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FACTORS AFFECTING THE LEVEL OF COMMERCIALIZATION AMONG CATTLE KEEPERS IN THE PASTORAL AREAS OF UGANDA

BY

GODFREY KALEMERA RUHANGAWEBARE

BSC AGRIC (HONS)

PGD PPM

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NOVEMBER 2010

DECLARATION

I hereby declare that this thesis is my own work and has never been submitted to any University for the award of a Degree

Signed ……Date…….

Ruhangawebare Kalemera Godfrey

This thesis has been submitted with our approval as university supervisors.

Signed ……Date…….

Assoc. Prof. Bernard Bashaasha

Signed ……Date…….

Dr. Denis Mpairwe

DEDICATION

Godwin, Stiglitz, Samuel and our great Mum Tuhairwe, may you live to enjoy the greatest joys and pleasures of this work for which you bore the little pain. Roses may have thorns but they are still beautiful.

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LIST OF ACRONYMS

ACDI/VOCA	Agricultural Cooperative Development International/ Volunteers in Overseas Cooperative Assistance
AERC	African Economic Research Consortium
AMRS	Ankole Masaka Ranch Scheme
CAADP	Comprehensive Africa Agriculture Development Programme
CCA	Commodity Chain Approach
DANIDA	Danish International Development Agency
FAO	Food and Agricultural Organization
IGMAFU	Income Generation through Market Access and Improved Feed Utilisation
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MFPED	Ministry of Finance, Planning and Economic Development
MTTI	Ministry of Trade. Tourism and Industry
NEPAD	New Partnership for Africa's Development
GOU	Government of Uganda
SCP	Structure Conduct and Performance
TCE	Transaction Costs Economics
UBOS	Uganda Bureau of Statistics
UBPA	Uganda Beef Producers Association
WISP	World Initiative for Sustainable Pastoralism

ABSTRACT

Deliberate efforts have been made by the government of Uganda to commercialize agriculture through market and trade liberalisation. However, marketed livestock offtake has remained low contributing to the existing per capita meat deficit. A survey was conducted by way of personal interviews with 180 respondents in selected central and western pastoral districts of Uganda. The study was initiated with the overall purpose of assessing the factors that influence cattle keepers' participation in commercialization of livestock production in the pastoral communities and to establish the factors affecting cattle keepers' decision to sell cattle**.** Descriptive statistical analysis and Tobit model were used to answer the study objectives.

The average household size was 10 members and 8 years of formal education an equivalent of secondary school was the household heads' average level of education. The average household grazing land owned was 157 hectares with some households owning as small as 2.3 hectares due to increasing land pressure and few others owned as large as 301 hectares. Results revealed that the majority of the cattle keepers (51%) kept indigenous breeds mostly Ankole cattle with an average herd size of 57 heads of cattle followed by cross breed keepers (45%) with an average of 35 heads of cattle and the exotic breed cattle keepers who consisted of a dismal 1% with an average of 3 heads of exotic cattle. The herds were dominated by female cows constituting 50.4 %, heifers (24.3%), calves (15.8%), and mature bulls (1.5%).

A sales rate of 17.6% was recorded close to the 18% typical of other grasslands. Cattle were kept as a form of insurance and store of wealth rather than for commercial purposes. Selling cattle was made to satisfy cattle keepers' specific cash needs and was not driven by the market demand, a pattern that negatively affected their cattle sales rates. Livestock markets operated on a four tier system; farm gate, primary market, secondary market and terminal markets. Abattoir dealers were the major market outlet and cattle markets played a facilitative role to increase cattle keepers' sales rates. Culled cows dominated the sold cattle because they were most available in the herd followed by immature bulls to reduce competition with the female reproductive cattle for pastures and water.

Cattle keepers' sales rate were positively influenced by sex of the household head (5%), access to market information (5%), distance to the nearest livestock market (10%), value of the milk sold (5%), cattle prices (5%); while road condition (5%) and access to alternative sources of income (10%) negatively affected the cattle keepers' sales rate. Essentially, pastoral cattle keepers were willing to sell their cattle despite the encountered marketing constraints. Hence improving market information access and flow as well as upgrading of physical infrastructure would potentially increase pastoral cattle keepers' sales rates and consequently improve their participation in livestock commercialisation.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Livestock production is a major component of the agriculture industry in Uganda contributing 9% of Gross Domestic Product and 17% of Agricultural Gross Domestic Product (Uganda Bureau of Statistics - UBOS, 2009). In addition to food and income, it provides social security / insurance and serves as mobile banks, wealth accumulation, and social esteem (Davie *et al*., 2007; David *et al*., 2001). However, these contributions are predominantly in the non-monetary sector because of limited commercialization of production of meat and milk in the pastoral systems, which have approximately 90% of the national cattle population; produce 85% of the milk and 95% of the beef consumed in the country (King and Allan, 2002).

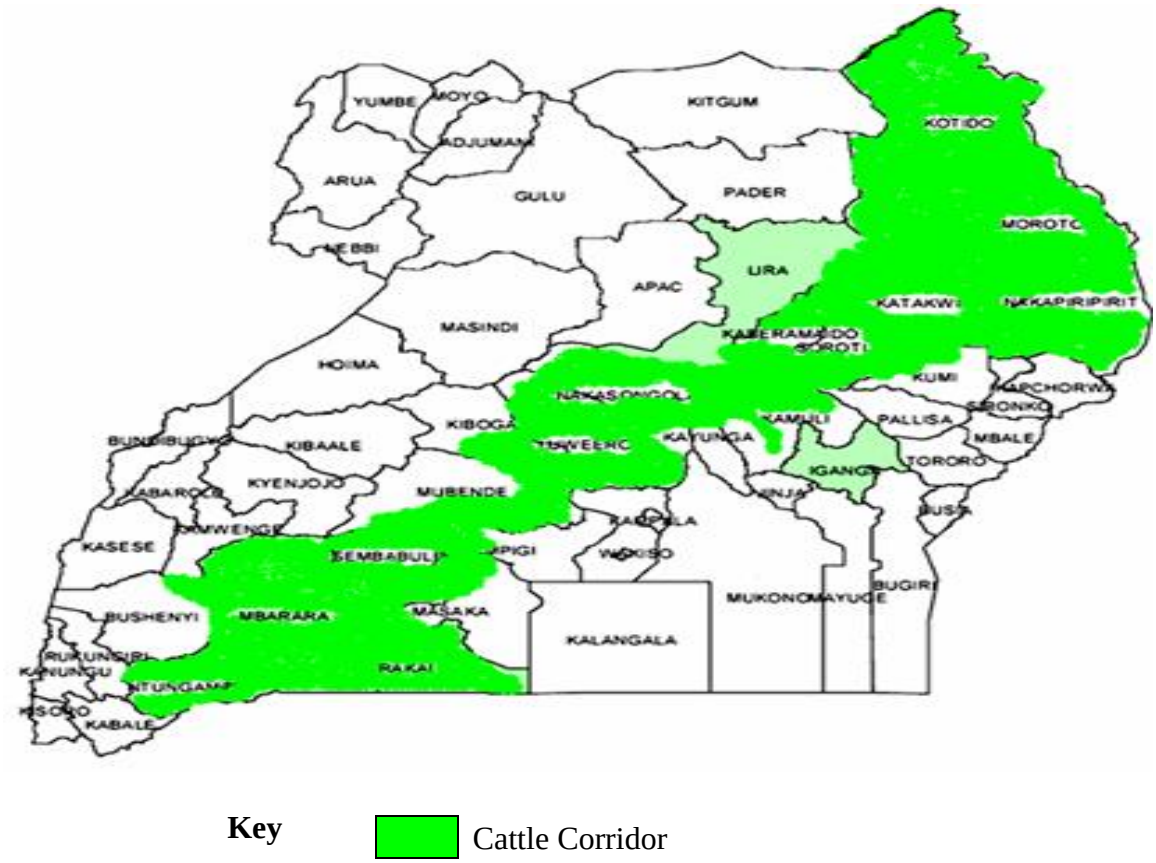
According to Uganda Bureau of Statistics (2009), Uganda livestock population was estimated to comprise of 11.4 million cattle, 12.5 million goats, 3.4 million sheep, 3.2 million pigs and 37.4 million poultry (Table 1.1). The national cattle herd consists of 0.8 million (6.4%) exotic/cross cattle and 10.6 million (93.6%) indigenous cattle. Exotic (45.4%) and cross breed cattle (22 %) are mostly concentrated in the Western while the Eastern region leads in indigenous cattle breeds. Of all the livestock species, cattle are the most dominant in Uganda.

