"PARTICIPATORY ASSESSMENT OF LIVESTOCK MARKETING IN LOIMA DIVISION, TURKANA DISTRICT, KENYA."

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A thesis submitted in partial fulfillment of the requirements

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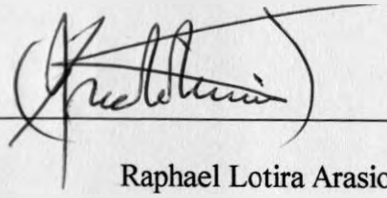
DECLARATION

This thesis is my original work and has not been presented for a degree in any other university

Signature  Date 8/2/05

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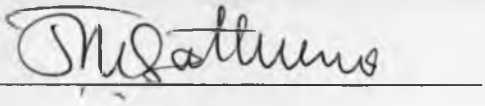
Signature  Date 8/2/2005

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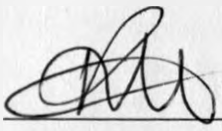
Signature  Date 8/02/05

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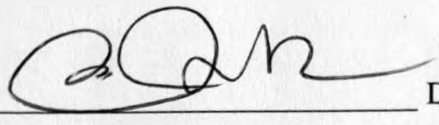
Signature  Date 8/2/2005

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DEDICATION

In memory of my beloved mother, **Martha Benedette Awoi Naleng'o**

and my uncle, **John Paul Losur Eleman Naleng'o.**

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ABSTRACT

A participatory study was conducted in Loima Division of Turkana District, Kenya, to assess livestock marketing. It was aimed at generating information that could be used in redesigning or modifying plans for viable livestock marketing interventions in the division. The main objectives were: 1) to assess herders' perceptions on local markets; 2) to assess herders' perceptions of cash income sources; 3) to determine existing livestock marketed off-takes; 4) to assess herders' perceptions of livestock marketing constraints; and 5) to determine herders' predictions of off-take levels if markets were improved.

Four livestock camps (*adakars*) that included Natuba, Kicono, Acemie and Aporon were conveniently selected for the study based on accessibility, security and logistics. Selection of Loima Division as the study area was influenced by the existence of a livestock marketing project that was under Veterinaries Sans Frontieres- Belgium (VSF-B). The study involved seventy-two (72) individual informants (herders) stratified on gender and wealth, 16 informant groups of herders stratified on gender (each group had 8-15 people), fifty-nine (59) individual livestock traders (20 in 'lower' primary markets, 14 in 'upper' primary markets and 25 in secondary markets) and eight (8) government livestock workers. Participatory Appraisal (PA) methods used in data collection included seasonal migration maps, matrix scoring, proportional piling, simple ranking, seasonal calendars, semi-structured interviews and workshops.

Potential livestock markets in the division were identified as Namoruputh, Lokiriama and Lorengippi, with Namoruputh being proposed as central for establishment of an initial livestock market. The herders classified traders based on tribe and marketing system of operation of which the latter criterion clearly distinguished traders' preference than the former. Traders were preferred based on their pricing of livestock, consistency in buying livestock, trustworthiness, always with cash and friendly negotiations. The auction system and organized marketing system with designated market days (based on person-to-person negotiation) were highly preferred as were traders operating in those systems. Preference of a marketing system was based on livestock prices offered, cash availability, attraction of buyers and sellers, and its frequency. The other systems of marketing were traditional system, mobile trader system and the shop system.

The two major sources of cash reported were from the sale of livestock and livestock products (68%), and cash remittances from relatives and friends (13%). Commonly sold species of livestock were goats, cattle, camels and donkeys of which goats emerged as the primary source of cash (68%). Within the livestock holdings, sheep and goats (shoats) constituted the largest proportion (60.9%) in the herds, followed by camels (17.9%) and cattle (11.5%), with donkeys being the least (9.7%). Shoats constituted a higher proportion of livestock in the herds among the poor whereas the proportion of large stock was higher among the rich and medium class. Preference for selling different types of stock was based on availability of buyers/market, season, availability in the herd, magnitude of family problem, wealth status and need for cash.

Most preferred age-sex categories for sale among goats, cattle and camels were mature male castrates, except for donkeys where breeding males and females were sold. Mature male castrates of goats, cattle, camels and donkeys were mostly sold during the dry season whereas young animals of these species were sold throughout the year. Breeding male and female donkeys were mostly sold during the dry season.

Whereas producers gave high priority to low prices of livestock and traders perceived low working capital as major problems affecting them in livestock marketing, government livestock workers prioritized poor marketing infrastructure and lack of marketing information as major problems that need to be addressed. When marketing improves, herders were willing to sell livestock in proportions (30.4%) equal to that of the current marketing system (30.5%). The proportional change in sales (difference between sales before and after marketing improves) was negative for goats (-7.3%) and positive for other types of livestock. Nonetheless, the proportion of goats (18.1%) to be sold when marketing improves was still higher than that of the other livestock types combined (12.3%).

Based on the results of this study, it is concluded that the pastoralists desire to participate more actively in livestock markets but livestock marketing constraints are a hindrance. They should therefore be involved in gathering and analyzing information to be used in planning and designing best-bet interventions in livestock marketing. A further study is recommended, to look at the root causes and effects of livestock marketing constraints

and analyze the various options for intervention; and to determine factors that would influence pastoralists' desire to sustainably sell more livestock when marketing improves.

1.0 INTRODUCTION

Turkana District is one of the arid and semi-arid districts of Kenya, situated in the northern part of the Rift Valley Province. It covers an area of approximately 77,000 Km^2 with 75% of its total area classified as arid or semi-arid land (ASAL) (Republic of Kenya, 2002). It is inhabited by the Turkana pastoralists, who, according to the 1999 national census, were estimated at 450,860 people in 73,645 households (Central Bureau of Statistics, 2001). The livestock populations in the district for the year 2002 were estimated at 175,815 cattle, 2,439,027 goats, 813,000 sheep, 138,000 camels and 32,000 donkeys (DALEO, 2002).

Livestock is the main resource in the district and it forms the economic base of the Turkana community, as it is more reliable than crop production. During drought, for instance, animals die and crops fail, but some animals may survive to build up the herd again, this being a kind of insurance against unpredictable misfortunes in the harsh environment (Chabari, 1994). Indeed, livestock is the centerpiece of the daily and ceremonial life and is the major currency for social and commercial transactions among the pastoralists (McDermott *et al.*, 1999). The development of irrigation agriculture has so far contributed very little to stabilization of food security in the district and it remains doubtful whether it ever will (Chabari, 1994). Rain-fed agriculture has not been given adequate attention yet, but its scope will be limited anyhow (Airey *et al.*, 1981). Relief food instituted during periods of severe droughts is only but expanding the handouts dependency level among the Turkana pastoralists (AGSEC, 2000).

Strengthening the need and the capacity of Turkana pastoralists to access and utilize the livestock resource sustainably is essential (AGSEC, 2000). In various community dialogue meetings among the Turkana, livestock marketing has featured prominently as a felt need of the livestock keepers (OAU/IBAR, 1999; OAU/IBAR, 2001). In addition, livestock marketing development is believed, and seen, to be key to the success of other development programmes in this area (Aklilu *et al.*, 2002). Livestock marketing is therefore considered a wider food production system and economic activity in the district (Njenga, 2000). Improved livestock marketing would be expected to improve pastoral households' incomes and thus, their food security status.

There are common myths that pastoralists accumulate livestock in an irrational way, and at the same time are resistant to new ideas of development (Gulliver, 1951; Schwartz, 1981). This is a tendency to refer to pastoralists as if they have remained the same for hundreds of years, without recognizing the fact that they have also changed socially as a result of external influence. In the recent past, it has been realized that pastoralists are willing to sell their stock if an advantageous market and marketing system exists which they can easily access and be involved in (Njiru, 1982; Gathuma *et al.*, 1989; Gufwoli and Behnke, 1990; AGSEC, 2000). However, livestock marketing constraints and recurring droughts are still adversely impacting on the wishes of both livestock traders and producers (Aklilu *et al.*, 2002). Commonly mentioned constraints to livestock marketing include: lack of markets for livestock and livestock products; lack of information on markets and marketing; livestock diseases and lack of assured animal

health services in such pastoral areas (Gathuma *et al.*, 1989; Gufwoli and Behnke, 1990; ALRMP, 2001; Aklilu *et al.*, 2002).

The Government of Kenya, in collaboration with other development agencies mainly non-governmental organizations (NGOs), have attempted to develop livestock marketing strategies in the district, but their efforts have not achieved the desired goal (Njenga, 2000). Past reviews and studies suggest conflicting opinions, probably signifying the complexity of livestock development in a pastoral district like Turkana (Helland, 1987). In common with other pastoral areas in Africa, billions of dollars have been spent on pastoral livestock schemes but impact has been minimal and hardly sustained (Jahnke, 1982).

There appears to be lack of good ideas on the kind of interventions required to handle the main problems of fluctuating productivity and food security in such a pastoral setting (Helland, 1987). Many research projects and livestock development interventions are examining "suitable" conventional technologies for pastoral development ignoring pastoralists' traditional knowledge of survival in their own environment (Jahnke, 1982; Aronson, 1984; Akabwai, 2001a; Orre, 2003). Furthermore, these areas have been lowly prioritized by livestock experts and policy makers. For instance, the Sessional Paper No. 4 of 1981 on food policy recommended establishment of large-scale ranches in the rangelands and expansion of feedlots in order to increase off-take (Republic of Kenya, 1999) but implementation failed perhaps due to inappropriateness of policy (Orre, 2003).

Development efforts in Turkana have traditionally been aimed at providing the poor with alternatives to pastoralism, particularly through efforts in fisheries, irrigation and handcraft, ignoring the importance of the livestock resource (McCabe, 1984; Mbogoh *et al.*, 1989). Livestock development problems could be unique to a location or a division based on its cultural, economic, social and physical differences and, district-wide studies and development interventions could be low-yielding (Jahnke, 1982). Although some workers have advocated for greater local say (involving local people) in livestock research and development, accounts of local perceptions on livestock marketing opportunities and constraints in the district are lacking, particularly comparative analysis of opinions of all stakeholders in livestock marketing.

The approach of past research and livestock development interventions is questionable especially in considering local peoples' priorities, preferences and strategies. There is limited published information describing how opportunities and constraints of livestock marketing are analyzed at community level or, how decisions are made concerning the most appropriate interventions. Subsequently, it has been realized that in pastoral areas, acquiring information through the conventional quantitative methods of investigation is difficult owing to financial and other research-related constraints; moreover, in most cases data or information collected is not suitable for field analysis for immediate action and making timely informed decisions (Catley, 1999). As an alternative, participatory appraisal methods have been found to be appropriate data gathering tools under the pastoral settings, given their flexibility and ability to allow cross-checking of information at field level.

This study aimed at generating information that could be used in redesigning or modifying plans for viable livestock marketing interventions in Loima Division of Turkana District, Kenya. In addition, the study is expected to provide information on current status of livestock off-take in the division, and how the trends could change if marketing were improved. Attention was focused on producers' and traders' knowledge, abilities, attitudes, beliefs and behavioural patterns. It was hoped that the study would assist the pastoral community in the division, or even the whole district, to transcend from an isolated, subsistence-oriented economy to a market-oriented one, which can be integrated into the national economy.

1.1 SPECIFIC OBJECTIVES OF THE STUDY:

1. To assess herders' perceptions on local markets with regard to:
    a) Mapping potential livestock markets in relation to seasonal movements;
    b) Criteria for classification and preference for different types of livestock traders;
    c) Preference for different types of marketing systems;
2. To assess herders' perceptions of sources of cash income.
3. To determine existing marketed off-take with regard to:
    a) Proportional measure of herds;
    b) Species, age and sex of animals sold;
    c) Preferences for selling different types of stock;
    d) Seasonality of sales;
4. To assess herders' perceptions of marketing constraints and compare these perceptions to those of livestock traders and government livestock workers.
5. To determine herders' predictions of marketed off-take levels if marketing were improved taking into account the constraints identified in objective 4.

2.0 LITERATURE REVIEW

2.1 THE LIVESTOCK SECTOR IN KENYA

2.1.1 Contribution of livestock sector to Kenya's economy

Livestock production contributes about 3.3% of the total Gross Domestic Product (GDP) in Kenya (Aklilu *et al.*, 2002) and nearly 50% to the Agricultural GDP, which has fluctuated around 25% of the total agricultural GDP of the country since the early 1980s (MoA, 1996). Despite such significant contribution to the national economy, the livestock sector received only 2% of the total recurrent agricultural budget in Kenya for the year 97/98 (Aklilu *et al.*, 2002).

2.1.2 Livestock resources, populations and market off-take in Kenya

In 2001, Kenya's livestock population was estimated at 12 million head of cattle (of which 3.2 million were dairy herds), close to 21 million sheep and goats (shoats) and 1 million camels (MoARD, 2001). Variation in livestock population between years is not uncommon and is mainly a reflection of frequent droughts resulting in heavy losses (Chabari, 1986; Aklilu *et al.*, 2002), as well as gaps in population data collection in pastoral areas (Dahl and Hjort, 1976). Non-estimated off-take consumed within the production units also contributes to the variation (Little *et al.*, 1983). Off-take can be defined as the total of all that is taken from a pastoral flock/herd including sales

(commercial) and home-slaughter, deaths and gifts (non-commercial) expressed as a percentage of the number of animals owned (Sobania, 1988; Orre, 2003).

The annual estimate of red meat production in Kenya is approximately 362,815 metric tonnes of which beef constitutes about 286,000 metric tonnes (LMD, Undated (a)). The bulk of this beef is mainly from Arid and Semi-arid Lands (ASAL) (AGSEC, 2000). A small proportion of beef supply also comes from the dairy herds. The value of annual red meat production is estimated at Ksh 43.3 billion of which beef contributes about Ksh 34.4 billion, combined goat meat and mutton at Ksh 8.2 billion, and camel meat at Ksh 0.7 billion (LMD, Undated (a)). In addition to drought, annual variation in market off-take is attributed to cross-border trade (Aklilu *et al.*, 2002). Indeed, the prevailing market off-take rate in Kenya cannot be adequately met without the contribution of cross-border trade which accounts for 26% of beef supply in Kenya (Aklilu *et al.*, 2002).

The annual market off-take rate for shoats is estimated at 25% from an estimated 21 million shoats in the country of which 6.9 million are hair sheep, 1.1 million wool sheep, 12.95 million meat goats and 0.04 million dairy goats (LMD, Undated (a)). In the year 2000, mutton and goat meat production was estimated at 68,269 metric tons (LMD, Undated (a)). Demand for red meat is expected to grow by 15,000 metric tons every year for the next five years (2002-2007)(LMD, Undated (b)).

2.1.3 Livestock populations and market off-take in Turkana District

Different species of livestock perform best under different environmental conditions. The Turkana, therefore, maintain proportions of stock in their herds appropriate to the local environmental conditions and local patterns of drought risk (Gathuma *et al.*, 1989; AGSEC, 2000). The commonly kept livestock species include cattle, sheep, goats, camels and donkeys. In the year 2002, livestock populations were estimated at 175,815 cattle, 2,439,027 goats, 813,000 sheep, 138,000 camels, 32,000 donkeys and 10,387 poultry (DALEO, 2002). Recurrent droughts in the district cause fluctuations in livestock populations. In the year 2001, a total of 2,809 cattle and 8,623 shoats were sold in markets outside the district (DALEO, 2001).

2.1.4 Policy development in livestock marketing industry in Kenya

Government policy on livestock marketing arose from policy changes imposed by the International Monetary Fund (IMF) and the World Bank (WB) through the structural adjustment programmes (SAPs) and, to a lesser extent, through the government's own initiatives. A shift in Government policy in mid 1980s focused on agriculture in providing food security, the absorption of the labour force, boosting earnings and rural industrialization (Republic of Kenya, 1986). Specific policies included liberalization of markets and removal of government subsidies, effectively sidelining the Livestock Marketing Division (LMD) of the Ministry of Agriculture and Rural Development (MoARD) from operating in the markets. The earlier role of LMD was livestock

purchasing, drought management, provision of facilities and disease control (Aklilu *et al.*, 2002). Due to the SAPs, the roles of LMD were revised to entail supervision and maintenance of infrastructure, establishment of livestock marketing information network and livestock off-taking during droughts (LMD, Undated (b)).

Currently, there is a growing keenness among interested parties (civic associations, government agencies, donors, non-governmental organizations (NGOs), regional organizations, etc) to promote livestock marketing in quality and quantity to alleviate the predicaments of the primary producer and also the livestock trader (Aklilu *et al.*, 2002). However, following the exit of LMD and the Kenya Meat Commission (KMC) from the market, no specific policy has been formulated to date aimed at supporting and facilitating the livestock trade *per se*, especially within the private sector. Livestock marketing, whether for the domestic or export markets, has been left to the rules of globalization (Aklilu *et al.*, 2002).

2.2 COMMON LIVESTOCK MARKETING SYSTEMS IN PASTORAL AREAS OF KENYA

2.2.1 Traditional non-market circulation of livestock and livestock products

Pastoralists maintain a network of interpersonal relations characterized by presence of claims between individuals (Storaas, 1989). Personal relationships are established and maintained through transfer of property such as live animals, food, tobacco, utensils or

clothing as well as being exercised as expressions of active support and generosity among relatives (McCabe, 1984). Outstanding claims between individuals are challenged or called for in different situations including: compensations; during periods when a relative is worst hit by calamities such as raids, livestock disease epidemics and droughts; and during inheritance quarrels (McCabe, 1984). When a need arises, a person can talk to a wide range of people and bring such claims to the surface. It is important to note that, these claims are not bound by time like in typical pure market exchanges (Storaas, 1989). So long as partners recognize their relation and the "state of the ledger", they are never regarded complete. This flexible social mechanism of outstanding claims is of great importance in such a society where the risks of losing livestock (the subsistence base) are so high, mostly in disasters such as raids, disease epidemics and drought (Broch-Due and Storaas, 1983). It is, therefore, practised as a support system.

The non-market circulation of livestock and livestock products between individual units serves as a kind of security mechanism for groups and individuals among the pastoralists. These exchanges are generally characterized by impersonal *ad hoc* demand-supply conditions where individual transactions need not carry any further implications for the relation between the partners, although it occasionally happens (Broch-Due and Storaas, 1983; Broch-Due, 1987). Essentially, this mechanism is an inherent aspect of the political and socio-economic organization of the pastoralists. Furthermore, this organization has an expanded role, which enables the pastoralists to regulate exploitation of natural resources in such a vulnerable natural environment where they live.

2.2.2 Auctions

Auctions flourish spontaneously when there is a surplus of bidders competing against each other for a scarce commodity, and disappear when there is plentiful supply of a commodity and relatively fewer buyers (Gufwoli and Behnke, 1990). The auctions provide producers and buyers with the opportunity to use their discretion when deciding when to buy or sell and also injects transparency to the market place such that it is possible to monitor values such as price changes. Seasonal timing, adequate and timely advertising, coupled with the regular and reliable holding of sales, is crucial to the success of this marketing system such that, there is a tendency to influence and improve buyer attendance and prices (Airey *et al.*, 1981; Mbogoh *et al.*, 1989). Buyers must be informed in advance of the sales' venues and dates and the likely numbers, types, grades and prices of animals to be offered. Likewise, producers must be aware when sales are to take place and be encouraged to offer their animals. Common means of advertising include radio, newspaper and personal communication (Gufwoli and Behnke, 1990).

Droughts adversely affect performance of auctions. During these periods, markets get flooded with animals in poor condition, inevitably causing a drop in prices. Poor prices discourage sellers who would ultimately resort to private negotiations with buyers to allow disposals/off-take of their animals at some better prices (Gufwoli and Behnke, 1990). In such situations, auction system collapses into a series of private negotiations between individual buyers and sellers. On the other hand, wet seasons are characterized by a reluctance to sell and high price expectations from producers. As a result, buyers are

disadvantaged due to possible reduced trading margins when competing for external markets.

Other factors affecting the operations of the auction system include, among others, nomadic nature of the pastoralists, problems with organization and information arrangements, price distortions due to a cartel of buyers, as well as trade volume fluctuations (Gufwoli and Behnke, 1990).

2.2.3 Person-to-person negotiations

Airey *et al.* (1981) and Gufwoli and Behnke (1990) indicated that a person-to-person negotiation is the current livestock marketing system in pastoral areas after the collapse of LMD and KMC. The ALRMP (2001) and Aklilu *et al.* (2002) observed that, although livestock and livestock trade is the main source of livelihoods in most pastoral areas, most livestock markets operating under this system are, in fact, poorly organized. This is partly attributed to poor infrastructural development, poor marketing support interventions and poor markets and marketing information systems. Traders operate in a haphazard system that may be entirely relying on their extensive knowledge to understand the supply and demand conditions of the trade, thus creating possibilities of their profit margins being curtailed (Gufwoli and Behnke, 1990). Traders operating in such circumstances need to have unique adaptation behaviour and inter-related business skills and approach in order to give them the financial and logistical flexibility to cope with difficulty of assembling trade animals under the poor road conditions, nomadic

nature of the pastoralists, long distances and possible variations in supply volume. In addition, they operate amid claims that they are exploitative to the pastoralists (Gathuma *et al.*, 1989; AGSEC, 2000). Airey *et al.* (1981) and Gufwoli and Behnke (1990) advocated that measures intended to improve livestock marketing in pastoral areas would more likely achieve their objective, viability and cost-effectiveness if they were designed to organize and assist this existing livestock trading system.

2.3 HISTORICAL DEVELOPMENT OF COMMERCIAL LIVESTOCK TRADE IN TURKANA

2.3.1 Colonial period up to early 1970s

An auction system began in the 1950s under the colonial administration (Gathuma *et al.*, 1989). This system was being propelled by poll/hut taxes that were charged directly to all pastoral households (McCabe, 1984). The auctions acted as big market places and major outlets for stock sales and retail purchases.

