

**PARTICIPATORY ASSESSMENT AND ANALYSIS OF
LIVESTOCK MARKETS, OFF TAKE AND MARKETING
CONSTRAINTS IN LOIMA DIVISION, TURKANA DISTRICT,
KENYA.**

By

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DECLARATION

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

TABLE OF CONTENTS

| | |
|--|------|
| DECLARATION | ii |
| DEDICATION | iii |
| TABLE OF CONTENTS..... | iv |
| LIST OF TABLES | viii |
| LIST OF FIGURES | ix |
| LIST OF PLATES | xii |
| LIST OF APPENDICES..... | xiii |
| ACKNOWLEDGEMENTS..... | xv |
| ABSTRACT..... | xvii |
| 1.0 INTRODUCTION | 1 |
| 1.1 SPECIFIC OBJECTIVES OF THE STUDY:..... | 5 |
| 2.0 LITERATURE REVIEW | 6 |
| 2.1 BACKGROUND INFORMATION | 6 |
| 2.1.1 Contribution of livestock sector to Kenya’s economy..... | 6 |
| 2.1.2 Livestock resources, populations and off-take in Kenya..... | 6 |
| 2.1.3 Livestock populations and off-take in Turkana District | 7 |
| 2.1.4 Policy developments in livestock marketing industry in Kenya..... | 8 |
| 2.2 COMMON LIVESTOCK MARKETING SYSTEMS IN PASTORAL AREAS OF KENYA..... | 9 |
| 2.2.1 Traditional non-market circulation of livestock and livestock products | 9 |
| 2.2.2 Auctions | 10 |
| 2.2.3 Person to person negotiation..... | 12 |
| 2.3 HISTORICAL DEVELOPMENT OF COMMERCIAL LIVESTOCK TRADE IN TURKANA..... | 13 |
| 2.3.1 Colonial period up to early 1970s..... | 13 |
| 2.3.2 Late 1970s to Early 1990s..... | 14 |

| | |
|---|----|
| 2.3.3 Early 1990s to date..... | 16 |
| 2.4 TERMS OF EXCHANGE IN TRADING TRANSACTIONS IN PASTORAL AREAS OF KENYA | 17 |
| 2.5 MARKETING OF LIVESTOCK AND LIVESTOCK PRODUCTS IN THE PASTORAL AREAS OF KENYA..... | 19 |
| 2.5.1 Live animals..... | 19 |
| 2.5.1.1 <i>Livestock species, age and sex structure preference for sale</i> | 19 |
| 2.5.1.2 <i>Domestic and export markets for live animals from pastoral areas of Kenya.</i> | 20 |
| 2.5.2 Trade in livestock products..... | 21 |
| 2.5.2.1 <i>Milk</i> | 21 |
| 2.5.2.2 <i>Hides and skins.</i> | 21 |
| 2.6 COMMON CONSTRAINTS ASSOCIATED WITH LIVESTOCK TRADE IN PASTORAL AREAS..... | 22 |
| 2.6.1 Poor Marketing infrastructure..... | 23 |
| 2.6.2 High Transportation costs | 24 |
| 2.6.3 Drought | 24 |
| 2.6.4 Lack of markets and marketing information..... | 25 |
| 2.6.5 Livestock diseases..... | 26 |
| 2.6.6 Variation in the volume of sales | 29 |
| 2.6.6.1 <i>Variation due to season</i> | 29 |
| 2.6.6.2 <i>Variation due to the level of home consumption</i> | 30 |
| 2.7 CONCLUSION..... | 32 |
| 3.0 MATERIALS AND METHODS..... | 33 |
| 3.1 DESCRIPTION OF STUDY AREA | 33 |
| 3.2 SELECTION OF STUDY AREA, SITES AND SAMPLING UNITS..... | 36 |
| 3.3 DATA COLLECTION | 36 |
| 3.3.1 Phase one: Sensitization workshop..... | 37 |
| 3.3.2 Phase two: Participatory mapping | 38 |
| 3.3.3 Phase three: Matrix scoring | 40 |

| | |
|---|----|
| 3.3.3.1 Herders' preference for different types of livestock traders and livestock marketing systems | 40 |
| 3.3.3.2 Seasonal calendar | 41 |
| 3.3.4 Wealth ranking and Proportional piling | 43 |
| 3.3.5 Phase Five: Simple ranking and semi-structured interviews | 44 |
| 3.3.6 Phase six: Stakeholders workshop | 45 |
| 3.3 DATA HANDLING AND ANALYSIS | 46 |
| 3.3.1 Participatory mapping data | 46 |
| 3.3.2 Matrix scoring and seasonal calendars data | 47 |
| 3.3.3. Proportional piling data | 47 |
| 3.3.4 Semi-structured interviews data | 47 |
| 3.3.5. Simple ranking data | 48 |
| 4.0 RESULTS | 49 |
| 4.1 HERDERS PERCEPTIONS OF LOCAL MARKETS | 49 |
| 4.1.1 Mapping potential livestock markets based on seasonal movements of pastoralists | 49 |
| 4.1.2 Herders' criteria for classification and preference for different types of livestock traders. | 50 |
| 4.1.2.1 Classification and preference based on tribe of a trader | 50 |
| 4.1.2.2 Classification and preference based on how and where traders operate (marketing system of operation) | 54 |
| 4.1.3 Preference for different types of Livestock marketing systems | 57 |
| 4.2 HERDERS' PERCEPTIONS OF CASH INCOME SOURCES WITH SPECIAL REFERENCE TO LIVESTOCK MARKETING AS SOURCE OF CASH | 60 |
| 4.2.1 Sources of cash income with special reference to livestock | 60 |
| 4.2.2 Cash proportions of different sources of income: Comparing <i>adakars</i> | 63 |
| 4.2.3 Cash proportions of different sources of income: Gender groups' comparison. | 65 |
| 4.2.4 Cash proportions of different sources of income: Wealth groups' comparison. | 66 |
| 4.3 LIVESTOCK OFF-TAKES | 68 |
| 4.3.1 Existing off take with regard to species, age and sex of animals sold | 68 |
| 4.3.2 Preference for selling different types of stock (species and their age sex categories) | 72 |
| 4.3.2.1 Goats | 72 |

| | |
|--|-----|
| 4.3.2.2. <i>Donkeys</i> | 73 |
| 4.3.2.3 <i>Cattle</i> | 73 |
| 4.3.2.4 <i>Camels</i> | 74 |
| 4.3.3 Existing off take with regard to proportional measure of herds | 75 |
| 4.3.4 Existing off-take with regard to seasonality of sales | 78 |
| 4.3.4.1 <i>Seasonal variation in donkeys' age-sex categories' off takes</i> | 78 |
| 4.3.4.2 <i>Seasonal variation in goats' age-sex categories' off takes</i> | 80 |
| 4.3.4.3 <i>Seasonal variation in cattle age-sex categories' off takes</i> | 82 |
| 4.3.4.4 <i>Seasonal variation in camels' age-sex categories' off takes</i> | 84 |
| 4.4 LIVESTOCK MARKETING CONSTRAINTS..... | 86 |
| 4.4.1 Livestock marketing constraints as perceived by herders, traders and government livestock workers | 86 |
| 4.5 HERDERS' PREDICTION OF OFF-TAKE LEVELS IF MARKETING WAS IMPROVED..... | 88 |
| 4.5.1. General trend in off-take levels if marketing was improved. | 88 |
| 5.0 DISCUSSION..... | 90 |
| 6.0 CONCLUSIONS AND RECOMMENDATIONS | 111 |
| 6.1 CONCLUSIONS..... | 111 |
| 6.2 RECOMMENDATIONS | 112 |
| 7.0 REFERENCES: | 114 |
| 8.0 APPENDICES | 127 |

LIST OF TABLES

| | |
|--|----|
| Table 1: Mean annual cash proportion (%) of important sources of income in four <i>adakars</i> of Loima division, Turkana District (2002-2003)..... | 62 |
| Table 2: Mean annual proportion (%) of goats, cattle, camels and donkeys sold in relation to those in the original herd and not sold, in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)..... | 76 |
| Table 3: Median ranks (range) of four most important livestock marketing constraints as perceived by herders, traders and government livestock workers in Loima Division, Turkana District (2002/2003)..... | 87 |
| Table 4: Mean annual proportion (%) of livestock type in the herd, proportion sold before marketing improves, proportion sold after marketing improves and proportional change in sales, expressed as a proportion of total livestock population units, in four <i>adakars</i> of Loima division, 2002/2003..... | 89 |
| Table 5: Mean annual proportion (%) of livestock types sold before marketing improves, proportion sold after marketing improves and proportional change in sales, expressed as a proportion of population of particular livestock species, in four <i>adakars</i> of Loima division, 2002/2003..... | 89 |

LIST OF FIGURES

| | |
|---|----|
| Figure 1: Map of Turkana District showing Loima Division (study area)..... | 34 |
| Figure 2: Map showing the location of the four <i>adakars</i> (<i>Natuba, Kicono, Acemie</i> and <i>Aporon</i>) studied in Loima Division, May/June, 2003..... | 38 |
| Figure 3: Mean ranks and significance values for tribal classification and preference of traders in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003..... | 54 |
| Figure 4: Summarized matrix scoring of livestock trader-qualities in four <i>adakars</i> of Loima Division, Turkana District (May/July 2003)..... | 56 |
| Figure 5: Summarized matrix scoring of marketing systems-qualities in four <i>adakars</i> of Loima Division, Turkana District (May/July 2003)..... | 59 |
| Figure 6: Mean annual cash proportion per <i>adakar</i> of livestock as a source of cash in four <i>adakars</i> of Loima Division, Turkana District (2002/2003)..... | 62 |
| Figure 7: Mean annual cash proportion (%) of important sources of income in four <i>adakars</i> of Loima division, Turkana District (2002-2003)..... | 63 |
| Figure 8: Mean annual cash proportion (%) per <i>adakar</i> unit of important sources of income in four <i>adakars</i> of Loima division, Turkana District (2002-2003)..... | 65 |
| Figure 9: Mean annual cash proportion (%) per gender group of important sources of income in four <i>adakars</i> of Loima division, Turkana District (2002-2003)..... | 66 |
| Figure 10: Mean annual cash proportion (%) per wealth group of important sources of income in four <i>adakars</i> of Loima division, Turkana District (2002-2003)..... | 67 |

| | |
|---|----|
| Figure 11: Mean annual proportion (%) of age-sex categories of goats sold in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)..... | 69 |
| Figure 12: Mean annual proportion (%) of age-sex categories of cattle sold in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)..... | 70 |
| Figure 13: Mean annual proportion (%) of age-sex categories of camels sold in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)..... | 70 |
| Figure 14: Mean annual proportion (%) of age-sex categories of donkeys sold in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)..... | 71 |
| Figure 15: Mean annual proportion (%) of goats, cattle, camels and donkeys in a herd, expressed as proportion of total livestock population units in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003..... | 76 |
| Figure 16: Mean annual proportional measure (%) of goats, cattle, camels and donkeys expressed as proportion of total population of animals per <i>adakar</i> group, in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003..... | 77 |
| Figure 17: Mean annual proportional measure (%) of goats, cattle, camels and donkeys expressed as proportion of total livestock population units per gender group, in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003..... | 77 |

| | |
|---|----|
| Figure 18: Mean annual proportional measure (%) of goats, cattle, camels and donkeys expressed as proportion of total livestock population units per wealth group, in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003..... | 78 |
| Figure 19: Summarized seasonal calendar for donkeys age-sex categories' off-take in four <i>adakars</i> of Loima Division, Turkana District (2002/2003)..... | 79 |
| Figure 20: Summarized seasonal calendar for goats age-sex categories' off-take in four <i>adakars</i> of Loima Division, Turkana District (2002/2003)..... | 82 |
| Figure 21: Summarized seasonal calendar for cattle age-sex categories' off-take in four <i>adakars</i> of Loima Division, Turkana District (2002/2003)..... | 84 |
| Figure 22 Summarized seasonal calendar for camels' age-sex categories' off-take in four <i>adakars</i> of Loima Division, Turkana District (2002/2003)..... | 85 |

LIST OF PLATES

Plate 1: Elders of *adakar* Aporon carrying out a matrix scoring exercise, May/June, 2003.....45

Plate 2: Enumerator, Mark Adiaka, confirming from the informant the outcome of a proportional piling exercise, May/June 2003.....46

Plate 3: An elder, Longole Lotwel, expressing a point in a stakeholders’ workshop, July 2003.....46

LIST OF APPENDICES

| | |
|---|-----|
| Appendix 1: Significance levels between <i>adakar</i> , gender and wealth groups, of sources of cash income in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003..... | 125 |
| Appendix 2: Mean annual cash proportion (%) of sources of cash income in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003..... | 126 |
| Appendix 3: Grand mean annual proportion (%) of age-sex categories of goats, cattle, camels and donkeys sold in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)..... | 127 |
| Appendix 4: Significance levels of age-sex categories of goats, cattle, camels and donkeys sold in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003..... | 128 |
| Appendix 5: Mean annual proportion (%) of age-sex categories of goats, cattle, camels and donkeys sold in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)..... | 129 |
| Appendix 6: significance levels of goats, cattle, camels and donkeys sold in relation to those in the original herd and not sold, in four <i>adakar</i> of Loima Division, Turkana District, 2002/2003..... | 130 |
| Appendix 7: Mean annual proportion (%) of goats, cattle, camels and donkeys sold in relation to those in the original herd and not sold, in four <i>adakars</i> of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)..... | 131 |

| | |
|--|-----|
| Appendix 8: Median ranks (range) of livestock marketing constraints affecting herders and traders as perceived by government livestock workers, Loima Division, Turkana District (2002/2003)..... | 132 |
| Appendix 9: Median ranks (range) of livestock marketing constraints as perceived by herders and traders themselves, Loima Division, Turkana District (2002/2003)..... | 133 |
| Appendix 10: Significance levels for proportion of livestock types sold before marketing improves, proportion after marketing improves and proportional change in sales, in four <i>adakar</i> of Loima Division, Turkana District, 2002/2003..... | 134 |
| Appendix 11: Off-take prediction per <i>adakar</i> , gender and wealth groups expressed as a proportion of total livestock population units in four species of livestock sold by pastoralists of Loima Division, Turkana District, 2002/2003..... | 135 |
| Appendix 12: Off-take prediction per <i>adakar</i> , gender and wealth groups expressed as a proportion of particular livestock species population in four species of livestock sold by pastoralists of Loima Division, Turkana District, 2002/2003..... | 136 |

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ABSTRACT

A participatory study was conducted in Loima Division of Turkana District to assess and analyze livestock markets, off-take and marketing constraints. It was aimed at generating information that could be used in redesigning or modifying plans for viable livestock marketing interventions in the division.

Four livestock camps (*adakars*) including *adakar* Natuba, Kicono, Acemie and Aporon were conveniently selected based on accessibility, security and logistics. Selection of study area was influenced by the existence of livestock marketing project that was under Veterinaries Sans Frontieres- Belgium (VSF-B). 72 individual informants stratified on gender and wealth, and 16 informant groups of 8-15 people each were selected from the livestock camps. 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.

From the study, potential livestock markets in the division were defined. 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, cash handling and friendly negotiations. The auction system and organized marketing system with market days (based on person-to-person negotiation) were highly preferred and also

were the 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 regularity.

The major sources of cash reported were livestock, borrowing and sale of livestock products in a decreasing order. Commonly sold species of livestock were goats, cattle, camels and donkeys of which goats emerged the primary source of cash. Within the livestock holdings, goats had the largest proportion, followed by camels and cattle, with donkeys being the least. The proportion of goats in the herd (and hence sales) was higher among the poor whereas the proportion of large stock (and hence sales) 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 sold of goats, cattle and camels were mature male castrates except for donkeys where breeding males and females were being 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 males and females of 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 more livestock. The proportion of goats to be sold was higher than of other livestock types though the proportional change in sales (difference between sales before and after marketing improves) was negative. Despite low proportion of sales in future, camels, cattle and donkeys displayed positive proportional change in sales as compared to goats.

Based on the results of this study, it can be concluded that livestock marketing is an important recipe to the livelihoods of Turkana pastoralists and are ready to sell their livestock if a market with less barriers to entry exist. They should therefore be involved in gathering and analyzing information that is used in planning and designing best-bet interventions to livestock marketing. A further study is recommended to look at the root causes of livestock marketing constraints, their effects and perceptible and economic analysis of various options of intervention.

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 Km² with 75% of its total area classified as arid or semi-arid (Republic of Kenya, 2002). It is inhabited by the Turkana pastoralists, who, according to the 1999 census, were estimated at 450,860 people in 73,645 households (Central Bureau of Statistics, 2001).

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). It is the centerpiece of the daily and ceremonial life and is the principle currency for social and commercial transactions (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 this 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). Besides, livestock market development is believed and seen to be key to the success of other development programs 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 therefore 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. 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 (producers and livestock traders) 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 adversely impacting 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 (NGOs), have been attempting to develop livestock marketing strategies in the district, but their efforts have remained an illusive goal (Njenga, 2000). Past reviews and studies suggest conflicting opinions probably signifying the complexity of livestock development in a pastoral district like Turkana. In common with other pastoral areas in Africa, billions of dollars have been spent on pastoral livestock schemes but impact is cloudily seen and hardly sustained. Several reasons and suggestions have been associated with this.

There seems to be lack of good ideas on the kind of interventions required to tackle the main problems of fluctuating productivity and food security in such pastoral set-up (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, 2001; Orre, 2003). Moreover, these areas have been lowly prioritized by livestock experts and policy makers. 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 destitutes with alternatives to pastoralism, particularly so 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 comparatively analysis of opinions of all stakeholders in Livestock marketing.

The approach of past research and livestock development interventions is questionable especially when it comes to 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, mostly in pastoral areas, acquiring information through quantitative methods of investigation is difficult owing to financial and other research related constraints; and in most cases data or information collected doesn't lend itself to field analysis for immediate action and making timely informed decisions.

This study aimed at generating information that can be used in redesigning or modifying plans for viable livestock marketing interventions in Loima Division of Turkana District. Additionally, can provide information on current status of livestock off-take in the division and how trends could change if marketing was improved. Attention was focused on producers' and traders' knowledge, abilities, attitudes, beliefs and behavioral patterns. This will assist the pastoral community in the division, or otherwise the whole District, to transcend from an isolated, subsistence-oriented economy to a market oriented one, which can be integrated in to 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 cash income sources with special reference to marketing of livestock;
3. To assess existing off-take with regard to:
 - a) Species, age and sex of animals sold;
 - b) Preferences for selling different types of stock;
 - c) Proportional measure of herds;
 - 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 assess herders' predictions of off-take levels if marketing was improved taking in to account the constraints identified in objective 4;

2.0 LITERATURE REVIEW

2.1 BACKGROUND INFORMATION

2.1.1 Contribution of livestock sector to Kenya's economy

Livestock contribute about 3.3% of the total GDP in Kenya (Aklilu *et al.*, 2002). Cattle production contributes nearly 50% to the Agricultural GDP, which has fluctuated around 25% of the total GDP of the country since the early 1980s (MoA, 1996). Despite such significant contribution to the national economy, the livestock sector received 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 off-take in Kenya.

In 2001, Kenya's livestock population was estimated at 12 million head of cattle (of which 3.2 million are in dairy herds), close to 20 million sheep and goats (sheeps) and 1 million camels (MoARD, 2001). Variation in livestock population between years is not uncommon and it is mainly a reflection of frequent droughts resulting in heavy losses (Chabari, 1986; Aklilu *et al.*, 2002). In addition, it owes to gaps in population data collection in pastoral areas (Dahl and Hjort, 1976) and non-estimated off-take consumed within the production units (Little *et al.*, 1983).