Table 1.1. Estimates of Livestock Numbers (Thousand Animals), 2001 – 2008

	2002	2003	2004	2005	2006	2007	2008
Cattle	6 ,328	6 ,519	6 ,567	6, 770	6,973	7,182	11,408
Sheep	1 ,141	1 ,175	1 ,552	1 ,600	1,648	1,697	3,410
Goats	6 ,852	7 ,092	7 ,566	7 ,800	8,034	8,275	12,499
Pigs	1 ,710	1 ,778	1 ,940	2 ,000	2,060	2,122	3,184
Poultry	32, 639	35, 903	31, 622	32, 600	26,049	26,950	37,443

Source: Compiled from the National Livestock Census Report 2008 (UBOS, 2009)

Cattle is concentrated in the "cattle corridor" (King and Allan, 2002). The 'cattle corridor' covers the dry lands which range from the South-Western areas of Mbarara, Sembabule and Rakai Districts through the mid-Central Districts of Soroti, Kumi and Nakasongola, to the North-East, in the Karamoja region covering approximately 84,000 km2 of the country's land area covering the rangelands in Uganda (Fig.1). The rangeland refers to the areas on which the native vegetation (climate or natural potential) is predominantly grasses, grass-like plants, forbs or shrubs suitable for browsing or grazing by animals (Society of Range Management, 1989). In Uganda rangelands are characterized by low and erratic rainfall regimes leading to frequent and severe droughts; fragile soils with weak structures which render them easily eroded; and land tenure systems that lack incentives for pastoralists to invest in preservation of the range as a common pool resource.



Key Cattle Corridor

Figure 1: Cattle Corridor

Degradation of rangelands manifested by bush encroachment, gullies due to soil erosion and bare ground along the cattle paths and resting grounds, has greatly affected their carrying capacity and production potential (Mpairwe, 2001). This rangeland degradation affects the productivity of cattle in terms of growth and number thus reducing the cattle keepers' sales rates.

Pastoralism, a farming system involving mobility of people with their livestock in search of pastures and water is the major characteristic of rangelands. However, events of climate extremes often induce transhumant pastoralism to areas where water and pasture can be

found but return to the settled areas after the rains return (Muhereza and Otim, 2000; Oxfam, 2006). Mobility enables pastoralists to adapt to climate variability (Jacobs and Coppock, 1999); maximize on herd size and herd productivity (Western and Nightingale, 2002) and increase the effectiveness and efficiency of land use in arid and semi arid ecologies (Brooks, 2006; Oxfam, 2008). In Uganda there has been a systematic shift from nomadic pastoralism towards limited mobility around settlements and agro-pastoralism as integrated crop-livestock farming.

1.2 Problem Statement and Justification

According to King and Allan (2002), pastoralists constitute 22% of the population; hold 55% of the national herd, produce 85% of the milk and 95% of the beef consumed in the country. There is limited information on the impact of structural changes on pastoral communities in Uganda. The commercial value of livestock is limited to a few live sales and sales of hides and skins to the local market and across the borders within the region and beyond (Odhiambo, 2006). The current level of contribution of the livestock sector in Uganda is still below its potential given the size of the livestock population due to a number of factors. Low productive indigenous cattle breeds, diseases, feed availability and quality constrain cattle productivity (Kisamba-Mugerwa *et al.*, 2006; McIntire *et al*., 1992; Jhanke, 1982). Poor market infrastructure, price variability, limited marketing support services and market information and credit services to traders and cattle keepers, absence of effective producer organizations at the grassroots and limited access to markets provide inadequate opportunities for increased incomes (Coetze *et al*., 2005). Therefore market off-take is low

(10 - 12%) compared to other grassland based systems such as those of Namibia (15% - 25%) and Brazil which fluctuates between 15 and 18% (FAO, 2006).

In addition to infrastructural problems (Turner and Williams, 2002; Jansen *et al*., 2006) low market off-take is attributed to a number of disincentives for pastoralist to participate in the livestock markets. These include inadequate investments in non-livestock sectors in pastoral systems to provide local market for livestock products (Barrett *et al*., 2004); disproportionate balance between socio-cultural and monetary values that pastoralists attach to livestock (Ashley and Nanyeenya, 2002; Moll, 2005) and export barriers and import restrictions at international level (Aklilu, 2002). Of these disincentives, the most prominent constraints are the overwhelming socio-cultural values of livestock and risk aversion strategy (Djamen *et al*., 2008). This contrasts with commercial production objectives that emphasize production for the market (Patrick *et al*., 1993). Therefore cattle herders keep animals as stores of wealth-in-kind and insurance scheme that smoothen returns from the market (Walters- Bayer *et al*., 1992; David *et al*., 2001). As risk aversion strategy pastoralists participate in the market primarily for convenience of adapting to inclement weather and disease incidences. Their monetary values is limited to subsistence cash economy and need for petty cash needs for medical bills, scholastic requirements, and occasional household needs (Oxfam, 2003). This situation accentuates erratic supply and price disincentive for producers as well as traders (Behnke *et al*., 1993; Holtzman and Kulibab, 1994; David *et al*., 2001).

Despite government's effort to commercialise agriculture through trade and market liberalisation (Ministry of Trade and Tourism Industry-MTTI, 2005; MAAIF, 2000), marketed livestock off take has remained low; fluctuating between 10% and 12% thus contributing to the existing per capita meat deficit of 41.2 kilogrammes (FAO, 2006). This has been further exacerbated by the pastoralists' survival strategy of minimizing risk by maintaining large herds so that production does not drop below subsistence level (consumption smoothening) and the risk of total loss of the herd (Mace and Huston, 1989) rather than maximizing benefits per animal in cash or energy currencies (Djamen *et al*., 2008; Upton, 1986). As such, livestock Cattle Keepers have not responded to the demand and sometimes have tended to hold on to their livestock and only sell when they are cash constrained; not when it is most profitable (Asfaw and Jabbar, 2008; Marstrand *et al*., 2004; Ayele *et al*., 2003; Nkosi and Kirsten, 1993) which subsequently results into low levels of income. Sandford (1983) observed little supply response from the pastoralists to changes in prices for livestock which was attributed to the low demand for cash other than for essentials such as schools and taxes. However, there are no information updates on the level of participation of pastoralists in livestock market as well as limited understanding of the circumstances that make pastoralist recalcitrant to market price incentives.

Therefore, this study was initiated with the overall purpose of assessing the factors that influence cattle keepers' participation in commercialization of livestock production in the pastoral communities and to establish the factors that affect Cattle Keepers' decision to sell livestock.

1.3 Objectives of the Study

The objectives of the study were to:

1. Describe the socio economic characteristics that influence market participation of pastoral cattle keepers in the Western and Central regions of Uganda.
2. Establish and describe the livestock marketing system used among the cattle keepers in the pastoral communities.
3. Quantify the factors that affect the cattle sales rates of the pastoral cattle keepers in Western and Central districts of Uganda.

1.4 Hypotheses

1. The current pastoral practices exhibited by the cattle keepers in the cattle corridor have negatively affected their level of livestock production commercialisation.
2. The existing marketing system in the pastoral areas has negatively affected commercialisation of cattle production in Uganda.
3. Cattle sales rate is positively influenced by distance to the market and access to market information.
4. Household size and average grazing land owned by the household positively influence cattle keepers' sales
5. Cattle prices offered to the farmer positively influence the cattle keepers' sales rate.

1.5 Rationale of the Study

One of the major challenges to the government of Uganda is agriculture modernization so as to attain food security and commercial oriented production. Modernized agriculture leads to improved farm productivity, food security and farm incomes. Recent information on location specific livestock market constraints, livestock resources and market information endowments are unknown. Provision of necessary information on factors affecting cattle keepers' participation in the livestock marketing will greatly contribute to the stated national objective.

The key findings from this study will help the policy makers, Cattle Keepers and extension staff to plan, address the technical and economic constraints as well as enacting appropriate policies to enhance more market oriented livestock production.

1. 6 Scope of the Study

This study is limited to assessing factors that affect livestock keeper's participation in the livestock markets. The study targeted cattle keepers in Southwestern and Central regions of Uganda in the districts of Kiruhura, Luweero, Nakasongola and Nakaseke because pastoralism and transhumance are still being practiced, the area holds the largest cattle population in Uganda and is the major source of the most cattle slaughtered in city abattoirs. In addition, Income Generation through Market Access and Feed Utilization (IGMAFU) Project was running with these was running in these two regions.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Cattle Production Systems

Cattle production systems operate on three principal models: extensive grazing, mixed farming, and industrial (or intensive) livestock production. Extensive grazing accounts for 9.3 percent of global meat production, mixed farming for 53.9 percent, and industrial livestock production for 36.8 percent (Seinfeld *et al., 1997*).

In extensive grazing systems, cattle herds subsist on inputs readily available from pasture areas. These systems occupy about one-quarter of the world's land, yet yield less than 10 percent of global meat production. In this type of system, production growth primarily is achieved by opening new grazing areas. However, when expansion of grazing land is not possible, further production growth is achieved by increasing the number of animals on a fixed area of land, thereby increasing the pressure on rangelands (Steinfeld *et al., 1997*).

Mixed farming systems integrate livestock and crop production, whereby each provides inputs used in the other: livestock consume crop residues while manure contributes to crop fertilization. When input requirements for production growth overwhelm on-farm capacity to supply feed, expansion depends on increased supplies of external inputs, particularly feed grain (Thomas and Barton, 1995). The introduction of modern strains of high yielding crops into traditional systems presents another challenge to mixed farming. These crops generate between one-third and one-quarter as much non-grain biomass as traditional varieties, reducing the amount of waste products available to feed livestock.