Buyers in the auctions were reported to have come from Uganda rather than from Kenya, and reasons for this trend are unknown. In fact, Kenyan buyers of Turkana animals frequently resold them in Uganda. No wonder, the system collapsed with the onset of political insecurity in Uganda in the 1970s. Cattle rustling along the Kenya-Uganda border exacerbated the collapse (Akabwai, 2000). Since the end of the golden moments

for these auctions in the early 1970s, other specialized marketing mechanisms fundamentally developed.

2.3.2 Late 1970s to early 1990s

After the collapse of the colonial auction system, the Turkana Livestock Co-operative Society Limited (TLCS Ltd) was registered in 1977 to continue performing livestock marketing activities from where the colonialists left (Gufwoli and Behnke, 1990). In 1985, the cooperative society collapsed due to poor management, lack of financial skills, lack of enough working capital, political interference and competition from private traders.

The severe drought of 1979-81 that occurred in Turkana District found a disorganized livestock marketing system where pastoralists could get an opportunity to salvage their livestock (Airey *et al.*, 1981). The Turkana Rehabilitation Project (TRP), instead of distributing free relief food, introduced a strategy where the Turkana could sell their livestock in exchange for commercial goods. Private traders in commercial goods also utilized this opportunity created by TRP.

On consolidation of lessons learned from the operations of the colonial auction system, the TLCS and TRP's interventions, and after consulting several Turkana District Development Plans from 1979 (Skjerdal, 1979; Sandford, 1983), the Livestock Marketing Division of the Ministry of Agriculture in collaboration with the Norwegian

Agency for Development (NORAD) and TRP, considered initiating a livestock marketing project in Turkana District in 1983. The strategy was based on re-establishment of the auction system and development of infrastructure (consisting of holding grounds, stock routes, outspans, sale yards) for facilitation of marketing and disease control measures (Gathuma *et al.*, 1989). Furthermore, it was to encourage gradual involvement of private traders in livestock purchasing activities and to continue acting as a buyer of last resort during stress and drought periods.

In its operations, the project was faced with a myriad of marketing constraints, which undermined the establishment and viability of commercial trading in the district. These marketing constraints included, among others, stiff competition for external markets, difficulty in developing regular and high volume sales, non-adoption of integrated approach that embraces related disciplines and projects and, lack of baseline data for estimation and verification of its economic viability and determination of its performance (Mbogoh *et al.*, 1989; Gufwoli and Behnke, 1990). Furthermore, auctions were infrequent and could not favour traders' involvement because the project participated in the auctions and consistently offered much higher prices than could be offered by the private traders.

After the collapse of the LMD and the KMC, the Livestock Small Trader Loans Project, later to be called Turkana Livestock Traders and Consumers Cooperative Society, was founded; however, it never took off. Subsequently, Gufwoli and Behnke (1990), in their

livestock marketing study in Turkana, advocated for a Turkana Livestock Trading Company, which, however, did not also materialize.

2.3.3 Early 1990s to date.

It is apparent that private traders' networks have been attempting to emerge and were being suppressed by top-down interventions. This was evident after the colonial auctions, during the TRP drought intervention project, and after the livestock marketing project of LMD. In any pastoral area of Kenya, livestock trading has been the domain of the private sector following the liquidation of KMC and the exit of LMD from the markets (Aklilu *et al.*, 2002). Four categories of traders were identified: shopkeepers; itinerant livestock traders (rural merchants); large-scale businessmen; and butcher men/hoteliers (McCabe, 1984; Gufwoli and Behnke, 1990). This indicates that livestock change hands several times before reaching any of the domestic markets (Aklilu *et al.*, 2002).

All sorts of traders are observed to reach the pastoralists (Gufwoli and Behnke, 1990). It is questionable whether these traders' networks are vertically and horizontally well integrated and, clearly defined either by location or function in the trade (ALRMP, 2001). The present status of the livestock markets necessitates a complete review in order to formulate goal-oriented strategies (Aklilu *et al.*, 2002). The roles and responsibilities of governments, trader and producer associations, private sector and other civic associations need to be re-assessed with a view to handing over most of trade-related activities to the

private sector for sustainability while maintaining the regulatory and supervisory role of governments (Aklilu *et al.*, 2002).

2.4 TERMS OF EXCHANGE IN TRADING TRANSACTIONS IN PASTORAL AREAS OF KENYA

Exchange of animals for animals or animals for goods or animals for cash is commonly practised both within the pastoral communities (McCabe, 1984; Storaas, 1989) and between pastoralists and traders (Mbogoh *et al.*, 1989; Gufwoli and Behnke, 1990). Controversies have existed on relative superiority and attractiveness of either barter or cash under the pastoralists trading situation. Gathuma *et al.* (1989), Mbogoh *et al.* (1989) and AGSEC (2000) indicated with little supportive data, that barter trade does not give the producer his worth and more preference should be given to introduction of a cash economy. Gufwoli and Behnke (1990), however, observed that the conditions under which barter trade is conducted are in part difficult, and it is not immediately clear that anyone is exploiting the other. Gufwoli and Behnke (1990) further argued that pricing in the barter exchange system is not simply a second-hand or more exploitative version of cash prices; barter prices are set by the internal logic of the system and are not strictly comparable to cash prices. Gufwoli and Behnke (1990) were of the opinion that in any anticipated period of transition, in search of a cash economy, barter should co-exist with cash transactions. This debate has remained unresolved to date.

One of the reasons associated with pastoralists disfavour of cash emanates from the common observation that few shopping centers are found in the hinterland and the pastoralists are forced to exchange their livestock with consumables brought by mobile traders (Mbogoh *et al.*, 1989). Gathuma *et al.* (1989) indicated that, even if shops were available, pastoralists do not have ready cash facility to do purchases at the time and place of wish. Additionally, traders are untrustworthy when it comes to cash transactions. Gufwoli and Behnke (1990) proposed that national distributors of commercial goods should be expanded to pastoral areas to give the pastoralists a bargaining power for cash. Mbogoh *et al.* (1989) suggested that, to promote more fair transactions, many shopkeepers and mobile traders should be in the market and they should be provided with credit facilities to allow them use cash as they participate in trading transactions.

In the pastoralists-traders' transactions, the terms of exchange are determined by different relative values that pastoralists and traders place on different classes of animals and on different types of consumer goods. Traders' assessment of animals is rather specialized as compared to that of pastoralists, which exhibits a diverse nature. Traders attach a lot of consideration to the market value of animals. Attributes valued by pastoralists are more diverse and not specially business-focused because, they do not only sell but also breed animals, use them for draught power and subsist on them and their produce (Gufwoli and Behnke, 1990).

A question arises of how transactions should be legitimately handled in pastoral set-ups, to the favourable expectation of both traders and livestock producers and in a bid to

promote a cash economy. The need for, and the use of cash, by pastoralists might vary from one commodity to the other or from one pastoral community to the other, or may depend on other factors that are worth investigating.

2.5 MARKETING OF LIVESTOCK AND LIVESTOCK PRODUCTS IN THE PASTORAL AREAS OF KENYA

2.5.1 Live animals

2.5.1.1 Livestock species, age and sex structure preference for sale

Mbogoh *et al.* (1989) found that, among the Turkana, 56% of the marketed species were sheep and goats, cattle (24%), camels (12%) and donkeys (8%), although proportions could vary from individual to individual (family status) and from community to community. For any transactions, pastoralists consider small stock as a "current account" and cattle as a "savings account", while the camel is likened to a "fixed account". Pastoralists will first sell the small stock for their needs before they think of selling cattle and camels that are only sold as a last resort (Mbogoh *et al.*, 1989).

Pastoralists sell or slaughter distinct classes of animals (Dyson-Hudson, 1982; McCabe, 1984; Gufwoli and Behnke, 1990). Often sold or slaughtered are mature castrated males (Mbogoh *et al.*, 1989), infertile females and culled breeding animals that are past reproductive age (Schwartz, 1981). When these classes of animals are unavailable,

pastoralists resist sales or slaughter. Breeding and young stock are neither preferred for sale nor for home consumption. This is to ensure that total herd size decline is not experienced. Breeding stock is the one that ensures progression of the herd, produces milk for consumption and sale and, produces males for future slaughter and sales (Schwartz, 1981).

2.5.1.2 Domestic and export markets for live animals from pastoral areas of Kenya

Domestic markets consist of primary, secondary and terminal markets (Aklilu *et al.*, 2002). The major terminal market for live animals from the pastoral areas of Kenya used to be the KMC (ALRMP, 2001). Since its collapse in 1987, total volume of off take of livestock from pastoral areas has been greatly reduced, leaving domestic markets to become supply-driven and increasingly non-competitive to the disadvantage of the producer (Aklilu *et al.*, 2002). Setting up of private abattoirs to replace the KMC has been limited by high production costs and deterioration of livestock marketing infrastructure (AGSEC, 2000; Aklilu *et al.*, 2002). However, current major terminal markets are Nairobi, Mombasa and Nakuru (Mbogoh *et al.*, 1989; Kariuki, 2000; Aklilu *et al.*, 2002). The other source of livestock for the domestic markets is the cross-border livestock supply. This is claimed to be squeezing some pastoralists out of domestic markets (Aklilu *et al.*, 2002). The Middle East dominated the live animals export market in the late 1970s and 1980s. Since late 1980s, Kenya has not exported any significant quantities of animals, owing to trade bans due to diseases, expanding domestic markets and other reasons (Aklilu *et al.*, 2002).

2.5.2 Trade in livestock products

In pastoral areas, trade in livestock products has received little or no attention as yet. This is based on the assumption that most livestock products are used for subsistence/home consumption (Mbogoh *et al.*, 1989). However, recent observations indicate that a portion of these products is readily sold in markets (Aklilu *et al.*, 2002).

2.5.2.1 Milk

It has been observed that milk contributes a greater percentage of pastoralists' diet, especially during the rainy season and normal dry season (Schwartz, 1981; McCabe, 1984). Milk is readily marketed when in excess (Mbogoh *et al.*, 1989). Many households sell milk in the wet season or early dry season when production is high in spite of low prices (Gufwoli and Behnke, 1990). However, during the dry season, milk production is low and sales are low despite higher prices. In pastoral areas, market outlets for milk are the urban and settlement centers, which directly consume it. Traders are not involved in this milk trade due to problems of return to investment as a result of limited milk markets in pastoral areas (Mbogoh *et al.*, 1989).

2.5.2.2 Hides and skins

A high proportion of hides and skins in pastoral areas is in the low quality grades III and IV and a low proportion is of the high quality grades I and II (Aklilu *et al.*, 2002). The

Ministry of Agriculture and Livestock Development is doing little to improve the quality of hides and skins and their prices (Gathuma *et al.*, 1989) although it is entrusted with the responsibility of providing licensing, extension, inspection, grading and advisory services (Director of Veterinary services, 2000). This scenario is attributed to non-recognition of hides and skins trade as one of the major components of trade in pastoral areas as well as an important source of income to livestock producers and thus, deserving an increased attention (Gufwoli and Behnke, 1990).

Sources of hides and skins for trade in pastoral areas include pastoralists themselves, butchers/slaughterhouses and an influx from neighbouring districts or countries (Mbogoh *et al.*, 1989; Aklilu *et al.*, 2002). In pastoral areas, socio-cultural obligations such as ritual meat feasts and traditional crafts affect the volume of hides and skins for trade (McCabe, 1984; Gathuma *et al.*, 1989; Storaas, 1989). Export markets for Kenyan hides and skins are Pakistan, Italy, India and China (Aklilu *et al.*, 2002).

2.6 COMMON CONSTRAINTS ASSOCIATED WITH LIVESTOCK TRADE IN PASTORAL AREAS

Relatively unique features associated with trade risks and uncertainties characterize pastoral areas. Njiru (1987), Bekure and Chabari (1991), ALRMP (2001), Wario (2001) and Orre (2003) have enumerated major constraints associated with livestock trade as lack of organized and established livestock markets and marketing systems, lack of market and marketing information, livestock diseases, inadequate or deteriorating

infrastructure, insecurity due to banditry and cattle rustling, inadequate market outlets for livestock, high transportation costs and cess charges, poor road infrastructure, lack of operating capital for livestock traders, and droughts. These problems highly disadvantage small livestock traders and producers (Wario, 2001).

2.6.1 Poor marketing infrastructure

Many marketing structures in pastoral areas were constructed by government projects, or in the recent years by NGOs. The main purpose of these structures was to facilitate and promote an efficient and organized livestock marketing system and disease control. These structures consist of stock routes, holding grounds, out-spans, tanneries for hides and skins, and slaughter facilities. Many of these are either abandoned or under-utilized or are poorly maintained, where they still exist (Aklilu *et al.*, 2002). Provision of infrastructural facilities has had problems after the KMC and LMD ceased marketing operations and stopped managing them after their collapse in 1987 and 1983 respectively, although a few are currently being used and managed by community user groups (ALRMP, 2001). Most of these infrastructures require heavy capital investments both for initial establishment and maintenance (Gufwoli and Behnke, 1990). The Arid Lands Resource Management Project (ALRMP) is now undertaking responsibility of improving livestock marketing infrastructure (ALRMP, 2001).

2.6.2 High transportation costs

Transport has been the most important component of cost in marketing operations for any trader (Aklilu *et al.*, 2002). In Kenya, 25% to 40% of the total cost of livestock taken to terminal markets from the northern pastoral areas is associated with transport (Aklilu *et al.*, 2002). In a study in South Sudan, the ratio of transportation costs in the marketing margin was found to be between 0.07 and 0.48 per kg live weight of cattle (Guvele and Lautze, 2000). As a result, transport costs determine the level of profits accrued by livestock traders. Those traders with their own means of transport accrue the highest profit margin (Aklilu *et al.*, 2002). Some traders trek their animals and it is not certain whether the perceived benefits would outweigh costs of trucking, particularly if trekking involves many days that result in tying up of working capital for too long, low turn-over volume, disease spread and weight loss. Remoteness of the pastoral areas, rough terrain, insecurity and poor roads limit lorry transport (Gufwoli and Behnke, 1990). In addition to transport costs, livestock traders pay taxes and transit fees in many places en-route to terminal markets, regardless of the regulation that livestock should only be taxed at the point of origin (Aklilu *et al.*, 2002).

2.6.3 Drought

Drought is an ever-recurring problem in pastoral areas and has serious effects on livestock production and marketing (Airey *et al.*, 1981). It is recommended that, for any livestock marketing system to be considered satisfactory, it must continue to function

under drought conditions and lend itself to practical drought contingency measures that are appropriate to pastoral areas and, any other measures that prove necessary (Airey, *et al.*, 1981; Schwartz, 1981). Although pastoralists are increasingly pushed to sell animals during droughts, this has not been matched by a corresponding growth in per capita consumption of meat due to the stagnation of the economy (Aklilu *et al.*, 2002), causing a price inelastic demand situation (Kivunja, 1976). During these periods, low producers' price share and lack or limited export markets exacerbate the pastoralists' suffering.

2.6.4 Lack of markets and marketing information

Lack of a market information network has been identified to be a major constraint to livestock marketing in pastoral areas of Kenya and Tropical Africa in general (Chabari, 1986). Governments and public institutions have been performing the role of acquiring and disseminating market information in order to improve livestock market performance, but the problem still persists. Gatere and Dow (1980) found that pastoralists were less knowledgeable about market situation than the buyers and were commonly outwitted by the latter during selling/buying negotiations. This was attributed to the nomadic nature of the pastoral populations and inadequate or lack of extension agents that are mobile and flexible enough to accommodate the mobility of the groups (Mbogoh *et al.*, 1989). Furthermore, the harsh environmental situation of pastoral areas limits the frequency of visits by extension agents. Local chiefs have been regarded as most crucial in enhancing awareness and passing livestock development (and any other) extension messages (Mbogoh *et al.*, 1989). The accuracy and quality of information is poor (Aklilu *et al.*,

2002). Livestock marketing information and database centers are lacking in pastoral areas (Gufwoli and Behnke, 1990).

The ALRMP (2001) found that traders and producers commonly complain about lack of price information, and yet there is a lot of information that is required to improve the efficiency of markets in pastoral areas. Marketing information networks, therefore, should not only revolve around the issue of price, but be a wider conduit for passing other extension messages as well as intelligence information on several aspects of livestock trading, such as constraints, trading transactions, opportunities and, actual performance, structure and conduct (ALRMP, 2001).

In Kenya, there are continuing efforts by the Arid Lands Resource Management Project to establish market information systems through establishing pastoral and livestock marketing associations at the grassroots and district levels, culminating in registration of the Kenya Livestock Marketing Council (Wario, 2001).

2.6.5 Livestock diseases

Several diseases pose threats to livestock trade. These are diseases that are regarded as notifiable within the Animal Diseases Act (Cap 364 of the Laws of Kenya) (Republic of Kenya, 1972), and at the international level, those diseases that are listed under List A and List B (OIE, 1998). These diseases are transmissible, have the potential for very serious and rapid spread and have serious socio-economic or public health consequences.

The most significant diseases include Rift Valley Fever, Rinderpest, Foot and Mouth Disease (FMD) and Contagious Bovine Pleuropneumonia (CBPP).

Kenya's disease control policy was formulated and put in place in 1900. Government policy on control and eradication of diseases is through undertaking measures that would ensure an effective control of any future infections and disease outbreaks (ALRMP, 2001). This is achieved through vaccinations, screening and livestock movement restrictions via the enforcement of quarantine measures/cordons/lines between the disease endemic areas and the traditionally disease non-endemic areas within the country (Republic of Kenya, 1972). The Director of Veterinary Services (DVS) is empowered to declare livestock movement restrictions for disease control purposes within any part of Kenya under the Animal Diseases Act (Cap 364) (Republic of Kenya, 1972). Veterinary permits are necessary for movement of animals in all cases and the DVS encourages transportation by trucks as a means of disease control, especially for animals from disease high risk areas (Aklilu *et al.*, 2002). Livestock for sale must be subjected to the required regulations of inspection or vaccination against notifiable diseases (Gathuma *et al.*, 1989).

The efficacy of the current disease control systems through the restriction of movement has been found to be low (ALRMP, 2001). Disease control measures and regulations are not effectively adhered to. Funds, equipment and material, and trained personnel for disease control are in short supply (Aklilu *et al.*, 2002). Disease-Free Zones that were maintained in the central parts of the country and from which livestock and livestock

products were exported in the past no longer retain the status (LMD, Undated (b)). The eight quarantine facilities (including Isiolo), run jointly by the DVS and the LMD, are not providing the same level of service as in the past (ALRMP, 2001). The Animal Diseases Act is silent on some issues, for instance, cross-border livestock imports, and therefore requires review. Some provisions governing the inspection of livestock, for instance, three CBPP tests that have recently been reduced to two, i.e., applied within 21 days prior to exports appear unrealistic in today's highly competitive world market (ALRMP, 2001; Aklilu *et al.*, 2002).

Disease control regulations for international trade are being coordinated by the Office International des Epizooties (OIE) through formulation, documentation and regular review of international standards, guidelines and recommendations formally adopted as International Animal Health Code. The aim of the code is to ensure the health security of international trade in animals (mammals, birds and bees) and animal products, through the detailed definition of health guarantees to be required of trading partners so as to avoid the transfer of disease agents that are pathogenic to animals or humans (OIE, 1998).

2.6.6 Variation in the volume of sales

2.6.6.1 Variation due to season

The number of animals marketed by pastoralists is sensitive to changes in rainfall and pasture conditions but the relationship between sales and rainfall is complex (Gufwoli and Behnke, 1990). Similar rainfall conditions can elicit very different marketing responses depending on the condition of the pastoral economy and size, structure and productive performance of pastoral herds (Gufwoli and Behnke, 1990). Wide and unpredictable fluctuations in the numbers of animals sold in a given year or season are characteristic of marketing patterns in dry pastoral areas. The number of livestock sold by pastoralists from season to season or year to year are difficult to predict. Gufwoli and Behnke (1990) noted a supply variation of 500% to 1000% from year to year. Difficulties in predicting livestock sales among pastoralists creates obstacles in attempting to design a strategic livestock marketing system that incorporates other vital technical and economic requirements that are otherwise expensive to provide, establish and maintain, such as infrastructure and financial assistance. Redundancy of structures at some season or circumstance of no trading activity is possible and yet it is expensive to maintain such redundant facilities.

Demand for commercial goods and services by pastoralists seems to reflect a seasonal variation. This indicates that improvement of livestock marketing in pastoral areas could therefore be matched with relative demand for these goods or services, coupled with

traders' knowledge on the dynamics of pastoralists' demand for the goods and services (Gathuma *et al.*, 1989).

2.6.6.2 Variation due to the level of home consumption

McCabe (1984) suggested that the socio-economic environment of pastoral communities has some remarkable influence on the marketing behaviour. This is mainly attributed to the ritual, social and economic role of livestock in a pastoral community (Gulliver, 1951; Schwartz, 1981). Galvin (1984) asserted that there is a tendency by pastoralists to "excessively" accumulate livestock because of lack of a "commercial-mind". Schwartz (1981) observed that, majority of the pastoralists are subsistence producers and therefore consume within the household most of the livestock produce. McCabe (1984), Gufwoli and Behnke (1990), and AGSEC (2000) were later to refute this claim when they found that, despite being surrounded by socio-cultural obligations, pastoralists were willing to sell their stock if an advantageous market for livestock and livestock products exists and, herds/stock are considerably built as a drought averting strategy or as an insurance against disastrous situations.

Gufwoli and Behnke (1990) noted that pastoralists sell livestock for complex and apparently conflicting reasons. Firstly, they sell to get cash to purchase demanded non-domestically produced goods and services such as veterinary drugs, tobacco, cloth, maize meal, beads, tyre shoes, school fees, and many others. Secondly, they sell because they have an unusual abundance of livestock products, which they cannot otherwise use.

Thirdly, the pastoralists sell livestock during periods of stress (long dry season or drought) in order to purchase food and offset shortfalls in subsistence production.