An annual estimate of red meat production in Kenya is approximately 362,815 metric tons of which beef constitutes about 286,000 metric tons (LMD, Undated (a)). A bulk of

this is beef 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 43.2 billion. Within this the value of beef is estimated at Ksh 34.4 billion, combined goat meat and mutton at Ksh 8.2 billion and camel meat at Ksh 0.66 million (LMD, Undated (a)). Annual variation in off-take is attributed to droughts and cross-border trade (Aklilu *et al.*, 2002). The prevailing 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 off-take rate for shoats is estimated at 25% from an estimated 21.08 million shoats in the country (comprising 6.9 million hair sheep, 1.1 million wool sheep, 12.95 million meat 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 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 as 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 developments in livestock marketing industry in Kenya

Government policy on livestock marketing arose from policy changes imposed through the structural adjustment programs (SAPs) and to a less extent through its 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 SAP, the roles of LMD were revised to supervision and maintenance of infrastructure, establishment of livestock marketing information network and livestock off taking during droughts (LMD, Undated (b)).

Today, 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 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

The pastoralists maintain a network of interpersonal relations. This is characterized by presence of claims between individuals (Storaas, 1989). Personal relationships are established and maintained through transfers 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. These include: as compensations; during periods when a relative is worst hit by calamities such as of raids, livestock disease epidemics and droughts; and during inheritance quarrels (McCabe, 1984).

When need arises, a person can go and see 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 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 practiced as a support system, though not in total.

This non-market circulation of livestock and livestock products, as well as money and bartered or bought 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. 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 a plentiful supply of a commodity and relatively fewer buyers (Gufwoli and Behnke, 1990). It provides

producers and sellers 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 to the regular and reliable holding of sales (frequency) 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, sellers 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 this season, markets get flooded with animals in poor condition, inevitably causing a drop in price. Poor prices discourage sellers who would ultimately resort to private negotiations with buyers to allow greater disposals/ off-take of their animals at the face of low prices (Gufwoli and Behnke, 1990). In such situations, auction system collapses into a series of private negotiations between individual buyers and sellers rather than maintain its status quo of equal bargaining power. Conversely, wet seasons are characterized by reluctance of producers to sell and high price expectation 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 fluctuation (Gufwoli and Behnke, 1990).

2.2.3 Person to person negotiation

Airey *et al.* (1981) and Gufwoli and Behnke (1990) indicated that this is the existing livestock marketing system in pastoral areas after the collapse of LMD and KMC. 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 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. Additionally, 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) recommended that, measures intended to

improve livestock marketing in pastoral areas would more likely achieve their objective, viability and cost-effectiveness if they are 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 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 be coming 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 (after the colonial era), other specialized marketing mechanisms (market forces) fundamentally developed.

2.3.2 Late 1970s to Early 1990s

After the collapse of the colonial auction system, the Turkana Livestock Co-operative Society Ltd (TLCS Ltd) was registered in 1977 to continue performing livestock 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 vent and salvage their livestock (Airey *et al.*, 1981). The Turkana Rehabilitation Project (TRP), instead of distributing free relief food, introduced a food-for-work strategy where the Turkana could sell their livestock in exchange for consumables. Private traders in consumer 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, Livestock Marketing Division of the Ministry of Agriculture in collaboration with Norwegian Agency for Development (NORAD) and TRP considered to initiate 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 by a myriad of market distortions, which undermined the establishment and viability of commercial trading in the district. These 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). Additionally, auctions were infrequent and could not favour traders' involvement because of the project being the only buyer at the auctions and by extension the project was offering consistently much higher prices than could be offered by the private traders.

After the collapse of LMD and KMC, Livestock Small Trader Loans Project, later to be called Turkana Livestock Traders and Consumers Cooperative Society, was formed but never took off. Subsequently, Gufwoli and Behnke (1990) in their livestock marketing study in Turkana, made a proposal for a Turkana Livestock Trading Company, which, however, did not 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. It clearly manifested 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 have been identified to exist. They include shopkeepers, itinerant livestock traders (rural merchants), large-scale businessmen, and butcher- men/hoteliars (McCabe, 1984; Gufwoli and Behnke, 1990). This indicates that, stocks 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 well vertically and horizontally 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 Roy, 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 evidence that, barter trade doesn't 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. They 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). 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 for many years.

One of the reasons associated with pastoralists disfavour of cash emanates from the common observation that, less shopping centers were found at 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 do a lot of blackmailing when it comes to cash transactions. Gufwoli and Behnke (1990) proposed that national distributors 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 haulage and subsist on them and their produce (Gufwoli and Behnke, 1990).

It therefore raises a question of how transactions should be legitimately handled in such pastoral set-ups, to the favorable expectation of both traders and livestock producers (herders) 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 are sheep and goats, followed by cattle (24%), camels (12%) and finally donkeys (8%), although percentages can 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”. This means that, pastoralists will first dispose the small stock for their needs before they think of disposing cattle. Camels will only be disposed of as a last resort (Mbogoh *et al.*, 1989).

Pastoralists sell or slaughter distinct class of animals (Dyson-Hudson, 1982; McCabe, 1984; Gufwoli and Behnke, 1990). Often sold or slaughtered are mature castrated males (Mbogoh *et al.*, 1989), barren females and culled breeding animals that are past reproductive age (Schwartz, 1981). When this class of animals is unavailable, they resist sales (or slaughter). Breeding stock and young stock is neither preferred for sale nor 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 animal from the pastoral areas of Kenya used to be 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 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 late 1980s. Since late 1980s, Kenya has not exported any significant quantities of animals, owing to trade bans due to disease 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 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 destined for market (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 rain 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 since they can't dispose it (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 high quality grades I and II (Aklilu *et al.*, 2002). The

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

Sources of trade's hides and skins in pastoral areas include pastoralists themselves, butchers/slaughterhouses and influx from neighbouring districts or countries (Mbogoh *et al.*, 1989; Aklilu *et al.*, 2002). In pastoral areas, socio-cultural obligations such as ritual meat feast 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. Chabari and Njiru (1991); ALRMP (2001); Wario (2001) and Orre (2003) enumerated major constraints connected to 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 is 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 them 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 KMC and LMD ceased marketing operations and stopped managing them due to 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 accounted to 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 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 this period, 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 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 so as to improve livestock market performance, but the problem still remains. 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). Additionally, the harsh environmental situation of pastoral areas limits the frequency of visits by extension agents. Local chiefs have been underlined to be 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 data base 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 extra bulk 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 knowledge-passing conduit and intelligence system on several aspects of livestock trading, such as constraints, opportunities and, mere performance, structure and conduct (ALRMP, 2001).

In Kenya, there are current efforts by the Arid Lands Resource Management Project (ALRMP) to establish market information systems through establishing pastoral and livestock marketing associations at the grass roots and district levels, culminating into 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 include Rift Valley fever, Rinderpest, Foot and Mouth disease (FMD), Contagious Bovine Pleuropneumonia (CBPP), among others.

The Kenya's disease control policy was put in place in 1900. Government policy to try to control and eradicate 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 through 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 (i.e. livestock quarantines) 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) 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 for 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. Difficulty 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 facility.

Similarly, 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 same.

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). In part, Galvin (1984) asserted that there is a tendency by pastoralists to “excessively” accumulate livestock as a result of them lacking a “commercial-mind”. Schwartz (1981) observed that, majority of the pastoralists are subsistence producers in that they consume within the household most of the livestock produce. McCabe (1984), Gufwoli and Behnke (1990) and AGSEC (2000) later refuted this claim when they found that, despite being surrounded by socio-cultural obligations, pastoralists are willing to sell their stock if an advantageous market (for livestock, livestock products and non-pastoral 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

(Gufwoli and Behnke, 1990). 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). 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 CONCLUSION

In common with other pastoral communities, livestock is the main resource and economic base of the Turkana pastoralists. Indeed, there is need to strengthen the capacity of the Turkana pastoralists to utilize this livestock resource. 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. There is therefore need to involve the pastoralists themselves in the analysis of constraints and opportunities to livestock marketing or livestock development in general, in a bid 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. 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 34⁰' and 36⁰40' East, and between latitudes 10⁰30' and 5⁰30' North. It covers an area of approximately 77,000 km². The district has 17 divisions, 56 locations and 158 sub-locations, with a human population estimated at 450,860 (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 and, with temperatures ranging between 24-38⁰C.

Loima Division covers an area of approximately 4,250km² comprising of two geographically distinct regions, Lorengippi region (2,050Km²) and Loima hills plateau (2,200Km²) (Range Management Handbook of Kenya, 1994). It 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 comprises of evergreen woodlands, deciduous bush land, deciduous bush annual

grassland, and wooded grassland and it is within 10Km of permanent water (Range Management Handbook of Kenya, 1994). It 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. It supports a livestock population of 24,500 cattle, 126,800 sheep, 253,600 goats, 18,300 camels and 4,250 donkeys (DALEO, 2002). The division is inhabited by ngikamatak section of the turkana. There are no organized livestock markets in the division and people often sell their animals at markets outside the division (but within Turkana District), and to some extent, across the border to Moroto markets in Uganda and Amakuriat in West Pokot District of Kenya. Government of Kenya (Ministry of Agriculture and Rural Development) and Veterinaries Sans Frontieres- Belgium (Non-Governmental Organization) provide Animal Health and Livestock marketing services. Figure 1 shows the location of the study area.

3.2 SELECTION OF STUDY AREA, SITES AND SAMPLING UNITS

The study was carried out in four livestock camps of Loima Division. They included Adakar Natuba, Kicono, Acemie and Aporon. They were conveniently selected based on accessibility, security and logistics. Additionally, Veterinaries Sans Frontieres- Belgium (VSF-B) was carrying out livestock marketing project in the area that helped to mobilize the pastoralists and sometimes offer logistical support. In studying livestock off-take, a family was taken as the basic sampling unit. It is the primary decision making unit among the Turkana pastoralists as far as resource management is concerned, and collecting data at that level assisted to understand factors that influence decision that could be used to design and plan development interventions.

3.3 DATA COLLECTION

The data was collected between May and July 2003. Participatory appraisal (PA) methods such as seasonal migration maps, matrix scoring, proportional piling, simple ranking, seasonal calendars, semi-structured interviews and workshops were used. Other workers had used these methods in the past in conducting epidemiologic and economic assessment studies (Catley and Ahmed, 1996; Catley and Mohammed, 1996; Mariner; 1999; Catley, 2000; Catley and Leyland, 2001; Catley *et al.*, 2002; Eregae, 2003; Kaitho, 2003; Mochabo, 2003).

3.3.1 Phase one: Sensitization workshop

A workshop was held in Lorugum at District Officer's (DO) compound for three days, between 13th and 16th May 2003, with the main purpose of informing the community of the intended research and the need for their involvement. The participants included 12 key elders (mainly livestock camp leaders) from the three locations of Loima Division (four from every location), 3 chiefs (one from each location), 7 livestock traders, 2 representatives from the Ministry of Agriculture and Rural Development, and one representative from VSF-Belgium. Discussions were mainly through brainstorming and semi-structured interviews. Issues discussed were major cattle camps in every location and their possible routes of migration, historical development of livestock marketing in turkana; types of marketing systems; means of exchange; classification of livestock traders; those responsible for decision to sell an animal in a family; wealth ranking; age-sex categories of types of livestock kept; constraints faced by producers and traders in livestock marketing; seasons of the year and their corresponding months; 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 in the course of actual data collection.

3.3.2 Phase two: Participatory mapping

This was used to map potential livestock markets in Loima Division based on seasonal movements of the livestock camps. One group of informants (of about 8-15 people) in every livestock camp was involved, totaling to 4 informant groups. A mapping procedure was explained to a group. Features of interest to the researcher were geographical boundaries of a livestock camp demarcated by major mountains/hills, main rivers and major watering points along them, neighboring tribes; grazing areas during wet and dry season plus potential directions of migration; trading centers; earth roads. A group was instructed to use locally available materials such as stones, sticks, tyre shoes, traditional chairs (*Ekicholong*), bones to distinctively mark a feature placed on the map. A clean space on the ground was prepared for them to produce a map. Informants were left alone to carry out the exercise for twenty minutes. The informants were 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 reaffirm 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 in to one, shown in Figure 2.

3.3.3 Phase three: 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 one for women), each of about 8-15 people, were involved per livestock camp. The total number of informant groups was 8. Types of livestock traders operating in the division were brainstormed in sensitization workshop. Classification criteria for different types of livestock traders was agreed upon in the same workshop and was later verified at adakar level. Two classification criteria for traders were agreed upon: based on tribe of the trader, and on marketing system he operates in. In every criterion, types of livestock traders mentioned were compared in a pair-wise manner, resulting in a set of qualities (indicators). Similar set of qualities (indicators) was generated in the separate pair-wise comparison of traders in the two classification criteria. Handling one classification criterion at a time, the categories of traders mentioned under each criterion were represented in a matrix using familiar objects such as tyre shoes, waste papers, stones and traditional chairs, which were placed along the top X-axis of the matrix. The qualities (indicators) generated were written on cards and illustrated along the left Y-axis of the matrix. For each quality, the informants were asked to score each livestock trader by dividing a pile of stones against the trader. In the pile of stones, 5 pebbles represented a uniform score for every trader, sufficient to show differences between traders, that is, 20 stones if there were 4 categories

of traders to be scored against. Every time a quality was to be scored against the types of traders, the quality was read and explained to the group by the researcher. After the exercise, informants were given additional five minutes to crosscheck the scores in a matrix and do any alterations if necessary. In the course of crosschecking, 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 for different livestock marketing systems underwent the same procedure as above, that is, brainstorming in sensitization workshop, verification of types of marketing systems at adakar level, pair-wise comparison of different marketing systems and generation of qualities that were scored against each marketing systems which, eventually produced marketing systems-qualities matrices. Plate 1 shows a matrix –scoring exercise performed by an informant group.

3.3.3.2 Seasonal calendar

This was used to assess existing off take with regard to seasonality of sales. One informant group of herders each of about 8-15 people was involved per livestock camp. The total number of informant groups was 4. In the sensitization workshop, participants were asked to mention the types of livestock commonly sold. For each type of livestock, corresponding age-sex categories sold was produced. Participants were encouraged to mention these categories in local language. Attempts were made to ensure that participants settled at 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 actual data collection, a line was drawn on the ground and explained to informant group that it represented one full year. The informants were asked to divide the line in to community's seasons and corresponding months in local language. Each season was labeled by a representation on a piece of carton; red marks for dry season, green for wet season and green-red partition for inter-phase between wet and dry season. Informants were given a chance to explain back to the researcher the meaning of color marks on the pieces of cartons that represented seasons. Pieces of cartons were placed on the top X-axis. Age-sex categories generated during sensitization workshop, written on pieces of cartons, were placed on the left Y-axis. Considering one livestock type at a time, informants were asked to divide the pile of stones provided, against seasons for every age-sex category mentioned by the researcher to show the relative seasonal trend in the sale of a particular age-sex category. After every scoring, informants were asked to carefully check the scores and if they wished, adjust the scores until they are satisfied. The produced seasonal matrix prompted further questioning and discussions. The matrix was later transferred in to a field notebook.

3.3.4 Wealth ranking and Proportional piling

This was used to assess herders' perceptions of income sources with special reference to livestock marketing; assess off-take with regard to age and sex of animals sold and as proportional measure of herds and, assess herders' predictions of off-take levels if marketing was improved. A total of 72 herders (individual informants), 18 from each livestock camp, stratified on gender and wealth were involved. In assessing sources of income, participants were asked ways and means they obtained cash income in the past one year. Major sources of 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 among the mentioned sources of income to show the relative proportions of income that accrued from each source. In assessing off-take, each informant was asked to divide a pile of 100 stones in to the four types of livestock (goats, cattle, camels and donkeys) that were mentioned to be in his/her total herd in the past one year to show relative proportions in the total herd. For each livestock type, the informant was asked to further divide the allocated proportion of stones in to "those sold in the past one year" and "those that remained in the herd". Subsequently, the informant was asked to divide the proportion of livestock sold in to age-sex categories that were sold. To predict off take levels, stones assigned to a particular livestock species were pooled back and informant asked to divide the stones in to a proportion he/she would sell if marketing improves.

Community's criteria of wealth ranking were discussed in the sensitization workshop. This was verified at the adakar level. To identify individuals that belonged to various wealth groups (rich, medium class or poor) in an adakar, the researcher consulted the adakar leader based on the fact that he had a holistic understanding of individuals in the adakar, commands respect and also had attended the sensitization workshop. The adakar leader was asked to produce names of elders that were members/ occupants of his adakar and a list was generated. Based on his experience coupled with wealth ranking criteria adopted in sensitization workshop the adakar leader was asked to provide wealth ranks against every elder listed. From the elders' wealth status list, the researcher grabbed 3 elders for every wealth group (3 rich, 3 medium class and 3 poor). 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 ensure that every wealth and gender group was equally represented. Plate 2 shows a proportional piling exercise performed by an informant.

3.3.5 Phase Five: Simple ranking and semi-structured interviews

This was used to assess herders' preference for selling different types of stock, and assess herders' and traders' perceptions of marketing constraints that were later compared to perceptions of government livestock workers. This involved 72 herders (individual informants), 59 individual traders (20 in lower primary markets, 14 in upper primary markets and 25 in secondary markets) and 8 government livestock workers (individual informants). Constraints faced by traders and producers in livestock marketing were

brainstormed during the sensitization workshop and later verified during actual data collection. Herders were asked constraints they face in marketing their livestock and subsequently assign ranks in the 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 constraints they face in buying and selling livestock and later guided through the process of assigning ranks to constraints in the order of importance. Government livestock workers were asked to give their perception of constraints faced separately by traders and producers in livestock marketing and assign ranks in the order of their importance.

3.3.6 Phase six: Stakeholders workshop

After data collection and brief analysis of results 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 District officer's compound in Lorugum. It was attended by 20 livestock owners (12 men and 8 women) from the four adakar 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), 1 representative from District Veterinary office, 1 representative from Animal Production office, 5 NGO representatives (1 from ITDG-EA, 1 from CAPE Unit of AU/IBAR, 1 from SNV-Kenya and 2 from VSF-Belgium) and 2 lecturers from Department of Public Health

Pharmacology and Toxicology of the University of Nairobi. Plate 3 shows a participant in a stakeholders' workshop expressing a point.

Plate 1: Elders of *adakar* Aporon carrying out a matrix scoring exercise, May/June 2003

Plate 2: Enumerator Mark Adiaka, confirming from the informant the outcome of a proportional piling exercise, May/June 2003

Plate 3: An elder, Long'ole, expressing a point in a stakeholders' workshop, July 2003

3.3 DATA HANDLING AND ANALYSIS

Data handling and analysis was as described by Eregae (2003); Kaitho (2003) and Mochabo (2003).

3.3.1 Participatory mapping data

Maps constructed by pastoralists in the four *adakars* were summarized in to 1. The map was first stored in field notebook and later scanned using Scanjet® 5200 scanner (Hewlett Packard Corporation, USA).

3.3.2 Matrix scoring and seasonal calendars data

The data were first stored in field notebook as tables and later entered into Microsoft Excel® 2000 (Microsoft Corporation, USA) software as spread sheets/workbooks. Data were saved as Microsoft Excel 4.0 worksheet in separate files and then imported to Statistical Package for Social Sciences (SPSS®) Version 11.0, 2002 (SPSS® Inc. USA) where it were saved as SPSS files. Using SPSS, medians and range (maximum and minimum values) were computed using descriptive statistics menu. Levels of agreement between informant groups were computed using Kendall's coefficient of Concordance (W). Kendall's coefficient of Concordance compares more than 2 items. The two types of traders identified in tribal classification could not be compared using Kendall's coefficient of Concordance and was therefore subjected to Mann-Whitney (U) and Wilcoxon (W) tests.

3.3.3. Proportional piling data

In the field, data were stored in to a notebook. Data were later entered into Microsoft Excel® workbook and saved as Microsoft Excel 4.0 worksheets as separate files. These were then imported in to SPSS where descriptive statistics were computed and presented as tables, pie charts and bar graphs with error bars. Significant differences between *adakar*, gender and wealth groups were computed using non-parametric one-way analysis of variance (ANOVA).

3.3.4 Semi-structured interviews data

Data were summarized qualitatively.