Of the three main production systems, output from industrial or intensive livestock production is growing at the fastest rate (4.3 percent per year versus 2.2 percent for mixed systems and 0.7 percent for extensive systems) (Seré and Steinfeld, 1996). The intensive production model relies on inputs imported from outside, particularly concentrate feed grains, and therefore can be sustained on small units of land. As discussed below, the impact of future cattle production on biodiversity largely will depend on the extent to which rising demand for beef is met by greater intensification or by expansion of grazing to areas currently occupied by important native habitat. Although pasture expansion is a clear force of deforestation, severe environmental impacts can also accompany intensification and industrial production systems.

In Uganda smallholders and pastoralists own 90% of the cattle, large proportion of poultry, pigs, sheep and goats under agropastoral and pastoral production systems; as well as ranching schemes (FAO, 2006).

In pastoral production system, mobility in search of water and grazing is the sole a survival strategy for people and their stock (Muhereza, 2003; Muhereza and Ossiya, 2004). However, most pastoralists in Uganda have established settlements and abandoned nomadic pastoralism. Transhumance is also declining due to increasing population growth, land pressure and political perception of pastoralism as a backward lifestyle (Desta and Coppock, 2004). Therefore an increasing number of cattle keepers have adopted a sedentary lifestyle and are practicing mixed crop livestock farming and deriving livelihoods from other non pastoral activities (Fratkin and Mearns, 2003). Typical example of such transition is

sedentarisation in Kiruhura due to the changing conditions in addition to deliberate government policies that promote settlement and land private land ownership (Kisamba-Mugerwa, 1995). In Southwestern Uganda, communal grazing has been parceled into privately owned ranches (Serunkuuma and Kent, 2001). However, the pastoralism has persisted in some South Western districts of Ntungamo, Mbarara and Sembabule; Central areas of Luwero and Kiboga and in the North East Kotido, and Moroto districts.

Agro-Pastoralism has developed as pastoralists settle and start to grow crops, though the main emphasis remains on livestock which provide milk, meat, draught power, savings and income. Livestock graze on communal land and consume crop residues but are moved in the dry season in search of grazing pastures and water. Livestock are generally marketed when need arises, a characteristic that is evident among cattle keepers in Kiruhura, Luwero, Nakasongola and Nakaseke districts; productivity is higher than in pastoral systems (Muhereza and Ossiya, 2004).

Also there is settled livestock/crop system where the major source of food and income is from crops. Herds are smaller than in the agro-pastoral system. Livestock rely on natural grazing as well as crop residues. While wealth is kept in the form of livestock, some households market excess animals due to pressure on grazing land.

A small proportion of livestock are raised on ranch system for beef production and intensive systems like zero grazing to dairy production. Ranches account for less than 10% of the beef and milk reaching the commercial market (Robin, 2005; New Partnerships for Africa's

Development- Comprehensive Africa Agriculture Development Programme NEPAD-CAADP, 2004). Ranching is a commercial system mainly producing animals for sale mostly on unimproved natural pastures. Before the civil strife of the 1980s, there were over 500 ranches in the country including 5 ranching schemes which held 100,000 heads of cattle; by 1985, only 42,000 heads of cattle had remained. Under the ranches restructuring scheme over 2000 squatter families and their animals were settled on the ranches; by 2000, only about 50 of the original 500 ranches were functioning commercially. The Ankole Masaka Ranching Scheme was degazetted to create small commercial ranches.

Dairy systems contain about 300,000 dairy cattle in Uganda, with the majority keeping crossbred of Friesians with indigenous cattle. Fenced paddocks of both natural and improved pastures are used and total herd size is usually below 50 animals with 20 or less in milk at one time. Yields vary from 2 litres per day from indigenous cows up to 20 litres from exotics. Zero grazing and semi zero grazing schemes are found in Mbarara district and around Kampala (King and Allan, 2002). Tethering system is being carried out in urban and peri-urban as well intensively cultivated areas whereby animals are restrained by ropes (Robin, 2005).

2.2 Socio-economic Characteristics of Pastoralists

Pastoralists are characterized by cultural and economic orientation towards livestock. Families depend on livestock for a significant part of their income and food. Large herds guarantee subsistence and income, confer status and it is regarded to provide insurance against impact of drought (Wurzinger *et al*., 2008). Even the educated members of pastoral

ethnic groups who are no longer dependent on pastoralism often tend to continue to invest in livestock (Bartons *et al*., 2001). Reasons for selling animals are limited to subsistence cash needs to buy food, pay school fees and medical bills. Kerven (1992), further states that in good times, pastoralists' surplus animals are marketed depending on the interaction between availability and access to markets. The pastoral herds are mostly composed of indigenous and cross breeds an adaptation to the harsh nature of range lands and high resistance to pests and diseases prevalent on the rangelands. Because pastoralists prefer to consume milk for subsistence, their herd structures are dominated by female animals rather than beef i.e. bulls and steers (Barton *et al.*, 2001). Serunkuuma and Kent (2001) noted a similar pattern where female cattle constituted 81.4% of the herd among the pastoralists in Nyabushozi County Mbarara district, Uganda. This herd structure significantly affects their market offtake rates whereby their sale decisions are influenced by the decision rule that first sold is the cull cows and bulls. Poor households are forced to sell immature bulls to generate cash for their subsistence requirements.

Pastoralists' stocks are dependent on natural pastures for their diets on the rangelands where the natural resources are managed through a mix of common property and private regimes, access to pastures and water are negotiated and dependent on reciprocal arrangements. As a coping mechanism, they have adapted and evolved to cope with constraints of climate, economic change and opportunities facing them. Some of the key livestock management strategies include herd mobility, herd diversification, raising several species of animals in one herd and maintenance of a high proportion of female stock (Hesse, 2006). However, due to increased land pressure arising from the population growth, individualization of land and

gazetting of land by government for national parks and game reserves, the pastoralist in Uganda have adopted a sedentarisation lifestyle by engaging in crop cultivation, agro-pastoralism and increasing involvement in the market economy to purchase grains for supplementing their diets most especially during the dry periods.

Pastoralists strive to strike a balance between large and small household sizes. Small sizes imply poor management of livestock resulting into low milk production and weak animals that are prone to diseases. Large households mean high demand for economic goods and resources obtainable outside the pastoral economy that result in increased cattle sales thus reducing the family's herd and its security as cattle will not produce enough milk for household consumption. Pastoralists' household size is known to be large averaging to 11 members as revealed by Serunkuuma and Kent (2001) in Nyabushozi and Ocaido *et al*. (2005) who reported an average household size of 10 members among the agro-pastoralists in Soroti Eastern Uganda. Therefore household size is one of the factors that significantly influence the cattle keepers' sales rates. Large family size provides labour for livestock management especially during the dry season when pastoral work is more labour intensive e.g. watering, driving animals to distant pastures. This study was conducted to validate the effect of household size as one of the socio economic characteristics of the pastoralists on the cattle keepers' sales rate within the Central and Western corridor districts of Uganda.

2.3 Agricultural Marketing

A potential market consists of a group of people with similar needs for a particular good or service, sufficient resources to make a purchase, and the willingness and ability to buy

(FAO, 1993). A market is said to exist whenever buyers and sellers of a particular resource or good freely come together leading to a flow of information that creates the opportunity for trade and exchange resources and goods. Essentially, buyers and sellers need not come together. However, it has been observed that most African markets for agricultural goods involve physical interaction between buyers and sellers which gives the markets a clearly defined geographic location. Most villages have small markets where traders regularly gather to market their produce. Mugisha (1994) identified such markets as road side markets, and rural/ village markets. Similar kinds of markets are found to play a role in livestock marketing in Uganda specifically in the districts of Kiruhura, Nakasongola, Luweero and Nakaseke. Some animals are bought at the farm gate while others are trekked to nearby livestock markets which operate on weekly or monthly basis at sub county and / county levels. It can be regarded as a multilayered sequence of physical and other activities and transfer of property rights from farm-gate to consumer including brokerage, storage, processing, transport and trade financing (Harris-White, 1995) with a mission of bridging the gap between the complementary capacities of producers and consumers to participate in the economy (Beirlein *et al*., 1995).

Livestock marketing structure follows a four tier system. The main actors in the first tier are the local cattle keepers and rural traders who transact with low volumes of 1- 2 animals per transaction irrespective of species involved. Those small traders from different corners bring their livestock to the local markets - primary markets (second tier). Traders purchase a few large animals to sell to the secondary markets. In the secondary markets (3rd tier), both the smaller and larger traders operate and traders and butchers from terminal markets come to

buy animals. In the terminal markets (4th tier), big traders and butchers transact in large number of mainly slaughter type of animals (Ayele *et al*., 2003; Aklilu, 2002).