In spite of the willingness of pastoralists to sell, the decision to sell is a joint undertaking between those with claims on the livestock, for instance, husband and wife (Storaas, 1989). Among the Turkana, conflicts arise when one party makes a decision without consulting the other party, ending up in restitutions. Stronger claims are attached to big stock (camels, cattle) than to small stock (McCabe, 1984).

2.7 PARTICIPATORY APPRAISAL (PA) METHODS AS DATA GATHERING TOOLS

In the past three decades or so, PRA was developed primarily as a tool to facilitate needs assessments of projects. It was closely associated with the concept of community participation where the local people were to be involved in identifying important issues and problems, suggesting solutions, generating an action plan, and subsequently implementing and monitoring development activities based on the action plan (Lelo *et al.*, 1995; Chambers, 1997). As a development tool, it was developed out of the realization that use of conventional technologies to foster development in rural less developed set-ups, where a majority of the poor resided, was yielding poor results for several decades (Chambers, 1997). In research, it was realized that conventional methods produced a lot of data at high cost that was often unused, were inflexible and complex (Catley, 1999; Mariner and Roger, 2000).

This concept was initially widely used by social scientists (Chambers, 1997). Development professionals in the fields such as human health, agriculture, education, water supply and natural resource management, soon adopted it to foster general development (Leyland, 1991). In the recent past, there has been increased focus to develop field-specific or appropriate PA approaches, both for development and research; for instance, application of PA methods in livestock development and research has been documented by Leyland (1991), Catley (1999), and Mariner and Roger (2000).

A wide range of PA tools have been used and are currently in use by development workers and researchers as described by Leyland (1991), Lelo *et al.* (1995), Catley (1999), and Mariner and Roger (2000). They are classified into secondary sources; direct observation; interviewing techniques such as semi-structured interviews; visualization techniques such as maps, venn diagrams, flow diagrams, timelines, seasonal calendars and transect walks; and ranking and scoring methods such as simple ranking, pair-wise ranking, proportional piling and matrix scoring.

Before undertaking any PA study, gathering already existing information from reports and literature (secondary sources) is paramount. Interviewing techniques involve use of an open, semi-structured checklist to guide a discussion. They are part and parcel of other methods and involve asking follow-up questions to gain insightful information. In the process of data collection, use of probing questions is important in assessing the consistency of information given. To ensure validity and reliability of information

collected, information from a set of informants and/or methodologies is triangulated with the aim of observing patterns, indicating either uniformity or disagreement.

Maps mark and give a rough idea of the spatial distribution of important resources in an area such as grazing areas, water resources, mountains, and seasonal movements, whereas timelines and seasonal calendars give a picture of temporal distribution of important resources in a location or illustrate variation in time of a given item of interest. Ranking and scoring methods provide a priority pattern of relative sizes or importance of different items by attributing a specific score to each item.

Researchers and academicians have been more concerned about inappropriateness of publishing qualitative nature of information from PA methods. However, ability of methods such as proportional piling, ranking and matrix scoring to produce numerical data that can be subjected to and summarized using simple statistical packages gives hope and relief to academicians and researchers (Catley, 1999).

2.8 CONCLUSION

In common with other pastoral communities, livestock is the main resource and economic base of the Turkana pastoralists (Chabari, 1994). Indeed, there is need to strengthen the capacity of the Turkana pastoralists to utilize this livestock resource (AGSEC, 2000). Livestock market development is therefore key to such attempts. Several constraints have been suggested as limiting sustainable access to this resource. Among others, is the limited involvement of pastoralists in matters pertaining to livestock development interventions (Catley, 1999). There is therefore a need to involve the pastoralists themselves in the analysis of constraints and opportunities in livestock marketing or livestock development in general, in an effort to formulate or design strategies/interventions that suit the pastoralists' way of life, and which can subsequently influence design or amendment and adoption of policies that are specific to pastoral development.

3.0 MATERIALS AND METHODS

3.1 DESCRIPTION OF STUDY AREA

The study was carried out in Loima Division of Turkana District, Rift Valley Province of Kenya. Turkana District occupies the northwestern part of Kenya sharing international borders with Ethiopia to the North, Sudan to the northwest and Uganda to the West (Fig. 3.1). Within Kenya, the district borders Marsabit to the East, Samburu to the southeast and Baringo and West Pokot districts to the South. The district lies between longitudes $34^0 0'$ and $36^0 40'$ East, and between latitudes $10^0 30'$ and $5^0 30'$ North. It covers an area of approximately 77,000 km^2. The district comprises of 17 divisions, 56 locations and 158 sub-locations, and has a human population estimated at 450,860 persons (CBS, 2001). Turkana District is an arid and semi-arid land and receives annual rainfall of between 120mm and 500mm in the lowlands and highlands, respectively. Temperatures range between 24-38^0C.

Loima Division covers an area of approximately 4,250 km^2 comprising of two geographically distinct regions, Lorengippi region (2,050 km^2) and Loima hills plateau (2,200 km^2) (Range Management Handbook of Kenya, 1994). The division falls under range units 7 (Lorengippi region) and 8 (Loima hills plateau). Landforms in the division include mountains, hills, uplands, foot slopes, dissected erosional plains, sedimentary plains and riverine (flood) plains (Range Management Handbook of Kenya, 1994). The vegetation found in the division comprises of evergreen woodlands, deciduous bushland,

deciduous bush annual grassland, and wooded grassland, and the vegetation is within 10 km of permanent water (Range Management Handbook of Kenya, 1994). The division receives a median annual rainfall of 200-400mm.

Loima Division has three locations with an estimated human population of 33,765 people in 5,104 households (Republic of Kenya, 2002). It is in the Western part of the district, sharing borders with West Pokot District to the South and Uganda to the West. The division supports an estimated livestock population of 24,500 cattle, 126,800 sheep, 253,600 goats, 18,300 camels and 4,250 donkeys (DALEO, 2002). The *Ngikamatak* clan of the Turkana community inhabits Loima division. The government of Kenya through the Ministry of Agriculture and Rural Development and Veterinaries Sans Frontieres-Belgium (a non-governmental organization) provide animal health and livestock marketing services. Figure 3.1 shows the location of the study area.

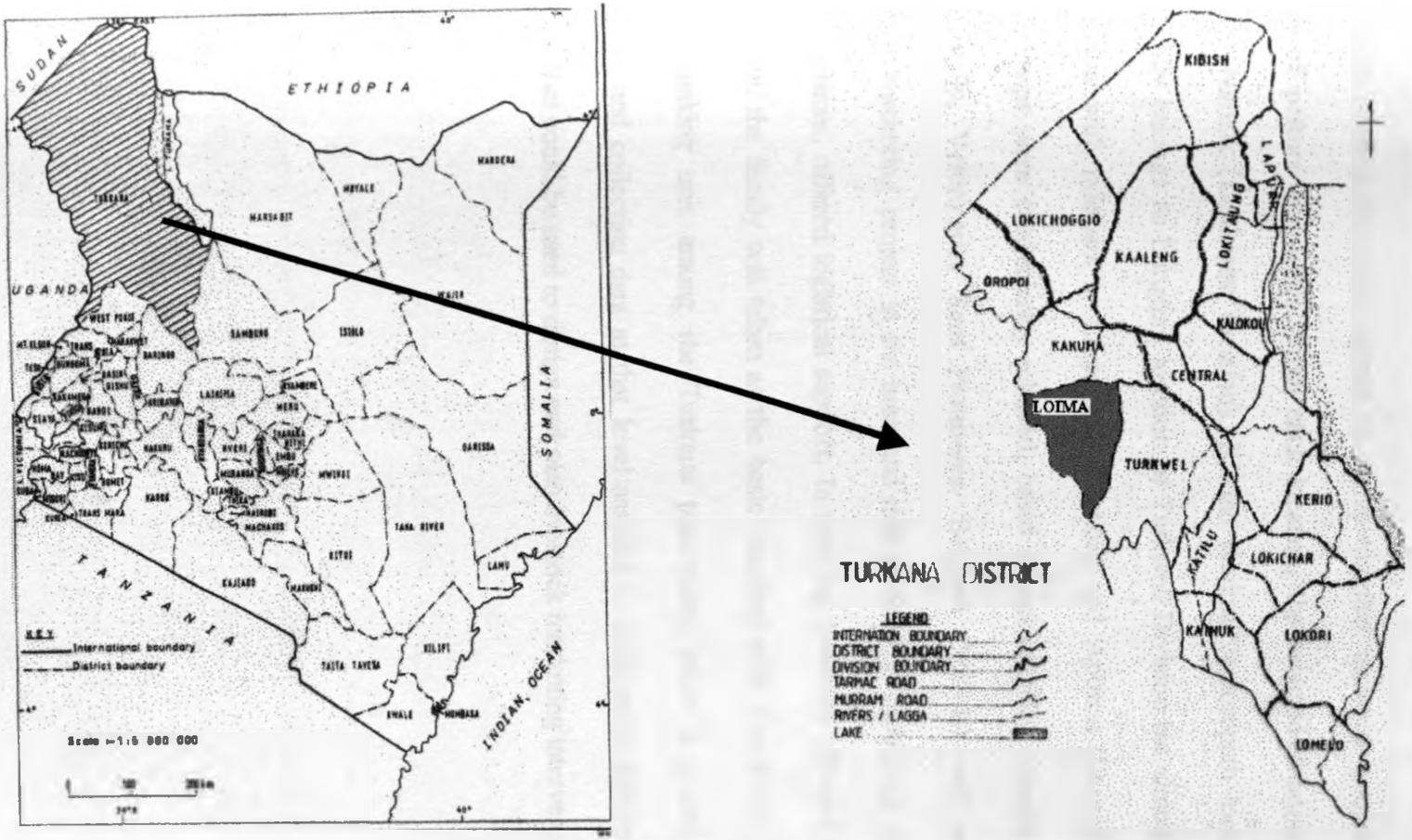

Figure 3.1: Map of Kenya showing the location of Turkana District and the study Loima Division.

3.2 SELECTION OF STUDY SITES

The study was carried out in four (4) out of twenty-five (25) livestock camps of Loima Division (4 in Lokiriama location, 6 in Lorengippi location and 15 in Loima/Namoruputh location). A livestock camp (*adakar*) consists of a group of nomadic pastoral households/families that have agreed to move together under a recognized leader in pursuit of pasture and water. From each location, the selected livestock camps were *Adakars* Natuba (Lokiriama location), Kicono (Loima/Namoruputh location), Acemie (principally belongs to Lorugum location of Turkwell Division but almost in permanent association with *adakars* in Lorengippi location) and Aporon (Lorengippi location). These camps were conveniently selected, based on accessibility, security and logistics. Additionally, Veterinaries Sans Frontieres- Belgium (VSF-B) was carrying out a livestock marketing project in the area and they assisted in mobilizing the pastoralists, and sometimes, offered logistical support. In studying livestock off-take and marketing constraints, the family was taken as the basic sampling unit. The family is the primary decision-making unit among the Turkana pastoralists when it comes to selling of livestock, and collecting data at that level assisted to understand factors that influence decision that could be used to design and plan livestock marketing interventions.

3.3 DATA COLLECTION

Data were collected between May and July 2003. Participatory appraisal (PA) methods including seasonal migration maps, matrix scoring, proportional piling, simple ranking, seasonal calendars, semi-structured interviews and workshops were used according Catley and Ahmed (1996), Catley and Mohammed (1996), Catley (2000), Mariner and Roger (2000), Catley and Leyland (2001) and Catley *et al.* (2002). Data collection was carried out in six phases as described below.

3.3.1 Sensitization workshop

A workshop was held in Lorugum at the District Officer's (DO) compound for three days, between 13th and 16th May 2003, with the main purpose of informing community representatives of the intended study and the need for their involvement. The participants included twelve livestock camp leaders from the three locations of Loima Division, three locational chiefs, seven livestock traders, two representatives from the Ministry of Agriculture and Rural Development, and one representative from VSF-Belgium. Discussions were mainly through brainstorming and the use of semi-structured interviews. Issues discussed included: existing major livestock camps in every location and their routes of migration; historical development of livestock marketing in Turkana; types of marketing systems; means of exchange; classification of livestock traders; individuals responsible for decision to sell an animal in a family; wealth ranking; age-sex structures of types of livestock kept; constraints faced by producers and traders in livestock marketing; seasons of the year and their corresponding months; and sources of

cash income. Participatory methods to be used in the study were also demonstrated. The workshop generated information that was later verified and standardized during the subsequent phases of data collection.

3.3.2 Participatory mapping

Participatory mapping was used to point out potential livestock markets in Loima Division based on seasonal movements of the livestock camps. One group of key informants of about 8-15 people in every livestock camp was involved for a total of 4 informant groups. The mapping procedure was explained to each group. Features of interest were: geographical boundaries of a livestock camp demarcated by major mountains/hills; main rivers and major watering points along them; neighbouring tribes; grazing areas during wet and dry seasons plus potential directions of migration; trading centers; and earth roads. A group was instructed to use locally available materials such as stones, sticks, tyre shoes, traditional chairs (*Ekicholong*) and bones to distinctively mark a feature placed on the map. A clean space on the ground was prepared to produce the maps. Informants were left alone to carry out the exercise for twenty minutes and added more time on request. Guidance of the researcher was sought from time to time. On completion of the exercise, the informants were asked to confirm the features on the map, after which the map was drawn on A-4 size notebook. The maps from the four livestock camps were collapsed into one.

3.3.3 Matrix scoring

3.3.3.1 Herders' preference for different types of livestock traders and livestock marketing systems

Two informant groups of herders, one for men and the other for women, each of about 8-15 people, were involved per livestock camp (*adakar*) for a total of 8 informant groups. Types of livestock traders operating in the division were discussed in a brainstorming session during the sensitization workshop. Classification criteria for different types of livestock traders were agreed upon in the workshop and later verified at the *adakar* level. Two classification criteria of traders were agreed upon: 1) based on tribe of the traders; and 2) based on the marketing system they operated in. For every criterion, types of livestock traders mentioned were compared in a pair-wise manner, resulting in a set of preference indicators. In the two classification criteria, similar sets of indicators were generated. Taking one classification criterion at a time, the categories of traders mentioned under each were represented in a matrix drawn on the ground using familiar objects such as tyre shoes, waste papers, stones and traditional chairs, placed along the top X-axis of the matrix. The indicators generated were written on cards and illustrated along the left Y-axis of the matrix. For each indicator, the informants were asked to score each type of livestock trader by dividing a pile of stones against the trader, sufficient to show differences between traders. For the criterion based on the tribe of the traders and the one based on the marketing system traders operated in, the number of stones used to score each livestock trader against an indicator were 10 and 15 stones respectively; five stones represented a uniform score for every trader. Every time an indicator was to be

scored against the types of traders, it was read and explained to the group. After the exercise, informants were given additional time to cross-check the scores in the matrix and make any alterations, if necessary. In the course of cross-checking, informants were asked probing questions in a bid to generate any other additional information about livestock traders. The matrix produced was later recorded in a field notebook.

The matrix scoring exercise for preference of different types of livestock marketing systems followed the same procedure as above. Plate 3.1 shows a matrix-scoring exercise being performed by an informant group.

Plate 3.1: Elders of a livestock camp conducting a matrix-scoring exercise in Loima Division, Turkana District, 2003

3.3.4 Seasonal calendar

Seasonal calendars were used to assess existing market livestock off-take, with regard to seasonality of sales. Four informant groups of herders, each of about 8-15 people, were involved. In the sensitization workshop, participants were asked to mention the types of livestock owned and their age-sex categories. For each type of livestock, age-sex categories sold were indicated and named in the local Turkana language. Attempts were made to ensure that participants agreed on a name for every age-sex category mentioned, because an age-sex category seemed to have several synonyms. This information was verified at the *adakar* level.

During the actual data collection, a line was drawn on the ground and explained to the informant group that it represented one full year. The informants were asked to divide the line into the community's seasons and corresponding months in the local language. Each season was labeled by a representation on a piece of carton as: red marks for the dry season; green for the wet season; and green-red partition for the inter-phase between the wet and dry seasons. Informants were given a chance to explain back the meaning of colour marks on the pieces of cartons that represented seasons. The pieces of cartons were placed on the top X-axis. Age-sex categories generated during the sensitization workshop, written on pieces of cartons, were placed on the left Y-axis. Taking one livestock type at a time, informants were asked to divide a pile of 15 stones provided, against seasons for every age-sex category mentioned to show the relative seasonal trend in the sale of the particular category. After every scoring, informants were asked to carefully check the scores and if they wished, adjust the scores until they were all in

agreement. The seasonal matrix produced prompted further questioning and discussions. The matrix was later transferred onto a field notebook.

3.3.5 Wealth ranking and proportional piling

Wealth ranking and proportional piling were used to assess herders' perceptions of cash income sources; assess market off-take with regard to proportional measure of herds and age-sex categories of types of animals sold; and assess herders' predictions of market off-take levels if marketing were improved.

The community's criteria of wealth ranking were discussed in the sensitization workshop and verified at the *adakar* level. The commonly mentioned criteria were 1) based on types of livestock owned, and 2) based on number of livestock owned.

To identify individuals who belonged to the various wealth groups (rich, medium or poor) in an *adakar*, the *adakar* leader was consulted on the basis that he had a holistic understanding of individuals in the *adakar*, commanded respect and had also attended the sensitization workshop. The *adakar* leader produced a list of elders who were members of his *adakar*. Based on his experience and coupled with the wealth ranking criteria adopted in the sensitization workshop, the *adakar* leader was asked to provide wealth ranks for every elder listed. From the elders' wealth status list, 3 elders from each wealth group (3 rich, 3 medium class and 3 poor) were conveniently selected. For purposes of capturing information from both women and men, every elder was interviewed and views of the wife sought later. This approach helped to standardize the number of informants

required and ensured that every wealth and gender group was equally represented. A total of 72 herders, 18 from each livestock camp, stratified by gender and wealth, were involved.

In assessing sources of cash income, participants were asked to state the sources of their cash income in the past one year. Major sources of cash income were noted and those regarded minor by participants were classified under "others". Using a pile of 100 stones, each informant was asked to divide the stones across the sources of cash income to show the relative proportions of cash income that accrued from each source (Plate 3.2).

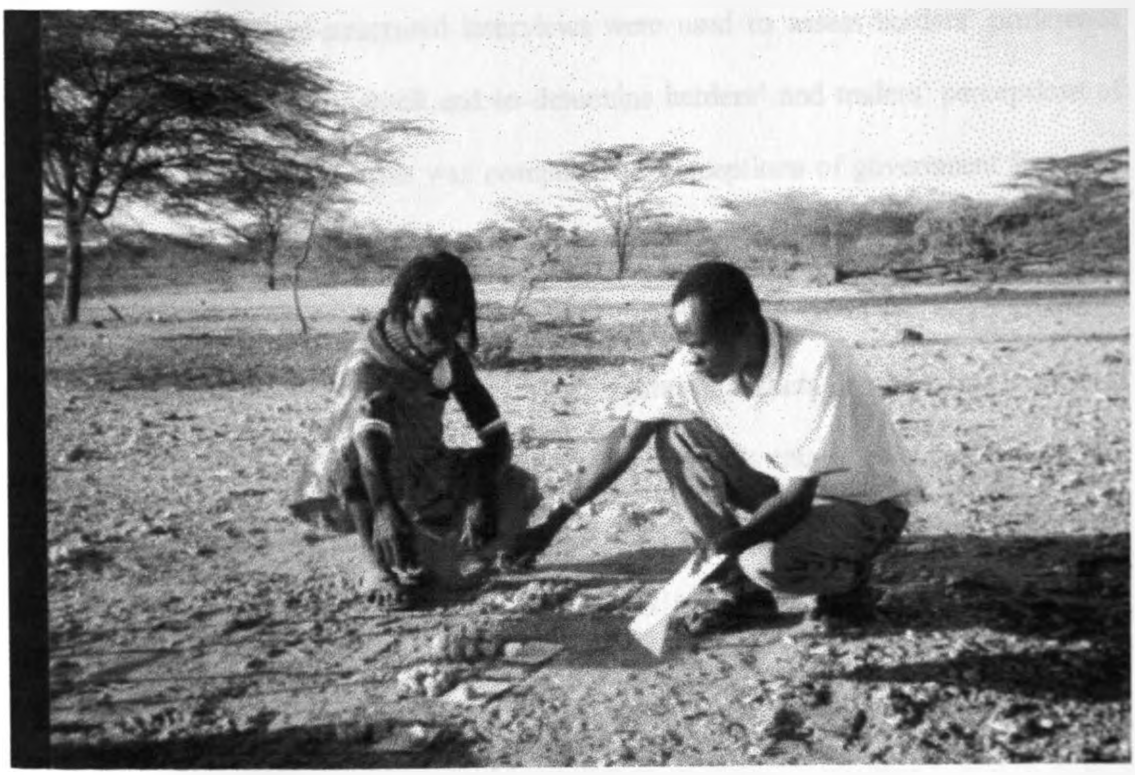

Plate 3.2: An enumerator confirming the outcome of a proportional piling exercise from an informant in Loima Division, Turkana District, 2003.

In the assessment of market off-take, each informant was asked to divide a pile of 100 stones across the four types of livestock (goats, cattle, camels and donkeys) that were in

their livestock holding in the past one year as proportions of the total herd. For each livestock type, the informants were asked to further divide the allocated stones into "those sold in the past one year" and "those that remained in the herd". Subsequently, the informants were asked to further divide the stones to indicate the proportions of the livestock sold according to age-sex categories. To predict future market off-take levels, stones assigned to a particular livestock species were pooled and the informants asked to divide the stones to indicate the proportion they would sell were marketing to improve.