3.3.5. Simple ranking data

In the field, data were stored in to a notebook. Data were later entered into Microsoft Excel® workbook and saved as Microsoft Excel 4.0 worksheets as separate files. These were then imported in to 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 Mapping potential livestock markets based on seasonal movements of pastoralists.

Figure 2 shows the map for the location of the four *adakars* of Loima Division that were involved in the study. It defines potential livestock markets and displays possible routes of migration during seasonal movements by livestock keepers in the division. Trading centers around the study *adakars* herein dubbed as potential livestock markets were Namoruputh, Lokiriama and Lorengippi. There has been disorganized low-scale marketing of livestock in these centers. Livestock keepers highly depended on markets outside the division, namely, Lorugum, Turkwell, Lodwar and Kakuma ; Amakuriat market in West Pokot District of Kenya, and Moroto market in Uganda. During dry season, livestock was moved to hilly or mountainous regions of the Division and to some extent across the borders to West Pokot and Uganda during severe drought. In the wet season, livestock was moved to the erosional plains which form a larger part of the division's land mass. These movements were only reflected in three species of livestock, that is, shoats, camels and donkeys. Cattle were in almost permanent grazing in Uganda throughout the year. *Ngikamatak* of Loima Division occasionally engaged in running battles with their neighbours, the pokots of Kenya, Tepes of Uganda, Matheniko of Uganda and Jie of Uganda. These fierce battles were occasioned by raiding that is practiced between and among the pastoral communities in the Karamoja cluster. Other

features shown in the map were earth roads, mountain ranges, hills, rivers and watering points.

Pastoralists in Loima Division further reiterated that establishment of a market in the division has to fulfill the following requirements: centrally placed to reduce distance from a livestock camp to the market; not in an insecure area; with substantial supply of commercial goods demanded by producers; availability of water and pasture for trade animals; utilize cross-border marketing opportunities since the region borders West pokot District and Uganda; easily accessed by traders; based on a marketing system that promotes market days. Namoruputh was unanimously suggested as the trading center where a livestock market could be established.

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 a trader

Figure 3 shows the mean ranks and significance values for tribal classification and preference of traders. There was no significant difference in the herders' preference of *Esomalit* (Somali) or *Eturkanait* (Turkana) based on prices of livestock, consistency of buying livestock, trust worth, cash handling and friendly negotiations. Informant groups disagreed over the scoring of all indicators considered in preferential differentiation of a certain tribe of trader. Though the differences were insignificant, *Esomalit* emerged to be

slightly trustworthy (mean=8.81) and handling enough cash (mean=9.19) than *Eturkanait*. On the other hand, *Eturkanait* was recognized as a friendly negotiator (mean=10.44), consistent in buying livestock (mean=9.88) and offering better prices of livestock (mean=9.69) than *Esomalit*. In overall, most preferred qualities were trustworthiness (U=29.5), Cash handling (U=26.5) and pricing of livestock (U=22.5). From observation, most of the discussions were subjective.

In the course of discussion and on probing, some observations were made and further information was provided. Some informants tilted towards *Eturkanait* due to the tribal bias and generosity highly expected of them. It was observed that, some of the informants were traders, and screening and isolating them from the groups was difficult. However, interactive nature of methodology used and passive control of talkative individuals by the researcher assisted to generate lengthy and heated debates that sometimes ended unresolved.

Some informants preferred *Eturkanait* because, his business property belonged to the community while that of *Esomalit* was individually owned and commonly re-invested back to his original homeland. There was complaint over non-aggressiveness of *Eturkanait* in trade. This was attributed to lack of business skills, working capital or due to high illiteracy rate. Educated *Eturkanait* was blamed firstly, for fearing to conduct trade around the community perhaps because of generosity expected and secondly, for lacking deliberate effort and attempt to enlighten illiterate traders and community as a whole. Low working capital was given as a reason why few Turkanas were venturing in

to livestock trade. Most of the traders emanated from poor families. Old historical myth of disunity among the Turkana was mentioned as one of impermeable barriers that hinder operation of livestock trade as a cooperative that could help cushion risks and uncertainties associated with trading in such set up.

Some *Eturkanait* were associated with offering very low prices. Consequently, *Esomalit* learns this behaviour from *Eturkanait* and resorts to equally depress prices. *Esomalit* could also offer low prices when they are few. Worse still, *Esomalit* was mentioned to have studied the food-availability cycle among the turkana, known when they are desperately looking for food, and at his discretion, could offer low prices for livestock at that time. Despite the low pricing of *Eturkanait*, he was recognized for informing producers on price changes, an attribute that was missing in *Esomalit*. One could only sense that prices of livestock were not favorable when *Esomalit* was seen not to be loading trucks of livestock for markets outside the division.

Though *Esomalit* was associated with handling enough cash, it was reported that, they couldn't release it easily. If they do, they depress livestock prices so that they can offer very little cash that would otherwise be useless in the face of pastoralists when they want to purchase priceless commodities from their shops. This could be a trick to divert the minds of pastoralists from cash and lure them towards barter where the trader has advantage of manipulating prices. Most of the transactions of *Eturkanait* were in barter and this was blamed for influencing the mind of *Esomalit* to equally use and perpetrate barter trade. Lack of cash among Turkana traders was attributed to low working capital.

Esomalit and *Eturkanait* were almost equally rated in being consistent in buying livestock. However, *Esomalit* was said to be in a better position due to his capital base. Conversely, lack of enough capital coupled with low business skills and non-integration of business could often push *Eturkanait* out of business. *Esomalit* was associated with trustworthiness because he could sometimes raise the price of livestock, trade both in cash and barter and could give gifts.

Eturkanait was recognized for his ability to negotiate for a price margin in a respectable manner. This was attributed to his constant presence with the people, better local language command, wider knowledge of people's problems and social/cultural attachment to the people. *Esomalit* was reported to be treating livestock keepers as strangers and his friendship was business oriented. He could set the price of livestock without incorporating wishes of livestock owners especially when he realizes that, the livestock owners are desperately in need of food.

Based on past experience, some informants were totally dissatisfied with the crop of traders (both turkana and somali) that were present within the community, accusing them of extensive mischief, business cartels and exploitation. They could prefer dealing with new traders (from outside Loima division) if marketing improves. In the overall, the basic concern of informants was a trader who is trustworthy (U=29.5), one who has cash (U=26.5) and one who offers better prices (U=22.5).

| Variable | Trader type | Group (N) | Mean Rank | Mann-Whitney U | Wilcoxon W | Significance |
|---------------------------------|-------------|-----------|-----------|----------------|------------|--------------|
| Price of livestock | Esomalit | 8 | 7.31 | 22.5 | 58.5 | 0.3 |
| | Eturkanait | 8 | 9.69 | | | |
| Consistency in buying livestock | Esomalit | 8 | 7.13 | 21 | 57 | 0.22 |
| | Eturkanait | 8 | 9.88 | | | |
| Trust worthiness | Esomalit | 8 | 8.81 | 29.5 | 65.5 | 0.79 |
| | Eturkanait | 8 | 8.19 | | | |
| Cash handling | Esomalit | 8 | 9.19 | 26.5 | 62.5 | 0.56 |
| | Eturkanait | 8 | 7.81 | | | |
| Friendly negotiation | Esomalit | 8 | 6.56 | 16.5 | 52.5 | 0.09 |
| | Eturkanait | 8 | 10.44 | | | |

Number of informant groups=8

Figure 3: Mean ranks and significance values for tribal classification and preference of traders in four adakars of Loima Division, Turkana District, 2002/2003.

4.1.2.2 Classification and preference based on how and where traders operate (marketing system of operation)

Figure 4 shows the summarized matrix-scoring diagram for livestock trader-qualities based on how and where they buy livestock (the system they use). The results show a good agreement between the 8 informant groups, for the 5 qualities considered, with critical values of W ranging from $W=0.810$ to $W=0.875$. *Lo anok* was strongly associated with the five qualities. *Lo edukan* was moderately associated with the five qualities while *Lo angakejen* did not receive high scores for any of the qualities relative to other types of traders.

Further probing indicated that *Lo edukan* was a next alternative in the absence of *Lo anak*. However, his substitution and preference was dictated by distance between a shop establishment and location of livestock camp. Livestock owners that were very far from a shop preferred dealing with *Lo angakejen* although his scope was limited by the quantity and sizes of commodities he carried (by hand), his relative affinity to barter and poor prices for livestock. On pricing, a competitive price offered by *Lo anak* was as a result of them being many in the market place.

Consistency of buying livestock was strongly associated with *Lo anak*. However, his presence was more realized during a market day (as seen in Moroto market). He acted as a destination for livestock brought by producers, *Lo edukan* and *Lo angakejen*. *Lo angakejen* was described as being in business when he has sold an animal from his herd or when he has stolen and sold someone's animal (a thief), and therefore displayed no distinctive difference from an ordinary livestock keeper.

Despite the extensive despise on *Lo angakejen* that was evident across informant groups, he could not miss a score because of his constant presence within the people, reducing livestock owners' distance to markets, not discriminating the type and size of animal he wanted, being strategic in supply of commodities (though the sizes and quantities were small) and always being a last resort in the absence of other types of traders. Though pronounced unskilled, he must have had tactics of going about his business, in his small way.

On tribal consideration and domination of a market or a livestock marketing system, *Lo angakejen* was more likened to a Turkana trader; *Lo edukan* likened to a Somali trader and *Lo anok* being a trader of no tribal identity whose main interest was livestock. Many Turkana traders were seen to be reaching livestock producers on foot with commodities carried by hand or on shoulders and to some extent on donkeys. Many Somalis had established shops along seasonal movement routes, stocked with commodities that were exchanged with livestock. Sale yards were seen as all-tribes-inclusive livestock marketing grounds/establishment. *Lo angakejen* was characterized as an advanced class of producers because, just like a producer, he could be seen driving 1-2 animals to the market and at the same time depended on *Lo anok* for disposing his livestock.

| Quality | Livestock trader | | |
|--|--------------------------------------|-----------------------------------|-----------------------------------|
| | Lo angakejen (Mobile/foot trader) | Lo edukan (trader with a shop) | Lo anok (trader in a saleyard) |
| 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) |
| Trustworthy (W=0.810**) | •• 1.5(0-5) | •• •• 4(2-6) | •••• •••• 9.5(6-11) |
| Cash handling (W=0.851***) | •• 1.5(0-4) | •• •• 4(3-7) | •••• •••• 10(7-11) |
| Friendly negotiation (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 parenthesis.

Figure 4: Summarized matrix scoring of livestock trader-qualities in four *adakars* of Loima Division, Turkana District (May/July 2003).

4.1.3 Preference for different types of Livestock marketing systems

Figure 5 shows summarized matrix scoring diagram for marketing systems-qualities. There was very good agreement between the 8 informants on all the 5 qualities used in the matrices to compare the 5 marketing systems. *Akoros* and *Eogesen* systems received high scores in all the 5 qualities, with *Akoros* leading in scores. *Edukan* was moderately associated with all the qualities while *Ngakejen* and *Akisiecha* received very low scores. *Akisiecha* was almost exempted from scoring with the view that, it was pastoralists' traditional way of exchange. They were satisfied with it since time immemorial and could not be compared with the other four modern and commercial-oriented systems. *Akisiecha* was likened to someone's livestock herd and being the "mother" of the other systems. This was because animals from this system entered the other systems either through livestock owners themselves or *Ngakejen* traders who didn't appear different from producers.

From observation, *Eogesen* seemed to have faded from memories of some informants. However, diverse age structure of informants present during the scoring provided an own-learning environment. The elderly individuals (who witnessed auctions) were very instrumental in revitalizing memories of others. Informants repeatedly mentioned some weak points about *Eogesen*. First, it disappeared several years ago and its reintroduction

was uncertain. Secondly, price setting based on a second party was not satisfying. Thirdly, its irregularity was not uncommon. Fourthly, it was based on poll tax (during colonial time) and Harambee (post-colonial taxation system) that was not a good precondition to necessitate sale of livestock. Despite the above setbacks, they were liked for standardized (somehow controlled) prices of livestock, being conducted closer to production areas, minimal price cartels and brokering, reliability during drought, wholesale purchases, shorter bargaining time, and absorbing all types, ages and sexes of livestock.

Compared to *Eogesen*, *Akoros* discriminated on the sex and age and, to some extent type of livestock required in the market; were not or never established in the division (reference based on those outside the division), encouraged and promoted brokers (one cannot know true traders), exploitative during drought (offer very low prices), unpredictable price changes, unsteady number of livestock buyers over time, long negotiation time, far away from production areas and, introduction of unexplained fee known as county council cess. Relative to other systems, *Ngakejen* was considered by informants as very exploitative and could only attract insincere traders and sellers. Most of the sellers were explained to be wrongdoers who spent most of their time in hiding (thieves) or young herdsmen who sold livestock without parents' consent or approval, for their own leisure.

| Quality | Marketing systems | | | | |
|---------------------------------------|--|-----------------------------|--|--------------------------------|---|
| | <i>Akisiecha</i> (Traditional system) | <i>Eogesen</i> (Auction) | <i>Ngakejen</i> (Itinerant/mobile traders system) | <i>Edukan</i> (shop system) | <i>Akoros</i> (Person-to-person negotiation) |
| 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) |
| Regularity (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 parenthesis.

Figure 5: Summarized matrix scoring of marketing systems-qualities in four *adakars* of Loima Division, Turkana District (May/July 2003).

4.2 HERDERS' PERCEPTIONS OF CASH INCOME SOURCES WITH SPECIAL REFERENCE TO LIVESTOCK MARKETING AS SOURCE OF CASH

4.2.1 Sources of cash income with special reference to livestock

Figure 7 and Table 1 show the mean annual proportion of cash of important sources of income in four *adakars* of Loima Division. Mean annual cash proportion associated with four types of livestock in four *adakars* of Loima Division is presented in Figure 6. The major sources of cash income as perceived by herders were, in a decreasing order, livestock (58.7%), borrowing (12.9%), sale of livestock products (9.7%) and labour, gold mining and hunting combined (5.5%). Business appeared the least source of cash income, contributing a proportion of 2.4%. Mean proportion of others (minor sources of income) was observed to be exaggerated by tendency of informants to reduce proportion of cash in the main sources of income in a bid to display a state of suffering that would otherwise attract a form of assistance. On further probing, the informants explained that, most of the cash they got from these sources was for family use, including cash from business.

Among the four species of livestock that were sold for cash in the year 2002/2003, goats emerged the primary source of cash with mean annual cash proportion of 46.39% while donkeys appeared the least source (3.1%). The mean annual cash proportions from camels and cattle were 5.01% and 4.15% respectively. There was no significant difference in the relative proportions of cash from the four species of livestock (goats, cattle, camels and donkeys), between *adakar*, gender groups and wealth groups. Informants explained that large proportion of income from livestock emanated from sale

of goats mainly because of their large proportions in total population of livestock, easy disposability due to their small size, and availability of markets. Markets of goats were available and could be accessed by all the four *adakars*. However, there were complaints that, there were no organized livestock markets in the division except for the mobile traders and the shopkeepers. People could travel long distances to reach competitive livestock markets outside the division. The farthest of these markets were cattle, camels and donkeys markets. Cattle were mostly sold in Moroto market in Uganda; camels sold in Kakuma market where they were in high demand by the refugees while donkeys were sold at Amakuriat market in West Pokot District, Kenya. Sale of large proportions of a certain type of large stock (donkeys, cattle and camels) was reported to be largely dependent on proximity of the *adakar* to the above particular markets following its seasonal migration pattern. Very long distances to markets was a major constraint curtailing the pastoralists' will to sell large stock as compared to distances covered to access markets for small stock. Appendix 1 shows significance levels between *adakar*, gender and wealth groups of sources of cash income and Appendix 2 shows mean annual cash proportion (%) of sources of cash income.

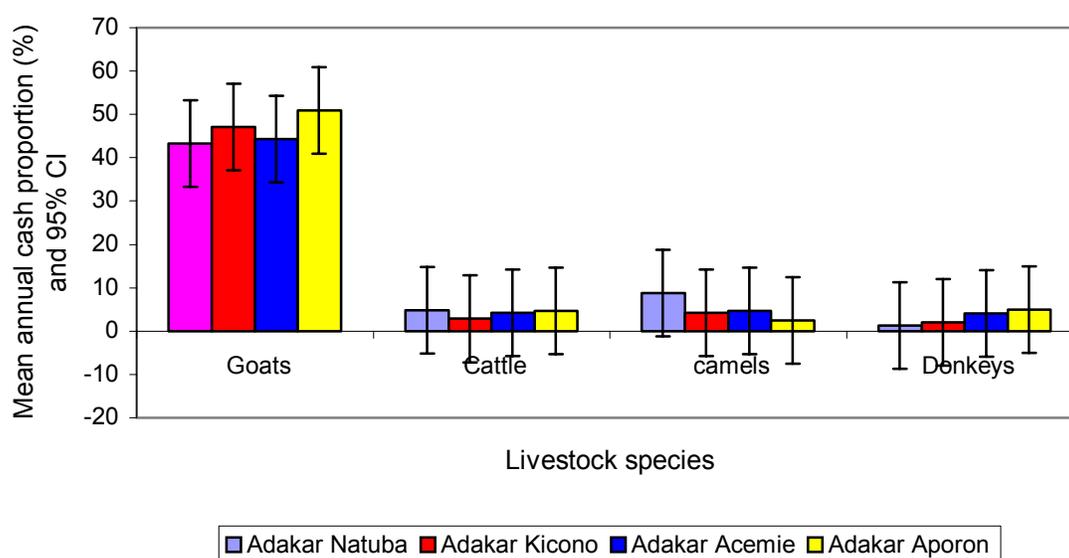


Figure 6: Mean annual cash proportion per adakar of livestock as a source of cash in four *adakars* of Loima Division, Turkana District (2002/2003).

Table 1: Mean annual cash proportion (%) of important sources of income in four *adakars* of Loima division, Turkana District (2002-2003).

| SOURCE OF CASH INCOME | N | MEANCP(%) |
|------------------------------|----------|------------------|
| Goats | 72 | 46.39 |
| Cattle | 72 | 4.15 |
| Camels | 72 | 5.01 |
| Donkeys | 72 | 3.1 |
| Labour | 72 | 1.94 |
| Gold mining | 72 | 2.65 |
| Borrowing | 72 | 12.88 |
| Hunting and gathering | 72 | 0.92 |
| Livestock products | 72 | 9.71 |
| Business | 72 | 2.43 |
| Others | 72 | 10.82 |

Key:

N Number of individual informants

MEANCP Mean cash proportion associated with a source of income.