Cattle Prices are settled through private individual on the spot negotiations between cattle keepers and traders except in areas where brokers are involved (Aklilu, 2004). Brokers are involved in the transactions and transportation of animals and obtain commissions of indefinite amounts from both the sellers, buyers and transporters and are reported to be prominent particularly in the live animal markets (Jabbar and Benin, 2005). Cattle Keepers in Ethiopia reported that brokers charge very high brokerage fees , misinform on prices paid by buyers, collude with buyers and hinder transactions if they were not allowed to be involved (Gebremedhin *et al*., 2007). Generally, livestock prices are affected by several factors which include periods of sale, age, weight, colour and body condition of the animal, urgency of the household cash needs, the distance producers travel to sell animals and the ease of trekking animals back (Gebremedhin *et al*., 2007; Aklilu, 2004).

Central to the cattle marketing system is the complex web of relationships among its key participants namely the cattle keepers, traders, butchers, abattoir dealers and exporters. Cattle keepers raise the animals; traders buy animals in and around periodic marketing events, hoping to sell them at a profit elsewhere to transporters, local butchers, terminal abattoirs in large towns and ultimately consumers (Ayele *et al*., 2003). Households in the developing areas use a number of channels which include auctions in local markets, speculators, butcheries private sales and abattoirs (Musemwa *et al*., 2007; Nkosi and Kirsten, 1993; Montshwe, 2006). The choice of the marketing channel is influenced by

prices offered, distance to the market and the marketing potential to absorb stock on sale. According to Nkosi and Kirsten (1993), private sales are the most preferred channel in developing areas.

2.4 Pastoral Cattle Keepers' Marketing Behaviour

In developing countries, livestock are rarely sold because they play important subsistence functions in the life of rural households which include provision of human needs like food, draught power, manure, social needs and provision of financial security to households (Tapson, 1990). Therefore sales are often stimulated by the farmer's needs for cash than by the characteristics of the demand or the state of the market (Djamen *et al*., 2007). Forced sales is also an adaptive strategy to dry season feed shortage (Gebremedhin *et al*., 2007).

Although it is argued that small scale cattle keepers are incaple of responding rationally to markets, there are some of them who actively participate in livestock marketing (Nkosi and Kirsten, 1993). The differences in cattle keepers' objectives and perceptions to cattle production hamper the formulation of effective livestock policies aimed at improving the livelihoods of resource poor cattle keepers (Barrett *et al*., 2004). Efforts to improve the rural cattle production and market supply of quality live animals should therefore emphasize the understanding of cattle keepers' objectives, perceptions and experiences (Dovie *et al*., 2006).

The animals usually offered to cattle markets for sale are local breeds with a few crossbreeds (Serunkuuma and Kent, 2001). The herder's decision as to which animal is to be marketed

depends on a number of factors which include; the magnitude of the cost to be satisfied and the size, the species composition, age, sex and structure of the herd. For small recurrent expenses, the sale of shoats will usually prove adequate but large expense needs like medication or school fees often necessitate sale of cattle (Ayele *et al*., 2003). When the cattle keepers are confronted with the necessity of selling cattle, off-take is restricted to the non productive elements of the herd such as cull cows, sterile heifers, non breeding bulls and bull yearlings (Semenye, 1980). Marketing preference is often balanced with the fundamental pastoral considerations like securing the future reproduction of the herd and maximizing milk flows. The herders' decision to sell a specific animal is guided by judging the usefulness of that animal on the criteria of fertility, physical resistance and milk production (John, 1987). The cattle keepers within the cattle corridor are faced with a commercialization strategy characterized by heavy culling of young bulls and forced sales of cows and heifers (Oxfam, 2003). This kind of offtake disorganizes the growth of the herd and for most vulnerable cattle herders leading to a downward spiral of disinvestment. This process of herd contraction has forced most cattle keepers within the cattle corridor to abandon Pastoralism.

2.5 Factors Affecting Livestock Marketing

There are various factors affecting livestock marketing among the rural cattle keepers in the developing pastoral areas of Uganda which range from production, processing up to delivery. Inadequate infrastructure imposes a serious constraint on the marketing of livestock (Mahabile *et al*., 2002). Most livestock cattle keepers are located in areas remote from the major markets where there is a serious lack of both physical and institutional

infrastructure (Coetze *et al*., 2005). Sara (2010) observed that pastoralists and agro-pastoralists are the main producers of livestock in the region, located in remote areas, at times in inaccessible terrain and far from town centres. Coupled with the seasonal market supply patterns, producers in Northern Kenya and Southern Ethiopia said that they sold a limited number of animals – one to two cattle or four to five shoats at a time, either to livestock collectors or by trekking to primary markets. This partly explains the poor livestock supplies to formal marketing outlets. The most important physical infrastructural weakness for rural cattle producers are related to transport and holding facilities (Bailey *et al*., 1999). In addition to the distance to formal markets, poor state of roads in rural areas affects the ability of cattle keepers to attract many buyers in their areas since bad road network is associated with very high transport costs (Musemwa *et al*., 2008). Thormeyer (1989) points out that increasing the level of sophistication of a transport system can improve the ability and accessibility of market opportunities (Bailey *et al*., 1999).

According to Musemwa *et al*. (2008), transaction costs are barriers to efficient participation of cattle keepers in different markets. Remote location of the most rural cattle producers coupled with poor road networks result in high transaction costs (especially transport costs) reducing the price that traders are willing to pay for cattle. Makhura (2001) and Nkhori (2004) noted that even if cattle keepers are in areas with good road linkage, the distance from the markets tends to influence transaction costs. The further away they are from the markets, the higher the transport costs they incur. Sara (2010) noted that poor road infrastructure in Mandera in Northern Kenya constrained efficient cattle trade. Traders trucked animals from primary and secondary markets to Nairobi terminal market for

domestic consumption and because of poor road conditions it took very long hours between Moyale and Nairobi. This constraint to trade deriving from non-paved roads resulted into the low trading cattle volumes in the newly established Dillo livestock market.

Also, communal livestock ownership is another impediment to cattle keepers' participation in livestock markets. Low per capita capacity to supply quality animals is a disincentive to buyers (Jabbar, 1998) and to cattle keepers to sell at low prices. Livestock numbers in communal areas are generally low per producer and the average weight of the animal are generally low compared to those of commercial farming sector. Lack of marketable numbers and poor livestock condition result in buyers not coming to purchase livestock since they will face high transaction costs. The poor condition of livestock fetches low farm gate prices during drought periods which also often results in cattle keepers refusing to sell their livestock (Makhura, 2001). Sara (2010) also pointed out that pastoralist on Ethiopia- Kenya border had few animals to offer during the drought due to lack of feeds thus leading animals to lose body mass making them less marketable while they regarded rainy seasons favourable for herd accumulation with high reproduction rates and large quantities of milk used by households both for consumption and sale.

Lack of timely and reliable agricultural information (Shepherd, 1997; Bailey *et al*., 1999), especially in rural areas (Msemakweli, 1993; MAAIF, 1995; Montshwe, 2006), has greatly contributed to limited agricultural development in developing countries. Well informed cattle keepers are able to make rational, relevant decisions and strengthen their bargaining power with buyers (Coetze *et al*., 2005) because well designed information systems create

strong competitive advantage thus improve the efficiency in decision making (Cravens, 1994). In Uganda, market information flow to producers and buyers is sporadic and limited to personal contact as the main channel for communication. Limited price information compels producers in rural areas to accept low prices from middlemen especially when they are in dire need for cash (Oxfam, 2003). The status quo discourages cattle keepers from participating in the market.

Lack of marketing infrastructure such as weigh stations, quality grading systems, fences delimiting the market yards, holding grounds, water and fodder are a disservice to cattle keepers who are forced to accept low prices offered by traders in order to avoid taking the cattle back home (Sara, 2010). Because of unavailable facilities such as weigh stations, cattle keepers have to depend on the cattle traders' live weight estimation of cattle on sale who in most times under estimate the weights so as to exploit and offer low prices to cattle keepers. Bekele and Aklilu (2008) and Sara (2010) found that pastoralists in Dubluk, Dire Woreda Ethiopia actively participated in the livestock marketing using the Agricultural Cooperative Development International/ Volunteers in Overseas Cooperative Assistance (ACDI /VOCA) built market infrastructures. These markets were set up with the overall objective of improving pastoralist livestock marketing through increased sales with infrastructures such as brick fence, separate compartments for shoats, cattle and camels, loading ramps, feeding and watering troughs and shaded areas compared to the ones in Borana zone who lacked any basic livestock market infrastructure. Much of Uganda's infrastructures including roads, market weigh stations and cattle dip tanks were destroyed in

the periods between 1971 and 1985. Although the state is reconstructing the infrastructure, the transaction costs are still high (Robin, 2005).