3.3.6 Simple ranking and semi-structured interviews

Simple ranking and semi-structured interviews were used to assess herders' preference for selling different types of stock and to determine herders' and traders' perceptions of marketing constraints. The latter was compared to perceptions of government livestock workers. This exercise involved 72 herders, 59 traders (20 conveniently selected in "lower" primary markets, 14 in "upper" primary markets and 25 in secondary markets) and 8 government livestock workers. "Lower" primary markets denote markets at farm gate level where transactions take place inside the livestock camps, at watering points or at transitional centers established by mobile traders. They are characterized by a large number of producers who barter few animals to a few small-scale traders or other producers. "Upper" primary markets denote markets at rural shopping centers or settlements. The number of animals supplied is more than in 'lower' primary markets and involved are an increased number of small-scale traders and to some extent local butchers. They are rarely organized and fenced. Transactions are both in barter and cash. Secondary markets are those in large town centers, often dominated by large-scale traders

and butchers and offering a large volume of livestock. Livestock come from primary markets. Secondary markets serve the local consumer populations as well as supplying the terminal markets.

Constraints faced by traders and producers in livestock marketing were discussed in a brainstorming session during the sensitization workshop and later verified during the actual data collection. Herders were asked to list constraints they faced in marketing their livestock and to assign ranks in their order of importance. Traders were stratified according to types of livestock markets they were operating in ("lower" primary, "upper" primary and secondary), and asked to mention the constraints they faced in buying and selling livestock and later guided through the process of assigning ranks to the constraints in their order of importance. Government livestock workers were asked separately to give their perception of constraints faced by traders and producers in livestock marketing and assign ranks in the order of their importance. From the constraints listed by every group (6 by producers, 8 by traders and 10 by government livestock workers), 1 represented the most important constraint while the least important constraint in the separate rankings by producers, traders and government livestock workers was represented by 6, 8 and 10, respectively.

3.3.7 Stakeholders' workshop

After data collection and preliminary analysis of data in the field, a stakeholders' workshop was held where preliminary findings of the study were presented and verified. The workshop was held between 10th and 12th July 2003 at the District Officer's

compound in Lorugum. It was attended by 20 livestock owners (12 men and 8 women) from the four *adakars* where the study was carried out, 3 chiefs from the 3 locations of Loima Division, 14 traders (3 from secondary market in Lodwar, 3 from "upper" primary market in Lorugum and 8 from the "lower" primary markets), one representative from the Turkana District Veterinary Office, one representative from the Turkana District Animal Production Office, 5 NGO representatives (one from ITDG-EA, one from CAPE Unit of AU/IBAR, one from SNV-Kenya and two from VSF-Belgium) and two lecturers from Department of Public Health, Pharmacology and Toxicology of the University of Nairobi. The stakeholders outlined a series of activities in form of a community action plan with a view to improve livestock marketing in the division. Plate 3.3 shows participants at the stakeholders' workshop in Lorugum.

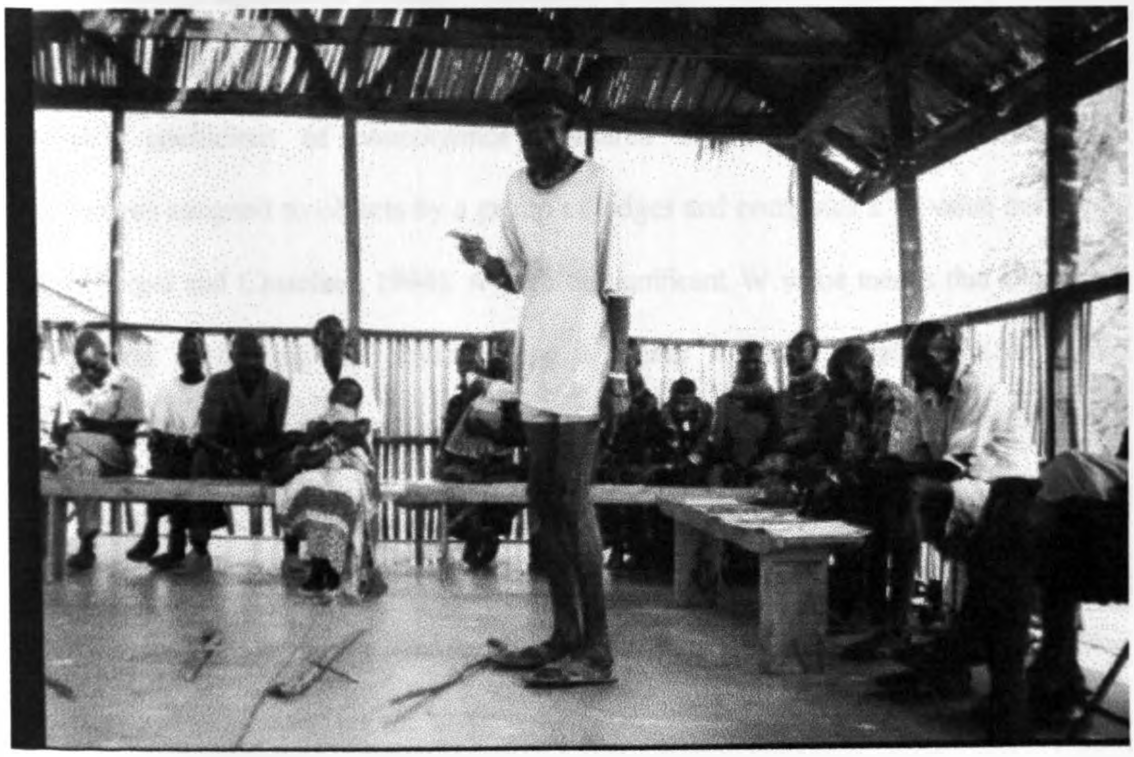

Plate 3.3: An elder stressing a point in the stakeholders' workshop held in Lorugum, Turkana District, July 2003

3.4 DATA HANDLING AND ANALYSIS

The participatory maps constructed by pastoralists in the four *adakars* were collapsed into one map. The map was first stored in a field notebook and later scanned using Scanjet® 5200 scanner (Hewlett Packard Corporation, USA).

The data were entered into Microsoft Excel® 2000 (Microsoft Corporation, USA) software as spreadsheets and saved as Microsoft Excel 4.0 worksheet in separate files and then imported into the Statistical Package for Social Sciences (SPSS®) Version 11.0, 2002 (SPSS® Inc. USA) and saved as SPSS files. The SPSS was used to generate descriptive statistics (medians and range) for the matrix scoring and seasonal calendar data. Levels of agreement between informant groups were computed using Kendall's coefficient of concordance (W), which compares more than 2 sets of a subject. The Kendall's coefficient of concordance measures the association between sets of ranks/scores assigned to objects by a group of judges and computes a W value between 0 and 1 (Seigel and Castellan, 1994). A high or significant W value means that the judges are ranking or scoring the objects using a similar standard or pattern (Seigel and Castellan, 1994). The matrix scoring data on the two types of traders identified in the classification by tribe were analyzed using the Mann-Whitney (U) test to test the null hypothesis that the same population equally preferred the two groups (SPSS Inc, 1999). The SPSS software was also used to generate mean proportions and presented as tables, pie charts and bar graphs for the proportional piling data. Differences across *adakars* and wealth groups and between gender groups were computed using non-parametric one-way analysis of variance (ANOVA) test (Kruskal-Wallis). Data on semi-structured interviews

and workshops were summarized qualitatively and that on simple ranking were imported into SPSS where descriptive statistics (median ranks and range) were computed and presented as tables.

4.0 RESULTS

4.1 HERDERS PERCEPTIONS OF LOCAL MARKETS

4.1.1 Potential livestock markets based on seasonal movements of pastoralists

Figure 4.1 shows the collapsed participatory map indicating the locations of the four *adakars* of Loima Division that were involved in the study. The map shows the routes of migration and the potential livestock markets used during seasonal movements by livestock keepers in the division. Other features shown in the map were earth roads, mountain ranges, hills, rivers and livestock watering points. During the dry season, livestock were moved to hilly or mountainous regions of the division and sometimes across the borders to West Pokot and Uganda during severe drought (Fig. 4.1). In the wet season, livestock were moved to the erosional plains which form a larger part of the division's land mass. These movements were only applicable to sheep and goats, camels and donkeys. Cattle were almost permanently grazing in Uganda throughout the year. During these movements, the need by livestock keepers to sell livestock was mostly done at the trading centres along the migration routes. Within the Division, the major trading/market centers were Namoruputh, Lokiriama and Lorengippi. Livestock marketing operations at these centers were however reportedly disorganized. In addition, these market centers were inaccessible during the dry season. Thus, the livestock keepers often utilized alternative markets outside the division, namely, Lorugum, Turkwell, Lodwar and Kakuma in Turkana, Amakuriat market in West Pokot District of Kenya, and Moroto market in Uganda. Although markets outside the division offered better prices,

pastoralists highly complained of insecurity to and in these markets, particularly those in West Pokot District of Kenya and in Moroto in Uganda. The *Ngikamatak* clan of Loima Division reportedly engaged in running battles with their neighbours, the Pokots of Kenya and the Tepes, Matheniko and Jie of Uganda, largely occasioned by livestock rustling. This fear of insecurity was said to be exacerbated by long distances to the secure market centers within the division, particularly during the dry season. The interviewed pastoralists of Loima Division expressed the need for their internal market centers being developed and organized in such way that the seasonal movements are taken into consideration. They suggested that the necessary marketing infrastructure (starting with setting up of a sale yard) could be made available at the major trading centers in the division to allow for organized marketing of livestock. In addition to seasonal movements, other requirements considered by pastoralists of Loima Division to be key to establishment of an organized livestock market were: security; substantial supply of commercial/consumer goods; availability of water and pasture for livestock; easy to occasionally utilize cross-border marketing opportunities when there is relative peace since the region borders West Pokot District and Uganda; easily accessible by traders; based on a marketing system that promotes designated market days. It was suggested that one of the three major trading centers could be developed as an initial livestock marketing centre. On further deliberations during the stakeholders' workshop, Namoruputh was agreed upon as a relatively central trading centre where an initial livestock market could be established in the division. Veterinaries Sans Frontieres-Belgium (NGO working in the area) together with the Livestock Production Department

along with the community agreed to facilitate the establishment of a livestock market at Namoruputh based on the following action plan:

1) Sensitise and mobilize the community to form marketing groups or committees at livestock camp (*adakar*) level to facilitate access to the livestock market and also as a channel of passing livestock marketing information;
2) Setting up a market day;
3) Constructing a sale yard at the trading center;
4) Publicizing the set market day to traders outside the division and;
5) Facilitating formation of a management committee to take care of the operations at the sale yard.

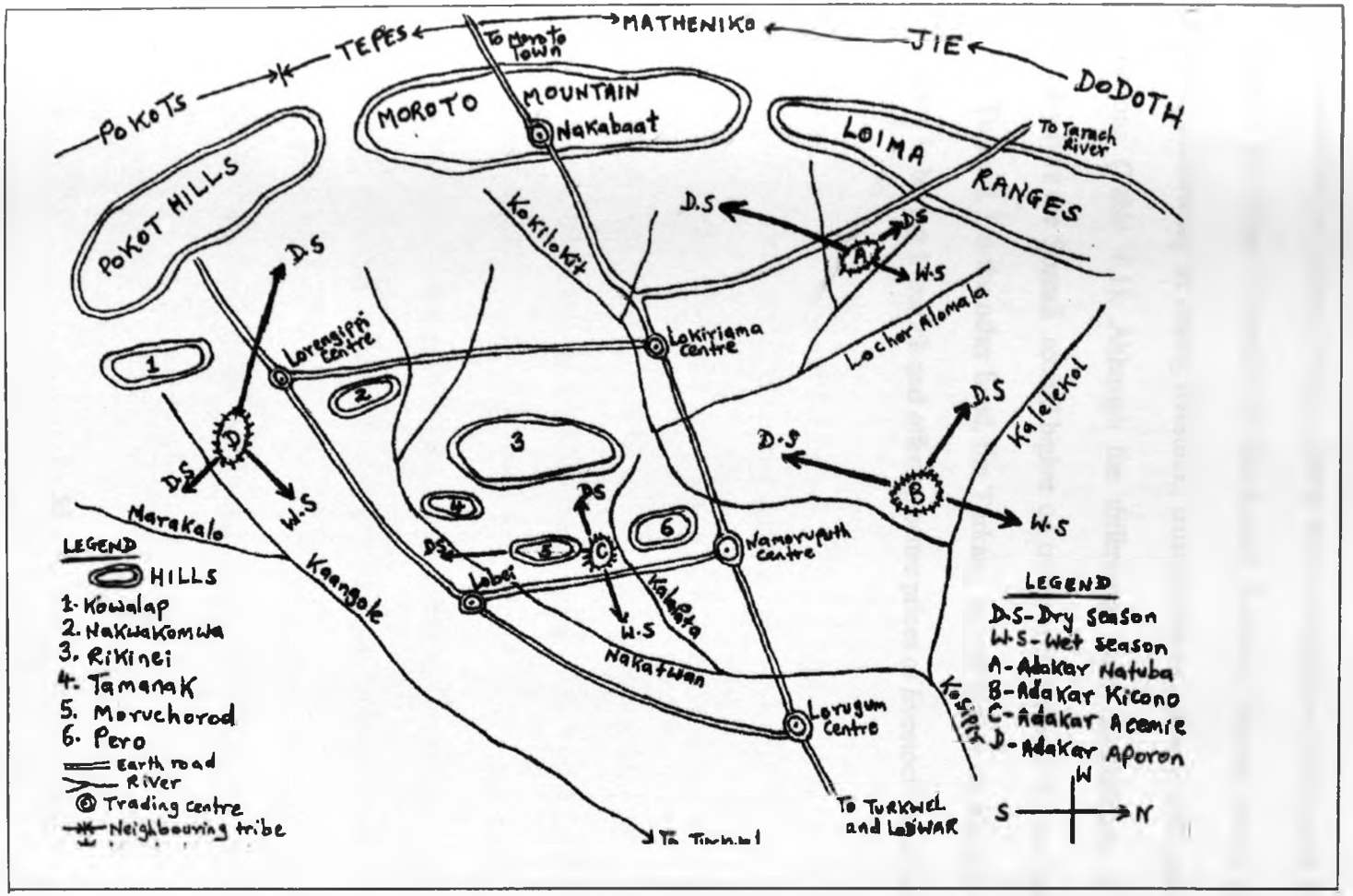

Figure 4.1: Participatory map showing the location of the four study *adakars*, their seasonal migration patterns and potential livestock markets in Loima Division, Turkana District, 2003.

4.1.2 Herders' criteria for classification and preference for different types of livestock traders

4.1.2.1 Classification and preference based on tribe of traders

The Somali (*Esomalit*) and the Turkana (*Eturkanait*) were the two types of livestock traders identified in Loima Division. There were no significant differences in the herders' preference for either *Esomalit* or *Eturkanait* livestock traders based on pricing of livestock, consistency in buying livestock, trustworthiness, always with cash and friendly negotiations (Table 4.1). Although the differences were insignificant, a pattern was observed where the Somali scored higher on trustworthiness and always being with cash than the Turkana. On the other hand, the Turkana scored higher on friendly negotiations, consistency in buying livestock and offering better prices of livestock than the Somali.

Table 4.1: Tribal preference of livestock traders by pastoralists in Loima Division of Turkana District, 2003.

Indicator	Trader type	Group (N)	Mean Rank	Mann-Whitney (U)	P-Value
Price of livestock	Esomalit	8	7.31	22.5	0.3
	Eturkanait	8	9.69		
Consistency in buying livestock	Esomalit	8	7.13	21	0.22
	Eturkanait	8	9.88		
Trust-worthiness	Esomalit	8	8.81	29.5	0.79
	Eturkanait	8	8.19		
Always with cash	Esomalit	8	9.19	26.5	0.56
	Eturkanait	8	7.81		
Friendly negotiations	Esomalit	8	6.56	16.5	0.09
	Eturkanait	8	10.44		

N=Number of informant groups

On further probing, it emerged that some informants preferred the Turkana because their business property belonged to the community while that of the Somali was individually owned and commonly re-invested back to their original homeland. There were concerns over the non-aggressiveness of the Turkana in trade. This was attributed to lack of business skills, working capital and/or due to a high illiteracy rate. Educated Turkana were blamed, firstly for fearing to conduct trade within the community, perhaps because of "generosity" expected from them and secondly, for lacking a deliberate effort to enlighten illiterate traders and the community as a whole. Low working/investment capital was given as a reason why few Turkanas ventured into livestock trade. Most of the Turkana traders were said to be from poor families. In addition, there is a historical

myth that the Turkanas are disunited; this was mentioned as one of the barriers that hinder operation of livestock trade through cooperatives that could help cushion the traders against risks and uncertainties associated with trading in such a pastoral set up.

Some Turkana traders were associated with offering very low prices for livestock. Consequently, the Somali traders learnt this behaviour from the Turkana and resorted to equally low prices. The Somali could also offer low prices when they were few. Furthermore, the Somali were said to have studied the food-availability cycle among the Turkana. When they were desperately looking for food, the Somali could offer low prices for livestock. The Turkana traders were recognized for informing producers on price changes, an attribute that was missing with the Somali traders.

Although the Somali were associated with handling more cash, they were considered to be very mean. This was said to be a deliberate trick to divert the minds of pastoralists from cash and lure them towards barter (exchanging livestock with consumer goods) where the trader had advantage of manipulating prices. In addition, the low prices of livestock offered was said to be an exploitative trick to make pastoralists sell more animals in order to offset shortfalls in purchasing expensive commodities from the Somali shops. Most of the transactions of the Turkana were in barter form and this was blamed for influencing the Somali to increasingly use barter trade. Lack of cash among Turkana traders was attributed to low working capital.

The Somali and the Turkana traders were almost equally ranked with regard to being consistent in buying livestock. Although the analysis indicated that the Turkana were more consistent in buying livestock, the Somali were said to be in a much better position due to their capital base. The consistency of the Turkana in buying livestock was recognized but low working capital coupled with low business skills and non-diversified business were said to often push them out of business. The Somali were associated with trustworthiness because they could sometimes raise the price of livestock, trade both in cash and barter, and could give gifts.

The Turkana were recognized for their ability to negotiate for a price margin in a respectable manner. This was attributed to their constant presence within the community, better local language command, wider knowledge of people's problems and social/cultural attachment to the people. On the other hand, the Somali were reported to treat livestock keepers as strangers and that their friendship was mostly business-oriented. The Somali could set the price of livestock without considering wishes of livestock owners, especially when they realized that the livestock owners were desperately in need of food. Some interviewed informants reported that they were totally dissatisfied with both types of livestock traders, accusing them of extensive mischief, forming of business cartels and for exploitation. They preferred dealing with new traders from outside Loima Division if marketing of livestock were to improve.

4.1.2.2 Classification and preference based on the location of livestock traders

The pastoralists of Loima Division identified three types of livestock traders based on how and where they operated from. They included: traders on foot/mobile (*Lu ang'akejen*); traders operating from a shop (*Lu edukan*); and traders operating from a livestock sale yard (*Lu anok*). There was excellent agreement between the 8 (eight) informant groups for the 5 qualities considered. The critical values of the level of concordance (W) ranged from 0.810 to 0.875 (Table 4.2). Traders operating from a sale yard had the highest median scores ranging from 9.5-10 (Table 4.2). Traders on foot (mobile) received the least scores ranging from 1.5-2.0 while traders operating from a shop received moderate scores ranging from 3.5 to 4.5.

On probing further, the informants indicated that traders operating from a shop were only preferred in the absence of traders operating from a sale yard. The distance between the shop and the location of a livestock camp however influenced trading with a trader operating from the shop. Livestock owners far from a shop preferred dealing with the "mobile" traders (*Lu ang'akejen)* although the quantity and sizes of commodities they carried, their relative affinity for barter trade, and poor prices for livestock, limited their scope. Traders operating from a sale yard were reportedly many and thus were able to offer competitive prices.

Table 4.2: Summarized matrix scoring of livestock traders by preferred qualities in four livestock camps in Loima Division, Turkana District, 2003.

Indicator	Livestock traders		
	Mobile/foot traders (*Lu ang'akejen)*	Traders with a shop (*Lu edukan)*	Traders in a sale yard (*Lu anok)*
Pricing of livestock (W=0.813**)	••	••	•••••
	••	••	•••••
	1.5(0-5)	3.5(1-5)	9.5(6-11)
Consistency in buying livestock (W=0.875***)	••	••	•••••
	•••		•••••
	2(0-5)	4.5(2-6)	9.5(6-11)
Trustworthiness (W=0.810**)	••	••	•••••
	••		•••••
	1.5(0-5)	4(2-6)	9.5(6-11)
Always with cash (W=0.851***)	••	••	•••••
	••		•••••
	1.5(0-4)	4(3-7)	10(7-11)
Friendly negotiations (W=0.851***)	••	••	•••••
	•••		•••••
	1.5(0-4)	4.5(2-6)	9.5(6-11)

Number of informant groups=8; W=Kendall's Coefficient of Concordance (**p<0.01; ***p=0.001). W values vary from 0 to 1.0; the higher the value, the higher the level of agreement between informants. The black dots represent the median scores (number of stones) that were used during the matrix scoring. The minimum and maximum limits are shown in parentheses.

Consistency in the purchase of livestock was strongly associated with traders operating from a sale yard (*Lu anok)* especially during market days. They were usually the major buyers of livestock from producers, traders operating from shops (*Lu edukan)* as well as from the "mobile" traders (*Lu ang'akejen)*. The latter traders were said to be in business when they sold animals from their herds or when they stole and sold someone else's animal, and therefore were no different from an ordinary livestock keeper.

Despite the extensive dislike of the mobile/foot traders (*Lu ang'akejen)*, the herders still dealt with them because of: their constant presence within the community; reducing livestock owners' distance to markets; not discriminating the type and size of animal they wanted; being reliable in supply of commodities; and were always buyers of last resort in the absence of the other types of traders.

The mobile/foot traders were mostly Turkanas while traders operating from shops were Somalis and traders operating from a sale yard had no tribal identity. Many Turkana traders reached livestock producers on foot with commodities carried by hand and sometimes on donkeys. Many Somalis had established shops along seasonal movement routes, stocked with commodities that were exchanged with livestock. Sale yards were said to be "all-tribes-inclusive" livestock marketing establishments. The mobile/foot traders (*Lu ang'akejen)* were described as an advanced class of producers because, just like a producer, they could take 1-2 animals to the market where a shop or a sale yard was available.