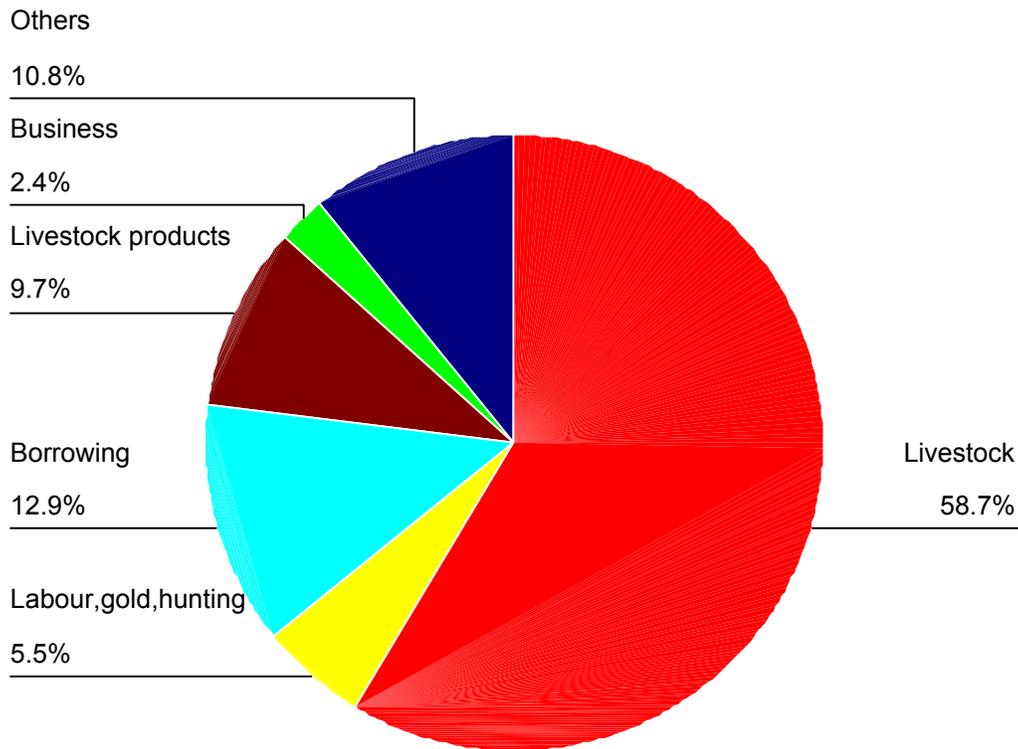


Figure 7: Mean annual cash proportion (%) of important sources of income in four *adakars* of Loima division, Turkana District (2002-2003)

4.2.2 Cash proportions of different sources of income: Comparing *adakars*.

The mean annual cash proportion per *adakar* of important sources of income is presented in Figure 8. Between the four *adakars* units of Loima division, there was no significant difference in the relative proportions of cash from sale of livestock (goats, cattle, camels and donkeys), labour, gold mining, borrowing, hunting and gathering and sale of livestock products. Business showed significant difference ($P < 0.05$) in the proportion of cash between the four *adakar*. *Adakar* kicono had the largest mean proportion of cash

from business (6.22%). The *adakar* was closer to a major trading center in Loima division (Namoruputh trading center) and women were organized in to business groups. Labour, gold mining and hunting and gathering were observed to be sources of cash income for those *adakars* that were closer to where the activity (Casual work) and resources (gold mining, hunting and gathering) were found. Loima ranges were observed to be grossly rich in biodiversity and minerals. Gold deposits were found in Mt. Moroto in Uganda and people from Loima Division could access these from the eastern side where they were bordering. VSF-B was sinking water sand dams in Loima Division and this provided the community with additional cash income through providing casual labour. Therefore, projects that seek to develop an area could seriously involve the local people in order to partly boost their source of cash and there hence their livelihood. Milk was mainly sold in urban settlements around the grazing areas and mostly in the rainy season.

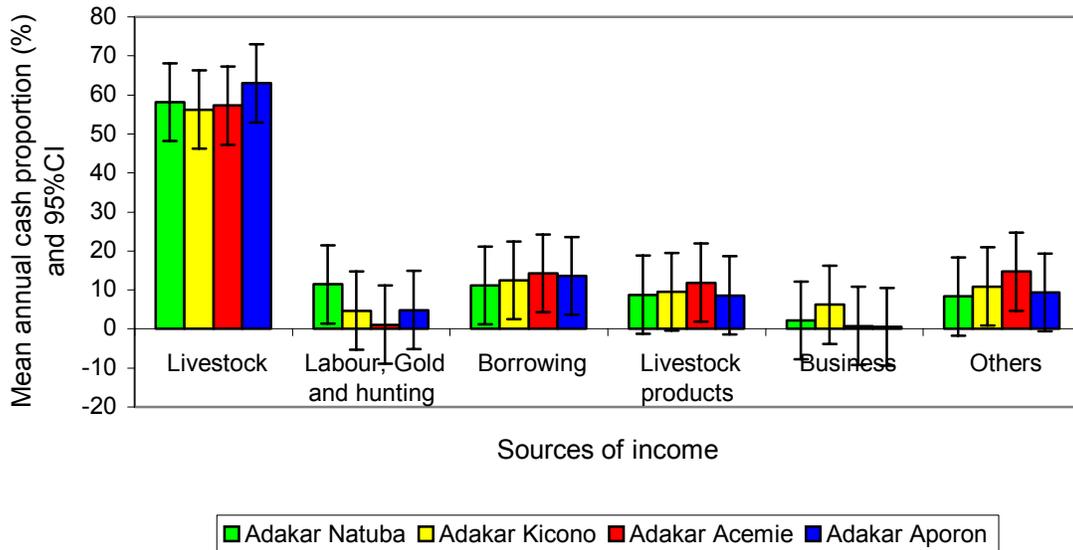


Figure 8: Mean annual cash proportion (%) per *adakar* unit of important sources of income in four *adakars* of Loima division, Turkana District (2002-2003)

4.2.3 Cash proportions of different sources of income: Gender groups' comparison.

Figure 9 shows the mean annual cash proportions per gender group, of important sources of income. Between men and women there was no significant difference in mean annual cash proportions for the rest of cash income sources except for business where significant difference ($P=0.05$) was observed. Women recorded a higher proportion of cash from business (3.97%) compared to men (0.89%). Between men and women, differences in the proportions of cash from various sources of income could be compromised by the consultative nature of pastoral men and women in almost everything that comes in and goes out of the family.

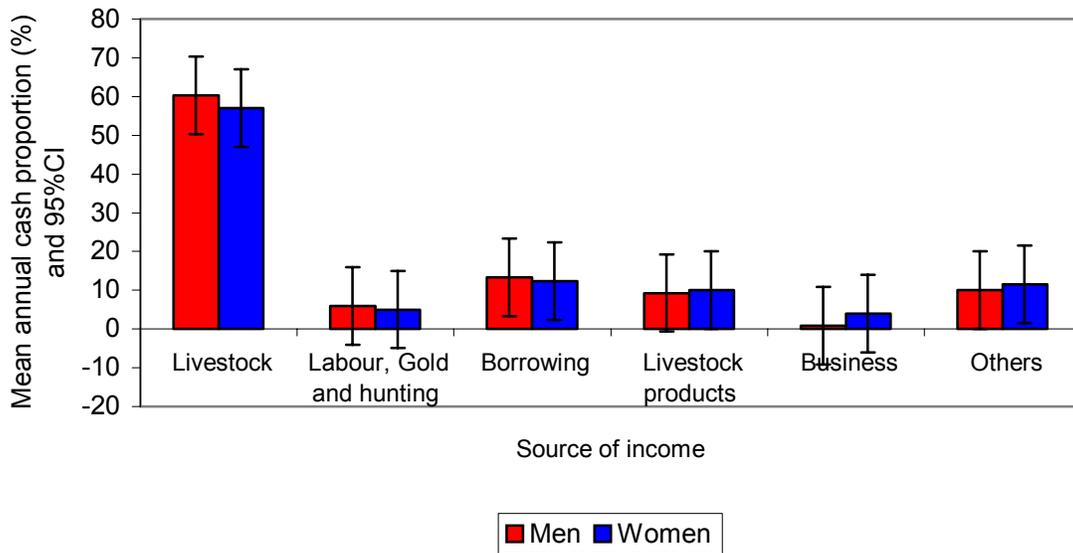


Figure 9: Mean annual cash proportion (%) per gender group of important sources of income in four *adakars* of Loima division, Turkana District (2002-2003)

4.2.4 Cash proportions of different sources of income: Wealth groups' comparison.

Figure 10 shows the mean annual cash proportions per wealth group of important sources of income. Cash proportions from different sources of income as perceived separately by the rich, medium class and the poor were not significantly different. Though differences in total livestock holding (both in type and proportions) between wealth groups were expected to partly dictate for differences in the proportions of livestock sold for cash, this was not revealed. On further probing, particularly in relation to sale of large stock, rich and medium class informants were mentioning that, although they had a large proportion of large stock in their herds, they sold a few for cash not because they were to retain the rest in the herd but because most of them that could be sold later were coincidentally raided. This was possible in such pastoral area where livestock populations were constantly threatened by raids, uncontrolled severe disease outbreaks and recurrent

droughts. This could result in a “forced” uniform mean cash proportion of livestock types sold between wealth groups. Therefore in these areas such factors as raids, drought and disease could constantly disorganize wealth status among individuals and consequently destabilize the community’s traditional wealth structures and ranking procedures. In spite of lack of significant differences between wealth groups, the poor had a larger proportion of cash income from goats, donkeys, hunting and gathering and business whereas the rich and medium class had a large proportion of cash income from cattle, camels, labour and borrowing.

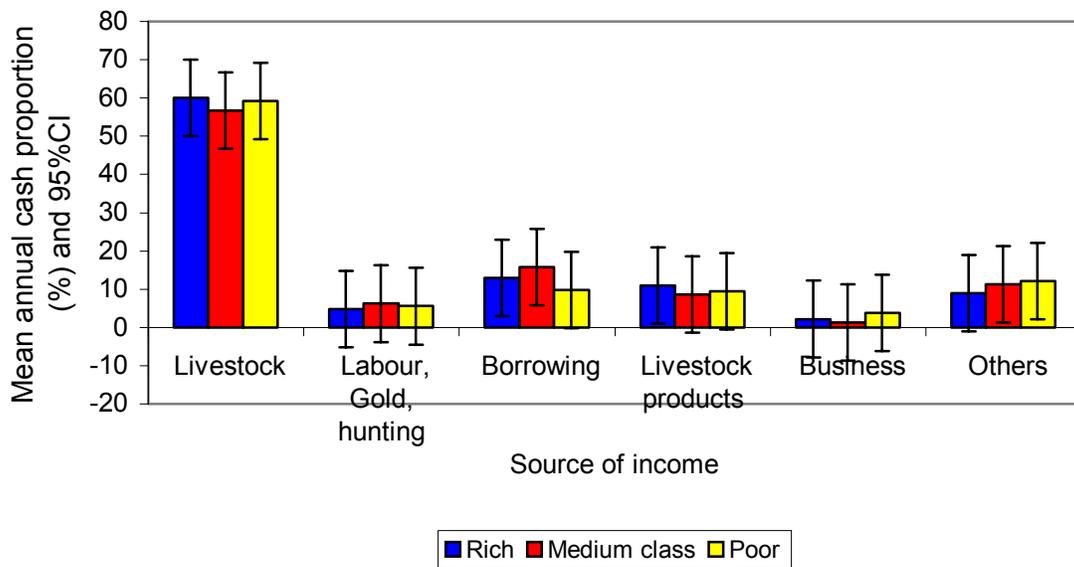


Figure 10: Mean annual cash proportion (%) per wealth group of important sources of income in four *adakars* of Loima division, Turkana District (2002-2003)

4.3 LIVESTOCK OFF-TAKES

4.3.1 Existing off take with regard to species, age and sex of animals sold

Commonly sold species of livestock were goats, cattle, camels and donkeys. *Ngikamatak* were not selling sheep owing to low numbers due to the effect of environment and traditional uses. Traditionally, sheep were used for treating some human ailments, good source of fat for family use, its skin used for making women wear, delicacy for in-laws during courtship and actual wedding ceremony, used for cleansing wrong doers, slaughtered for a woman who has just delivered and also in shaving ceremonies. Sale of donkeys was restricted by their use for transport, medicinal value and low numbers kept.

Figures 11-14 show the mean annual proportion (%) of age-sex categories of goats, cattle, camels and donkeys sold. Most preferred age-sex categories of goats sold were *Ebilarengoit* (8.72%; 8.72/100) and *Lodongong* (6.82%; 6.82/100); in cattle were *Emong* (1.29%; 1.29/100) and *Aite Nakolup* (0.33%; 0.33/100); in camels were *Lodongong* (0.65%; 0.65/100) and *Namojong* (0.32%; 0.32/100); in donkeys were *Asikiria* (0.64%; 0.64/100) and *Loketepan* (0.38%; 0.38/100). Gender and wealth groups did not show any significant differences in all categories of goats, cattle, camels and donkeys sold. However, *adakar* groups displayed significant differences in the sales of some age-sex categories of goats (*Naminawoi*= $P<0.01$; *Ebilarengoit*= $P<0.001$) and camels (*Loangitou*= $P<0.05$). *Adakar Acemie* reported the lowest proportion of *Naminawoi* (1.94%; 1.94/100) sold in the past one year while *adakar Natuba* reported the lowest proportion of *Ebilarengoit* (2.83%; 2.83/100) sold in the past one year. In camels, the

lowest proportion of *Loangitou* (0%) sold last year was reported by *adakar Aporon*. Some individuals in the respective *adakar* could have underestimated the proportional sales of some age-sex categories of animals. Appendix 3, 4 and 5 show grand mean annual proportion (%) expressed as proportion of total livestock population units, significance levels, mean annual proportion (%) per *adakar*, gender and wealth groups expressed as proportion of total livestock population units of age-sex categories of goats, cattle, camels and donkeys sold respectively.

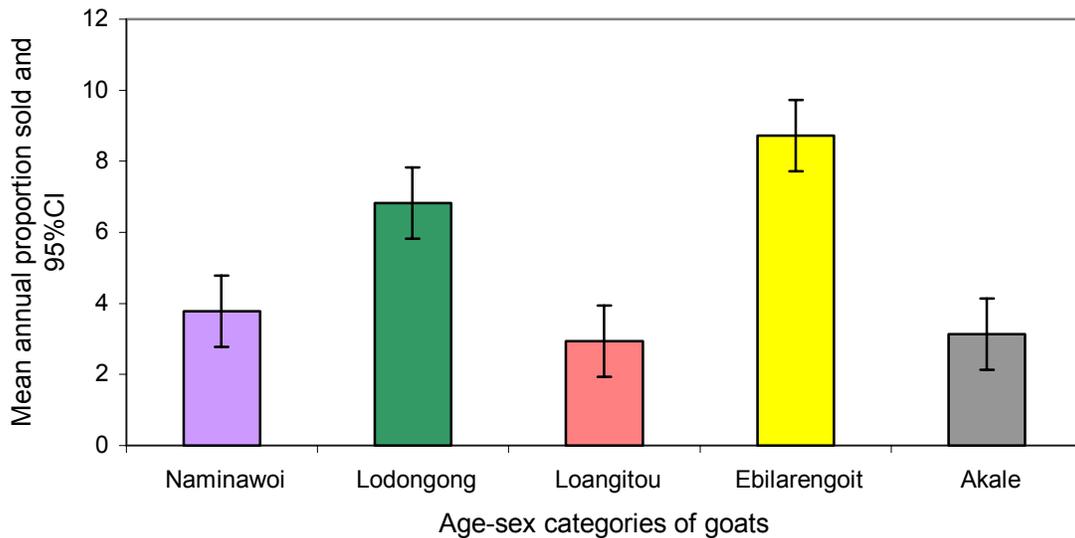


Figure 11: Mean annual proportion (%) of age-sex categories of goats sold in four *adakars* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units).

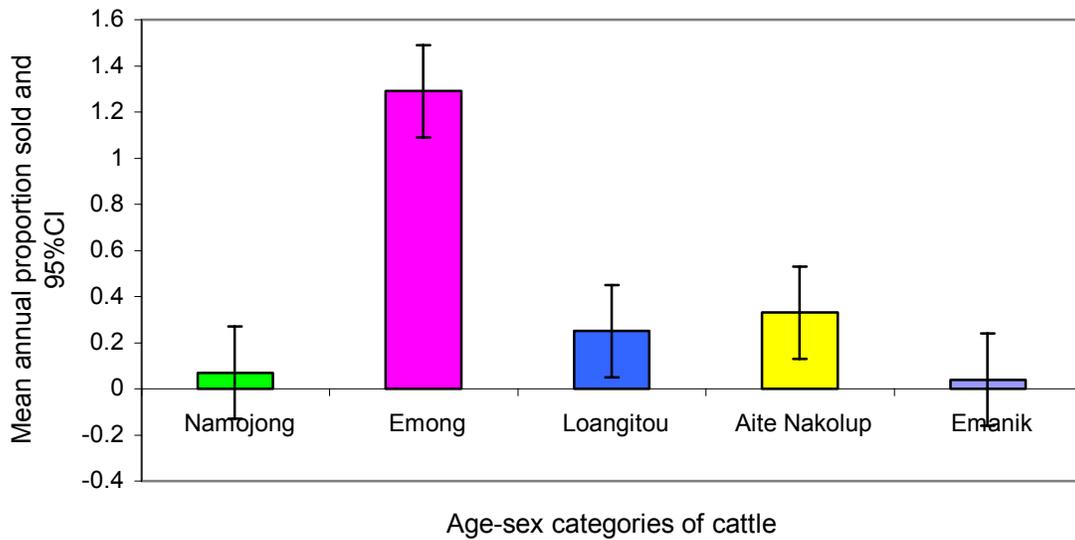


Figure 12: Mean annual proportion (%) of age-sex categories of cattle sold in four *adakars* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units).

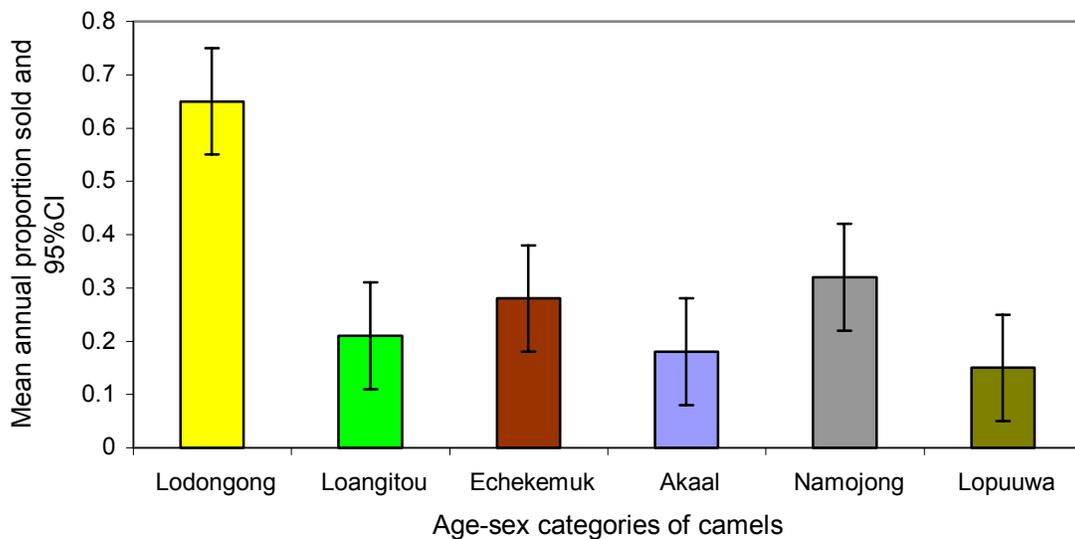


Figure 13: Mean annual proportion (%) of age-sex categories of camels sold in four *adakars* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units).

