worsens the transport hardship in pastoral communities. Truck owners avoid conflict-prone areas to prevent attacks during market days (Krätil and Swift, 1999). This disrupts the demand and supply chains of commodities through stalling marketing activities and distorts price (Raleigh et al., 2015). For instance, Odhiambo et al. (2012) contend that as conflict looms or occurs, the prices of food and essential items increase due to the shortage. Livestock prices drop as herders rush to sell their animals to avoid a total loss. Herders' distress-sales are taken advantage of by traders to make high profits by taking animals from conflict-prone areas to distant markets where prices are usually still high. Schilling et al. (2012) and Raleigh et al. (2015) find that high food prices in African pastoral communities ignite and potentially fuel conflict, which causes a vicious circle of socio-economic disadvantage for pastoralists. Quality-based payments for livestock, therefore, require peace and security of both people and animals.

Third, although our findings support calls for reforms of market institutions, implementing these are medium to long-term ventures. Inadequate marketing and infrastructure challenges such as poor roads amidst long distance to markets, weak market linkages, absence of institutional frameworks for marketing and insufficient market information all contribute to pricing. These factors contribute to the low bargaining power of livestock keepers. Consequently, the marketing system becomes manipulative, collusive and uncompetitive (Zander et al., 2009; Little et al., 2014). The potential of the North-Rift region to supply animals is hampered, causing meat processing companies in the

country, including the state-owned Kenya Meat Commission (KMC), to face an uncertain supply of quality livestock. For example, during periods of supply shortfalls, KMC operates at less than 50% of its operational capacity (Ng'eno et al., 2010).

Fourth, parasites and diseases present another significant risk that shocks livestock marketing, affecting prices (Aklilu and Catley, 2010). Faced with an outbreak of infectious diseases, livestock keepers sell their animals at every possible opportunity. However, animal health authorities usually respond by imposing quarantines to prevent the disease from spreading (Barrett et al., 2005). Cattle raids also take place after periods of drought and disease (Schilling et al., 2014). These risks are even exacerbated by the fact that most animals trek to the market, which undermines their immunity increasing the risk of spread of infectious diseases, poor meat quality and sometimes mortality en route to the market (Carlsson et al., 2007). All these factors push livestock prices downwards. Therefore, quality-based payments are conditioned on parasite and disease control, improved transport network, and availability and access to water primarily through dam construction.

Fifth, from the results, it is discerned that the quality definitions in livestock trade need reframing. The standard definition of livestock quality is informed by both the cultural purposes of animals and traditional knowledge and beliefs. Consistent with Rueff and Rahim (2016), respondents in the present study were undecided on the value of improved breeds. This discrepancy creates tension on which breeds to promote among pastoralists to achieve the target of quality-based payments for livestock. A growing body of literature on crossbreeds and community-based breeding indicates that these breeding programs are effective in pastoral communities since they balance the needs and desires of pastoralists and economic prospects (de Aguiar et al., 2020; Duguma et al., 2011; Getachew et al., 2020; Liljestrand, 2012; Mbuku et al., 2010). We suggest more confirmative research on the feasibility of such breeding efforts in the Kerio-Valley.

5. Conclusion

Based on our investigation of price-building mechanisms among livestock traders in the Kerio-Valley, we conclude that the transition to quality-based payment is possible conditioned on overcoming a set of obstacles. Strategies to enhance quality-based payments for livestock should be phased and need to consider regional differences of actors. Fodder production and conservation should be promoted to even out seasonal livestock supply rigidities, which result in price fluctuations. Also, risk reduction, mitigation and coping strategies should be in place to reduce the likelihood of violent conflicts and manage the negative impacts of natural disasters such as epidemics and droughts.

There is justification for initiating action-oriented research to practically introduce quality-based payments for livestock and test the feasibility of micro-credits linked to quality payments among a selected number of livestock traders. It is also worthwhile to study the effects of contracts and certification of livestock quality on quality-based payments for livestock in pastoralist areas. Finally, we recommend investigating the feasibility of fodder intensification, cross-margins of fodder types, cultural distortions, trade-offs and climate-related risks resulting from the introduction of quality-based payments for livestock. Finally, this article hopefully stimulates future quantitative confirmative research of willingness by market actors to pay a higher price for better quality animals in the region. Variables listed in **Table 1** provide a starting point for respective research designs. Although limited to the Kerio-Valley, our findings provide several insights for quality-based payments in similar contexts across East Africa.

Contributors

Michael Hauser designed the study and laid out the data collection method. John Mugonya organised and conducted data collection, transcriptions and the first round of analysis. Three research assistants

supported data collection. For their time, they received a small remuneration. John Mugonya and Michael Hauser contributed to all chapters of this paper.

CRediT authorship contribution statement

John Mugonya: Investigation, Data curation, Writing – original draft. **Michael Hauser:** Conceptualization, Methodology, Writing – review & editing, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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