4.1.3 Preference for different types of livestock marketing systems

Five livestock marketing systems were identified by the informants: traditional (*Akisiecha*); auctions (*Eogesen*); mobile traders (*Ng'akejen*); shop (*Edukan*); and person-to-person negotiation (*Akoros*). The pastoralists defined these systems as follows: the traditional system involved circulation of livestock between individual producers as a gesture of establishing and/or maintaining interpersonal relations. Animals were given as gifts or credits or exchanged. Auctions involved announcing of market dates and venues on monthly, quarter-yearly, half-yearly or sometimes on annual basis where large number of producers and traders met to buy and sell livestock. The auctions took place in an auction yard, a second party set prices of livestock and most of the transactions were in cash. Mobile trader system was where itinerant traders moved into the hinterland of the district/division on foot to buy small number of livestock particularly through barter. The shop system was where livestock owners took their animals to shops in the hinterland stocked with consumer goods. Animals were bought either in cash or barter or both. Person-to-person negotiation took place in a sale yard either daily or on designated market days. It involved individual buyer-seller negotiation for the price of livestock and most transactions took place in cash.

The marketing systems were scored against the following qualities: better prices of livestock; cash availability; attraction of buyers; attraction of sellers; and their frequency. There was an excellent agreement between the 8 informant groups on all the 5 qualities of livestock marketing systems (Table 4.3). The auction and person-to-person negotiation

systems were scored highly for all the qualities while the traditional system received zero scores in 4 of the 5 qualities (Table 4.3). The informants considered the traditional system as someone's livestock herd and the "mother" of the other systems because animals from this system entered the other systems either through livestock owners themselves or mobile traders.

Table 4.3: Summarized matrix scoring of livestock marketing systems by preferred qualities in four livestock camps in Loima Division, Turkana District, 2003

Quality	Marketing systems				
	Traditional (*Akisiecha*)	Auction (*Eogesen*)	Mobile traders (*Ng'akejen*)	Shop (*Edukan*)	Person-to-person negotiation (*Akoros*)
Livestock prices (W=0.870***)	•• •• 1.5(0-5)	•••• •••• 7.5(6-12)	• 0.5(0-3)	•• ••• 4.5(1-5)	••••• ••••• 10(8-14)
Cash availability (W=0.963***)	0(0)	•••• ••••• 9(5-13)	• 1(0-2)	•• •• 4(3-7)	••••• •••••• 11(9-16)
Attraction of buyers (W=0.940***)	0(0)	•••• ••••• 9(8-13)	• 1(0-2)	•• ••• 4.5(2-6)	••••• ••••• 10(9-12)
Attraction of sellers (W=0.933***)	0(0)	••••• ••••• 9.5(8-13)	• 0.5(0-2)	•• •• 4(2-6)	••••• •••••• 10.5(7-12)
Frequency (W=0.906***)	0(0)	•••• •••• 8(4-9)	•• 1.5(0-5)	•• ••• 4.5(2-6)	••••• •••••• 11(10-15)

Number of informant groups=8; W=Kendall's Coefficient of Concordance (***p<0.001). W values vary from 0 to 1.0; the higher the value, the higher the level of agreement between informants. The black dots represent the median scores (number of stones) that were used during the matrix scoring. The minimum and maximum limits are shown in parentheses.

Despite the high scores for auctions, there were some concerns about the system. First, it disappeared in the distant past and its reintroduction was uncertain. Secondly, price setting based on a second party was said not to be attractive. Thirdly, it used to be held after several months and thus was not responsive to immediate needs. Fourthly, it was based on poll/hut tax during the colonial time and "Harambee", a post-colonial taxation system, which were both hated by the pastoralists. Despite the above setbacks, auctions were preferred because they standardized/controlled prices of livestock, were conducted closer to production areas, had minimal price cartels and brokering, were reliable during drought, permitted wholesale purchases, had shorter bargaining time, and absorbed all types, ages and sexes of livestock.

The person-to-person negotiation system reportedly discriminated on the sex and age and, to some extent, type of livestock required in the market; encouraged and promoted brokers; was exploitative during drought by offering very low prices; was prone to unpredictable price changes; had unsteady number of livestock buyers over time; took long to negotiate for a price; was far away from production areas; and often introduced an unexplained fee known as county council levy at the sale yards. Relative to the other systems, mobile traders' system was considered by informants as very exploitative and could only attract insincere traders and sellers. Most of the sellers in this system were said to be wrongdoers who spent most of their time in hiding as thieves or young herdsmen who sold livestock without parents' consent.

4.2 HERDERS' PERCEPTIONS OF SOURCES OF CASH INCOME

4.2.1 Sources of cash income of herders

Of the major sources of cash income during the past one year enumerated by 72 informants from the 4 livestock camps, livestock and livestock products accounted for 68% of the total cash income (Figure 4.2)

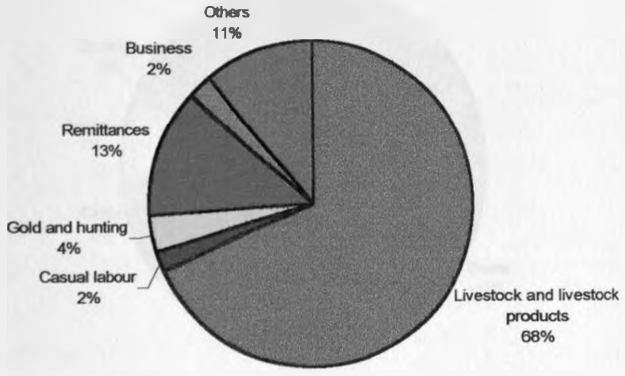

Figure 4.2: Sources of cash income of 72 informants in Loima Division, Turkana District, 2003.

Of the four species of livestock sold for cash, goats were the major source of cash constituting 68% of the total cash income from livestock and livestock products (Figure 4.3). There were no significant differences in the proportions of cash income from the four species of livestock by *adakar*, gender and wealth groups (Table 4.4). Indeed, the only significant difference ($P<0.05$) of the various sources of cash income was from business. *Adakar* Kicono had a significantly higher proportion (6.2%) of cash income

from business in comparison to the other 3 *adakars* (Table 4.4). The *adakar* was closer to Namoruputh trading center and there were organized women business groups who were involved in car hire and retail shop businesses. As a result, the proportion (3.97%) of cash income earned by women from businesses was significantly ($P<0.05$) higher than the proportion (0.89%) of cash income earned by men (Table 4.4). There were no significant differences of sources of cash income between the three classes of wealth (Table 4.4).

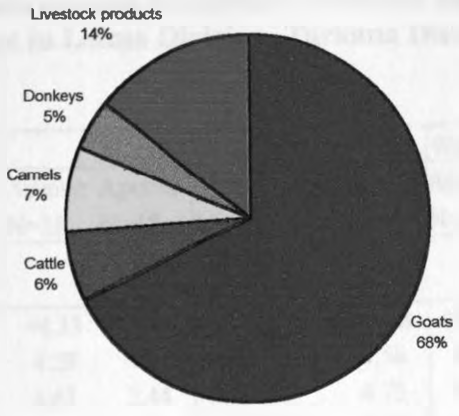

Figure 4.3: Cash income to herders from different species of livestock and their products, as a proportion of total cash income from livestock and livestock products in Loima Division, Turkana District, 2003.

On further probing, the informants said goats were sold in large numbers because they formed the bulk of their herd/flocks, were easy to dispose of because of their small sizes, and that markets for goats were relatively accessible. However, the informants said that there were no organized livestock markets in the division and thus, they travelled long distances to reach competitive livestock markets outside the division. The farthest were markets for cattle, camels and donkeys. Cattle were mostly sold in Moroto market in

Uganda; camels in Kakuma market where they were in high demand by refugees; and donkeys at Amakuriat market in West Pokot District, Kenya. The sale of large stock was reported to be largely dependent on proximity of the *adakar* to the specific markets following its seasonal migration pattern. Further probing also revealed that, of the mentioned livestock products, milk sales contributed more to cash income as compared to hides and skins.

Table 4.4: Sources of cash income to herders expressed as a proportion by *adakar*, gender and wealth groups in Loima Division, Turkana District, 2003.

Sources of cash income	*Adakar* group				Gender group		Wealth group			P-value	
	Natuba N=18	Kicono N=18	Acemie N=18	Aporon N=18	Men N=36	Women N=36	Rich N=24	Medium N=24	Poor N=24	*Adakar* group	Gender group
	Proportion (%)										
Goats	43.22	47.1	44.33	50.89	47.69	45.08	46.125	44.25	48.79	0.79	0.65
Cattle	4.83	2.83	4.28	4.67	4.72	3.58	4.75	4.17	3.54	0.79	0.46
Camels	8.72	4.28	4.61	2.44	5.28	4.75	6.67	5.125	3.25	0.099	0.78
Donkeys	1.33	2	4.06	5	2.64	3.56	2.5	3.21	3.58	0.19	0.51
Labour	2.83	1.89	1.11	1.94	2.36	1.53	2.375	2.625	0.83	0.88	0.57
Gold mining	5.72	2	0	2.89	2.69	2.61	1.29	3.58	3.08	0.09	0.96
Remittances	11.17	12.44	14.28	13.61	13.39	12.36	13	15.79	9.83	0.83	0.68
Hunting	2.89	0.78	0	0	0.94	0.89	1.12	0	1.64	0.08	0.95
Livestock products	8.79	9.57	11.89	8.61	9.31	10.11	10.96	8.67	9.5	0.71	0.72
Business	2.17	6.22	0.78	0.56	0.89	3.97	2.21	1.29	3.79	0.036**	0.05**
Others	8.33	10.89	14.66	9.39	10.09	11.56	9	11.29	12.17	0.37	0.59

** *Shows significant difference*
N= Number of informants

4.3 LIVESTOCK MARKETED OFF-TAKE

4.3.1 Marketed off-take as a proportional measure of herds

The composition of the herds in the order of decreasing proportions was: sheep and goats (60.9%); camels (17.9%); cattle (11.5%); and donkeys (9.7%) (Figure 4.4). There were significant differences ($P<0.05$) in the proportions of shoats, cattle and camels in the herds by wealth groups. The proportions of shoats in the herds were higher among the poor (73.3%) as compared to the rich (51.7%) and medium class (57.8%) while the proportions of cattle and camels in the herds were higher among the rich (13.5% and 23.3% respectively) and medium class (13.8% and 19.1% respectively) as compared to the poor (7.1% and 11.4% respectively). There were no differences in the proportions of shoats, cattle and camels between *adakar* and gender groups. Women significantly ($P<0.05$) reported a higher proportion (11.3%) of donkeys in the herds than men (8.1%). There were no significant differences in the proportions of donkeys in the herds by *adakar* and wealth groups.

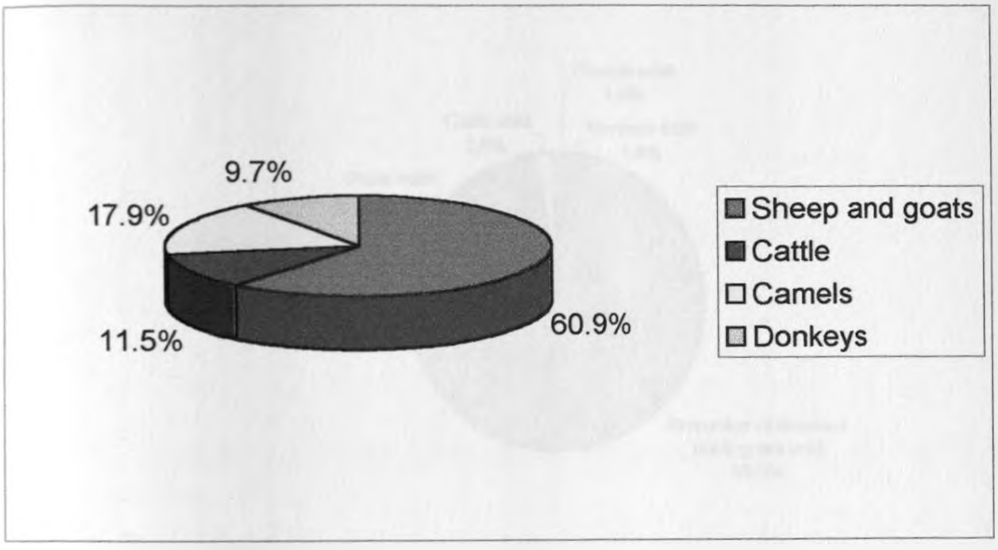

Figure 4.4: Proportions (%) of livestock species in the herds in four livestock camps of Loima Division, Turkana District, 2003.

During the past one year, 30.5% of the herds were sold; in decreasing order of magnitude, goats were 25.4%, cattle were 2.0%, camels were 1.8%, and donkeys were 1.3% (Figure 4.5). Sheep were not sold. Overall, the unsold proportion of livestock species in the herds was higher (69.5%) than the sold (30.5%).

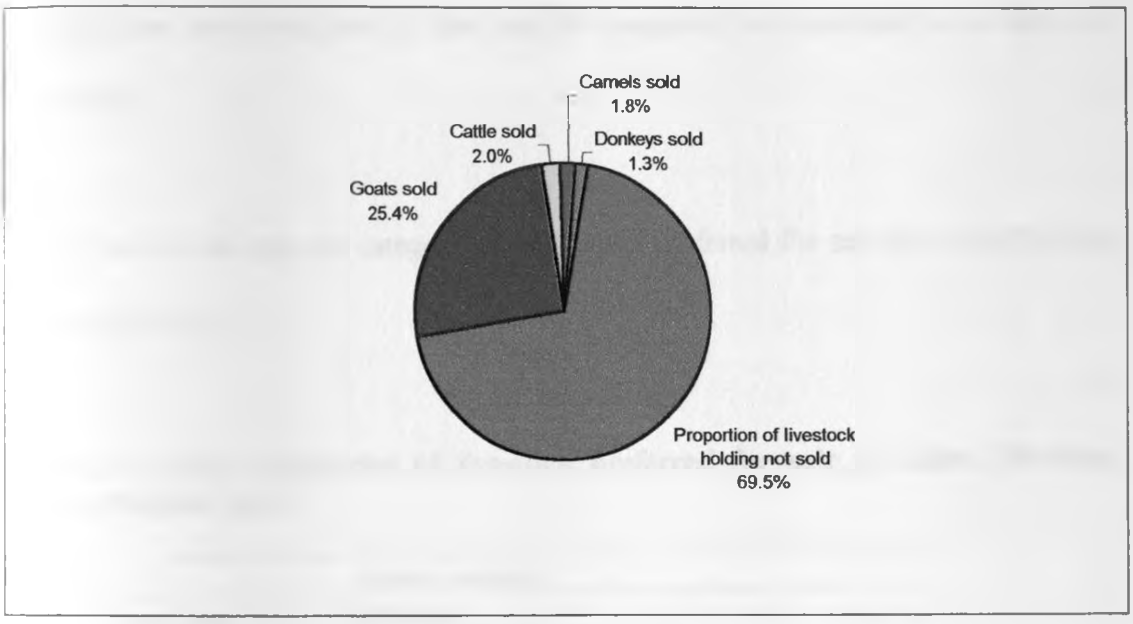

Figure 4.5: Proportion (%) of animals sold over the past one year relative to the unsold in four livestock camps in Loima Division, Turkana District, 2003.

4.3.2 Marketed off-take according to species and age-sex categories

Commonly sold species of livestock were goats, cattle, camels and donkeys. Sheep were not sold. There were no significant differences in the proportions of the different species of animals sold in the past year by *adakar*, gender and wealth groups.

Sheep were not sold because of their low numbers resulting from unfavourable production environment and traditional uses. Traditionally, sheep were used for: treating some human ailments; producing fat for family use; making women wear (skins); delicacy for in-laws during courtship and wedding ceremonies; cleansing wrong doers; slaughter for women who had just delivered; and in burial rituals. Although donkeys were

sold, their sales were restricted by their use for transport, their medicinal value and low numbers kept.

Table 4.5 shows the age-sex categories of livestock preferred for sale in Loima Division and their definitions.

Table 4.5: Age-sex categories of livestock preferred for sale in Loima Division, Turkana District, 2003.

Species	Age-sex category	
	Local name	**Definition**
Goats	Naminawoi	Male or female kid between 4 and 6 months old
	Lodong'ong'	Castrated male between 1 and 2 years (yearling)
	Loang'itou	Young uncastrated male between 6 months and 1 year
	Ebilareng'oit	Castrated male over 2 years old
	Akale	Young female between 6 months and 1 year
Cattle	Namojong'	Old female past reproductive age
	Emong'	Castrated male over 3 years
	Loang'itou	Uncastrated male between 1 and 2 years (yearling)
	Aite Nakolup	Mature infertile female
	Emanik	Mature breeding male
Camels	Lodong'ong'	Castrated male over 3 years
	Loang'itou	Uncastrated male between 1 and 2 years (yearling)
	Echekemuk	Young male or female between 9 months and 1 year
	Akaal	Mature breeding female
	Namojong'	Female past reproductive age
	Lopuuwa	Uncastrated male between 2 and 3 years
Donkeys	Lodong'ong'	Castrated male over 3 years
	Asikiria	Mature breeding female
	Loketepan	Mature breeding male
	Loang'itou	Uncastrated male between 1and 2 years (yearling)

Of the marketed off-take, the most preferred age-sex categories of various livestock species sold were the castrated males over 2 years (*Ebilareng'oit)* (34.3%) and the

castrated male yearlings (*Lodong'ong')* (26.8%) for goats (Figure 4.6); castrated males over 3 years (*Emong')* (65%) and the mature infertile females (*Aite Nakolup)* (16.5%) for cattle (Figure 4.6); castrated males over 3 years (*Lodong'ong')* (36.1%) and the female past reproductive age (*Namojong')* (17.8%) for camels (Fig. 4.7); and the mature breeding females (*Asikiria)* (49.2%) and the mature breeding males (*Loketepan)* (30%) for donkeys (Fig 4.7). There were no differences in the proportions of age-sex categories of animals sold by gender or wealth groups. However, *adakar* groups showed significant differences in the sales of some age-sex categories of goats and camels. *Adakar* Acemie reported a significantly ($P<0.01$) lower proportion (7.6%) of male or female kids between 4 and 6 months (*Naminawoi)* sold in the past one year than the other *adakars* while *adakar* Natuba reported a significantly ($P<0.001$) lower proportion (11.1%) of castrated males over 2 years (*Ebilareng'oit)* of goats sold in the same period. *Adakar* Aporon reportedly sold no uncastrated male yearlings (*Loang'itou)* of camels compared to the other *adakars*.

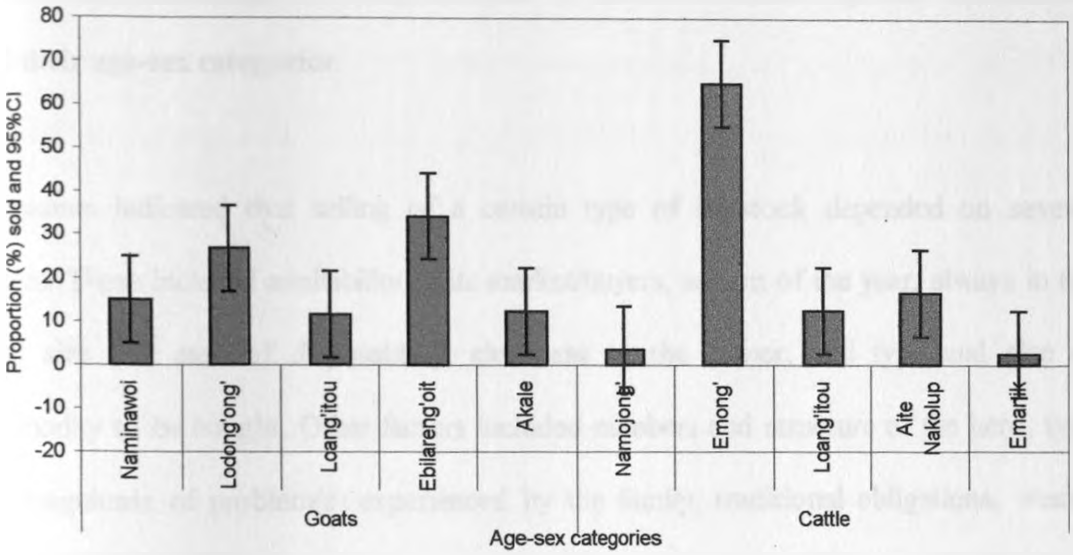

Figure 4.6: Annual proportion (%) of goats and cattle sold by their age-sex categories in four livestock camps of Loima Division, Turkana District, 2002/2003.

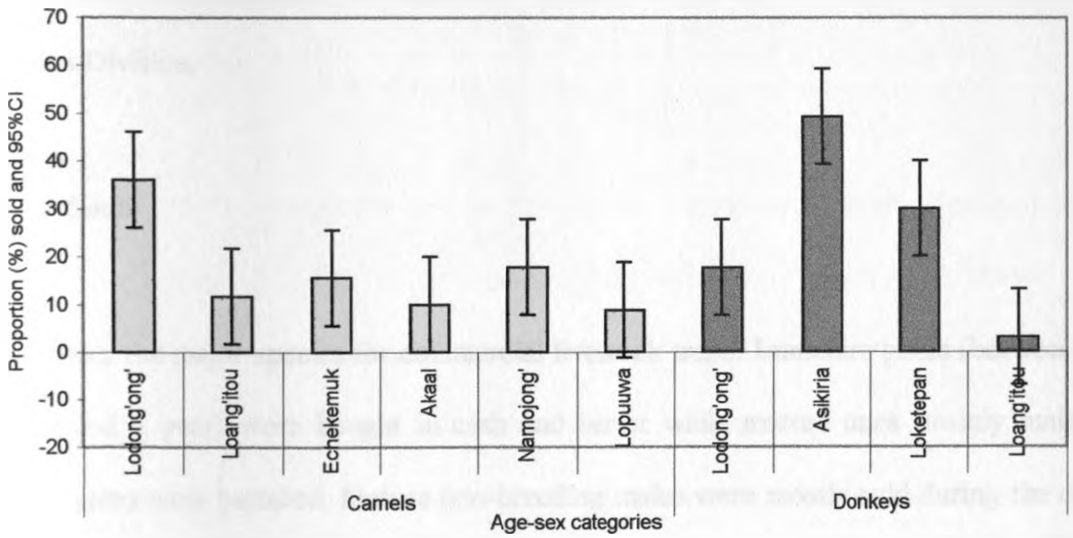

Figure 4.7: Annual proportion (%) of camels and donkeys sold by their age-sex categories in four livestock camps of Loima Division, Turkana District, 2002/2003.