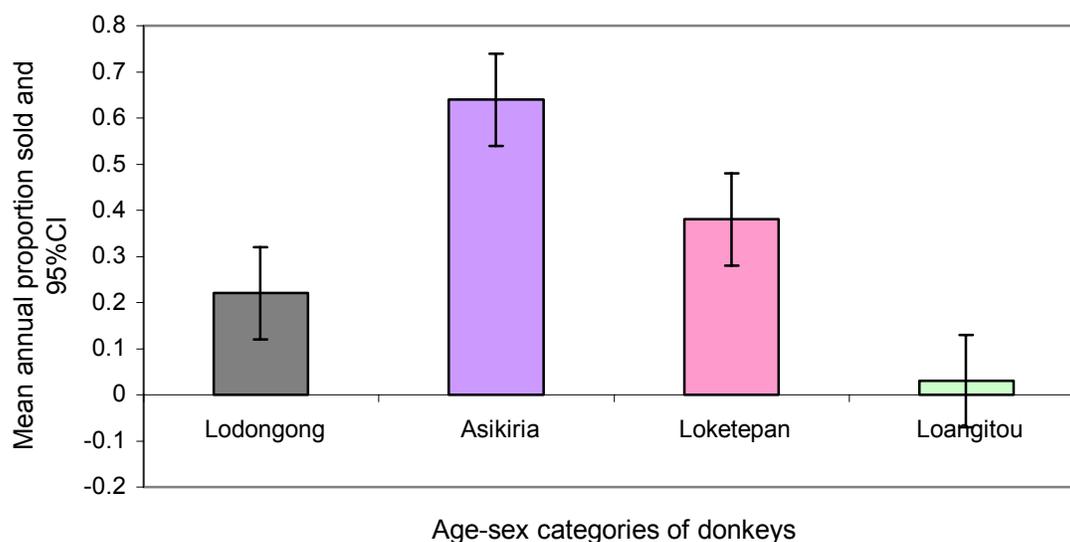


Figure 14: Mean annual proportion (%) of age-sex categories of donkeys sold in four *adakars* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units).

| Species | Age-sex category | |
|---------|------------------|---|
| | Local name | English translation |
| Goats | Naminawoi | Male or female kid upto 4 months old |
| | Lodongong | Castrated buck between 1 and 2 years |
| | Loangitou | Young uncastrated male between 4 and 9 months |
| | Ebilarengoit | Castrated buck over 2 years old |
| | Akale | Young female between 4 and 9 months |
| Cattle | Namojong | Old cow past reproductive age |
| | Emong | Castrated bull of over 2 years |
| | Loangitou | Uncastrated bull between 6 months and 1 year |
| | Aite Nakolup | Infertile cow |
| | Emanik | Breeding bull |
| Camels | Lodongong | Castrated male of over 2 years |
| | Loangitou | Uncastrated male between 6 months and 1 year |
| | Echekemuk | Young male or female between 4 and 12 months |
| | Akaal | Breeding female |
| | Namojong | Female past reproductive age |
| | Lopuuwa | Uncastrated male between 1 and 2 years |
| Donkeys | Lodongong | Castrated male of over 2 years |
| | Asikiria | Breeding female |
| | Loketepan | Breeding male |
| | Loangitou | Uncastrated male between 6 months and 1 year |

4.3.2 Preference for selling different types of stock (species and their age sex categories).

Informants reiterated that selling of a certain type of livestock depended on availability of its market/ buyers, season of the year, consistent presence in the herd and therefore its ability to counter emergencies, size and disposability, closeness to the owner, type of commodity to be obtained, numbers and structure in the herd, type and magnitude of problem (s) experienced by the family, traditional obligations, wealth status of an individual, its reproductive and production status, and on whether one needs cash or commodities or another type of stock, presence of different types of livestock in the herd.

4.3.2.1 Goats

There was no organized market for goats in Loima Division. Goats were the main recipes for commercial livestock trade. Immature goats were bought both in cash and barter while mature ones (mainly males) were bartered. Mature males were mostly sold in the dry season to cater for increasing food demand while immature ones were sold throughout the year to cater for minor family needs such as tobacco, sheets, shoes, veterinary medicines and beads. Sale of mature females and males was restricted by their role in breeding and thus being a source of future herd. However, they could be sold when they are many in the herd and during extreme starvation occasioned by prolonged drought despite low prices offered. Cultural obligations least impeded sale of goats.

There was complaint over availability of market-oriented age-sex categories of goats in the herd due to their frequent sales. Almost all age-sex categories of goats were readily sold, either through traditional system or directly to commercial systems of trade.

4.3.2.2. Donkeys

There was no organized market available for donkeys in Loima Division. Donkeys were mostly sold in Moroto market in Uganda and Amakuriat market in West Pokot District. Sale of large stock like donkey meant the family had many problems to settle. They could also be sold to complement sale of small stock so as to avoid depletion or imbalance of herd structure for small stock. Their use for transport, low numbers, recent tremendous reduction in using them for transporting business commodities and their medicinal value affected their market supply. Due to unreliability of their markets, they mainly went through the traditional system by being exchanged for goats and bulls that were readily sold.

4.3.2.3 Cattle

There was no organized market for cattle in Loima Division. They were mainly sold in Moroto market in Uganda and in Kakuma. Just like donkeys, such large stock could be sold to cover for many biting family problems. Immature cattle mainly entered traditional marketing system while the mature ones (non-breeding males and females) dominated commercial trading systems directly or indirectly through the traditional system. Mature

cattle (non-breeding males and females) were exclusively sold during the dry season to purchase food stuffs and, when sold in the wet season it were for purchase of veterinary medicines, paying school fees and medical bills and beads for cultural rituals. Though traditionally, sale of breeding males and females was restricted, their sales could be occasioned by starvation during prolonged droughts. Cultural values impacted negatively on the sale of cattle. *Emanik Lomojong* (old breeding male) was never sold due to its vital role in feasting at home; *Aite Nakolup* (Infertile cow) was a delicacy for home consumption due to its good body condition, *Emong/Emakudoit* (castrated male) was a source of pride and status to the owner.

4.3.2.4 Camels

There was no organized market for camels in the Division. They were mainly sold in Moroto Market in Uganda and in Kakuma. Their sale was dictated by the magnitude of family problems. Immature camels were mostly traditionally marketed while mature ones (non-breeding) dominated commercial systems. Immature camels were mainly bartered for beads. Sale of non-breeding mature males was mainly during the dry season (to cater for food requirements) while their sale during wet season was for purchase of veterinary medicines, paying school fees and medical expenses, buy beads for ladies and to buy food for performing cleansing rituals on children. Cultural values impeded sale of camels. They were a reliable source of milk for the family even during dry season. *Ekaal Lodongong/ Elekedeit* (castrated male) was for major feasts at home, source of pride and status to the owner and could be exchanged for nice females of breeding age.

4.3.3 Existing off take with regard to proportional measure of herds

Figures 15-18 show the mean annual proportion (%) in herd; and Table 2 shows the mean annual proportion (%) sold of goats, cattle, camels and donkeys. It was observed that, goats had the largest proportion (60.9%; 60.9/100) of livestock in the total population, followed by camels (17.9%; 17.9/100) and then Cattle (11.5%; 11.5/100). Donkeys recorded the least proportion (9.7%; 9.7/100). In the past one year, goats were mostly sold (25.4%; 25.4/100) followed by cattle (1.99%; 1.99/100) while the least sold livestock type were donkeys (1.26%; 1.26/100). Between *adakar* and gender groups there was no significant difference in the proportion of goats, cattle and camels in the herd. However differences were shown between wealth groups (goats= $P<0.001$; cattle= $P<0.05$; camels= $P<0.001$). Though *adakar* and wealth groups did not show significant differences in the proportion of donkeys in the herd, gender groups showed significant difference ($P<0.05$) with women reporting a higher proportion (11.31%; 11.31/100) than men (8.08%; 8.08/100). The proportion of goats in the herd was higher among the poor while the proportion of large stock (cattle, camels and donkeys) was higher among the rich and medium class. Between *adakar*, gender and wealth groups, no significant differences were observed in the proportion of goats, cattle, camels and donkeys sold in the past year. However, slight differences indicated that the poor had sold a large proportion of goats and donkeys whereas the rich and medium class had sold more of camels and cattle than the poor. Appendix 6 shows the significance levels and Appendix 7 shows the mean annual proportion (%) of goats, cattle, camels and donkeys sold.

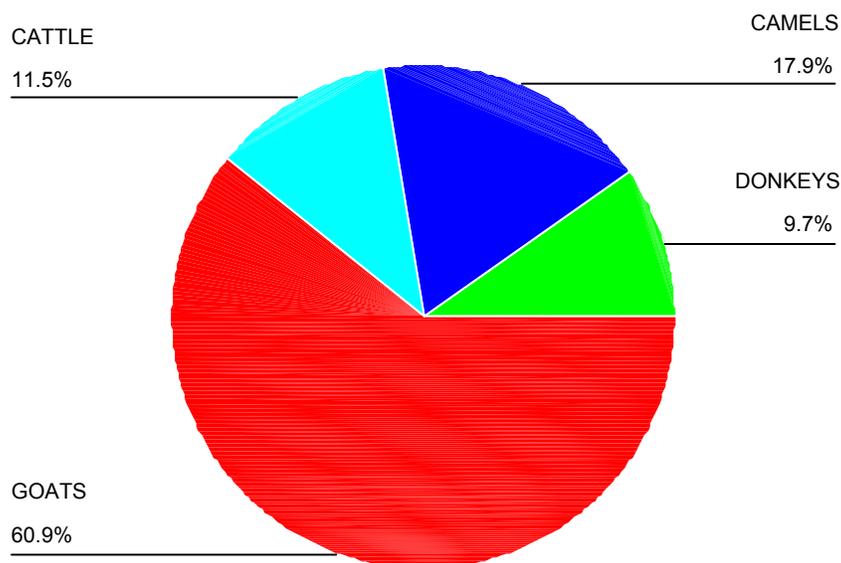


Figure 15: Mean annual proportion (%) of goats, cattle, camels and donkeys in a herd, expressed as proportion of total livestock population units in four *adakers* of Loima Division, Turkana District, 2002/2003.

| Livestock type | Number of informants (N) | In herd | Sold | Not sold |
|----------------|--------------------------|---------|------|----------|
| Goats | 72 | 60.9 | 25.4 | 35.5 |
| Cattle | 72 | 11.49 | 1.99 | 9.5 |
| Camels | 72 | 17.9 | 1.79 | 16.1 |
| Donkeys | 72 | 9.69 | 1.26 | 8.43 |

Table 2: Mean annual proportion (%) of goats, cattle, camels and donkeys sold in relation to those in the original herd and not sold, in four *adakar* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units).

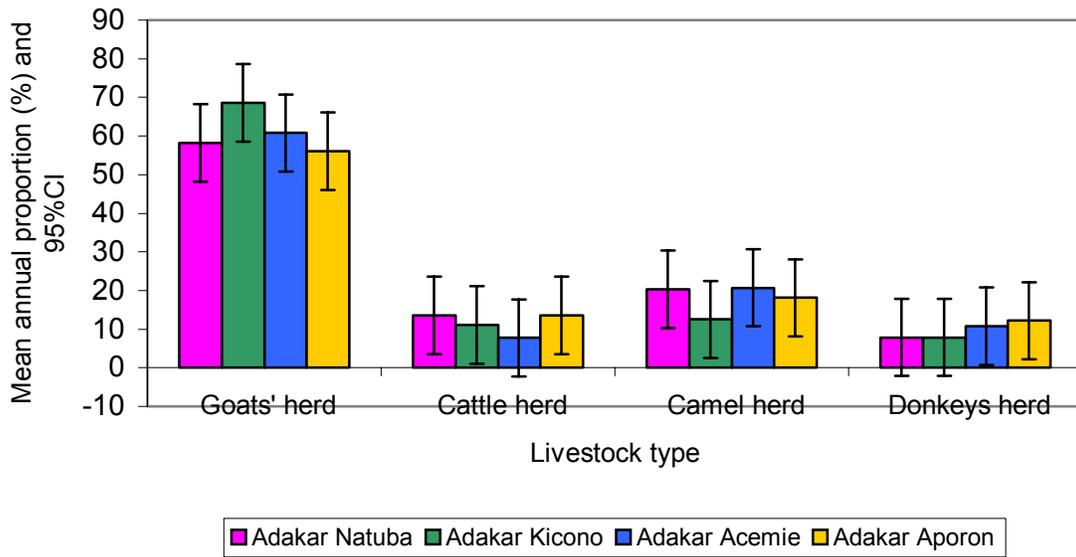


Figure 16: Mean annual proportional measure (%) of goats, cattle, camels and donkeys expressed as proportion of total population of animals per *adakar* group, in four *adakar*s of Loima Division, Turkana District, 2002/2003.

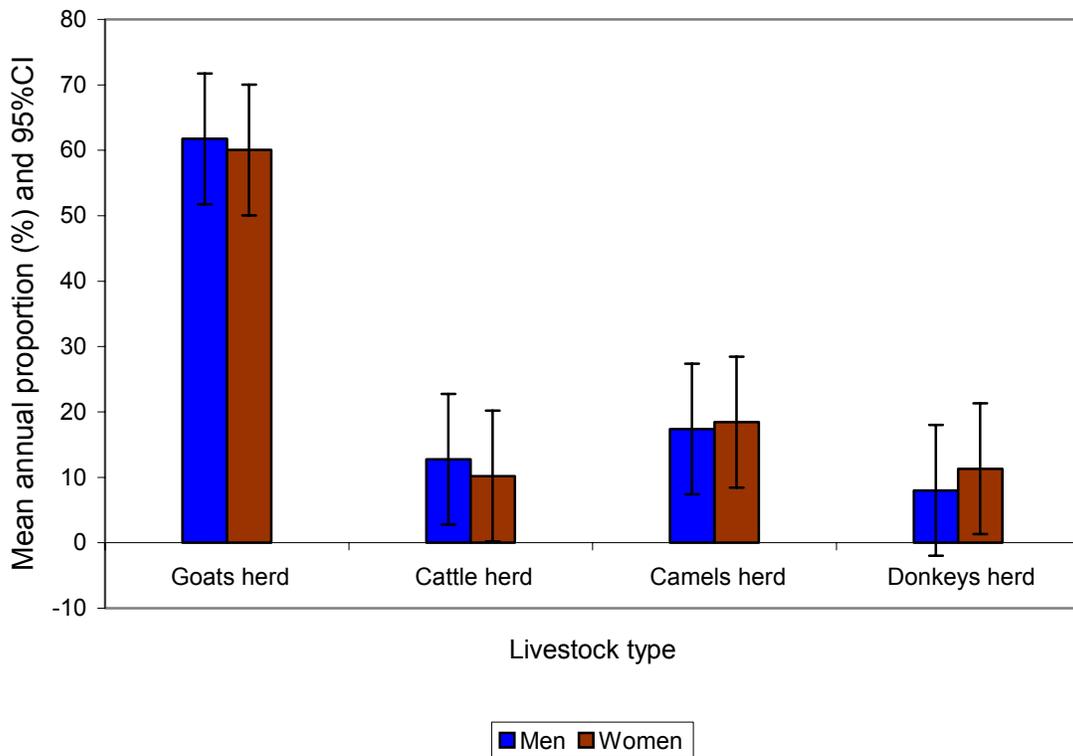


Figure 17: Mean annual proportional measure (%) of goats, cattle, camels and donkeys expressed as proportion of total livestock population units per gender group, in four *adakars* of Loima Division, Turkana District, 2002/2003.

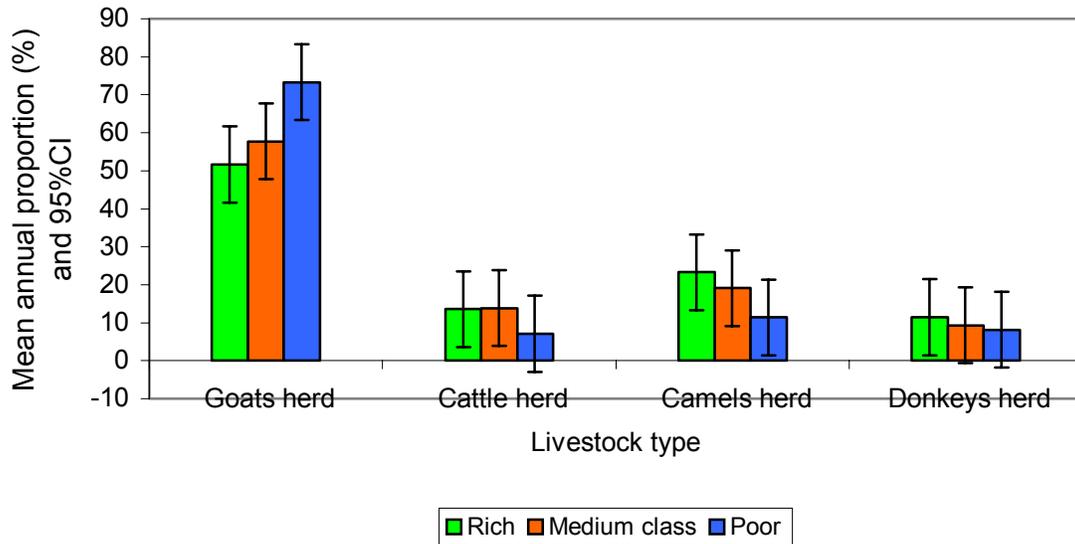


Figure 18: Mean annual proportional measure (%) of goats, cattle, camels and donkeys expressed as proportion of total livestock population units per wealth group, in four *adakars* of Loima Division, Turkana District, 2002/2003.

4.3.4 Existing off-take with regard to seasonality of sales

4.3.4.1 Seasonal variation in donkeys' age-sex categories' off takes

Figure 19 summarizes seasonal variation in the sale of different age-sex categories of donkeys. There was good agreement between the four informant groups for seasonal sales of *Loketepan* ($W=0.750$), *Lodongong* ($W=0.750$) and *Asikiria* ($W=0.750$). The informant groups weakly agreed on the seasonal sale of *Loangitou* ($W=0.250$). This weak agreement was rather insignificant. Some informant groups indicated that *Loangitou* was never sold because it was a source of future breeding males and additionally, was not

accepted by traders because of its size and age; while some informant groups insisted that it is commonly sold. This might have contributed to zero median score across the seasons. *Loketepan*, *Lodongong* and *Asikiria* were commonly sold during *Nakamu*, moderately sold during the *Nait* and least sold during *Nakiporo*. This was explained by informant groups to be corresponding to the trend of food shortage that was high during *Nakamu*, starts increasing at *Nait* and less felt during *Nakiporo*. *Lodongong* was either sold alive to butchers or slaughtered by the owner in a local butchery (under a tree) and meat sold by “hand” weighing. *Loketepan* and *Asikiria* were mostly sold to those with intentions to develop a donkey’s herd. The donkeys’ population in the area was relatively low and more threatened by raids from the neighbours (pokots of Kenya and the Karamojong of Uganda). Donkeys were important to livestock owners during seasonal movements (for carrying luggage) and also to traders (for carrying trade commodities while following pastoralists wherever they move).

| Donkeys age-sex categories | <i>Nakiporo</i> (Rainy season)- March-July | <i>Nait</i> (Interphase)- August | <i>Nakamu</i> (Dry season)- Sept-February |
|---------------------------------------|--|----------------------------------|---|
| Loangitou (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) |
| Lodongong (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 parenthesis. A higher number of dots indicated a relatively strong association between an age-sex structure of a species and season, whereas a low number of dots indicated a weak association.

Figure 19: Summarized seasonal calendar for donkeys' age-sex categories' off-take in four *adakars* of Loima Division, Turkana District (2002/2003).

4.3.4.2 Seasonal variation in goats' age-sex categories' off takes

Figure 20 summarizes seasonal variation in the sale of various age-sex categories of goats. Analysis of matrix scores demonstrated weak agreement between the four informant groups for seasonal sale of *Naminawoi* (W=0.250). *Loangitou* received varied scores and the level of agreement between informant groups was very poor (W=0.000). The weak agreement and very poor agreement for seasonal sale of *Naminawoi* and *Loangitou* respectively, was not significant. The four informant groups strongly agreed on seasonal sales of *Lokidingos/ Lodongong* (W=1.000), *Ebilarengoit/ Epachakitoit* (W=0.950) and *Akale* (W=0.750). *Naminawoi* and *Loangitou* were being sold throughout the year, while *Ebilarengoit*, *Lokidingos* and *Akale* were mostly sold during *Nakamu* when food requirements were explicitly high. Food requirements begin building during *Nait* and this explained why sale of *Ebilarengoit*, *Lokidingos* and *Akale* started rising during *Nait*. On further probing, sale of *Naminawoi* and *Loangitou* was mainly 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 *Loangitou* because their prices were low and itinerant traders could afford offering

the corresponding little cash. During restocking, that is, after a severe drought of 1999/2001, *Naminawoi* and *Loangitou* were in high demand. During these moments, cash was readily available for their purchase.

Ordinarily, traders could prefer buying *Naminawoi* (both male and female) when they observed that, livestock owners were not ready to sell goats of market size especially during *Nakiporo*. The traders take *Naminawoi* round the livestock camps to exchange for market-desired mature bucks. This was traders' mechanism to ensure that goats were always available in the market (with ready market) at moments when pastoralists are resistant to sell market-oriented types of goats, just because their food requirements are low, especially during *Nakiporo* and during drought mitigation interventions when food relief was distributed.