2.6 Role of Markets in Livestock Sector Commercialisation

Livestock markets are seen as an important addition or alternative to traditional dependence on livestock mobility as an adaptive strategy to seasonal fluctuations to local forage conditions (Holtzman and Kulibab, 1994). There has been growing research interest in the role livestock markets may play in stabilizing local livestock prices and adjusting stocking rates according to the temporal and spatial dynamics of feed and water resource supply/distribution (Fafchamps, 1998; Fafchamps and Gavian, 1996). In this way, markets are seen as an institution for moderating livestock densities for sustainable rural livelihoods and in harsh, arid and semi-arid environments in Africa through "flexible stocking" (Turner and Williams, 2002). The Burduras in Kenya proximal to the border having trading ties with their counterparts in Ethiopia reported that when the drought worsens, many cattle keepers sold all their cattle to Ethiopian traders on the other side, in the belief that it was better to destock early than wait until cattle deteriorated and died (Sara, 2010).

Livestock markets also act as critical institutions through which rural peoples recurrently convert wealth stores to cash and to grain. However, a major question that remains under examined are the degree to which the market functions emphasized by "flexible stocking" advocates have distributional consequences which may work to exacerbate the economic vulnerability of the rural poor. Despite new academic optimism about the role of markets in

sustaining dry land peoples and environments, there are two features of real market function which may have significant distributional consequences. The first is whether livestock price dynamics are predictable enough to allow the rich to profitably "trade across time" to the detriment of less economically-buffered actors in the market, as has been found in many grain markets (Clough, 1986; Watts, 1983). The second is the degree to which the institutional and socio-cultural contexts within which livestock markets operate lead to livestock price formation that is decidedly non-neutral, in other words, the price received for an animal is not determined solely by the characteristics of the animal but also by the social characteristics of the seller and buyer. If real livestock market functions deviate strongly in these ways from those assumed by static abstract models, the nature of policy reforms in the area of livestock marketing need to be rethought.

Livestock are individually identifiable and are living animals linked by their owners to other animals in the past and present through matrilineage. Therefore, livestock generally hold greater cultural and social meaning than other major commodities (Herskovits, 1996). The fact that an animal commodity is associated with a singular combination of characteristics may strongly affect price formation at local livestock markets (Kopytoff, 1986). This singularity provides the buyer with a wider range of defendable prices to offer for an animal than in the case of grain. This may play an important role in small livestock markets where sellers have limited access to market information and offer their animals to a limited number of buyers. Small rural markets in East Africa are socially-embedded with prices determined through negotiation between known sellers and buyers.

Prices offered by buyers are determined not simply by the commodity in question but by who is offering the commodity for sale and the number of other buyers at market that day. Buyers may change the prices offered to a seller based on his/her estimation of the seller's ability to refuse to sell. Such estimations can be made from readily available information on the buyer's home (distance to market), his/her economic status (need for cash), and the seller's relationship to the owner of the animal. When a seller's village is relatively far from weekly livestock markets, a cost of not accepting a merchant's price offer is the prospect of leading his animal(s) on at least three home-market trips rather than one. If cash needs are pressing and alternative markets distant (in time and distance), owners may in the end accept prices below what seemed fair at the beginning of the day. A buyer who knows the seller's situation has more latitude than other commodities in strategically altering his price offers for an animal because of its singularity each is different. Still, whether these features of livestock commodities translate into discernible differences in livestock prices received by livestock producers at local markets is an empirical question.

CHAPTER THREE

3.0 METHODOLGY

3.1 Theoretical Framework to Market Study

The performance of a market is majorly influenced by the structural market characteristics and the competitive behaviour of actors/participants in the market. Understanding how these market factors independently and jointly can provide a basis for identifying opportunities to be exploited and constraints that might need to be removed. Market study involving analysis of competition, efficiency and integration is useful for the formulation of interventions particularly those aimed at lowering marketing costs and reducing the tendency for excessive profit making (Harris- White, 1999).

The study of markets and marketing has witnessed a number of paradigm shifts including the Structure, Conduct and Performance (SCP) (Bain, 1959), the Commodity Chain Approach (CCA) (Shaffer, 1973 and 1987) and Transactions Cost Economics (TCE) approach (North, 1989; Williams *et al*., 2006). The range of models suggests that any single theoretical framework is hardly adequate for studying markets particularly in developing countries (Kohls and Uhl, 1990). The choice of any combination of the approaches is usually guided by the nature of the problem, complexity of the marketing systems and the constraints involved. Hence in studying livestock markets, there is a need to combine useful elements of both old and the contemporary models in order to understand the structural and institutional factors influencing the livestock marketing.

A number of agricultural markets rely on the theoretical foundations laid by the perfect competition model particularly those based on the structure conduct and performance paradigm (Ajal and Adesehinwa, 2007). The structure components of a market include marketing channels, marketed volumes, degree of market information, the ease of entry and exit of buyers and sellers in and out of the market. Market conduct refers to the actions which make participants take out of their own discretion or patterns of behavior which they follow in adopting or adjusting to the market in which they buy and sell. The conduct components of a market include exchange function methods of determining price, and product differentiation. Hence market conduct refers to the various stages adopted by participants in buying, selling and pricing. The SCP approach postulates that when a market structure deviates from the paradigm of perfect competition, the degree of competitive conduct will decline and there will be a consequent decrease in output (supply), allocative efficiency and an increase in prices. This implies that according to the SCP approach; the performance of markets can be assessed based on the level of competition and efficiency in those markets. This study attempts to distinguish marketing channels and also identify traders/participants, roles and functions in the marketing chain in order to measure the structure and conduct of the market. Due to the differences in the traders scale of operation (small, medium and large), it is hard to make generalizations and speculations about the traders conduct and market structure. Hence grouping traders according to their economic and social differences is expected to give a better understanding of how markets function because participants in livestock trade operate at different scales. Existence of these strata implies a certain degree of price collusion could go on within and between strata which in

turn may affect entry conditions and thus result in changes in market structure (Williams *et al*., 2006).

The SCP framework has been criticized for being too abstract and deterministic. Some of the criticisms are that its price integration and price performance are static and suffer from spatial arbitrariness (Harris-White, 1999); its market segmentation concepts with respect to margins and transfer costs are faulty (Barrett, 1996) and it does not explain how competition among traders may affect consumers' welfare. Thus the approach fails to explain the causal links between structure, conduct and performance from structures and vice versa (Harris-White, 1999). Despite these limitations, the SCP framework remains the conventional approach for studying market institutions (Scott, 1995). This study applies the SCP to examine the livestock marketing channels, influence on the flow of cattle from the producers to the consumers in the livestock marketing system.

The Commodity Chain Approach builds on the SCP framework. It assumes vertical as well as horizontal relationships between the firms evaluating market performance and is more dynamic in following the entire commodity flow from production to the ultimate consumer. At each stage along the commodity chain, the approach permits three types of analysis namely costs and margins, spatial flows (involving places, volumes and discretions) and the social relations of trade (Leplaideur, 1992).

The commodity approach has been criticized on account of difficulty usually encountered in defining empirical boundaries of segments in the commodity chain and in distinguishing

between the exogenous and endogenous factors affecting marketing exchange. Inspite of these shortcomings, the approach is flexible and particularly applicable to the study of markets in developing countries (Williams, 2006). One of the assumptions of perfect competition in neoclassical economic theory is perfect information under which it is presumed that traders in each market have perfect knowledge of the situations in all other markets as such, inter market price differentiation only reflect transportation and handling costs between concerned markets. Transactions Cost Economics (TCE) unlike neoclassical theory recognizes that commercial activity does not occur in a frictionless economic environment (Williamson, 1986). Costs usually incurred include cost of purchase of product, and transaction cost which can further be sub divided into information (ax-ante), negotiation and monitoring or enforcement (ex-post) costs (Williamson, 1986). Transaction cost include inter alia, the costs of searching for a partner with whom to exchange, screening potential trading partners to ascertain their trustworthiness, bargaining with potential trading partners (and in some cases officials who can hold up trade) to reach agreement, transferring the product (typically involving transportation, processing, packaging and security title if necessary), monitoring the agreement to see if conditions are fulfilled and enforcing (or seeking) damages for violation of the exchange agreement.

Against the limitations of the commodity chain regarding institutions, it has been argued that institutions are efficient responses to transaction costs and postulate that institutions emerge due to high asset specificity, high uncertainty, high levels of transactional idiosyncrancy and high levels of opportunism. The transaction costs theory predicts that transaction costs increase with distance, market concentration, systemic complexity and declining clarity of

property rights and that transaction costs decline with relational contracts with standardizing quality and quantity (Marion, 1986).

The smallholder nature of livestock production in Uganda has implications for increasing markets costs because more intermediaries are involved between these smallholder producers who are located several kilometers away. In addition, the volumes of cattle handled by these cattle keepers are small requiring market agents to move around these cattle keepers to collect the few cattle that are to be sold. It is expected that if transaction costs are lowered, there would be an increase in traded volume with economic benefits to producers and traders.