4.3.3 Factors affecting the sale/preference for sale of different species of livestock and their age-sex categories

Informants indicated that selling of a certain type of livestock depended on several factors. These included availability of its market/buyers, season of the year, always in the herd, size and ease of disposability, closeness to the owner, and type and size of commodity to be bought. Other factors included numbers and structure of the herd, type and magnitude of problem(s) experienced by the family, traditional obligations, wealth status of an individual, its reproductive and production status, whether one needs cash or commodities or another type of stock, and presence of different types of livestock in the herds. There were reportedly no organized markets for the different species of livestock in Loima Division.

4.3.3.1 Goats

Goats were the major species for commercial livestock trade. Immature goats (between 4 months and 1 year) were bought in cash and barter while mature ones (mainly males) (over 1 year) were bartered. Mature non-breeding males were mostly sold during the dry season to meet increased food demand by the family members while young ones were sold throughout the year to cater for minor family needs such as tobacco, bed sheets, shoes, veterinary drugs and ornamental beads. Sale of mature breeding females and males was restricted by their role in reproduction and were sold only when many in the flock and also during extreme famine occasioned by prolonged dry season. Cultural obligations

least impeded sale of goats. The availability of the market-preferred age-sex categories of goats in the flock was low due to frequent sales. Generally, almost all age-sex categories of goats were readily sold, either through the traditional system or directly to commercial traders.

4.3.3.2. Large stock (donkeys, cattle and camels)

Donkeys were sold in Moroto market in Uganda and Amakuriat market in West Pokot District while cattle and camels were sold in Moroto market in Uganda and in Kakuma Division of Turkana District. The sale of large stock was limited to very severe family problems and to also supplement the sale of goats in order to avoid depletion or distortion of herd structure of the latter.

Young (below 2 years) cattle and camels entered the traditional marketing system while the mature (2 years old and above) non-breeding males and females dominated the commercial trading systems directly or indirectly through the traditional system. The young cattle and camels were mainly bartered for ornamental beads. The sale of the mature non-breeding males and females was mainly restricted to the dry season mostly to purchase food for the family. During the wet season, sales of such animals were made to purchase veterinary drugs, pay school fees and medical bills, purchase ornamental beads for ladies and for cultural ceremonies, and to buy food during cleansing rituals on children. The sale of breeding males and females of cattle and camels was restricted to times of extreme famine as a result of prolonged droughts. Old breeding males of cattle

were never sold as they were used for family feasts. The infertile cow was considered a delicacy because of its good body condition. Besides sales, the castrated males of cattle and camels were for family feasts, source of pride and status to the owner, and could also be bartered with females of breeding age.

4.3.4 Seasonal marketed off-takes according to age-sex categories of livestock

4.3.4.1 Donkeys

There was good agreement between the four informant groups for seasonal sales of mature breeding males (*Loketepan)* (W=0.750), castrated males over 3 years (*Lodong'ong')* (W=0.750) and mature breeding females (*Asikiria)* (W=0.750) (Table 4.6). The informants did not agree (W=0.250) as to when the uncastrated males yearlings (*Loang'itou)* were mostly sold. Some informants said that *Loang'itou* was never sold because it was a source of future breeding males and, additionally, was not accepted by traders because of its small size and young age. Mature breeding males (*Loketepan)*, castrated males over 3 years (*Lodong'ong')* and the mature breeding females (*Asikiria)* were commonly sold during the dry season (*Nakamu)*, moderately during the interphase season (*Nait)* and least sold during the rainy season (*Nakiporo)* (Table 4.6). Castrated males over 3 years (*Lodong'ong')* were either sold to butchers or slaughtered by the owner in an "open-air butchery" and the meat sold without weighing. Mature breeding males (*Loketepan)* and mature breeding females (*Asikiria)* were sold to those wishing to develop/build a donkey's herd. The donkey population in the area was relatively low and

was frequently threatened by raids from the neighbouring Pokots of Kenya and the Karamojong of Uganda. Donkeys were important to livestock owners during seasonal movements and also to traders for carrying trade commodities while following pastoralists wherever they moved.

Table 4.6: Summarized seasonal calendar for donkey market off-takes by age-sex categories in four *adakars* of Loima Division, Turkana District (2002/2003).

Donkey age-sex categories	Rainy season (*Nakiporo)*- March-July	Interphase (*Nait)*- August	Dry season (*Nakamu)*- Sept-February
Loang'itou (W=0.250^{ns})	0(0-1)	0(0-2)	0(0-12)
Loketepan (W=0.750*)	● 0.5(0-1)	●● ●● 3.5(0-6)	●●●● ●●●●● 9(0-12)
Lodong'ong' (W=0.750*)	● 0.5(0-1)	● ●● 3(0-6)	●●●● ●●●●● 8.5(0-14)
Asikiria (W=0.750*)	● 1(0-3)	●● ●● 3.5(0-4)	●●●● ●●●●● 9(0-11)

Number of informant groups=4; Kendall's coefficient of concordance (^{ns}p=not significant; *p=0.05). W values vary from 0 to 1.0, the higher the value, the higher the level of agreement between the informant groups. The black dots represent the median scores (number of stones) that were used during the construction of the seasonal calendar. The minimum and maximum limits are shown in parentheses. A higher number of dots indicated a relatively strong association between an age-sex category of a species and season, whereas a low number of dots indicated a weak association.

4.3.4.2 Goats

The four informant groups strongly agreed on seasonal sales of the castrated yearling males (*Lodong'ong'*) (W=1.000), castrated males over 2 years (*Ebilareng'oit)* (W=0.950) and the young females between 6 months and 1 year (*Akale)* (W=0.750) (Table 4.7).

Table 4.7: Summarized seasonal calendar for goat market off-takes by age-sex categories in four *adakars* of Loima Division, Turkana District (2002/2003).

Goat age-sex categories	Rainy season (*Nakiporo*)- March-July	Interphase (*Nait*)-August	Dry season (*Nakamu*)- Sept-Feb
Naminawoi ($W=0.250^{ns}$)	●● ●●● 5(5-5)	●● ●●● 5(3-5)	●● ●●● 5(5-7)
Loang'itou ($W=0.000^{ns}$)	●● ●●● 5(4-8)	●● ●●● 5(5-5)	●● ●●● 5(2-6)
Lodong'ong' ($W=1.000^{**}$)	●● 1.5(0-2)	●● ●● 3.5(3-4)	●●●●● ●●●●●● 10.5(9-11)
Ebilareng'oit ($W=0.950^{**}$)	● 0.5(0-2)	● ●● 2.5(0-5)	●●●●●● ●●●●●● 12(8-15)
Akale ($W=0.750^{*}$)	● ●● 2.5(1-5)	●● ●● 4(3-5)	●●●● ●●●●● 8.5(5-11)

Number of informant groups=4; Kendall's coefficient of concordance (^{ns}p=not significant; $^{*}p=0.05$; $^{**}p<0.05$). W values vary from 0 to 1.0, the higher the value, the higher the level of agreement between the informant groups. The black dots represent the median scores (number of stones) that were used during the construction of the seasonal calendar. The minimum and maximum limits are shown in parentheses. A higher number of dots indicated a relatively strong association between an age-sex category of a species and season, whereas a low number of dots indicated a weak association.

The informants did not agree on the seasons of the year when kids between 4 and 6 months (*Naminawoi)* (W=0.250) and young uncastrated males between 6 months and 1 year (*Loang'itou)* (W=0.000) were mostly sold. They scored almost equally (median score=5) across seasons for both *Naminawoi* and *Loang'itou* indicating that they were sold throughout the year (Table 4.7).

The majority of the castrated males over 2 years (*Ebilareng'oit),* castrated yearling males (*Lodong'ong')* and young females between 6 months and 1 year (*Akale)* were sold during the dry season (*Nakamu)* when human food needs were high. On further probing, the sale of kids between 4 and 6 months (*Naminawoi)* and young uncastrated males (*Loang'itou)* were reportedly to obtain bartered small items such as shoes, clothes, beadware for ladies, tobacco and to obtain little cash for purchasing sugar and tea leaves. Cash was sometimes given for *Naminawoi* and *Loang'itou* because their prices were low and mobile traders could afford offering the corresponding little cash.

During the wet season and periods of relief, livestock owners were reportedly unwilling to sell goats of market size, and instead sold kids between 4 and 6 months (*Naminawoi)* (both males and females). The traders later offered *Naminawoi* (mainly female) to livestock owners in exchange (bartered) for the market-desired mature bucks. This was said to be traders' mechanism to ensure that goats were always available in the market at moments when pastoralists were unwilling to sell market-preferred types of goats.

Young females (*Akale)* were a combination of several categories of females, the infertile females (*Nakolup*) and those females that had reached reproductive age (true *Akale*). True *Akale* were the majority of females sold. Generally, females were rarely sold because they were a source of the future flock. However, the infertile ones (*Nakolup*), though always rare in the flock, and true *Akale*, were commonly sold to contribute to food requirements in the family, especially during the dry season (*Nakamu).*

4.3.4.3 Cattle

There was good agreement between the four informant groups as to the seasons when the majority of castrated males over three years (*Emong')* (W=1.000) and mature infertile females (*Aite Nakolup)* (W=0.929) were sold. The informants did not agree on the season when mature breeding males (*Emanik)* (W=0.464) and uncastrated male yearlings (*Loang'itou)* (W=0.083) were mostly sold (Table 4.8). The castrated males over 3 years (*Emong')* and the mature infertile females (*Aite Nakolup)* were sold mainly in the dry season. There were arguments that the mature breeding males (*Emanik)* were usually reserved for breeding and as a result, some informant groups did not score them against any season. However, some informant groups indicated that they could sell the mature breeding males (*Emanik)* when they had surplus in the herd and when they lacked other types of animals of market size and age, particularly during the dry season. Furthermore, some informant groups had no problems in selling the mature breeding males (*Emanik)* since they could take their cows to a neighbour to be mated. Some groups stated that the uncastrated male yearlings (*Loang'itou)* could not be sold during the dry season because

they were usually emaciated and, consequently were bartered during the wet season mainly to buy luxury commodities such as ornamental beads for women.

Table 4.8: Summarized seasonal calendar for cattle marketed off-takes by age-sex categories in four *adakars* of Loima Division, Turkana District (2002/2003).

Cattle age-sex categories	Rainy season (*Nakiporo*)- March-July	Interphase (*Nait*)-August	Dry season (*Nakamu*)- Sept-Feb
Emong' (W=1.000**)	●● 2(1-3)	● ●● 3(3-4)	●●●●● ●●●●● 10(8-11)
Emanik (W=0.464^{ns})	0(0-1)	● 0.5(0-1)	●●● ●●●● 6.5(0-14)
Loang'itou (W=0.083^{ns})	●●● ●●● 6(0-12)	● ●● 2.5(0-3)	●● 1.5(0-10)
Aite Nakolup (W=0.929**)	● 1(0-2)	●● 1.5(1-2)	●●●●●● ●●●●●●● 12.5(11-14)

Number of informant groups=4; Kendall's coefficient of concordance (^{ns}p=not significant; **p<0.05). W values vary from 0 to 1.0, the higher the value, the higher the level of agreement between the informant groups. The black dots represent the median scores (number of stones) that were used during the construction of the seasonal calendar. The minimum and maximum limits are shown in parentheses. A higher number of dots indicated a relatively strong association between an age-sex category of a species and season, whereas a low number of dots indicated a weak association.

4.3.4.4 Camels

The seasonal variation in the sale of various age-sex categories of camels is summarized in Table 4.9. There was good agreement between the four informant groups for seasonal variation in the sale of castrated males over 3 years (*Lodong'ong'*) (W=0.750) and the uncastrated males between 2 and 3 years (*Lopuuwa)* (W=0.750). Age-sex categories for

which there was weak to moderate agreement between the four informant groups were the uncastrated male yearlings (*Loang'itou)* (W=0.500), females past reproductive age (*Akaal namojong')* (W=0.500) and young males or females between 9 months and 1 year (*Echekemuk)* (W=0.250). The castrated males over 3 years (*Lodong'ong')* and uncastrated males between 2 and 3 years (*Lopuuwa)* were sold during the dry season (Table 4.9).

Table 4.9: Summarized seasonal calendar for camel marketed off-takes by age-sex categories in four *adakars* of Loima Division, Turkana District (2002/2003).

Camel age-sex categories	Rainy season (*Nakiporo*)- March-July	Interphase (*Nait*)-August	Dry season (*Nakamu*)- Sept-Feb
Echekemuk ($W=0.250^{ns}$)	● ●● 3(0-5)	●● ●● 4(0-5)	●● ●●● 5(0-11)
Loang'itou ($W=0.500^{ns}$)	● 1(0-3)	● ●● 2.5(0-6)	●● ●● 3.5(0-7)
Lodong'ong' (W=0.750*)	● 0.5(0-1)	●● ●● 3.5(0-5)	●●●●● ●●●●● 9.5(0-12)
Lopuuwa (W=0.750*)	● 1(0-1)	● ●● 2.5(0-4)	●●●●● ●●●●●● 10.5(0-12)
Akaal Namojong' ($W=0.500^{ns}$)	● 0.5(0-1)	●● 1.5(0-3)	●●● ●●● 5.5(0-11)

Number of informant groups=4; Kendall's coefficient of concordance (^{ns}p=not significant; *p=0.05). W values vary from 0 to 1.0, the higher the value, the higher the level of agreement between the informant groups. The black dots represent the median scores (number of stones) that were used during the construction of the seasonal calendar. The minimum and maximum limits are shown in parentheses. A higher number of dots indicated a relatively strong association between an age-sex category of a species and season, whereas a low number of dots indicated a weak association.

Some informant groups (25%) argued that camels were never sold and could not score the various age-sex categories against seasons. On further probing, it was explained that camels were few in the herds, there was no reliable market for camels and that they were vital in the provision of milk during the dry season when production in other types of livestock was impaired by scarcity of pasture and water. Due to its age and deteriorated body condition the females past reproductive age (*Akaal namojong'*) were not sold and, consequently were slaughtered in "open-air butchery" (under a tree) where meat was sold without weighing.

4.4 LIVESTOCK MARKETING CONSTRAINTS

4.4.1 Livestock marketing constraints as perceived by herders, traders and government livestock workers

Table 4.10 shows the constraints to livestock marketing as perceived by producers and traders. In descending order of importance, low prices of livestock, long distances to markets, few livestock buyers in markets, and lack of cash were the problems affecting producers in livestock marketing. Traders in "lower" primary markets cited long distances to markets, low working capital, high transport costs and low prices of livestock as their major constraints. Traders in "upper" primary and secondary markets agreed on low working capital as a major constraint affecting them in livestock trade. Overall, the three types of livestock traders agreed on low working capital as the major constraint affecting them in livestock trade (Table 4.10), which was consistent with the opinion of the government livestock officers (Table 4.11). Though producers mentioned low prices as a major constraint affecting them in livestock marketing, government livestock officers were of the opinion that poor marketing infrastructure and lack of marketing information were major problems affecting them (Table 4.11). The absence of many external livestock buyers and the long distances to livestock markets were also identified by the government livestock officers as important constraints affecting livestock producers. According to the government livestock officers, livestock diseases also impacted negatively on livestock traders. Overall, poor marketing infrastructure and lack of market information were the major constraints affecting both livestock producers and traders according to the government livestock officers.

Table 4.10: Distribution of livestock marketing constraints by ranks affecting livestock producers and traders in Loima Division, Turkana District, 2003.

Constraint	Median rank				
		Traders			
	Producers	LPM	UPM	SM	All traders
Low prices of livestock	1(1-5)*	5(1-8)****	5(1-8)****	8(8-8)	7(1-8)
Long distances to markets	2(1-4)**	1(1-3)*	8(8-8)	8(8-8)	8(1-8)
Few livestock buyers	3(1-6)***	8(8-8)	2(1-6)**	3(1-7)***	4(1-8)***
Lack of cash	4(1-6)****				
Insecurity to markets	5(2-6)	6(2-8)	6.5(2-8)	8(3-8)	7(2-8)
Livestock diseases	5(4-6)	5(2-8)	6(1-8)	6(3-8)	6(1-8)****
Low working capital		2(1-4)**	1(1-5)*	1(1-5)*	2(1-5)*
Disorganized traders		7(3-8)	5.5(2-8)	8(8-8)	8(2-8)
Lack of information		8(8-8)	8(8-8)	4(1-6)****	8(1-8)
High transport costs		4(1-8)***	5(2-8)	2(1-7)**	4(1-8)**
Producers' and family expectations		6(3-8)	3.5(2-8)***	6(3-8)	6(2-8)
Drought		8(8-8)	8(8-8)	6(1-7)	8(1-8)

1= Most important constraint; 8= least important constraint. The range of ranks is shown in parentheses.
*First; **Second; ***Third; ****Fourth priority constraint

Key:
LPM "Lower" primary markets
UPM "Upper" primary markets
TSM Secondary markets

Table 4.11: Distribution of livestock marketing constraints by ranks affecting livestock producers and traders according to government livestock officers in Loima Division, Turkana District, 2003.

Constraint	Median rank		
	Producers	Traders	Producers + traders
Long distances to markets	4.5(3-8)****	5.5(3-8)	5(3-8)***
Insecurity to markets	5(1-9)	7.5(4-10)	6.5(1-10)
Poor infrastructure	3.5(1-7)*	2(1-7)**	3(1-7)*
Lack of market information	4(2-7)**	4(1-5)***	4(1-7)**
Lack of cash	5.5(1-8)	10(10-10)	9(1-10)
Low prices of livestock	5(1-7)	10(10-10)	8.5(1-10)
Few external buyers	4(2-8)***	6.5(2-10)	5(2-10)****
Livestock diseases	8(1-9)	4.5(1-10)****	6.5(1-10)
Drought	9(4-10)	9(6-10)	9(4-10)
Poor government policy	10(1-10)	8(3-10)	9(1-10)
Low working capital	10(10-10)	1.5(1-3)*	6.5(1-10)
Disorganized traders (brokers)	10(10-10)	7.5(5-10)	10(5-10)
Producer-associated problems	10(10-10)	9(6-10)	10(6-10)

1= Most important constraint; 10= least important constraint. The range of ranks is shown in parentheses.
*First; **Second; ***Third; ****Fourth priority constraint

4.5 HERDERS' PREDICTION OF MARKETED OFF-TAKE LEVELS IF MARKETING WERE TO BE IMPROVED

4.5.1. Trend in market off-take levels

Table 4.12 shows the proportion of livestock types sold in the current marketing system and what would be sold were marketing of livestock to improve. There was a drop in the proportion of goats sold in the current marketing system and what would be sold were marketing to improve, from 25.4% to 18.1%. On the other hand, there were increases in the proportions of cattle, camels and donkeys that would be sold were marketing to improve (Table 4.12). However, there was no significant difference in the overall proportions of livestock sold in the current marketing system (30.5%) and what would be sold were marketing to improve (30.4%). There were no significant differences in the proportions of livestock sold in a future improved marketing system by *adakar*, gender and wealth groups.

On further probing, the informants indicated that the sale of goats would reduce and be compensated by sale of other types of livestock that did not have reliable markets if marketing were improved. A drop in the future sale of goats was said to be a strategy to allow growth of herd/flock sizes that had been depleted by frequent sales. Additionally, informants believed that, in the face of better prices in a future improved marketing system, even sale of few goats would give them enough money to meet their daily needs.

Only a few mentioned that they would sell more to permit investments such as starting a shop in consumer goods, building rental houses and starting livestock business.

Table 4.12: A comparison of proportions of livestock sold before and what would be sold were livestock marketing to improve in Loima Division, Turkana District, 2003.

Livestock type	Proportion (%) in herd	Selling proportions (%)		% Change
		Current	After	
Goats	60.9	25.4	18.1	-7.3
Cattle	11.5	2	3.8	1.8
Camels	17.9	1.8	5.3	3.5
Donkeys	9.7	1.3	3.2	1.9
Total	100	30.5	30.4	-0.1

5.0 DISCUSSION

This study describes a participatory assessment of livestock marketing in Loima Division of Turkana District, Kenya. Through participatory mapping, the community delineated some of the potential markets for livestock in Loima Division of Turkana District and further produced other criteria on which they could be established. The results showed that there were no organized livestock markets in the division. Indeed, establishment of livestock markets in pastoral areas is not uncommon but dilemmas caused by pastoralists' livestock management system of seasonal movements in search of water and forage, coupled with other marketing constraints, commonly render their design and establishment functionally ineffective. Although the pastoralists' seasonal movements have been widely regarded as an important coping strategy against unpredictable dictates of weather, it is however, often reported to limit access to delivery of essential services such as human health, animal health and livestock markets (Eregae, 2003). In Loima Division, the study showed that, during the wet season, livestock were moved to the plains close to urban settlements, whereas during the dry season, they were moved to high mountainous regions or even across international borders, thereby increasing distance to settlements in the division. The problem of long distances was said to be exacerbated by insecurity around livestock camps as well as along trek routes to urban settlements that were largely referred to as livestock markets. Consequently, during the dry season, producers cannot easily access internal livestock markets while the animals, in poor body condition, cannot withstand stress due to trekking to markets amid scarcity of pasture and water along trek routes. In addition, the livestock owners cannot stand the

stress of walking for long distances, traders have limited access to livestock and as a result incur extra costs in an effort to reach livestock camps. On the other hand, during the wet season, livestock markets were reported to be easily accessible to traders and producers, an opportunity that could be utilized. However, the common pattern of low supply of livestock to markets by pastoralists during the wet season hinders utilization of such an opportunity. Generally, the economic fabric of the region weakens. Orre (2003) reported a similar scenario in the livestock markets of the neighbouring Marsabit District.