Akale in the context of this research referred to or combined all categories of females sold, and commonly mentioned by informants were infertile females (*Nakolup*) and females that had reached puberty (truly termed as *Akale*). *Akale* were the majority of females sold and thus the name to also represent infertile females that were remotely mentioned. In principle, females were rarely sold because they were a source of future flock. However, infertile ones (*Nakolup*), though always rare in the flock, were commonly sold to contribute to food requirements in the family especially during *Nakamu*. Scores appearing in *Nakiporo* and *Nait* for *Akale* represented those that were sold to traders who exchanged them with males of market size and age.

| Goats age-sex categories | Nakiporo (Rainy season)- March-July | Nait (Interphase)- August | Nakamu (Dry season)- Sept-Feb |
|---|-------------------------------------|---------------------------|-------------------------------|
| Naminawoi (W=0.250 ^{ns}) | •• ••• 5(5-5) | •• ••• 5(3-5) | •• ••• 5(5-7) |
| Loangitou (W=0.000 ^{ns}) | •• ••• 5(4-8) | •• ••• 5(5-5) | •• ••• 5(2-6) |
| Lokidingos/ Lodongong (W=1.000 ^{**}) | •• 1.5(0-2) | •• •• 3.5(3-4) | ••••• •••••• 10.5(9-11) |
| Ebilarengoit/ Epachakitoit (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 parenthesis. A higher number of dots indicated a relatively strong association between an age-sex structure of a species and season, whereas a low number of dots indicated a weak association.

Figure 20: Summarized seasonal calendar for goats age-sex categories' off-take in four *adakars* of Loima Division, Turkana District (2002/2003).

4.3.4.3 Seasonal variation in cattle age-sex categories' off takes

Figure 21 summarizes seasonal variation in the sale of different age-sex categories of cattle. The seasonal calendar for sale of cattle age-sex categories' indicates that *Emong/Emakudoit* and *Aite Nakolup* were mostly sold during *Nakamu*. Though *Emanik*

was reported to be frequently sold during *Nakamu*, this was insignificant. Some groups did not place any score for *Emanik* in any of the seasons, arguing that, *Emanik* was mainly reserved for breeding. This resulted in zero minimum scores for *Emanik* across the three seasons. However some informant groups explained that, *Emanik* could also be sold when you have many in the herd and when you don't have other types of animals of market age and size. Lack of *Emanik* in the herd was not a major problem to some informant groups because one could take his cows to a friend or neighbor's herd to be mated. *Loangitou* received varied scores throughout the year whereby many scores were observed in *Nakiporo*. Further probing indicated that, *Loangitou* could not be commonly sold during *Nakamu* because they appeared to be weak during this season. They were sold (mainly bartered) during *Nakiporo* when they were strong so as to obtain luxury commodities such as beads for ladies. Though in a minimal way, they could also be used to purchase food. There was good agreement between the four informant groups for seasonal sales of *Emong/Emakudoit* ($W=1.000$) and *Aite Nakolup* ($W=0.929$). *Emanik* and *Loangitou* received varied scores and this resulted in insignificant moderate agreement for seasonal sales of *Emanik* ($W=0.464$) and poor agreement for seasonal sales of *Loangitou* ($W=0.083$).

| Cattle age-sex categories | Nakiporo (Rainy season)- March-July | Nait (Interphase)- August | Nakamu (Dry season)- Sept-Feb |
|---------------------------------------|-------------------------------------|---------------------------|---------------------------------|
| Emong/ Emakudoit (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) |
| Loangitou (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 parenthesis. A higher number of dots indicated a relatively strong association between an age-sex structure of a species and season, whereas a low number of dots indicated a weak association.

Figure 21: Summarized seasonal calendar for cattle age-sex categories' off-take in four *adakars* of Loima Division, Turkana District (2002/2003).

4.3.4.4 Seasonal variation in camels' age-sex categories' off takes

Seasonal variation in the sale of various age-sex categories of camels is summarized in Figure 22. Analysis of scores demonstrated good agreement for seasonal variation in the sale of *Lodongong* (W=0.750) and *Lopuuwa* (W=0.750). Age-sex categories for which there was moderate agreement between the four informant groups were *Loangitou* (W=0.500) and *Akaal namojong* (W=0.500). However, this moderate agreement was not

significant. Informant groups disagreed over the scoring of *Echekemuk* ($W=0.250$). *Echekemuk* and *Loangitou* were observed to be sold throughout the year while *Lodongong*, *Lopuuwa* and *Akaal namojong* were mostly sold during *Nakamu*. Some informant groups could not place any score for seasonal variation in the sale of all camel age-sex categories arguing that camels were never sold, resulting in zero minimum score for every age-sex category across the seasons. On further questioning, they explained that camels were few within their herds, there was no reliable market for camels and they were very vital in provision of milk during dry season when production of other types of livestock was impaired by scarcity of pasture and water. *Akaal namojong* was not sold alive but slaughtered in open-air butchery (under a tree) where meat was sold by hand weighing. No trader could buy *Akaal namojong* due to its age and poor body condition.

| Camels age-sex categories | Nakiporo (Rainy season)- March-July | Nait (Interphase)- August | Nakamu (Dry season)- Sept-Feb |
|---|-------------------------------------|---------------------------|--------------------------------|
| <i>Echekemuk</i> ($W=0.250^{ns}$) | • •• 3(0-5) | •• •• 4(0-5) | •• ••• 5(0-11) |
| <i>Loangitou</i> ($W=0.500^{ns}$) | • 1(0-3) | • •• 2.5(0-6) | •• •• 3.5(0-7) |
| <i>Lodongong</i> ($W=0.750^*$) | • 0.5(0-1) | •• •• 3.5(0-5) | ••••• ••••• 9.5(0-12) |
| <i>Lopuuwa</i> ($W=0.750^*$) | • 1(0-1) | • •• 2.5(0-4) | ••••• ••••••• 10.5(0-12) |
| <i>Akaal Namojong</i> ($W=0.500^{ns}$) | • 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 parenthesis. A higher number of dots indicated a relatively strong association between an age-sex structure of a species and season, whereas a low number of dots indicated a weak association.

Figure 22 Summarized seasonal calendar for camels' age-sex categories' off-take in four *adakars* of Loima Division, Turkana District (2002/2003).

4.4 LIVESTOCK MARKETING CONSTRAINTS

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

Table 3 shows the four most important constraints to livestock marketing as perceived by producers, traders and government livestock workers. In descending order, producers gave high priority to low prices of livestock, long distances to markets, few livestock buyers in markets and lack of cash as major problems affecting them in livestock marketing. Traders in lower primary markets were mainly complaining about long distances to markets, low working capital, high transport costs and low prices of livestock. Traders in upper primary and secondary markets agreed on low working capital as a major constraint affecting them in livestock trade. In the overall, priority problem affecting livestock traders across types of livestock markets was low working capital. Though producers had mentioned low prices as a major constraint affecting them in livestock marketing, government livestock workers were for a different opinion that, the major problems to producers were poor marketing infrastructure and lack of marketing information. Traders and government livestock workers agreed on low capital as a major

problem affecting livestock traders. However, government livestock workers could not leave behind poor marketing infrastructure and lack of marketing information as two other major constraints affecting livestock traders. In search of a common livestock marketing strategy that brings together producers and traders, government livestock workers ranked poor marketing infrastructure and lack of marketing information as major problems that need to be addressed in livestock marketing. Appendix 8 shows median ranks of livestock marketing constraints affecting herders and traders as perceived by government livestock workers whereas Appendix 9 shows the median ranks of livestock marketing constraints as perceived by herders and traders themselves.

Table 3: Median ranks (range) of four most important livestock marketing constraints as perceived by herders, traders and government livestock workers in Loima Division, Turkana District (2002/2003).

| Rank | Constraint | | | | | | | | |
|------|--------------------|---------------------|-----------------------|-----------------------|---------------------|----------------------------|--------------------------|--------------------------|--|
| | Producers N=72 | TLPM N=20 | TUPM N=14 | TSM N=25 | TO N=59 | GP N=8 | GT N=8 | G0 N=16 | |
| 1 | Prices 1(1-5) | Distance 1(1-3) | Capital 1(1-5) | Capital 1(1-5) | Capital 2(1-5) | Infrastructure 3.5(1-7) | Capital 1.5(1-3) | Infrastructure 3(1-7) | |
| 2 | Distance 2(1-4) | Capital 2(1-4) | Buyers 2(1-6) | Transport 2(1-7) | Buyers 4(1-8) | Information 4(2-7) | Infrastructure 2(1-7) | Information 4(1-7) | |
| 3 | Buyers 3(1-6) | Transport 4(1-8) | Producers 3.5(2-8) | Buyers 3(1-7) | Transport 4(1-8) | Buyers 4(2-8) | Information 4(1-5) | Distance 5(3-8) | |
| 4 | Cash 4(1-6) | Prices 5(1-8) | Prices 5(1-8) | Information 4(1-6) | Diseases 6(1-8) | Distance 4.5(3-8) | Diseases 4.5(1-10) | Buyers 5(2-10) | |

Key:

N Number of informants

Rank Order of priority; 1= Most important constraint; 4= Least important constraint

TLPM Traders in lower primary markets

TUPM Traders in upper primary markets

TSM Traders in secondary markets

TO Traders overall rank of constraints

GP Government livestock workers perceptions of constraints affecting producers

GT Government livestock workers perceptions of constraints affecting traders

GO Government livestock workers overall rank (producers and traders inclusive)

4.5 HERDERS' PREDICTION OF OFF-TAKE LEVELS IF MARKETING WAS IMPROVED

4.5.1. General trend in off-take levels if marketing was improved.

Tables 4 and 5 show mean annual proportion (%) of livestock type in the herd, proportion sold before marketing improves, proportion sold after marketing improves and proportional change in sales. It was observed that the proportion of goats sold before and after marketing improves was higher than of the other livestock types (25.4%; 25.4/100 or 41.7%; 25.4/60.9 before and 18.07%; 18.07/100 or 29.7%; 18.07/60.9 after). The proportional change in goats' sales when marketing improves was negative (-7.33%; -7.33/100 or -12%; -7.33/60.9) reflecting a situation where, each *adakar* would reduce sale of goats when marketing conditions improve and perhaps seek to sell more of other types of livestock. The proportional change in sales of the other livestock species was positive with camels taking a more positive proportional change (3.54%; 3.54/100 or 19.7%; 3.54/17.92). Between *adakar*, gender and wealth groups, there was no significant difference in the proportion of goats, cattle, camels and donkeys sold before and after marketing improves. Appendices 10-12 show significance levels, off-take predictions per *adakar*, gender and wealth groups expressed as a proportion of total livestock population units and off-take predictions per *adakar*, gender and wealth groups expressed as a proportion of particular livestock species population, respectively.

Table 4: Mean annual proportion (%) of livestock type in the herd, proportion sold before marketing improves, proportion sold after marketing improves and proportional change in sales, expressed as a proportion of total livestock population units, in four adakar of Loima division, 2002/2003

| Livestock type | N=Number of informants | In total population (%) | Sold before (%) | Sold after (%) | Proportional change (%) |
|----------------|------------------------|-------------------------|-----------------|----------------|-------------------------|
| Goats | 72 | 60.9 | 25.4 | 18.07 | -7.33 |
| Cattle | 72 | 11.49 | 1.99 | 3.82 | 1.83 |
| Camels | 72 | 17.92 | 1.79 | 5.33 | 3.54 |
| Donkeys | 72 | 9.65 | 1.24 | 3.17 | 1.93 |

Table 5: Mean annual proportion (%) of livestock types sold before marketing improves, proportion sold after marketing improves and proportional change in sales, expressed as a proportion of population of particular livestock species, in four adakar of Loima division, 2002/2003

| Livestock type | N=Number of informants | In total population (%) | Sold before (%) | Sold after (%) | Proportional change (%) |
|----------------|------------------------|-------------------------|-----------------|----------------|-------------------------|
| Goats | 72 | 60.9 | 41.7 | 29.7 | -12 |
| Cattle | 72 | 11.49 | 17.3 | 33.2 | 15.9 |
| Camels | 72 | 17.92 | 10.0 | 29.7 | 19.7 |
| Donkeys | 72 | 9.65 | 12.8 | 32.9 | 20.1 |

5.0 DISCUSSION

Through mapping, the community defined some of the potential markets for livestock in the Division and further produced criteria on which such premise could be established. There was no organized livestock market in the division. Livestock market establishment in pastoral areas is not uncommon but dilemmas based on pastoralists livestock management system (seasonal movements in such of water and forage) have commonly rendered such establishments redundant. In the division, during the wet season, livestock were moved to the plains almost in close vicinity to urban settlements, whereas during dry season, livestock was moved to high mountainous regions or even across international borders thereby increasing distance to trading centers in the division. Problem of distance is worsened by insecurity around livestock camps and also along routes for driving animals to markets. This result in a situation where, during the dry season, producers cannot easily access internal markets, poor body condition animals cannot withstand stress due to trekking/hoofing to markets amid lack of water and pasture along trek routes, starved pastoralists cannot stand the stress of walking for long distances, traders have limited access to livestock, traders incur extra costs (overhead costs) in venturing to reach livestock camps so as to buy livestock, and the general economic fabric of the region weakens. This therefore implies that, in the efforts to establish organized livestock markets within pastoral set-ups, seasonal mobility of pastoralists need to be seriously considered to minimize its negative multiplier effect to

the structure and conduct of markets and to the economic well-being of the area. Distances to internal markets could also be minimized by enhancing pastoralists access to cross-border markets. However, this requires cross-border guidelines that prescribe measures that enhance security to and in markets, and minimize inter-tribal or inter-community conflict in markets. The study reveals that, livestock markets could easily be accessible to traders and producers during the wet season. Stakeholders in the livestock marketing chain should utilize such opportunity. Ambivalent pattern of low livestock supply to markets by pastoralists during the wet season when demand by traders is high could however impede utilization of this seasonal opportunity. Orre (2003) also reported the same scenario in Marsabit markets. Mapping was also used by Eregae (2003) to define a target area for establishment of veterinary private practice in Lapur Division of Turkana District.

In Kenya, after the collapse of Kenya Meat Commission (KMC) and Livestock Marketing Division (LMD) of Ministry of Agriculture (MoA), livestock marketing has been in the hands of the private sector with the government offering regulatory services. KMC and LMD used to be more identical to pastoralists as major marketing agents, commonly referred to as “the government”. After their collapse, the government has been relaxed to streamline the private sector, perhaps based on livestock markets liberalization and decontrol policy that came as a result of Structural Adjustment Program (SAP) of 1980s. From 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 in to business. The main aim of economists is to study conduct, structure and efficiency of markets based on different levels of each of these traders. Classes of traders commonly identified are itinerant, middlemen, butchers, medium-scale and Large-scale traders (Orre, 2003). However, these criteria have not been able to penetrate producers so that they can make decisions on whom to profitably deal with. They have therefore designed their own criteria of traders' classification and preference. In this study, the Turkana of Loima Division classified traders based on tribe and marketing system they operate in, and the qualities they preferred were good pricing of livestock, consistency in buying livestock, trust worth, handling enough cash and friendly price negotiation. Tribe was weakly agreed upon as a criterion for preferring livestock traders displaying a scenario where a tribal inclination to a trader among the turkana is unnecessary. 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 market days (based on person to person negotiation) were highly preferred. This gives the overall impression that, livestock owners in Loima Division are in dire need of a marketing system where traders of all tribal backgrounds would meet and compete for livestock. This renders futile, the campaign by some development agencies to promote local turkana traders as a strategy to improve livestock marketing in Turkana district. The message from producers is that, an organized system of marketing should precede such trader-promotion attempts. Perhaps they are for the idea that, a better marketing system would reorganize the conduct and behavior of traders to minimize their collusion in markets and exploitation

that is common in “free-range” type of traders. The criteria used by producers to classify traders would be familiar to them when used by extension agents to deliver marketing messages that relate to livestock buyer-seller interaction and consensus building for purposes of improving livestock trade. These criteria could therefore be part of those used by economists to evaluate structure, conduct and efficiency of markets.

The class of traders referred to as brokers/ middlemen commonly appears in many livestock marketing literature/studies. Though not making an independent or clear perceptive description of a broker, the pastoralists of Loima Division likened this to a mobile trader (*Lo angakejen*). This class of traders is often widely 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 influence to livestock trade therefore require dialogue between all the stakeholders in livestock marketing to discuss their destructive role in marketing chains, understand benefits of eliminating them and propose workable solutions towards their reduction in the marketing chain.

Turkanas in Loima Division recognized shopkeeper livestock traders as an alternative point for selling their animals when no other buyers are available. A similar perception was found among the Rendille pastoralists of Marsabit (Orre, 2003). Shopkeepers in Marsabit were reported to be giving credits of household’s commodities to pastoralists, which were paid in cash or in kind during the wet season. This form of transaction

(credit) did not clearly emerge from the turkana pastoralists of Loima Division. Just like in Loima Division, the shopkeepers of Marsabit District were reported to mainly conduct transactions through barter (payment in kind), which was to the disadvantage of pastoralists due to livestock undervaluing. Butchers were highly recognized by Rendille pastoralists as traders. This was not the same for Turkana Pastoralists of Loima Division. This would mean that the Rendille pastoralists might have adopted a mechanism of avoiding middlemen by selling directly to butchers. It was not clear whether these producers also had their own butcheries, but this is an opportunity that can be explored.

In this study, pastoralists of Loima Division gave high preference to organized market system with market days (based on person-to-person negotiation) and auction system. Selling animals through a shop and itinerant (mobile) traders were considered as fallback systems in the absence of the two above. The traditional way of livestock exchange was almost being ignored in the preference list, pastoralists arguing that, it is their own and could not deserve comparison with conventional livestock marketing systems. This could be attributed to the fact that, due to the cash economy that is encroaching pastoral set-ups, pastoralists are changing towards marketing systems that could directly offer them cash. Auction has been the oldest marketing system that was established in Turkana District since colonial time. This seems to be true for other pastoral areas. Sobania (1988) reported the presence of auction livestock marketing system among the Rendille community as early as 1946. In this study, besides organized market system with market days, the pastoralists of Loima Division need auctions to be re-introduced. However,

modalities of its re-emergence need a 'full-house' discussion by all the stakeholders in livestock trade to avoid previous experiences that led to its collapse. Markets organized and held on specific days of the week offer better prices. This was 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) also observed Kiserian livestock market yard among the Maasai pastoralists to be attracting many producers, traders and butchers from the surrounding community. It is apparent in the current study that pastoralists of Loima Division are in need of this system.

Several studies conducted across pastoral communities in Kenya give reports that pastoralists are changing towards a cash economy as they gradually get integrated into the broader national economy and in such changing society where basic needs are expanding (Gitunu *et al.*, 2001; Orre, 2003). This opposes the common myth that pastoral production and marketing is based on satisfaction of subsistence needs and social cultural goals. Behnke (1983) and Frathkin (1991) reported 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 cash they got from each of them. Sale of livestock, borrowing and sale of livestock products emerged the major sources of cash. Livestock emerged as the leading source of cash income among the pastoralists of Loima Division. 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 reported to be now more dependent on using cash from livestock and livestock products to buy non-pastoral products. The situation was reported to be more advanced in some pastoral communities that have adopted some sedentary lifestyles such as the Maasai and Samburu, where as a result of changing land tenure system that favours individual ownership of land, cash economy is more pronounced and in high demand (Gitunu *et al.*, 2001; Orre, 2003). Rendille/Ariaal were reported to have recognized that, selling the animal for cash was better than home slaughter whereby meat is eaten within 1-2 days after which the family returns immediately to starvation (Orre, 2003).