In many studies, imperfections in marketing systems which lead to loss of competitiveness and efficiency have been attributed to high and sometimes prohibitive transaction costs. Even then, there are a few studies in which detailed empirical evidence is provided on the magnitude and importance of transaction costs (Staal *et al*., 1997). They observed that this may be due to the existence of conceptual and measurement difficulties when transaction costs are high enough to prevent exchange from occurring or due to the differences in the nature of the observed transaction costs. For example, the farmer's decision to sell at the farm gate rather than a more distant market may be influenced by the desire to avoid transaction costs involved in the latter option. On the other hand, the same farmer may decide to go all the way to a distant market because of the excessive profits made by intermediaries a situation which leaves returns to producers. It is desirable that observed marketing margins are commensurate with marketing services provided or marketing

functions performance, getting a product such as an animal from its producers (small holders) to the final consumer requires more individual transactions due to the small size of each sale relative to what is obtained in developed economies where livestock production is done on large scale (Fafchamps, 1997).

3.2 Theoretical Model

The study applies the Tobit model to estimate the factors that affect the cattle sales rate for the cattle keepers in the study area. An important characteristic of the data set is that the dependent variable (the proportion of the cattle sold from the herd over the past one year) is censored at the lower limit. The appropriate analytical approach is therefore the Tobit model using the maximum likelihood regression estimation technique (Tobin, 1958). The study followed Makhura (2001) and Bellemare and Barrett (2004) who used Tobit model to specify a market participation decision function. The Tobit model is specified in Maddala (1992) and Hobbs (1997) as follows:

$$y^* = \beta x + \mu \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where $y*$ is the latent variable (the potential cattle sales rate), and x is a vector of independent factors, β is the corresponding vector of parameters and μ is the error term.

The observed sales rate (y) is the actual proportion of cattle herd sold over the past one year which can be denoted as,

$$y = L_o \text{ If } y* \leq L_o$$
$$= y* \text{ if } y* > L_o \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where L_o is the unobserved lower limit of zero (i.e. no cattle is sold). The likelihood function for this model is

L ($\beta, \sigma / y, x, L_o$) = …….. (3)

$$= \prod_{y_i = L_o} \Phi \quad \frac{L_o - \beta' x}{\phi} \quad \prod_{y = y^*} \frac{1}{\sigma} \phi \quad \frac{y - \beta' x}{\sigma}$$

$\prod_{y=L_o}$ Product of L_o lower limit observations of smaller or no cattle sales.

$\prod_{y=y^*}$ is the second product over the non- limit observations reflecting different proportions of the cattle herd sold.

After maximizing the log of equation 3, to calculate the effects of changes in explanatory (independent) variables on the dependent variable (sales rate), the expectation of y (the observed proportions of cattle sold) can be derived. The conditional expectation of y based on the information that y^* lies above the limits is,

E(y/y* > L_o) = (β 'x + E ($\mu \left| L_o \beta' x < \mu \right) = \beta' x + \sigma \frac{\phi}{\Phi}$ …… (4)

Where $\Phi = \Phi[L_o - \beta' x) / \sigma]$ with corresponding definition for ϕ_1

The unconditional expectations of y (the observed proportions of cattle herd sold) without restricting y* (the potential proportion of the cattle herd that can be sold) lies below the lower limit, is

$$E(y) = P(y = L_o).L_o + P(y^* > L_o).E(y \mid y > L_o)$$

$\Phi.L_o + \beta' x \Phi + \sigma\phi$ …… (5)

Substitution in the values for L_o (zero/ where no cattle is sold), the effect of changes in the explanatory variables on the dependent variable becomes

$$\frac{\partial E(y)}{\partial x} = \Phi \hat{\beta} = (prob[y^* > 0]\hat{\beta} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

This followed Roncek (1992) and Leclere (1994) where marginal effects were computed to determine the effects of the explanatory variables on the probability and proportion of the cattle herd sold. Equation (6) gives the marginal effects of changes in the explanatory factors on the sales rate, given the censoring of the dependent variable (Roncek, 1992). The effect of a change in the explanatory factors on sales rates consists of two parts. Firstly, it is the change in the dependent variable of those observations over the limits, weighted by the probability of being over the limits; secondly, the change in the probability of being above the limits, weighted by the expected value of the dependent variable if above the limits (Kennedy, 1993; Hobbs, 1997).

3.3 The Empirical Model

Based on equation 1 above, the study estimated an empirical model which included several other explanatory variables hypothesized to affect the cattle keepers' sales rates. The empirical model was specified as shown in equation 7.

$$Y = \beta_0+\beta_1 X_1+ \beta_2 X_2+ \beta_3X_3+ \beta_4X_4+ \beta_5X_5+ \beta_6X_6+ \beta_7X_7+ \beta_8X_8+ \beta_9X_9+ \beta_{10}X_{10}+ \beta_{11}X_{11} + \mu \quad \ldots\ldots.. (7)$$

Where

Y= Sales rate (net commercial off-take rate) is expressed as a percentage

X_1 = Household size

X_2 = Gender of the household head (dummy 1= male 0 otherwise)

X_3 = Size of the grazing land owned by the household (Ha)

X_4 = Education level of the household head (years of formal education)

X_5= Access to market information (Dummy variable 1= access to the market Information and 0 otherwise)

X_6 = Distance to the nearest market (Km)

X_7 = State of the road condition (dummy 1= bad state of the road with a lot of pot holes, slippery and inaccessible during the wet season, 0 otherwise)

X_8 = Membership to the farmer organization (Dummy 1= yes 0 = otherwise)

X_9 = Average price offered for the cattle (Ugandan shillings)

X_{10} = Access to alternative sources of income (Dummy 1= one has alternative sources of income apart from livestock, 0 = otherwise)

X_{11} = Total value of milk over the past one year (Ugandan shillings)

β_0 = The intercept

β_1 - β_{11} = Are the coefficients associated with the independent variables

From the discussion in the previous chapters, it is clear that the cattle keepers' sales rate is affected by a multiple of factors. This study identified eleven factors as discussed below. Sales rate was computed as the net commercial offtake rate to represent the level of commercialization of the cattle keepers. Net commercial offtake rate takes into account of the purchased livestock by the farmer (Asfaw and Jabbar, 2008).

$$\textit{Net commercial off-take rate (Sales rate)} = \frac{\textit{(Sales - Purchases)}}{\textit{0.5(Opening stock + Ending stock)}} \textit{ X 100}$$

Household size is a useful unit of analysis given the assumption that within the household resources are pooled, income shared and decisions are made jointly by responsible household members (Ellis, 1993). An increase in the household size is expected to increase the demand for market goods thus an increased demand for cash that will subsequently increase the cattle keepers' sales rate (Fidzani, 1993). Household size was coded as a continuous variable.

Sex of the household head is a dummy variable where the male household head was coded as 1 and 0 if female. According Mapiye *et al*. (2009), adult males dominated all the cattle production activities including the sale of cattle across the production systems in South Africa. It is expected that male headed households are likely to have higher sales rates compared their counterpart female headed households.

The size of the household land holding for grazing is a continuous variable that reflects the pasture used for grazing the owned cattle by the farmer. According to Asfaw and Jabbar (2008), large areas owned by the cattle keepers had negative effect on the household decision to participate in the market as a seller but had a positive effect to participate as the buyer. It is expected that an increase in the grazing land area owned by the farmer will result into a decrease in the household's net commercial offtake (sales rate).

Education level of the household head refers to the number of years spent in formal education and is expected to positively affect the sales rate. Educated cattle keepers are more likely to use the market information more efficiently thus negotiate for a higher price for their cattle resulting into selling larger proportions of their herd.

Having access to market information can have significant impact on the ability of small scale cattle keepers to generate sustainable profits (Hobbs, 1997). Coetze *et al*. (2005) further stress that the provision of market information will strengthen the cattle keepers' negotiation during transactions with buyers and consequently prevent possible exploitation by better informed buyers. It is hypothesized that increased access by households to information would increase the sales of cattle and the livestock keeper's sales rate. Market information is coded as a dummy variable that reflects whether cattle keepers have access to market information or not.

Distance has a major influence on transaction costs according to Kyeyamwa *et al*. (2008). The impact of distance which requires transport of cattle to the markets results in imperfect and inefficient integrated markets and also reduces producers' profit margin as it results in high transaction costs. It is hypothesized that the closer a household is to the mainstream markets, the higher the tendency of cattle keepers to sell more proportions of their herds in the cattle markets. So distance has a negative effect on the sales rate, as distance increases, cattle keepers' sales rate is expected to decline. Distance is a continuous variable.

Membership to a cattle keepers' organization is coded as a categorical variable. Farmer organizations act as centres where information can be accessed (Montshwe *et al*., 2006). It is therefore expected that membership to farmer organization will increase participation of cattle keepers in the cattle markets thus increasing their sales rates.

Good transport infrastructure is a fundamental element in ensuring access between cattle keepers and markets especially in the context of developing countries. This was confirmed by Kyeyamwa *et al*. (2008) when they found that bad state of roads decreases the likelihood of cattle keepers in participating in the local market. It is hypothesized that bad state of roads is likely to negatively affect the cattle keepers' sales rates. The state of the road is coded as a dummy where bad state of the roads characterized by pot holes, slippery and inaccessible during the rainy season was coded as 1 and 0 otherwise as perceived by the cattle keepers.