It is important that, in an effort to establish organized livestock markets within pastoral set-ups, seasonal mobility of pastoralists must be seriously considered. Management of established market structures should be by organized groups of producers and traders keenly interested in livestock marketing. The reported long distances to internal markets could also be minimized by enhancing pastoralists access to cross-border markets. However, this requires cross-border guidelines that enhance security to and within markets, minimize inter-tribal or inter-community conflicts in markets, and create a conducive taxation environment. Additionally, awareness needs to be created among the pastoralists on the benefits of selling livestock during the wet season when traders reportedly offer better prices.

In Kenya, after the collapse of the Kenya Meat Commission (KMC) and the Livestock Marketing Division (LMD) of the Ministry of Agriculture, livestock marketing has been in the hands of the private sector, with the government offering mainly regulatory services. The KMC and LMD used to serve the pastoralists as major marketing agents,

commonly referred to as "the government". After their collapse, livestock markets, like other markets, were liberalized as a result of the structural adjustment programmes (SAPs) of the 1980s. Since then, pastoralists have been highly vulnerable to an array of traders that dominate the private sector. Economists have made attempts to characterize these traders based on age, level of operating capital, experience in trade and level of integration into business (Chabari, 1986; Gathuma *et al.*, 1989; Mbogoh *et al.*, 1989; Gufwoli and Behnke, 1990; Aklilu *et al.*, 2002; Orre, 2003). Classes of traders commonly identified are itinerant, middlemen, butchers, medium-scale and large-scale traders (Orre, 2003). These criteria however seem not to have been understood by producers so that they could make informed decisions on whom to deal with profitably. Producers, therefore have their own criteria of classifying and preferring traders.

In this study, the livestock producers of Loima Division classified traders based on tribe and the marketing system they operated in. The qualities they preferred were good pricing of livestock, consistency in buying livestock, trustworthiness, handling of enough cash and friendly price negotiations. Tribe was not considered an important criterion for preferring livestock traders by Turkana pastoralists, although tribal bias could have influenced scoring for Turkana traders. However, based on the marketing system, clear distinctions between traders were made. Traders operating in an auction system and those in an organized market system with designated market days based on person-to-person negotiations were highly preferred. This observation was an indication that livestock owners in Loima Division are in need of a marketing system where traders of all tribal backgrounds could meet and negotiate for livestock. Thus, the campaign by some

development agencies to promote local Turkana traders as one of the priority strategies to improve livestock marketing in Turkana District appears to lack support by the Turkana pastoralists. The livestock producers considered an organized marketing system as a means of taming wayward traders so that they do not collude and exploit them and, should therefore be given priority in the attempts to improve livestock marketing. It is envisaged that the criteria used by producers to classify traders could be used by extension agents in delivering marketing messages that relate to livestock buyer-seller interaction and consensus building for purposes of improving livestock trade since they are familiar to them. These criteria could be incorporated into those used by economists to characterize traders in pastoralist areas.

The class of traders referred to as brokers/middlemen appears frequently in many livestock marketing studies (Aklilu *et al.*, 2002; Orre, 2003). Although they could not make a clear description of a broker, the pastoralists of Loima Division likened this to mobile traders (*Lu ang'akejen*). This class of traders is often blamed for most trade distortions, particularly price distortions appearing in marketing chains. In a study carried out in Marsabit District, Orre (2003) found that 36.7% of traders were middlemen. Attempts to minimize their negative influence on livestock trade require dialogue between all the stakeholders in livestock marketing.

Turkanas in Loima Division recognized shopkeeper livestock traders as an alternative point for selling their animals when no other buyers were available. A similar perception was found among the Rendille pastoralists of Marsabit (Orre, 2003). Shopkeepers in

Marsabit reportedly gave credits on household commodities to pastoralists, which were paid in cash or by bartering during the wet season. These credit transactions were not observed clearly among the Turkana pastoralists of Loima Division. As was the practice in Loima Division, the shopkeepers of Marsabit District conducted livestock transactions mainly through barter. This mode of transaction was to the disadvantage of the pastoralists due to undervaluing of livestock.

In Marsabit District, Rendille pastoralists regarded butchers as livestock traders (Orre, 2003) unlike the Turkana pastoralists of Loima Division. It is probable that the Rendille pastoralists may have adopted a mechanism of avoiding middlemen by selling directly to butchers. It was not clear from the Marsabit study whether the producers had their own butcheries, but this is an opportunity that can be explored in Loima Division.

In this study, pastoralists of Loima Division preferred an organized marketing system, with designated market days based on person-to-person negotiation, and an auction system. Selling animals through a shop or to itinerant traders was considered as a fallback strategy in the absence of the preferred systems. The pastoralists were generally unwilling to compare the traditional method of livestock exchange with other marketing systems arguing that it was "their own" and could not therefore be compared with conventional livestock marketing systems. This probably could be an indication that pastoralists are changing towards marketing systems that directly offer cash or commercial goods.

The auction system has been the oldest marketing system that was established in Turkana District during the colonial time; it has also been in operation in other pastoral areas. Sobania (1988) reported the auction livestock marketing system among the Rendille community of Marsabit District as early as 1946. In the current study, besides an organized market system with designated market days, the pastoralists of Loima Divison expressed desire for auctions to be re-introduced. However, modalities of its re-introduction need to be discussed exhaustively by all the stakeholders in the livestock trade to avoid its collapse (Gathuma *et al.*, 1989; Mbogoh *et al.*, 1989; Gufwoli and Behnke, 1990). Markets organized and held on specific days of the week offer better prices. This was also observed by Orre (2003) in Sukuta Market in Samburu District and Gitunu *et al.* (2001) in Maasai markets of Kajiado District where the system was reported to be advanced. Gitunu *et al.* (2001) reported that the Kiserian livestock market yard among the Maasai pastoralists attracted many producers, traders and butchers from the surrounding community. It was apparent in the current study that pastoralists of Loima Division were in need of such a system.

Several studies conducted across pastoral communities in Kenya have revealed that pastoralists are changing towards a cash economy as they gradually get integrated into the broader national economy where basic needs are expanding (Gitunu *et al.*, 2001; Orre, 2003). This is contrary to the common myth that pastoral production and marketing are based on satisfaction of subsistence needs and social cultural goals. Behnke (1983) and Frathkin (1991) observed that generation of cash income, especially from pastoral animals, has gained considerable importance among the pastoralists. In this study, the

pastoralists of Loima Division enumerated various sources of income and subsequently assigned relative proportions of the cash they obtained from each. The sale of livestock and livestock products and remittances from relatives and friends emerged as the major sources of cash. This was consistent with findings among the pastoral Rendille of Northern Kenya (Bekure and Chabari 1991; Orre, 2003) and the Maasai of Kajiado District of Kenya (Gitunu *et al.*, 2001) who were reportedly using cash from the sale of livestock and livestock products to buy non-pastoral products. Cash economy is reported to be more pronounced and in high demand in some pastoral communities such as the Maasai and the Samburu who have adopted sedentary lifestyles due to changing land tenure system (Gitunu *et al.*, 2001; Orre, 2003). The Rendille/Ariaal pastoralists of Marsabit District recognize that the sale of animals for cash was better than home-slaughter where meat was eaten within 1-2 days and the family thereafter starved (Orre, 2003).

In addition to the sale of livestock as a source of cash, Orre (2003) reported that the Rendille were diversifying their livelihoods through engagement in other income-generating activities. This is consistent with the findings of this study where the pastoralists of Loima Division were engaged in additional income sources such as casual labour, gold mining and business. These off-herd activities add to household food availability and are seen as coping mechanisms or responses to minimize chances of household collapse following depletion of livestock herds due to phenomena such as drought, raids and diseases (Webb and Reardon, 1992; Republic of Kenya, 1999; Nyariki *et al.*, 2002). There was little evidence among the pastoralists of Loima Division that cash

income diversification strategies were investment-oriented except for business. The low contribution to cash income by business could mean that its perspective was limited and not profit making. Deliberate attempts should therefore be undertaken to educate, encourage, and support pastoralists on commercial ways of diversifying cash incomes and therefore livelihoods with livestock as capital.

In this study, goats emerged as the primary source of cash compared to camels, cattle and donkeys. This was attributed to the ease of availability of goat markets and the large proportions of goats in the livestock holdings. The finding was in concordance with that of Orre (2003) where goats contributed in a major way to cash incomes and hence livelihoods of the Rendille/Ariaal communities of Northern Kenya. Frathkin (1991) observed that goats greatly improve liquidity of pastoral households by providing most of the cash that is important in purchasing food, which is the bulk of pastoral diet. In this study, there were no significant differences in the proportions of cash income from various types of livestock sold by the poor, rich and medium classes of wealth. This finding differs with the observation of Gitunu *et al.* (2001) among the Maasai pastoralists where large stock contributed more to the cash incomes of the rich and medium class while shoats contributed more to the cash incomes of the poor. Lack of significant differences in the current study could be attributed to several reasons. First, among the Turkana pastoralists, raids constantly threaten livestock herds (particularly large stock). What is left for future sales even among the rich can be incidentally raided, consequently affecting the expected difference in household's annual off-take and incomes across wealth groups. Second, given the current poor livestock marketing situation in the

division, particularly for large stock, even the rich and the medium classes could gain less from sale of such types of livestock, meaning that all wealth groups attributed most of their cash incomes to sale of goats. Third, the rich and medium class could have had other major sources of cash income, for instance from relatives and friends; this could make them sell less of livestock to achieve the expected level of income. Fourth, large stocks were substantially associated with socio-cultural functions and least sold and therefore least contributed to differences in cash incomes across wealth groups. Fifth, the methodology used aimed at assessing a perception rather than precise sales and cash incomes. Ideally, other factors being constant, differences in composition of livestock herds across wealth groups are expected to dictate differences in the proportions of livestock sold and hence cash incomes.

In the study by Gitunu *et al.* (2001), differences in the proportions of cash income from different types of livestock between men and women were observed among the Maasai. This was in contrast to the findings in the current study. This could, in part, be explained by the fact that among the Maasai, men are the main decision makers regarding the sale of animals and could therefore report a relatively higher amount of cash income from sale of livestock whereas among the Turkana it is usually a consultative process between husband and wife in a family. The Rendille have a hybrid form of decision-making where the sale of small stock doesn't require any consultation between family members except for the sale of large stock (Orre, 2003).

The pastoralists of Loima Division recognized the sale of livestock products as a source of cash income. Milk was mentioned to contribute more to cash income as compared to hides and skins. Among the Maasai, milk was also reported to provide more money than hides and skins (Gitunu *et al.*, 2001). Markets for livestock products should therefore be explored and studies undertaken on marketing opportunities and constraints to livestock products' production and trade with the aim of improving them.

Remittances were identified as a source of cash income among the Turkana pastoralists of Loima Division. This could be viewed as a begging or dependency syndrome that enhances pastoralists' resistance to sell livestock. However, in the unpredictable world where pastoralists live, relatives and friends would expectedly come in as a support system to food security. Grandin (1987) also reported remittances as a source of cash income among the Maasai of Kenya and described it as a traditional coping or survival food security strategy against unpredictable phenomena that deplete livestock herds and fuel food insecurity. Instead of giving livestock as it was the practise in the past, cash is now being offered mainly by relatives and friends who are working or engaged in income generating activities in urban centres. A similar remittance pattern was observed among the Rendille/Ariaal community of Marsabit District (Orre, 2003).

There has been a common belief that most of pastoralists' labour goes to herding. However, the present study has shown that pastoralists do diversify labour to other activities that contribute to family income. It is conceivable that the dictates of weather and the uncertain production environment they live in would not allow them to over-

concentrate their labour on herding. Furthermore, modern developments have created opportunities for diversification. The pastoralists of Loima Division were engaged in some unskilled casual labour activities limited to NGO operations. The Turkana Livestock Development Project (TLDP) of VSF-Belgium was sinking sub-surface water dams and the community was involved in the construction. Njiru (1982), working among the Rendille community of Marsabit District, and Perckers (1997), working among the Pokots of Kenya, observed that a number of pastoralists were migrating to urban centres to seek employment and opportunities for children to go to school. Although this amounts to shortage of the labour required for herding, it is not uncommon in a changing society. In effect, this drain of herding labour from pastoral areas may induce detrimental changes in pastoral livestock management practices including reduction in the possibility of herd splitting, spatial dispersion and species diversification as noted by Dahl and Hjort (1976) and Behnke (1983).

The present study has shown the kind of businesses that may be appropriate in pastoral areas. An organized group of pastoralist women in Loima Division was able to secure a substantial amount of cash income from business. It is now evident that what the pastoralists need is to be organized and their business skills improved through training. The study has also revealed the vital role pastoral businesswomen play in contributing to household food security. Among the Kamba community of Kilome and Kibwezi divisions, households headed by males were reportedly more food insecure than those headed by women (Nyariki *et al.*, 2002). This means that the role of women in household livelihood diversification and food security is vital and needs to be promoted. As shown

in this study, women can be used as entry points in diversifying livestock trade and any other kind of business in pastoral areas. The important role of women in development has also been recognized in other interventions such as peace building (Akabwai, 2001b; Minear, 2001) and animal health (Eregae, 2003).

Some sources of cash income such as gold mining appeared to be least exploited by the pastoralists of Loima Division. Gold deposits were found in Mt. Moroto in Uganda and people in Loima Division accessed them from the eastern side of the mountain. This is consistent with observations among the Rendille of Southwestern Marsabit District where natural resources such as gum arabica were reported to be unexploited (Orre, 2003). Although it poses a big threat to sustenance of biodiversity, the pastoralists of Loima Division were also involved in hunting and gathering activities.

With regard to species composition in the total livestock holding, this study showed that shoats constituted the bulk of all livestock species. This was in agreement with the findings of Orre (2003) among the pastoral tribes of Marsabit District, and Wilson (1982), working among the Pokots of Kenya. Dahl and Hjort (1976) also observed that the stockless Boran of Northern Kenya who took paid jobs as policemen or herdsmen in commercial ranches often invested in small stock, and that the Kababish of Sudan exchanged camels for sheep and goats in order to be satisfied with the livestock holding.

Across wealth groups, there were significant differences in the proportions of livestock species in the livestock holdings. The analysis indicated that the poor had a large

proportion of shoats in the herds compared to the rich and medium classes while the rich and medium classes had large proportions of camels and cattle in the herds compared to the poor. The latter comparison of large stock across wealth groups appears realistic in real life than the former comparison of shoats. In real life situation, the rich and medium classes have more in absolute numbers of the three livestock species in the herds than the poor. The study however indicates that the poor are more associated with shoats than other species of livestock. Computing actual figures, Gitunu *et al.* (2001) found that the rich Maasai owned large proportions of sheep and goats and cattle compared to the medium class and the poor even in their attempts to hide actual numbers of livestock.

In the present study, between men and women, there were no significant differences in the proportions of goats, cattle and camels in the herds except for donkeys. Women reported a higher proportion of donkeys in the herds than men. This is partly due to the fact that during migrations, women are solely responsible for loading luggage on donkeys and every woman in a family has to have at least a donkey. They are therefore likely to give a relatively realistic proportion of donkeys in the herd than the men.

The commonly sold species of livestock in Loima Division were goats, cattle, camels and donkeys. Sheep were mostly used for socio-cultural obligations and were hardly sold. In addition, the large stock were substantially associated with socio-cultural functions and were least sold. Goats were the major livestock species sold because they formed a higher proportion in the herds compared to other species of livestock. Furthermore, they were always closer to the owners, had ready markets and were popular to consumers, among

other reasons. Cattle and camels were sold when there was a pressing need that required large amounts of cash, among other reasons. This contrasts with the situation among the Maasai pastoralists where goats, and to a lesser extent sheep, are mainly slaughtered at home while cattle are sold and only occasionally slaughtered at home in very exceptional customary ceremonies like initiation, marriage and burial rites (Bekure and Chabari, 1991; Gitunu *et al.*, 2001). This may be due to the fact that the Turkana perceive small stock as ready cash because their markets are available whereas the Maasai have acquired a sedentary lifestyle where cash needs are many necessitating the sale of cattle. In addition to traditional uses, this study found that donkeys were sold or eaten among the Turkana pastoralists. This contrasts with the situation in other pastoral areas of Kenya where donkeys are mostly used as beasts of burden (Gitunu *et al.*, 2001).

In this study, emphasis was placed on commercial/market off-take because it was expected to contribute most to household's access to cash. However, there were attempts by informants to include non-commercial off-take and thus the off-takes computed were likely to be exaggerated. Grandin (1987) also recognized this complication and reported off-take rates among the Maasai in terms of commercial and non-commercial sales or slaughter. Sobania (1988) defined off-take as the total of that which is taken from a pastoral flock/herd including sales, slaughter, gifts and deaths. In Loima Division, market off-take rates of goats were the highest, followed by cattle and camels. The least market off-take rates were reported in donkeys. There were no significant differences in the market off-take rates across livestock species sold by gender and wealth groups. Regarding gender groups, lack of significant differences can be explained by the fact that

those interviewed in this study were families and the Turkana culture demands consultation between husband and wife when making decisions to sell any animal. Both men and women would therefore report the same proportions. Studies among the Maasai (Chabari, 1986) and the Rendille/Ariaal (Orre, 2003) pastoralist communities showed significant differences in the proportional sales of livestock types between gender groups. This disparity between the Turkana on one hand and the Maasai and the Rendille/Ariaal on the other, may be attributed to the fact that among the Maasai, decision to sell an animal is a man's job while among the Rendille/Ariaal, consultation between family members is only in the sale of large stock while any member of the household can independently make a decision to sell small stock (Orre, 2003).

In this study, the lack of significant differences in proportional sales of all species of livestock across wealth groups could be attributed to lack of or poor livestock markets especially for large stock, raids and engagement in other income-generating activities. There was, however, a pattern where the poor members of the community sold slightly larger proportions of goats and donkeys than the rich and medium class. The rich and medium class sold more camels and cattle than the poor. This implies that the poor community members mainly depended on sale of goats for their cash needs while the rich and medium classes depended on sale of large stock in addition to the sale of goats. This was in agreement with the findings of Chabari (1986) among the Maasai and Orre (2003) among the Rendille/Ariaal pastoralists.

Concerning the age-sex categories of every species of livestock sold, most of the categories sold were the mature male castrates. Except for donkeys, females of other species of livestock were rarely sold because of their reproductive status as well as the social premium attached to them. Male donkeys of reproductive age were also sold. Demand for male and female donkeys was available from herders who wished to increase their donkey herds and also from livestock traders who resold or used them to transport consumer goods. Productive females of the other livestock species could only be sold when there were no male animals or cull/infertile females. The pastoralists attributed the number of female animals entering the market as an indicator of poverty levels of pastoral households usually occasioned by the effect of drought. During drought, excessive sale of castrate males depletes this category of livestock leaving households with no option but to also sell females. Young animals could only be sold when there was a need for small amounts of cash or when there were no cull/infertile females or castrates in the flock/herd, depriving households the future value of these animals. Furthermore, it deprives households of the livestock capital necessary for flock/herd growth in future, accentuating a downward spiral of flock/herd decapitalization. It is therefore necessary for pastoralists to create a balance between market-preferred and non-market-preferred age-sex categories of animals in the herds through proper management strategies. The need to sell non-market-preferred species and categories of livestock should be supported through price improvement strategies like buying animals based on weight or organizing producers into groups to directly slaughter these animals in butcheries for optimum returns, or to explore market outlets that specifically target them. Strategies for

supporting pastoralists after herd collapse due to phenomena such as drought need to be considered.

The vast majority of sales of market-preferred categories (large-sized and mature male castrates) of all species of livestock occurred in the dry season. This was the period when household food requirements were high and therefore a concomitant need for cash to purchase foodstuffs or exchange livestock for foodstuffs. This finding was in conformity with the findings of Orre (2003) among the Rendille/Ariaal. Food insecurity is most serious during the dry season (Republic of Kenya, 1999). Orre (2003) calculated food poverty incidence among the Rendille/Ariaal to be 0.89 and 0.61 in the dry season and wet season, respectively.

During the wet season, few animals were sold. During this season, milk production from herds and flocks increases and therefore the demand for purchased foodstuffs drops and only plays a supplementary role. Pastoralists are therefore unwilling to sell animals. However, there were concerns that, presently, during the wet season, milk production by animals is lower than in the past, meaning that milk may not be sufficient for household nutritional needs and therefore purchased foodstuffs are still in demand. This was evident in the current study where animals were sold to buy foodstuffs besides buying luxury commodities such as beads for girls. Animals sold in the wet season were mostly the young ones. Orre (2003) found that among the Rendille/Ariaal, animals were sold during the wet season to pay for debts incurred on food during the dry season. This situation was not observed in the current study.

It has been previously reported that pastoralists sell animals mostly during the dry season when livestock prices are low (Ondegi-Awuondo, 1990; Orre, 2003). This was confirmed in this study. This is an indication that pastoralists are mainly motivated to sell animals by immediate requirement for cash rather than good livestock prices and therefore do not benefit from the good price offered during the wet season. This situation is exacerbated during the dry season when prices of cereals are high. Several recommendations have been suggested in order to deal with this adverse relationship. Orre (2003) suggested that pastoralists need to sell animals during the wet season and buy enough foodstuffs for use during the dry season. A drawback of this recommendation is storage given that pastoralists are mobile. There is therefore a need for pastoralists to access price information, be encouraged to commercially invest and store wealth in forms other than livestock, and the country's traditional livestock market-base needs to be expanded and economic recovery programmes aimed at increasing consumers' per capita and hence demand for pastoral commodities, be designed.