In addition to sale of livestock as a source of cash, Orre (2003) reported a situation where the Rendille were diversifying their livelihoods through engagement in other activities that contributed to additional cash income. This is consistent with the findings of this study whereby the pastoralists of Loima Division were engaging in additional income sources (off-herd) such as casual labor, gold mining and business. Nyariki *et al.* (2002) working among the agro-pastoral Akamba of Kibwezi and Kilome, also revealed off-farm earnings that additionally contributed to household food availability. Webb and Reardon (1992); Republic of Kenya (1999) and Nyariki *et al.* (2002) described this as pastoralists' coping mechanisms/ strategies or responses to minimize chances of household collapse (attempts to be food secure) following depletion of livestock herds due to phenomenon such as drought, raids and diseases that make such communities' food poverty incidence

to be the highest. There was little evidence among the pastoralists of Loima Division that such cash income diversification strategies were investment-oriented. From the considered income sources, only business appeared to be a commercial investment. However, its low contribution to cash income could mean that its perspective was limited (not profit making). Deliberate attempts should therefore be undertaken to educate, encourage and support pastoralists on commercial ways of diversifying incomes given livestock as capital. Some sources of cash income such as gold mining appeared to be least exploited by the pastoralists of Loima division. This is consistent with observations among the Rendille of Southwestern Marsabit where resources such as gum arabica, solar and wind were reported to be unexploited (Orre, 2003). This could be attributed to unequal concern of the government in addressing development in the country.

Considering goats, camels, cattle and donkeys sold by pastoralists of Loima Division, goats emerged the primary source of cash. This was attributed to readily available goats markets and large proportion of goats in the livestock holdings. This was similar to the findings of Orre (2003) where goats highly contributed to cash and hence livelihoods of the Rendille/ Ariaal of Northern Kenya. Frathkin (1991) reported 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, though not significantly, goats contributed a larger proportion of cash income to the poor as compared to the rich and medium class. This differs with the findings of Gitunu *et al.* (2001) among the Maasai where goats least contributed to cash incomes of the poor. The

difference in findings could be attributed to the methodologies used. Gitunu *et al* (2001) was computing actual figures while in this study, proportions were being computed using Participatory Appraisal (PA) method known as proportion piling. Gitunu *et al.* (2001) reported differences in the proportions of cash income from different types of livestock between men and women among the Maasai. The Turkana of Loima Division did not report any significant differences. This can be explained by the fact that among the Maasai, men have upper hand in making decisions on sale of animals whereas among the Turkana it is a consultative process between a man and a woman in a family. The Rendille have a hybrid form of decision-making whereby, sale of shoats doesn't require any consultation between family members except when decision has to be made on the sale of large stock (Orre, 2003). Goats (and where sheep are sold) are therefore important source of cash to pastoral households and subsequently an important determinant of food security, and should be given a lot of attention in research and development interventions in Loima Division and/ or pastoral areas as a whole.

There has been a myth that most of the pastoralists' labour goes to herding. However, this research has shown that, pastoralists are able to divide or diversify the available labour to spread to other activities that contribute to family income. Dictates of weather and the uncertain production environment they are living in would also not allow them to over-concentrate their labour on herding. In the current study, pastoralists of Loima division were engaged in some casual labour activities though limited to NGO operations. Njiru (1982) working among the Rendille of Kenya and Perckers (1997) working among the

Pokots of Kenya observed that a number of pastoralists were leaving to urban centers for employment and children were going to school. Though this spells shortage on amount of labour required for herding, this is not uncommon in a changing society. But we can not undervalue the fact that, herding labour drain from pastoral areas may induce detrimental changes in pastoral livestock management practices, which include reduction in possibility of herd division, spatial diversion and species diversification. Dahl and Hjort (1976) and Behnke (1983) also pointed out these expected effects.

Contrary to common belief that, pastoralists are poor in conducting business, the study has significantly shown the kind of business attempt that could be appropriate to pastoral areas. An organized group of pastoralists 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 be imparted with business skills. Additionally, in supporting the active nature of pastoral women, the study has revealed the vital role of these women in doing business and thus contributing to household food security. Among the Kamba of Kilome and Kibwezi, a study by Nyariki *et al.* (2002) revealed that households headed by males were more food insecure than those headed by women. This therefore directs that the role of women in household livelihood diversification and food security is vital and needs to be explored and promoted, and with special reference to this study, be used as entry points in diversifying livestock trade and any other kind of business in pastoral areas. Important role of women in development has been echoed in other interventions such as peace building (REF);

Borrowing, clearly identified in this study as a source of cash income among the Turkana pastoralists of Loima Division, could be seen by others as a begging complex that enhances dependency and promotes pastoralists' resistance to sell livestock. However, in such uncertain world where pastoralists live, relatives and friends would inevitably come in as a support system to food security. Grandin (1987) also reported borrowing as a source of cash income among the Maasai of Kenya and described it as a traditional coping/ survival/ food security strategy against unpredictable phenomenon that deplete livestock herds and there hence fuelling food insecurity. It was also consistent with the findings of Orre (2003) among the Rendille/ Ariaal.

The pastoralists of Loima Division remarkably recognized sale of livestock products as a major source of cash income. Milk was mentioned to be commonly sold compared to hides and skins. Among the Maasai, milk was also reported to provide most 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' trade and production.

From the current study, the commonly sold species of livestock were goats, cattle, camels and donkeys. Sheep were not sold and were mostly used to meet socio-cultural obligations. Except for goats that were exceptionally sold, large stock were substantially tied to socio-cultural functions. This contrasts with the situation among the Maasai where

sheeps (but sheep are rarely sold) are mostly slaughtered at home while cattle mostly sold and only occasionally slaughtered at home in very inevitable customary ceremonies like initiation, matrimonial and burial (Gitunu *et al.*, 2001). This could be attributed to the fact that, Turkana perceive small stock as ready cash because there markets are available whereas the Maasai have acquired a sedentary lifestyle where cash needs are many and could necessitate selling of cattle. This could polarize Maasai livestock markets to cattle while those in Turkana to sheeps. In addition to traditional uses, this study found that donkeys are 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). This expressed potential of donkeys as food animals need to be explored and recognized.

The current study revealed that goats were highly sold because they had numerical advantage over other species of livestock (dominant in the total livestock herd), always closer to the owners, and with ready market and popular to consumers among other reasons. Cattle and camels were sold when there was no other alternative and when there was a pressing need for large amounts of cash. This was consistent with the findings of Orre (2003) among the Rendille/Ariaal of Northern Kenya and further agrees with the findings of Bekure and Chabari (1991) and that of Gitunu *et al.* (2001) among the Maasai of Kenya.

In terms of proportion of every species in the total livestock holding, this study showed that the proportion of goats (or shoats) was highest as compared to proportion of cattle, camels and donkeys. This was similar to the findings of Spencer (1973) and 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. They also revealed that, the Kababish of Sudan could exchange camels for shoats for them to be satisfied with livestock holding. Small stocks are therefore crucial in pastoral systems' economy.

Between wealth groups, there were significant differences in the proportions of livestock species in the livestock holding. The poor had a large proportion of goats in the herds compared to the rich and medium class; while the rich and medium class owned large proportions of camels and cattle in their herds as compared to the poor. This agrees with the findings of Orre (2003) among the Rendille/Ariaal and slightly disagrees with the findings of Gitunu *et al.* (2001) where the rich Maasai were reported to own large proportions of shoats as compared to the medium class and the poor. The difference can be attributed to different methodologies used. Gitunu *et al* (2001) was computing actual figures whereas in this study, proportions were being computed using Participatory Appraisal (PA) method called proportional piling. Author's experience during the study supports the use of the PA method to minimize the behaviour of pastoralists to hide actual numbers of livestock hoping for a sympathetic consideration by agencies, a

situation that was observed by Gitunu *et al* (2001) among the Maasai. Between men and women there were no significant differences in the proportions of other livestock species in the herd except for donkeys. This could be explained by 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 their men counterparts.

Considering the age-sex categories of every species of livestock sold, most of the categories sold were the mature male castrates. Females of every species were not commonly sold because of their reproductive status and also because of social stigma associated with them. Only donkeys of reproductive age (male and female) were sold perhaps owing to the fact that most households had few of them in their herds and there was need to buy more especially breeding ones. Productive females of other livestock species could only be sold when there were no male animals or cull/infertile females. It was explained that the number of female animals entering the market was an indicator of poverty levels of pastoral households mostly occasioned by the effect of drought. During drought, excessive sell of castrate males leaves households with no option but to extend to sale of females. Young animals could only be sold when there was need for small amounts of cash or when there was no old/infertile females or castrates in the flock/herd. This would mean that few market oriented age-sex categories of animals in the herd would force households to sell young males and females of reproductive age. This would deprive households the future value of these animals. It also deprives households the

livestock capital necessary for flock growth in future, accentuating a downward spiral of flock/herd decapitalization. It is therefore imperative to suggest that pastoralists should always create a balance between market-oriented and non-marketed oriented age-sex categories of animals in the herds through proper management strategies (traditional ones exist). The need for them to sell non-market oriented (not preferred or commonly undervalued by traders) species of livestock should be supported through price improvement strategies like buying animals based on weight or organizing them in to groups to directly slaughter these animals in butcheries for optimum returns (prices of livestock are always low but meat retail prices are constantly high!) or explore market outlets that are specifically inclined to them. Strategies should be devised to compensate pastoralists' livestock herd collapse during or after drought, for instance through restocking (needs pastoralists' drought mitigation policy!)

Proportion of livestock sold (off-take) in the past one year by pastoralists of Loima Division was estimated in this study. The author was mainly interested with commercial off-take of every species of livestock sold because it was the one expected to contribute most to household's access to cash. However, there were still attempts by informants to include even non-commercial off-take. This could not be strictly avoided and thus off-take computed could be slightly exaggerated. This complication made Grandin (1987) to report pastoral total off-take rates among the Maasai in terms of commercial and non-commercial sales or slaughter, and also Sobania (1979) to report off take as all that is taken off the pastoral flock i.e. sales, slaughters and Deaths. From this study, total off

take rates of goats were higher, followed by cattle and least off take rates reported in donkeys. Gender and wealth groups did not show any significant differences in the off-take rates across livestock species sold. This could be because, those interviewed in this study were families and Turkana have a culture of consultation between husband and wife when making decisions to sell an animal and could therefore report almost equal proportions of sales. Between wealth groups, the author could attribute lack of significant difference in proportional sales of all species, to methodology used (estimated proportions and not actual figures that could have highlighted differences), and unsteady nature of wealth status among turkana pastoralists that is occasioned by frequent raids. Additionally, wealthier groups could even be having many other sources of income e.g. from per diems, and borrowing and could therefore sell even smaller proportions of animals. However slight differences indicated that, the poor had sold larger proportions of goats and donkeys as compared to the rich and medium class, whereas the rich and medium class had sold more of camels and cattle than the poor. This is in common with the findings of Chabari (1986) among the Maasai and Orre (2003) among the Rendille/Ariaal that poor households depended on sale of small stock for their cash needs while the rich households depended on the sale of the large stock. These studies showed significant differences in proportional sales of livestock between gender groups. This could be because, among the Maasai, decision to sell and later taking the animal to the market is a man's job. Among the Rendille/Ariaal, consultation between family members is only in the sale of large stock while the head of the household solely takes decision to sell small stock.

Analysis of seasonality of sales indicated that most of market-oriented categories (large sized and mature male castrates) of all species of livestock were mainly sold during the dry season. This is the season when household food requirements were high and therefore need for enough cash to purchase foodstuffs. This was consistent with the findings of Orre (2003) among the Rendille/Ariaal. Food insecurity is most serious during the dry season. Orre (2003) calculated food poverty incidence (fpi) among the Rendille/Ariaal to be 0.89 and 0.61 in the dry season and wet season respectively. Food poverty incidence of households is the proportion of food-poor households compared to the total number of households, and is used to measure food security status of households. Food-poor households are those that do not have access to food that can supply 2250 calories/an Active African Man Equivalent (AAME)/day for healthy living (Republic of Kenya, 1999).

During wet season, few of the animals were sold. This could be because, during this season, milk production from herds and flocks is expected to greatly increase; demand for purchased foodstuffs drops or play a supplementary role and pastoralists are unwilling to sell animals. However, today, milk production status of animals is never like before. That means, milk may not be sufficient for household nutritional diet even during the wet season and therefore purchased foodstuffs could still be in demand. This was evident in the current study, whereby animals could still be sold perhaps to supplement nutritional requirements in the wet season besides other household needs (non-food requirements).

Animals sold during the wet season were mostly young ones. Orre (2003) found that among the Rendille/Ariaal, animals could still be sold during the wet season to pay for debts incurred on food during the dry season. In the current study, paying for debts incurred during the dry season was not mentioned.

It has been widely reported that pastoralists sell most animals during the dry season when national livestock prices are low (Ondegi-Awuondo, 1990; Orre, 2003). This was consistent with the findings of this study. This could indicate that pastoralists are mainly motivated to sell only by immediate requirement for cash rather than high livestock prices. That means pastoralists do not enjoy the price incentive during the wet season. This is exacerbated during the dry season when prices of cereals (highly demanded during dry season) are high. Several recommendations have been suggested in order to alleviate this perverse relationship. Orre (2003) suggested that, pastoralists need to sell animals during wet season and buy enough foodstuffs for use during the dry season. The big challenge to this recommendation is storage, given the fact that pastoralists are ever mobile. The author recommends that pastoralists' knowledge on price information need to be expanded, their willingness to commercially invest and store wealth need to be encouraged and supported, country's traditional livestock market base need to be expanded, and economic recovery programmes that increase consumers' per capita and hence demand for pastoral commodities need to be designed.

A lot of studies have been done on livestock marketing constraints in pastoral areas (Lusigi, 1984; Grandin, 1987; Njiru, 1982; Gitunu *et al.*, 2001; Orre, 2003) but priority analysis of these constraints at community level is lacking. The current study has revealed that producers regard low prices of livestock as the priority constraint affecting them in livestock marketing whereas livestock traders give high priority to low operating capital. Government livestock workers gave priority to poor marketing infrastructure and lack of marketing information as priority problems 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 could still complain of low prices (Gitunu *et al.*, 2001). Orre (2003) also reported that traders in Marsabit were grossly complaining of low working capital as a hindrance to their business. These problems seem to be worsened by market liberalization and decontrol that is in operation today.

Though these constraints are interrelated (one needs the other) and every group of informants can be correct in their own right, the principles underlying community-based development would dictate that the producers and traders are correct. Government livestock workers could also be correct but their passive involvement in improving their priorities makes them less felt. This could be attributed to financial, logistical and staff constraints. This demonstrates that, the government as a service provider has misplaced priorities or is malfunctioning as far as livestock marketing development in pastoral areas is concerned. Being a policy development facilitator, it is now evident that, the wishes

and concerns of producers and traders are least reflected in the policy formulations that seek to foster development in pastoral areas. There is therefore need to reconsider the involvement of producers and traders in matters pertaining to livestock marketing interventions and policy developments. Additionally, due to implementation constraints, the government should consider revising its roles (including those reflected in SAP changes), share them realistically with the private sector (and other development partners) and subsequently enact legislations and policies that provide enabling environment for operations of private sector, while safeguarding the interests of the producer and trader.

There are common paradigms that pastoralists are emotionally attached to their livestock, irrational and resistant to change. Their willingness to sell animals even when prices are conducive was considered as being unreasonable. This might have made national governments or other development agents to give little emphasis on livestock marketing in pastoral areas. The current study reveals that pastoralists are rational and are ready to sell livestock when marketing improves and therefore recognize the value of marketing livestock. However, they appeared to be unwilling to sell very large numbers of livestock. Some reasons could be associated with this. Their unwillingness to sell very large numbers of livestock could be attributed to the fact that, livestock to them is capital. It is the only resource that can sustain their livelihoods in the unpredictable environments they are living in and therefore need to be rational of their sales. This could therefore mean that they are cautiously concerned about long-term food security than short-term gains of

selling at high prices. In this regard, when prices improve, pastoralists achieve the target income by selling fewer animals compared to periods when livestock prices are low. Also, it is widely known and rationally expected that, before a pastoralist sells an animal, he first compares its present cash value to benefits foregone which include flow of milk, blood, additional cash value gained through future sales and social value attached to the animal. This behaviour of perverse response to price increase is expected in such non-market oriented society. This was consistent with the findings of Orre (2001) working with the Rendille/Ariaal, and Bekure and Chabari (1991) working among the Maasai. To expand pastoralists' willingness to sell animals when marketing conditions improve, there is need to continuously educate them on diversification of livelihoods through commercial investment of proceeds from livestock sales. Additionally, pastoralists should be supported to produce surplus livestock for market while maintaining a balanced herd/flock that enables them to withstand the effect of their harsh environment.

It was also found in the current study that, pastoralists of Loima Division were willing to sell more of donkeys, cattle and camels in the herd and less of goats although goats remained the principle livestock type highly sold. This could be attributed to the fact that, when marketing conditions were poor, goats were the only livestock species that could survive the intricate panorama of markets. As the situation improves, they could therefore want to sell less of goats in order to build their stock/ stock structure. Additionally, they might have realized that benefit lost in keeping other types of livestock as a result of poor marketing conditions was high and thus the need to utilize any upcoming marketing

opportunities in the sale of those livestock types. Though the predicted future off-take of goats is likely to sustain a goats' market, there is need to establish and promote markets for other types of livestock.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

- Turkana pastoralists of Loima Division recognized seasonal movements as a constraint to access of markets and as a result could utilize cross-border markets in West Pokot District of Kenya and Moroto market in Uganda along their migration routes.
- Pastoralists gave high priority to establishment of organized market system with market days (based on person-to-person negotiation) with auction system supplementing it. Traders in these systems were also preferred.
- Sale of livestock (major one), borrowing and sale of livestock products were the main sources of cash. Though rational, they appeared to be more driven by household needs than commercial investments.
- Compared to other species, goats were highly sold, substantially contributing to households' cash incomes and hence food security.
- In every species of livestock sold, mostly marketed age-sex categories were mature male castrates, and were sold mainly during the dry season when national livestock prices are expected to be low.

- Pastoralists have recognized the value of marketing livestock and are ready to sell more when marketing improves though not in very large numbers.
- Though improvement of livestock marketing information and infrastructure is equally important, producers give high priority to improvement of prices while traders want access to credit.

6.2 RECOMMENDATIONS

- In the efforts to establish internal organized livestock markets in pastoral set-ups, seasonal mobility of pastoralists should be taken into consideration.
- Recognizing pastoralism as a way of life, pastoralists should be allowed to access cross-border markets during seasonal movements. This therefore requires common pastoral (cross-border) policy or procedures that would minimize inter-community conflict and spread of livestock diseases at markets.
- In evaluating structure, conduct and efficiency of livestock markets based on traders, technical economists should additionally use the tribal and system-of-operation criteria so as to generate findings that are recognized, simply interpreted and more informative to producers.
- Women should be used as entry points in educating, encouraging and supporting pastoralists' endeavors 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 efforts and policy should emphasize on their health, production and marketing.
- Pastoralists' demise is more pronounced during the dry season and therefore the government and other development agencies should readily design mitigation measures to counter excessive vulnerability.
- Analysis of livestock marketing constraints, interventions and policy/legislative formulations should incorporate opinions and views of producers and traders so as to achieve authenticity and practicability.
- Further study is necessary to look at root causes of livestock marketing constraints, their effects and perceptive and economic analysis of various options of intervention.