An alternative source of income was coded as a dummy variable. It was expected that the households with alternative sources of income are less likely to increase their sales rate. Asfaw and Jabbar (2008) confirmed the assertion when they found that households with alternative sources of income were negatively associated with the decision to participate in the livestock market as sellers but rather positively participated in the livestock market as buyers.

Price was a continuous variable. Stable and attractive prices are a major incentive for smallholder agricultural producers (Ongile, 2002). Correspondingly low prices reduce cattle keepers' chances of realizing profits from the enterprise. It is expected that increasing prices for cattle will result in increased sales rates.

Total value of milk sold by the household during the past 12 months was a continuous variable. Serunkuuma and Kent (2001) confirmed the assertion that pastoralists have a bias towards milk production whereby the poor milkers and young bulls were sold off to reduce competition with the milkers for the limited pasture resources. It was expected that increase in the total value of milk sold will result in increased sales rates.

3.3.1 Justification for Using the Tobit Model

The study used the Tobit model because the dependent variable the sales rate (proportion of the cattle sold over the past one year) is truncated as a latent variable (Maddala, 2001). The sales rate tends to be censored at the lower limit of zero, that is, some households sold some of their livestock while others did not sell at all. Some cattle keepers who did not sell any cattle had zero value for the dependent variable. The Tobit model is the most common censored regression model (Tobin, 1958) and is appropriate for analyzing dependent variables that cannot take values below or above particular unit (Roncek, 1992). It can be used when the dependent variable is censored at upper and lower bound (Leclere, 1994). Several past studies have used Tobit analysis to study dependent variables for which a large proportion of cases have zero as the lowest possible value (Roncek, 1992). A Tobit model answers both questions on factors influencing the probability of selling (being a market

participant) and factors that determine the magnitude of sales (Sales rate). Makhura (2001) used the Tobit analysis to determine the factors that influence a farmer being a market participant and also determined the volume of livestock sales for different marketing channels used by cattle keepers in South Africa.

The Maximum Likelihood Estimates as well as marginal effects were estimated from the Tobit model using STATA computer software. The marginal effects/ coefficients indicate the amount of sales (proportion of cattle sold) resulting from a unit change in the independent variables and at the same time account for the probability of being a market participant. Although the Tobit model is a regression model, it is more complicated than the Ordinary Least Squares (OLS) model. Because a Tobit model provides a single coefficient for each independent variable despite two distinct types of dependent variables (censored and uncensored), the interpretation of coefficients in Tobit model differs substantially from the interpretation of an OLS regression (Judge *et al*., 1988; Roncek, 1992; Tansel, 2005). In an OLS analysis, a coefficient represents the effect of an independent variable on the dependent variable because the coefficient is the first order partial derivative of the independent variable. The OLS interpretation is not valid for Tobit coefficients because the Tobit coefficients represent the effects of the independent variables on the latent variables of the Tobit model (Leclere, 1994).

3.4 Data Collection and Sources

The study was conducted in the districts of Kiruhura, Luweero, Nakasongola and Nakaseke districts representing the Western and Central regions of the cattle corridor where Income Generation through Market Access and Improved Feed Utilization of beef and goat production (IGMAFU) project was running. The cattle corridor is a rangeland area measuring approximately 84,000 km^2 (almost 40% of the country) and stretches from North East to South East of the country between latitude 4^0 12' and 1^0 29'S and longitude 29^0 34' and 35^0 E. The cattle corridor has been the focus of national and international attention for the implementation of livestock development programmes aimed at poverty alleviation (Kyeyamwa *et al*., 2008). The study area is located within the agropastoral production system where livestock production is the major economic activity (Muhereza, 2003). Cattle keepers derive their livelihood from the livestock kept, seasonally move their herd in such of water and pasture and participate in livestock marketing.

Four districts namely Kiruhura, Luweero, Nakasongola and Nakaseke were randomly selected from the Western and Central regions of the cattle corridor where IGMAFU project was operating. Ten sub counties of Kazo, Nyakashashara, and Kenshunga in Kiruhura district, Ngoma, Wakyato, Nabisojo in Nakaseke district; Wabinyonyi and Nakitooma in Nakasongola district and Kikyusa and Kamila from Luweero district where livestock production was the major source of livelihood were randomly selected. From each sub county, 18 farm household heads were randomly selected from an up to date list of farmer households provided by the District Veterinary Officers in conjunction with their sub county extension staff.

Primary data were collected by a pre tested semi- structured questionnaire administered through face to face interviews to capture the underlying social, cultural and economic data. Data collected included age, sex of the household head, size of the grazing land owned, access to market information, reasons of keeping cattle , participation in the livestock marketing and channels used, road infrastructure status and challenges encountered. Secondary data to augment the research included livestock production estimates and livestock off-take rates was collected from Ministry of Agriculture Animal Industry and Fisheries (MAAIF), Uganda Bureau of Statistics (UBOS), and Uganda Beef Producers Association (UBPA).

3.5 Data Analysis

Data were entered, cleaned in Statistical Package for Social Scientists (SPSS) and subjected to statistical analysis to generate descriptive statistics. The first objective was achieved by use of descriptive statistics generated from the SPSS. The second objective was achieved by use of the structure, conduct and performance market study paradigm supported by data from the SPSS analysis. The third objective was achieved by transferring the data from SPSS to STATA version 9 in which empirical analysis was carried out to analyse the factors that affect the sales rates for the cattle keepers.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of the Sampled Cattle Keepers in the Pastoral Areas of Uganda

The characteristics of the sampled households included the respondent's level of education, household size, size of household grazing land , herd size and composition, purpose of keeping cattle, their cattle sales and the constraints they encountered in producing and marketing their livestock

4.1.1 Household Characteristics

The household characteristics of the respondents in the study area comprised of the household size, education level of the household head and the size of household grazing land (Table 4.1).

Table 4.1: Household size, Education level and Size of Grazing land of the Cattle Keepers July 2007

Characteristic	Mean	Standard deviation
Household size (Number of Persons)	10	5.41
Education level (years)	8	4.46
Household grazing land (Ha)	151.7	149.42

Source: Survey Data 2007

The study revealed that the average household size was 10 members which was close to 11 members reported by Wurzinger *et al*. (2008) among the Bahima in Nyabushozi and Isingiro districts (Table 4.1). Households with many members are likely to have more needs and

demands to be met. Since cattle is the household's major source of livelihoods; larger households are likely to be faced with increased household needs thus leading to an increase in the number of animals sold which may translate into a relatively higher sales rate. An increase in the household size and number of dependants both increase participation of small scale cattle keepers in the cattle markets. A bigger household size translates into an increased demand for market goods which will increase participation of the small scale cattle keepers in livestock markets (Fidzani, 1993) thus increasing their sales rate. However, in this study, the econometric results (Table 4.3) indicated that large household size across the western and central districts where this study was conducted did not significantly (P=0.76) affect the sales rate which contradicts the previous findings of Coetze *et al*. (2005) in South Africa. The pastoralists have changed their lifestyle. They have crossbred their cattle and sell their milk as an alternative source of income and have thus reduced number of cows.

The average number of years of formal education per farm household was 8 years an equivalent of form one (secondary education) (Table 4.1). Cattle keepers who attain some level of formal education are more likely to adopt better livestock husbandry practices such as observing recommended stocking rates and do livestock keeping as a business compared to the less educated. Education increases the ability of cattle keepers to use their resources efficiently and the allocative effect of education enhances the farmer's ability to obtain, analyse and interpret market information available. Elsewhere, Isabella and Steve (2007) reported a positive relationship between years of formal education and higher bargaining power for educated cattle keepers since learned cattle keepers are more likely to use the

existing market information more efficiently thus negotiate for a higher price and have more sales rate. The findings from this study revealed that education level was significant (10%) and had a negative relationship implying that the more educated one becomes, the lower his/ her sales rate is likely to become. This conforms to the field observations made during the study where some of the more educated cattle keepers had alternative sources of income including milk sales, crop sales, livestock trade, general merchandise (retail shops in trading centres) and other sources such as salaried employment working as parish chiefs and teachers thus reported to have bought more cattle to restock as a saving mechanism rather than sell the ones in the kraal (Fig. 2). Most of them had crossbreeds geared towards milk production than beef production most especially in Kiruhura district. This indicated that pastoralists in the cattle corridor especially in the western and central districts of Uganda no longer solely depend on cattle sales but have diversified sources of income. Similar findings were reported by David *et al*. (2001) who noted that even educated members of the of pastoral ethnic groups, no longer dependent upon pastoral production for their livelihood are inclined to continue investing in livestock (sometimes as absentee owners) since large herds guarantee subsistence and income, confer status and may provide insurance against the impact of drought.