Many studies have been conducted on livestock marketing constraints in pastoral areas (Njiru, 1982; Lusigi, 1984; Grandin, 1987; Gitunu *et al.*, 2001; Orre, 2003) but priority ranking and analysis of these constraints at community level is lacking. The current study showed that producers regarded low prices of livestock as a major constraint in livestock marketing while livestock traders considered low operating capital as the major constraint. In contrast, government livestock workers cited poor marketing infrastructure and lack of marketing information as the major constraints that need to be addressed in

order to improve livestock marketing. Bekure and Chabari (1991), working among the Maasai, also found that low prices were a major concern of pastoralists. Even in Kajiado District where pastoralists easily accessed organized markets, they still complained of low prices (Gitunu *et al.*, 2001). Orre (2003) also reported that traders in Marsabit District complained of low working capital as a hindrance to their business. These problems appear to be worsened by market liberalization policies in operation today.

It is notable that there were some differences in the ranking of constraints to livestock marketing between pastoralists, traders and government officials. In an effort to address these constraints, it is important that the key stakeholders (pastoralists and traders) be involved. What they consider as their main constraints should therefore be given serious consideration as recommended in community-based development. The wishes and concerns of livestock producers and traders should be reflected in policy formulation aimed at fostering development in pastoral areas. During the study, it appeared that the role of government livestock workers was not felt or appreciated by producers and traders. This may be attributed to financial, logistical and staff constraints. Due to these implementation constraints, the government should consider reviewing its roles, including those reflected in SAPs, share them realistically with the private sector and other development partners, and subsequently enact legislations and formulate policies that provide enabling environment for operations of the private sector, while safeguarding the interests of the producer and trader.

There are common paradigms that pastoralists are emotionally attached to their livestock, are irrational and resistant to change (Bekure and Chabari, 1991). Their unwillingness to sell animals, even when prices were conducive, was considered unreasonable. This conceivably may have made national governments and other development agents to give little emphasis on livestock marketing in pastoral areas. In this study, pastoralists were not willing to sell more livestock when marketing improves than they are selling in the current marketing system, meaning that improved marketing would have no influence on marketing behaviour and off-takes. This may partly be because, to pastoralists, livestock is capital and the only resource that can sustain their livelihoods in the harsh and unpredictable environments they live in and therefore need to be rational about their sales. This apparently means that they are cautiously concerned about long-term food security than short-term gains of selling at high prices. When prices improve, pastoralists believe that they would achieve the target income by selling fewer animals. Also, it is probable that before pastoralists sell an animal, they first compare its present cash value to benefits foregone, which include milk, blood, additional cash value gained through future sales and social value attached to the animal. A similar response to livestock price increases has been noted in the Rendille/Ariaal (Orre, 2003) and Maasai (Bekure and Chabari, 1991) pastoral communities of Kenya.

In the current study, a pattern was observed where the pastoralists were willing to sell more donkeys, cattle and camels in the herds and less goats if marketing improved, although goats remained the principle livestock type sold in relatively large numbers. Informants reiterated that when marketing conditions were poor, goats were the only

livestock species that were frequently sold. As the situation improves, they would reduce sales of goats to allow flock growth and instead sell more of other types of livestock. Additionally, there were concerns that lack of markets for other species of livestock restricted their sales and pastoralists wished to utilize the improved marketing situation to realize their economic potential and benefit, implying that increased sale of large stock does not necessarily mean a response to improved marketing but a compensatory response to allow growth of small stock. Ordinarily, the Turkana pastoralists sell large stocks when there are no alternative small stocks. Large stocks are also more attached to socio-cultural functions. Additionally, the current demand for cash appears to be more of subsistence than investment-oriented nature.

To stimulate increased sales when marketing improves, the following are suggested: supporting pastoralists (through access to water and pasture, providing security and improvement of local breeds) to produce surplus livestock for the market while maintaining their minimum herds/flocks sizes that enable them to withstand the effect of the harsh environment they live in (although there is unresolved debate that pastoral areas are overstocked (Schwartz, 1981)); encouraging non-livestock savings without jeopardizing livestock-keeping; encouraging cost-sharing in delivery of essential services such as human health, animal health and education; and limiting patterns of outside aid and food relief. More importantly, these off-take improvement strategies should be accompanied by awareness creation and education on storage of surplus proceeds from sale of livestock.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

- Turkana pastoralists of Loima Division recognized seasonal movements as a constraint to market accessibility and as a result utilized cross-border markets in West Pokot District of Kenya and Moroto market in Uganda along their migration routes.
- The pastoralists gave high priority to establishment of an organized marketing system with designated market days, based on person-to-person negotiation, with an auction system supplementing it. The traders in these systems were also preferred.
- The sale of livestock and livestock products, and remittances from friends and relatives were the main sources of cash, in that decreasing order, among the Turkana pastoralists of Loima Division.
- Compared to other species, goats were the most commonly sold species, contributing substantially to households' cash incomes and, hence food security.
- In every species of livestock sold, the most marketed age-sex categories were mature male castrates; these were sold mainly during the dry season when household food requirements were high and livestock prices were low.
- Although improvement of livestock marketing information and infrastructure is equally important, producers gave high priority to improvement of prices while traders gave priority to access to credit.
- Pastoralists were not willing to sell more livestock when marketing improves than they are selling in the current marketing system.

5.2 RECOMMENDATIONS

- In the efforts to establish organized internal livestock markets and marketing systems for both livestock and livestock products in pastoral areas, seasonal mobility of pastoralists should be taken into consideration.
- Producers and traders need to be organized into associations or cooperatives to enable them sell animals and access markets easily. If possible, a reliable market outlet, for instance an abattoir (a terminal market), needs to be established in the district.
- Recognizing pastoralism as a way of life, pastoralists should be allowed to access cross-border markets during their seasonal movements. This requires cross-border policies or procedures that would minimize inter-community conflicts and spread of livestock diseases at markets.
- Women should be used as entry points in educating, encouraging and supporting pastoralists' endeavours to commercially diversify their sources of income, given livestock as capital.
- Recognizing the role played by goats in food security of pastoral households, livestock development and research efforts should focus on their health, production and marketing.
- Policy issues geared towards supporting pastoralists during disasters and after herd collapse due to phenomena such as drought need to be put in place.
- Analysis of livestock marketing constraints, interventions and policy/legislative formulations should incorporate opinions and views of producers and traders in order to achieve acceptance and gain practicability.

- Further study is necessary to:

i) Investigate the root causes and effect of livestock marketing constraints and analyze the various options for interventions;

ii) Determine factors that would influence pastoralists' desire to sell more livestock when marketing improves.

7.0 REFERENCES

AGSEC **Consultants (2000).** Sourcing Livestock from Turkana for the Domestic and Export Market. A Feasibility study for African Medical and Research Foundation (AMREF), Nairobi, Kenya. Pp. 1-120.

Airey, **J. L., Schwartz, J., Meriti, P and Adoyo, P. (1981).** Turkana Livestock Marketing Feasibility Study. Report for Ministry of Livestock Development, Nairobi, Kenya.

Akabwai, **D. (2001b).** The Turkana-Toposa-Nyangatom-Didinga Alokita: The women's peace crusade. CAPE Unit of PACE/OAU/IBAR, Nairobi, Kenya.

Akabwai, **D. (2001a).** Livestock keeping and indigenous knowledge in the Horn of Africa: Personal reflections on 25 years of Experience. In: Catley, A and Mariner, J (Eds). Participatory Epidemiology- Lessons Learned and Future Directions. Proceedings of a workshop held on November 15th to 17th 2001. Addis Ababa, Ethiopia. Pp. 6-9.

Akabwai, **D. (2000).** The Impact of Insecurity on Livestock Marketing in Turkana District. Paper prepared for the Livestock Service Providers' Thematic Workshop: Livestock Marketing in Turkana (The Way Forward), held at Kitale, Kenya.

Aklilu, **Y., Irungu, P and Reda, A. (2002).** An Audit of the Livestock Marketing Status in Kenya, Ethiopia and Sudan. Vol. I. CAPE unit of PACE/ AU/IBAR, Nairobi, Kenya.

Arid Lands Resource Management Project (ALRMP) (2001). Quarantine Line and the ASAL Districts: Final Consultancy Report on the Livestock Health Quarantine Measures Study. African Technology Development Link (Techlink) International, Nairobi, Kenya.

Aronson, D. R. (1984). Pastoralism in Contemporary Development Perspective. *Nomadic Peoples*, No. 16.

Behnke, R. H. (1983). Production rationales: The commercialization of subsistence pastoralism. *Nomadic Peoples* No. 14, 3-33.

Bekure, S and Chabari, F. (1991). An economic analysis of Maasai livestock production. *In*: Bekure, S., de Leew, P. N., Grandin, B. E and Neatle, J. H (Eds). An economic analysis of the livestock production systems of Maasai in Eastern Kajiado District. ILCA, Addis Ababa, Ethiopia. Pp. 34-41.

Broch-Due, V. (1987). From Herds to Fish and from Fish to Food Aid. Report for NORAD. NORAD, Lodwar, Kenya.

Broch-Due, V and Storaas, F. (1983). The Fields of the Foe-*Amana Emoit:* Factors Constraining Agricultural Output and Farmers' Capacity for Participation. University of Bergen.

Catley, A., Osman, J., Mawien, C., Jones, B. A and Leyland, T, J. (2002). Participatory Analysis of Seasonal Incidences of Diseases of Cattle, Disease vectors and Rainfall in Southern Sudan. *Prev. Vet. Med.* 53, 275-284.

Catley, A and Leyland, T. (2001). Community Participation and the Delivery of Veterinary Services in Africa. *Prev. Vet. Med.* 49, 95-113.

Catley, A. (2000). The Use of Participatory Appraisal by Veterinarians in Africa. *Rev. Sci. Tech. Office Int. Epizooties* 19 (3), 702-714.

Catley, A. (1999). Methods on the Move. A review of veterinary uses of participatory approaches and methods focusing on experiences on dryland Africa. International Institute for Environment and Development, London, U.K. Pp. 1-97.

Catley, A. P and Ahmed, A. (1996). Use of Participatory Rural Appraisal (PRA) Tools for Investigating Tick Ecology and Tick-borne Diseases in Somaliland. *Trop. Anim. Hlth. Prod.* 28, 91-98.

Catley, A. P and Mohammed, A. A. (1996). The Use of Livestock-disease Scoring by a Primary Animal Project in Somaliland. *Prev. Vet. Med.* 28, 175-186.

Central Bureau of Statistics. (2001). 1999 Population and Housing Census, Counting our People for Development Vol. 1. Ministry of Finance and Planning, Nairobi, Kenya.

Chabari, F. N. (1994). Livestock Marketing. In: Range Management Handbook of Kenya Vol. II, 9, Turkana District. Republic of Kenya, Ministry of Agriculture, Livestock Development and Marketing (MALDM) and GTZ, Nairobi, Kenya. Pp. 159-174

Ibabari, F. N. (1986). The Marketing of Sheep and Goats from two Pastoral Systems in Kenya: A Comparison of Market Off-take from Maasailand and Baringo. MSc thesis, University of Nairobi, Kenya.

Chambers, R. (1997). Whose reality counts? Putting the last first. Intermediate Technology Publications, London, U.K.

Dahl, G and Hjort, A. (1976). Having Herds: Pastoral Herd Growth and Household Economy. Stockholm studies in Social Anthropology #2. Stockholm Department of Social Anthropology, University of Stockholm, UK

Director of Veterinary Services (DVS) (2000). Hides and Skins Improvement and Leather Development Status Report for the last ten years. DVS, Nairobi, Kenya.

District Agriculture and Livestock Extension Office- Turkana District (DALEO) (2002). Turkana District Annual Report- 2002, Lodwar, Kenya.

District Agriculture and Livestock Extension Office- Turkana District (DALEO) (2001). Turkana District Annual Report- 2001, Lodwar, Kenya.

Dyson-Hudson, R. (1982). South Turkana Herd Structures and Livestock Human Ratios. Cornell University, Department of Anthropology, Ithaca, New York. Pp. 1-52

Eregae, E. M. (2003). Participatory Market Research in Business Planning for Private Pastoral Veterinary Practice in Turkana District, Kenya. MSc Thesis, University of Nairobi, Kenya.

Fratkin, E. (1991). Surviving drought and development: Ariaal pastoralists of Northen Kenya. Wet View press, Colorado, USA.

Galvin, K. (1984). Diet and Nutrition of Turkana Pastoralists in a Social and Ecological Context. PhD Dissertation. State University of New York, Binghamton, USA.

Gatere, K and Dow, K. (1980). Improving Price Information Systems in Beef Marketing in Kenya. Development Planning Division, Ministry of Agriculture and Livestock Development, Nairobi, Kenya.

Gathuma, J., Bloxom, W., Inamdar, A., Ndiritu, C., Byrne, P and Storaas, F. (1989). Turkana Livestock Review-Phase II. Report for NORAD in Cooperation with the Ministry of Livestock Development and Turkana Rural Development Programme. Norconsult,A.S, Nairobi, Kenya.

Gitunu, A. M. M., Ruto, E. S. K. and Muindi, J. K. (2001). Socioeconomics of the current livestock marketing production, utilization and marketing in arid and semi-arid lands, with special reference to Kajiado District. National Range Research Center, Kiboko, Kenya.

Grandin, B. E. (1987). Pastoral culture and range management: Recent lessons from Maasailand. ILCA Bulletin No. 28. Nairobi, Kenya.

Gufwoli, P. N. K and Behnke, R. (1990). Livestock Marketing Study. Report for NORAD, Ministry of Livestock Development and Turkana Rural Development Programme. NORAD, Nairobi, Kenya.

Gulliver, P. H. (1951). A Preliminary Survey of the Turkana. Communications from the School of African Studies, University of Capetown. New Series # 26, Capetown.

Gavele, C and Lautze, S. (2000). Unofficial Cross-Border Livestock Exports from Southern Sudan to Kenya. Paper prepared for the Livestock Service Providers' Thematic Workshop: Livestock Marketing in Turkana (The Way Forward), Kitale, Kenya.

Helland, J. (1987). Turkana Briefing Notes- A Background Study to the Turkana Rural Development Programme. DERAP.

Jahnke, H. E. (1982). Livestock Production Systems and Livestock Development in Tropical Africa. Kieler Wissenschaftsverlag Vauk, West Germany.

Kariuki, R. (2000). Livestock Marketing from Pastoral Areas of Kenya: A strategy for Pastoral Development. Report for ALRMP, SNV, OXFAM (GB), World Concern, Nairobi, Kenya.

Kivunja, C. D. (1976). The Economics of Cattle and Beef Marketing in Kenya. MSc thesis, University of Nairobi, Kenya.

Lelo, F., Ayieko, J., Makenzi, P., Muhia, N., Njeremani, D., Muiruri, H., Omollo, J and Ochola, W. (1995). PRA field handbook for Participatory Rural Appraisal practitioners. PRA program, Egerton University, Njoro, Kenya.

Leyland, T. (1991). Participation in the 80s and 90s: Who asks the questions in livestock development? Msc Thesis, University of Edinburgh, Edinburgh, UK.

M. A., **Dyson-Hudson, N., Dyson-Hudson, R., Ellis, J. E and Swift, D. M. (1983).** Human Biology and the Development of the Ecosystem Approach: Past Studies and the South Turkana Ecosystem Project. In: The Ecosystems Approach in Anthropology. Ed. Moran, E.F. Westview Press, Boulder. Pp. 76-114.

Livestock Marketing Division (LMD). (Undated (a)). Marketing of Livestock and Livestock Products in ASAL areas. Ministry of Agriculture and Rural Development, Animal Production Division, Nairobi, Kenya.

Livestock Marketing Division (LMD). (Undated (b)). Development Proposal for the Arid and Semi-Arid Lands. Ministry of Agriculture and Rural Development, Animal Production Division, Nairobi, Kenya.

Lusigi, J. W. (1984). Integrated resource management plan for western Marsabit District of Northern Kenya. IPAL report No. A-6. Nairobi, Kenya.

Mariner, J. C and Roger, P. (2000). Manual on Participatory Epidemiology: Methods for the Collection of Action-oriented Epidemiological Intelligence. Food and Agriculture Organization of the United Nations, Rome, Italy.

Mbogoh, H. G., Kimaru, L. W., Imana, I. I., Akabwai, D. M. O., Mirega, S. O., Erukudi, C and Wekesa, N. (1989). Preliminary Study of the Livestock Sector-Turkana District. Report for Turkana Rural Development Programme, NORAD and GoK.

McCabe, J. T. (1984). Livestock Management Among the Turkana: A social and Ecological Analysis of Herding in an East African Pastoral Production. PhD Dissertation, Cornell University, Department of Anthropology.

McDermott, J. J., Randolph, T. F and Staal, S. J. (1999). The Economics of Optimal Health and Productivity in Smallholder Livestock Systems in Developing Countries. Revue Scientifique et Technique Office International des Epizooties; 18(2), 399-424.

Minear, L. (2001). Pastoralist Community Harmonization in The Karamoja Cluster: Taking it to the next level. Feinstein International Famine Centre, Friedman School of Nutrition Science and Policy, Tufts University, Medford, Mass. USA.

Ministry of Agriculture and Rural Development (MoARD) (2001). Animal Production Division Annual Report, Hill Plaza, Nairobi, Kenya.

Ministry of Agriculture (MoA) (1996). Animal Production Division Annual Report, Hill Plaza, Nairobi, Kenya.

Njenga, P. (2000). Livestock Marketing in Arid and Semi-Arid areas in Kenya: A description of Opportunities and Bottlenecks. Report for SNV-Kenya, Nairobi, Kenya.

Njiru, G. K. (1987). Studies into Pastoral Economics. Presentation at the UNESCO Orientation Seminar, UNESCO, Nairobi, Kenya.

Njiru, G. K. (1982). The Rendille economy: Some preliminary findings in trading activities. *IDS Working Paper* No. 385. Nairobi, Kenya.

Nyariki, D. M., Wiggins, S. L and Imungi, J. K. (2002). Levels and causes of household food and nutrition insecurity in dryland Kenya. *Ecology of food and nutrition*, 41 (2), 155-167.

Office International Des Epizooties (OIE) (1998). International Animal Health Code-Mammals, Birds and bees. 7th Ed. Office International Des epizooties, Paris, France. Pp. 3-10, 18-31, 44-47, 59-61, 285-289, 379-395.

Ondegi-Awuondo, C. (1990). The life in the balance: Ecology and sociology of Turkana Nomads. African Centre for Technology studies, Nairobi, Kenya. Pp. 15-34.

Organization of African Unity/ Inter-African Bureau of Animal Resources (OAU/IBAR). (2001). Pastoralists Harmonization Initiative- Second International Meeting held in Mbale between 19th and 25th May. Mbale, Uganda. OAU/ IBAR/ CAPE, Nairobi, Kenya.

Organization of African Unity/ Inter-African Bureau of Animal Resources (OAU/IBAR). (1999). Karamojong Cluster Harmonization Meeting held in Lodwar between December 6th and 8th. Lodwar, Kenya. OAU/ IBAR/Community-Based Animal Health and Participatory Epidemiology (CAPE) Unit, Nairobi, Kenya.

Orre, S. (2003). Marketing of sheep and goats and their role in food security among pastoral communities in Marsabit District. MSc Thesis, University of Nairobi. Nairobi, Kenya.

Perckers, U. (1997). Nomadic pastoralists in Kenya: human-ecological aspect of East-Pokot. IIED Issue Paper No. 73.

Range management Handbook of Kenya. (1994). Turkana District. Vol. II, 9.

Republic of Kenya (2002). Turkana District Development Plan (TDDP)-2002-2008. Office of the Vice-President and Ministry of Planning and National Development. Government Printer, Nairobi., Kenya.

Republic of Kenya (1999). National poverty eradication plan 1999-2015. A plan presented by office of the president- department of development and co-ordination. Government printer, Nairobi, Kenya.

Republic of Kenya (1986). Sessional paper No.1 – Economic Management for Renewed Growth. Government printer, Nairobi, Kenya.

Republic of Kenya (1972). The Animal Diseases Act, Chapter 364, Revised Edition 1989. Government Printer, Nairobi, Kenya.

Sandford, R. (1983). Turkana District Livestock Development Plan. OXFAM, Nairobi, Kenya.

Schwartz, H. J. (1981). Pastoral Livestock Production in Northern Kenya- Constraints and Potential. Discussion Paper for the International Workshop on "Strategies for Developing the Resources of the Arid and Semi-arid Areas of Kenya", Nairobi, Kenya.

Seigel, S and Castellan, N. J. (1994). Non-parametric statistics for behavioural sciences 2nd Edition. McGraw-Hill, New York pp399.

Skjerdal, K. (1979). Report on the Development of Turkana District. NORAD, Kenya.

Salania, N. (1988). Pastoralism migration and colonial policy: A case study from northen Kenya, *In*: Johnson, D. H and Anderson, D. M (Eds) The ecology of Survival: Case studies from NorthEastern African History, Lester Crook Academic Publishing, London. Pp. 16-21.

SPSS Inc. (1999). SPSS® Base 10.0 Application Guide. United States of America.

Storaas, F. (1989). Cattle Complex or Begging Complex: Livestock Transactions and the Construction of Turkana Society. University of Bergen, Department of Anthropology.

Wario, A. (2001). Background Information, Kenya Livestock Marketing Council. ALRMP, Nairobi, Kenya.

Webb, P and Reardon, P. (1992). Drought impact and household response in East Africa. *Quarterly Journal of International Agriculture*, 31(3), 230-244.

Wilson, T. R. (1982). The economic and social importance of goats and their products of semi-arid arc of Northern tropical Africa. *In*: proceedings of the third International conference on goat production and diseases. Department of Agriculture, Tucson University, Tucson, Arizona, USA. Pp. 72-78.