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8.0 APPENDICES

| Source of Cash income | Adakar | Gender | Wealth |
|-----------------------|---------|--------|--------|
| Goats | 0.79 | 0.65 | 0.81 |
| Cattle | 0.79 | 0.46 | 0.82 |
| Camels | 0.099 | 0.78 | 0.32 |
| Donkeys | 0.19 | 0.51 | 0.81 |
| Labour | 0.88 | 0.57 | 0.56 |
| Gold mining | 0.09 | 0.96 | 0.49 |
| Borrowing | 0.83 | 0.68 | 0.15 |
| Hunting and gathering | 0.08 | 0.95 | 0.34 |
| Livestock products | 0.71 | 0.72 | 0.69 |
| Business | 0.036** | 0.05** | 0.43 |
| Others | 0.37 | 0.59 | 0.61 |

Appendix 1: Significance levels between *adakar*, gender and wealth groups, of sources of cash income in four *adakars* of Loima Division, Turkana District, 2002/2003.

| Sources of cash income | Adakar | | | | Gender group | | Wealth group | | |
|------------------------|--------|--------|--------|--------|--------------|-------|--------------|--------------|-------|
| | Natuba | Kicono | Acemie | Aporon | Men | Women | Rich | Medium class | Poor |
| | N=18 | N=18 | N=18 | N=18 | N=36 | N=36 | N=24 | N=24 | N=24 |
| Goats | 43.22 | 47.11 | 44.33 | 50.89 | 47.69 | 45.08 | 46.125 | 44.25 | 48.79 |
| Cattle | 4.83 | 2.83 | 4.28 | 4.67 | 4.72 | 3.58 | 4.75 | 4.17 | 3.54 |
| Camels | 8.72 | 4.28 | 4.61 | 2.44 | 5.28 | 4.75 | 6.67 | 5.125 | 3.25 |
| Donkeys | 1.33 | 2 | 4.06 | 5 | 2.64 | 3.56 | 2.5 | 3.21 | 3.58 |
| Labour | 2.83 | 1.89 | 1.11 | 1.94 | 2.36 | 1.53 | 2.375 | 2.625 | 0.83 |
| Gold mining | 5.72 | 2 | 0 | 2.89 | 2.69 | 2.61 | 1.29 | 3.58 | 3.08 |
| Borrowing | 11.17 | 12.44 | 14.28 | 13.61 | 13.39 | 12.36 | 13 | 15.79 | 9.83 |
| Hunting and gathering | 2.89 | 0.78 | 0 | 0 | 0.94 | 0.89 | 1.125 | 0 | 1.625 |
| Livestock products | 8.79 | 9.57 | 11.89 | 8.61 | 9.31 | 10.11 | 10.96 | 8.67 | 9.5 |
| Business | 2.17 | 6.22 | 0.78 | 0.56 | 0.89 | 3.97 | 2.21 | 1.29 | 3.79 |
| Others | 8.33 | 10.89 | 14.67 | 9.39 | 10.08 | 11.56 | 9 | 11.29 | 12.17 |

Appendix 2: Mean annual cash proportion (%) of sources of cash income in four adakars of Loima Division, Turkana District, 2002/2003.

| Livestock type | Age-sex categories sold | Mean annual Proportion sold |
|----------------|-------------------------|-----------------------------|
| Goats | Naminawoi | 3.78 |
| | Lodongong | 6.82 |
| | Loangitou | 2.94 |
| | Ebilarengoit | 8.72 |
| | Akale | 3.14 |
| Cattle | Namojong | 0.07 |
| | Emong | 1.29 |
| | Loangitou | 0.25 |
| | Aite Nakolup | 0.33 |
| | Emanik | 0.04 |
| Camels | Lodongong | 0.65 |
| | Loangitou | 0.21 |
| | Echekemuk | 0.28 |
| | Akaal | 0.18 |
| | Namojong | 0.32 |
| | Lopuuwa | 0.15 |
| Donkeys | Lodongong | 0.22 |
| | Asikiria | 0.64 |
| | Loketepan | 0.38 |
| | Loangitou | 0.03 |

Appendix 3: Grand mean annual proportion (%) of age-sex categories of goats, cattle, camels and donkeys sold in four *adakars* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)

| Livestock Type | Age-sex category sold | Adakar | Gender | Wealth |
|----------------|-----------------------|----------|--------|--------|
| Goats | Naminawoi | 0.007** | 0.73 | 0.39 |
| | Lodongong | 0.54 | 0.46 | 0.59 |
| | Loangitou | 0.06 | 0.76 | 0.4 |
| | Ebilarengoit | 0.0008** | 0.93 | 0.81 |
| | Akale | 0.13 | 0.18 | 0.29 |
| Cattle | Namojong | 0.12 | 0.78 | 0.59 |
| | Emong | 0.91 | 0.82 | 0.14 |
| | Loangitou | 0.61 | 0.67 | 0.41 |
| | Aite | 0.34 | 0.5 | 0.4 |
| | Emanik | 0.14 | 0.66 | 0.55 |
| Camels | Lodongong | 0.92 | 0.85 | 0.12 |
| | Loangitou | 0.026** | 0.38 | 0.76 |
| | Echekemuk | 0.15 | 0.33 | 0.83 |
| | Akaal | 0.27 | 0.43 | 0.49 |
| | Namojong | 0.59 | 0.16 | 0.41 |
| | Lopuuwa | 0.44 | 0.83 | 0.73 |
| Donkeys | Lodongong | 0.12 | 0.36 | 0.53 |
| | Asikiria | 0.68 | 0.72 | 0.41 |
| | Loketepan | 0.16 | 0.91 | 0.24 |
| | Loangitou | 0.58 | 1 | 0.61 |

Appendix 4: Significance levels of age-sex categories of goats, cattle, camels and donkeys sold in four *adakars* of Loima Division, Turkana District, 2002/2003

| Livestock type | Age-sex categories sold | Adakar | | | | Gender group | | Wealth group | | |
|-------------------|-------------------------------|----------------|----------------|----------------|---------------|--------------|---------------|--------------|----------------------|--------------|
| | | Natuba N=18 | Kicono N=18 | Acemie N=18 | Aporo N=18 | Men N=36 | Women N=36 | Rich N=24 | Medium class N=24 | Poor N=24 |
| Goats | Naminawoi | 6.11 | 4.39 | 1.94 | 2.67 | 3.61 | 3.94 | 2.92 | 3.92 | 4.5 |
| | Lodongong | 7 | 7.5 | 7.67 | 5.11 | 6.31 | 7.33 | 7.13 | 5.83 | 7.5 |
| | Loangitou | 4.56 | 3.67 | 2 | 1.56 | 2.81 | 3.08 | 3.33 | 2.08 | 3.42 |
| | Ebilarengoit | 2.83 | 9.89 | 10.28 | 11.89 | 8.81 | 8.64 | 8.21 | 9.54 | 8.42 |
| | Akale | 3.72 | 4.78 | 1.89 | 2.17 | 3.81 | 2.47 | 2.5 | 2.67 | 4.25 |
| Cattle | Namojong | 0.28 | 0 | 0 | 0 | 0.08 | 0.06 | 0 | 0.13 | 0.083 |
| | Emong | 1.11 | 1.39 | 1.06 | 1.61 | 1.36 | 1.22 | 2.08 | 1.17 | 0.63 |
| | Loangitou | 0.44 | 0 | 0.39 | 0.17 | 0.19 | 0.31 | 0.13 | 0.5 | 0.13 |
| | Aite | 0.11 | 0 | 0.44 | 0.78 | 0.22 | 0.44 | 0.083 | 0.63 | 0.29 |
| | Emanik | 0.17 | 0 | 0 | 0 | 0.06 | 0.028 | 0 | 0.083 | 0.042 |
| Camels | Lodongong | 0.61 | 0.89 | 0.44 | 0.67 | 0.61 | 0.69 | 1.21 | 0.67 | 0.08 |
| | Loangitou | 0.61 | 0.11 | 0.11 | 0 | 0.28 | 0.14 | 0.25 | 0.25 | 0.125 |
| | Echekemuk | 0.72 | 0.22 | 0.06 | 0.11 | 0.17 | 0.39 | 0.21 | 0.25 | 0.375 |
| | Akaal | 0.44 | 0.06 | 0 | 0.22 | 0.11 | 0.25 | 0.21 | 0.042 | 0.29 |
| | Namojong | 0.67 | 0.33 | 0.28 | 0 | 0.08 | 0.56 | 0.46 | 0 | 0.5 |
| | Lopuuwa | 0.06 | 0.11 | 0.33 | 0.11 | 0.17 | 0.14 | 0.21 | 0.17 | 0.08 |
| Donkeys | Lodongong | 0.06 | 0.11 | 0 | 0.72 | 0.11 | 0.33 | 0.125 | 0.42 | 0.125 |
| | Asikiria | 0.39 | 0.44 | 0.61 | 1.11 | 0.56 | 0.72 | 0.21 | 0.79 | 0.92 |
| | Loketepan | 0 | 0.33 | 0.39 | 0.78 | 0.36 | 0.39 | 0.125 | 0.375 | 0.625 |
| | Loangitou | 0 | 0.06 | 0 | 0.06 | 0.028 | 0.028 | 0 | 0.04 | 0.04 |

Appendix 5: Mean annual proportion (%) of age-sex categories of goats, cattle, camels and donkeys sold in four *adakars* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units)

| Livestock Variable | | Adakar | Gender | Wealth |
|--------------------|----------|--------|---------|----------|
| Type | | | | |
| Goats | In herd | 0.21 | 0.71 | 0.0000** |
| | Sold | 0.35 | 0.96 | 0.47 |
| | Not sold | 0.68 | 0.62 | 0.0001** |
| Cattle | In herd | 0.33 | 0.32 | 0.049** |
| | Sold | 0.84 | 0.88 | 0.44 |
| | Not sold | 0.25 | 0.21 | 0.07 |
| Camels | In herd | 0.1 | 0.69 | 0.0005** |
| | Sold | 0.16 | 0.29 | 0.32 |
| | Not sold | 0.09 | 0.91 | 0.001** |
| Donkeys | In herd | 0.09 | 0.03** | 0.2 |
| | Sold | 0.12 | 0.55 | 0.27 |
| | Not sold | 0.35 | 0.045** | 0.02** |

Appendix 6: significance levels of goats, cattle, camels and donkeys sold in relation to those in the original herd and not sold, in four *adakar* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units).

| Livestock type | Variable | Adakar | | | | Gender group | | Wealth group | | |
|----------------|----------|----------------|----------------|----------------|----------------|--------------|---------------|--------------|----------------------|--------------|
| | | Natuba N=18 | Kicono N=18 | Acemie N=18 | Aporon N=18 | Men N=36 | Women N=36 | Rich N=24 | Medium class N=24 | Poor N=24 |
| Goats | In herd | 58.22 | 68.56 | 60.78 | 56.06 | 61.75 | 60.06 | 51.67 | 57.75 | 73.29 |
| | Sold | 24.22 | 30.22 | 23.78 | 23.89 | 25.33 | 25.47 | 24.08 | 24.04 | 28.08 |
| | Not sold | 34 | 38.33 | 37 | 32.67 | 36.42 | 34.58 | 27.58 | 33.71 | 45.21 |
| Cattle | In herd | 13.56 | 11.11 | 7.72 | 13.56 | 12.78 | 10.19 | 13.54 | 13.83 | 7.08 |
| | Sold | 2.11 | 1.39 | 1.89 | 2.56 | 1.92 | 2.06 | 2.29 | 2.5 | 1.17 |
| | Not sold | 11.44 | 9.72 | 5.83 | 11 | 10.86 | 8.14 | 11.25 | 11.33 | 5.92 |
| Camels | In herd | 20.33 | 12.5 | 20.72 | 18.11 | 17.39 | 18.44 | 23.29 | 19.08 | 11.38 |
| | Sold | 3.11 | 1.72 | 1.22 | 1.11 | 1.42 | 2.17 | 2.54 | 1.38 | 1.46 |
| | Not sold | 17.22 | 10.78 | 19.5 | 17 | 15.97 | 16.28 | 20.75 | 17.71 | 9.92 |
| Donkeys | In herd | 7.89 | 7.83 | 10.78 | 12.28 | 8.08 | 11.31 | 11.5 | 9.33 | 8.25 |
| | Sold | 0.44 | 0.94 | 1 | 2.67 | 1.06 | 1.47 | 0.46 | 1.63 | 1.71 |
| | Not sold | 7.44 | 6.89 | 9.78 | 9.61 | 7.03 | 9.83 | 11.04 | 7.71 | 6.54 |

Appendix 7: Mean annual proportion (%) of goats, cattle, camels and donkeys sold in relation to those in the original herd and not sold, in four *adakars* of Loima Division, Turkana District, 2002/2003 (expressed as proportion of total livestock population units).

Appendix 8: Median ranks (range) of livestock marketing constraints affecting herders and traders as perceived by government livestock workers, Loima Division, Turkana District (2002/2003)

| Constraint | Producers N=8 | Traders N=8 | Overall rank N=16 |
|--------------------------------|------------------|----------------|----------------------|
| 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 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 parenthesis.

Appendix 9: Median ranks (range) of livestock marketing constraints as perceived by herders and traders themselves, Loima Division, Turkana District (2002/2003)

| Constraint | Producers | Traders | | | Overall rank N=59 |
|-------------------------------|-----------|-------------------------------|-------------------------------|---------------------------|----------------------|
| | N=72 | Lower primary markets N=20 | Upper primary markets N=14 | Secondary markets N=25 | |
| 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 problems | | 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 parenthesis.

Appendix 10: Significance levels for proportion of livestock types sold before marketing improves, proportion after marketing improves and proportional change in sales, in four adakar of Loima Division, Turkana District, 2002/2003.

| Type of livestock | Variable | Adakar | Gender | Wealth |
|-------------------|---------------------|--------|---------|-----------|
| Goats | In herd | 0.21 | 0.71 | 0.00009** |
| | Sold before | 0.35 | 0.96 | 0.47 |
| | Sold after | 0.12 | 0.44 | 0.07 |
| | Proportional change | 0.16 | 0.39 | 0.54 |
| Cattle | In herd | 0.33 | 0.32 | 0.049** |
| | Sold before | 0.84 | 0.88 | 0.44 |
| | Sold after | 0.13 | 0.56 | 0.29 |
| | Proportional change | 0.16 | 0.44 | 0.75 |
| Camels | In herd | 0.097 | 0.69 | 0.0005** |
| | Sold before | 0.16 | 0.29 | 0.33 |
| | Sold after | 0.06 | 0.16 | 0.097 |
| | Proportional change | 0.49 | 0.51 | 0.34 |
| Donkeys | In herd | 0.097 | 0.027** | 0.2 |
| | Sold before | 0.15 | 0.5 | 0.29 |
| | Sold after | 0.37 | 0.058 | 0.75 |
| | Proportional change | 0.97 | 0.15 | 0.09 |

**** statistically significant difference**

Appendix 11: Table showing off-take prediction per *adakar*, gender and wealth groups expressed as a proportion of total livestock population units in four species of livestock sold by pastoralists of Loima Division, Turkana District, 2002/2003.

| Livestock type | Variable | Gender group | | Wealth group | | | Adakar | | | |
|----------------|-------------|--------------|---------------|--------------|----------------------|--------------|----------------|----------------|----------------|----------------|
| | | Men N=36 | Women N=36 | Rich N=24 | Medium class N=24 | Poor N=24 | Natuba N=18 | Kicono N=18 | Acemie N=18 | Aporon N=18 |
| Goats | In herd | 61.75 | 60.06 | 51.67 | 57.75 | 73.29 | 58.22 | 68.56 | 60.78 | 56.06 |
| | Sold before | 25.33 | 25.47 | 24.08 | 24.08 | 28.08 | 24.22 | 30.22 | 23.78 | 23.39 |
| | Sold after | 19.19 | 16.94 | 16.67 | 14.88 | 22.67 | 21.56 | 21 | 12.83 | 16.89 |
| | Prop change | -6.14 | -8.53 | -7.42 | -9.17 | -5.42 | -2.67 | -9.22 | -10.94 | -6.5 |
| Cattle | In herd | 12.78 | 10.19 | 13.54 | 13.83 | 7.08 | 13.56 | 11.11 | 7.72 | 13.56 |
| | Sold before | 1.92 | 2.06 | 2.29 | 2.5 | 1.17 | 2.11 | 1.39 | 1.89 | 2.56 |
| | Sold after | 4.14 | 3.5 | 4.67 | 4.13 | 2.67 | 5.56 | 3.33 | 2.11 | 4.28 |
| | Prop change | 2.22 | 1.44 | 2.38 | 1.63 | 1.5 | 3.44 | 1.94 | 0.22 | 1.72 |
| Camels | In herd | 17.39 | 18.44 | 23.29 | 19.08 | 11.38 | 20.33 | 12.5 | 20.72 | 18.11 |
| | Sold before | 1.42 | 2.17 | 2.54 | 1.38 | 1.46 | 3.11 | 1.72 | 1.22 | 1.11 |
| | Sold after | 4.58 | 6.08 | 6.63 | 5.54 | 3.83 | 7.72 | 3.89 | 4.94 | 4.78 |
| | Prop change | 3.17 | 3.92 | 4.08 | 4.17 | 2.38 | 4.61 | 2.17 | 3.72 | 3.67 |
| Donkeys | In herd | 8 | 11.31 | 11.46 | 9.33 | 8.17 | 7.83 | 7.83 | 10.78 | 12.17 |
| | Sold before | 1 | 1.47 | 0.46 | 1.63 | 1.63 | 0.44 | 0.94 | 1 | 2.56 |
| | Sold after | 2.44 | 3.89 | 3.33 | 2.75 | 3.42 | 2.61 | 2.94 | 2.78 | 4.33 |
| | Prop change | 1.44 | 2.42 | 2.88 | 1.13 | 1.79 | 2.17 | 2 | 1.78 | 1.78 |

Appendix 12: Table showing off-take prediction per *adakar*, gender and wealth groups expressed as a proportion of particular livestock species population in four species of livestock sold by pastoralists of Loima Division, Turkana District, 2002/2003.

| Livestock type | Variable | Gender group | | Wealth group | | | Adakar | | | |
|----------------|-------------|--------------|---------------|--------------|----------------------|--------------|----------------|----------------|----------------|----------------|
| | | Men N=36 | Women N=36 | Rich N=24 | Medium class N=24 | Poor N=24 | Natuba N=18 | Kicono N=18 | Acemie N=18 | Aporon N=18 |
| Goats | In herd | 61.75 | 60.06 | 51.67 | 57.75 | 73.29 | 58.22 | 68.56 | 60.78 | 56.06 |
| | Sold before | 41.02 | 42.41 | 46.6 | 41.6 | 38.3 | 41.6 | 44.1 | 39.1 | 41.7 |
| | Sold after | 31.08 | 28.21 | 32.3 | 25.8 | 30.9 | 37 | 30.6 | 21.1 | 30.1 |
| | Prop change | -9.94 | -14.2 | -14.3 | -15.8 | -7.4 | -4.6 | -13.5 | -18 | -11.6 |
| Cattle | In herd | 12.78 | 10.19 | 13.54 | 13.83 | 7.08 | 13.56 | 11.11 | 7.72 | 13.56 |
| | Sold before | 15.02 | 20.22 | 16.9 | 18.1 | 16.5 | 15.56 | 12.51 | 24.48 | 18.88 |
| | Sold after | 32.39 | 34.35 | 34.5 | 29.9 | 37.7 | 41 | 29.97 | 27.33 | 31.56 |
| | Prop change | 17.37 | 14.13 | 17.6 | 11.8 | 21.2 | 25.44 | 17.46 | 2.85 | 12.68 |
| Camels | In herd | 17.39 | 18.44 | 23.29 | 19.08 | 11.38 | 20.33 | 12.5 | 20.72 | 18.11 |
| | Sold before | 8.2 | 11.8 | 10.9 | 7.2 | 12.8 | 15.3 | 13.8 | 5.9 | 6.1 |
| | Sold after | 26.3 | 33 | 28.5 | 29 | 33.7 | 38 | 31.1 | 23.8 | 26.4 |
| | Prop change | 18.1 | 21.2 | 17.6 | 21.8 | 20.9 | 22.7 | 17.3 | 17.9 | 20.3 |
| Donkeys | In herd | 8 | 11.31 | 11.46 | 9.33 | 8.17 | 7.83 | 7.83 | 10.78 | 12.17 |
| | Sold before | 12.5 | 13 | 4 | 17.5 | 20 | 5.6 | 12 | 9.3 | 21 |
| | Sold after | 30.5 | 34.4 | 29.1 | 29.5 | 41.9 | 33.3 | 37.6 | 25.8 | 35.6 |
| | Prop change | 18 | 21.4 | 25.1 | 12 | 21.9 | 27.7 | 25.6 | 16.5 | 14.6 |