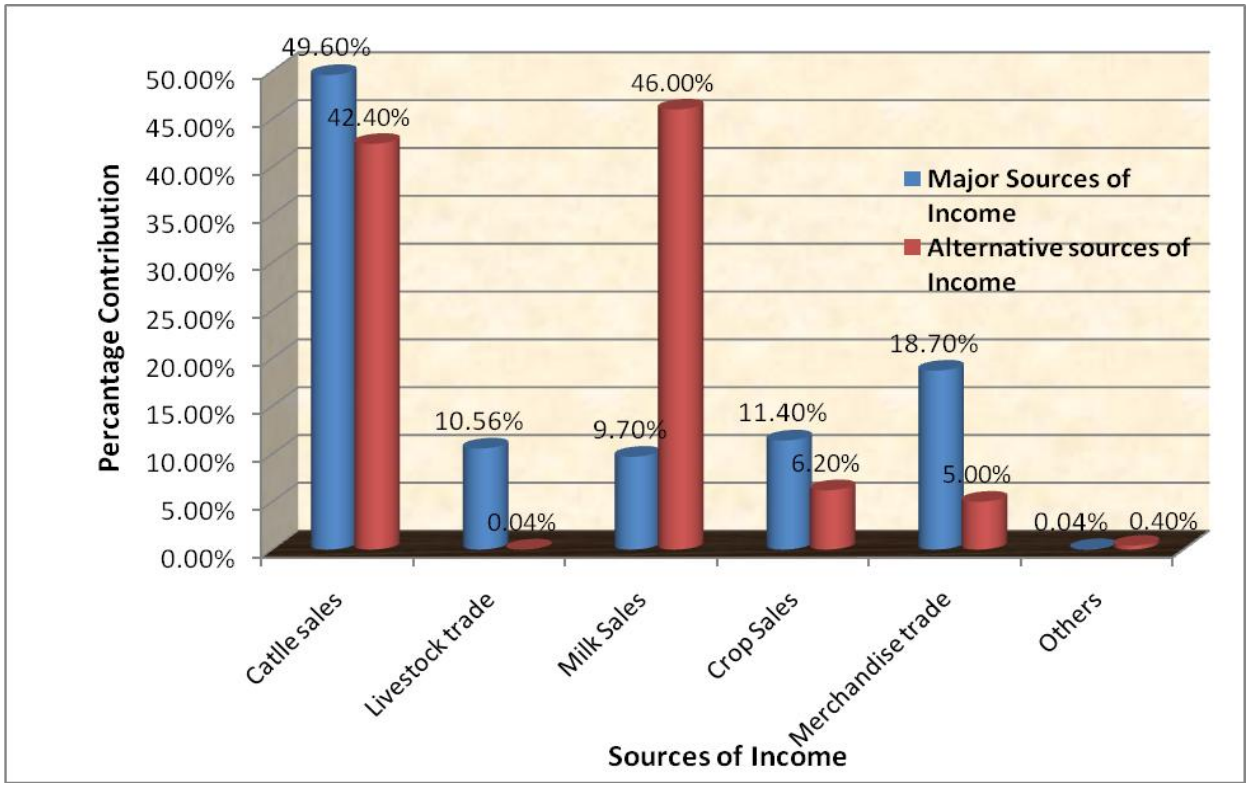


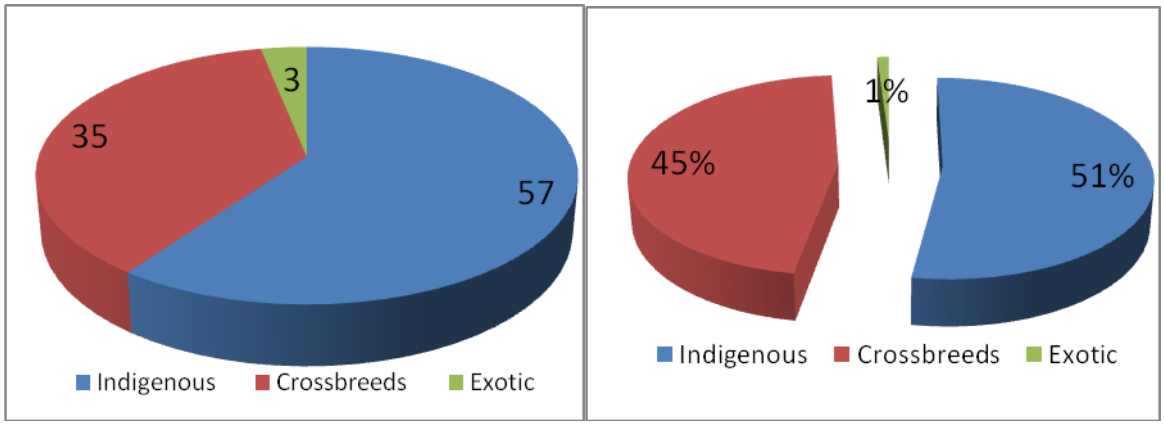
Figure 2: Sources of Income among the Pastoral Cattle Keepers in Western and Central Regions of the Cattle Corridor

The average size of the grazing land owned by households was 157.1 hectares with some households owning as small as 2.3 hectares due to increasing land pressure and few others owned as large as 301 hectares. The results in this study are however higher than the observations of Serunkuuma and Kent (2001) where some pastoralists in Nyabushozi owned an average of 119 hectares of grazing land. Pastoralists use large land expanses as well the communal grazing areas since they depend on natural pastures in the rangeland with little or no improvement to raise their cattle. The size for grazing area owned by the household was significant (1%) and negatively affected the farmer's sales rate. An increase in the size of grazing area owned by the household by 1 hectare led to a decrease in the cattle keepers'

sales rate by 5 percent (section 4.3). Asfaw and Jabbar (2008) observed that an increase in size of the household land owned had a negative effect on the household decision to participate in the livestock market as a seller. This may be so because increase in the cattle keepers' grazing area owned creates the need for more cattle for breeding and dairying than selling to the market. Households that owned large grazing area reported low levels of cattle sales but rather cited that they were in need of more cattle to fully utilize the available abundant pastures. However, due to increasing population, individualization of land under fencing and paddocking as well as alternative uses of land for cultivation, some pastoralists are being forced to dispose off some of their livestock to avoid starvation and death of their stock especially during the dry periods thus increasing their sales. This circumstantial cattle disposal provides an opportunity to carry out commercial destocking; this is a strategy that pastoralists in Burduras the Southern border of Ethiopia with Kenya have used to sell off their stock during onset of drought and buy in new cattle stock at the onset of rains (Sara, 2010).

4.1.2 Herd size, Composition and Structure

The study findings revealed that almost half of the cattle keepers (51%) in the study area kept indigenous breeds mostly Ankole cattle with an average herd size of 57 heads of cattle followed by the cross breed keepers (45%) with an average of 35 heads of cattle and lastly the exotic breed cattle keepers who consisted of a dismal 1% with an average of 3 heads of exotic cattle (Fig.3**).** The few exotic cattle kept were under zero grazing given to some cattle keepers under some development programs and International Non Governmental organizations such "Heifer Project International" and "Send a Cow".



[a]Average Herd size (Heads of Catlle) [b]Breed Composition (Percent)

Figure 3: Average Herd Size and Breed Distribution among the Pastoralists in the Cattle Corridor July 2007

Respondents keeping indigenous breeds indicated that they were kept mainly because they are hardy, can survive on poor grazing and extensive walk to water points and in search of grazing although they mature slowly and have low productivity. The slow growth and low productivity translates into delayed maturity of the indigenous cattle thus contributing to the deficit of animals that would be sold and thus low sales rate since size of the animal offered for sale affects the price and amount of money earned upon being sold. Pastoralists carry out breed improvement to increase productivity especially milk output following introduction of Holstein –Friesian cows to rehabilitate the diary sector and meet urban market demands (Mpairwe, 2005). Cattle keepers reported to prefer cross breeds to pure exotic breeds because of their ability to fetch higher prices than local breeds due to their heavier body weight and at the same time are hardier to harsh conditions and diseases than pure exotic breeds. Breed improvement towards a higher milk productive herd has contributed to the

decreasing cattle keepers' sales rates since many sales made were of cull cows and bull yearlings and small numbers of improved cattle breed that were being kept.

The cattle keepers in the study areas also practiced breed diversification whereby they were raising two separate herds on the same land especially in Kiruhura district, an improved breed herd alongside a local herd of pure local cattle as a risk management measure. This was a result of past experience where the pastoralists that rushed into breed improvement prior to adopting better animal practices and also due to the civil strife of 1979 that led to inaccessibility to acaricides experienced heavy animal losses. In fact, some pastoralists were reluctant to start improvement despite knowing that it will enhance productivity of their herds. Serunkuuma and Kent (2001) also noted that the Bahima of Nyabushozi kept separate herds of local and improved cattle breeds. Herd size is a very important factor in herd accumulation in the pastoral production systems. Climatic shocks cause sharp decrease in herd size and accumulation and herd recovery after shock depends on the pre climatic shock levels of herd size (Santos and Barrett, 2005). Thus herd accumulation is an effective way of reducing risks by the pastoralists (Getachew and Mc Peak, 2004). The respondents indicated that they sold more cattle from the local herds compared to the improved herd because the improved breeds would have to be sold at higher prices and yet the traders were not willing to pay the amount of money requested. This led to easy sale of a high number of local breeds compared to the improved ones.

The structure of the respondents' cattle herds were mainly dominated by female cows constituting 50.4 %, followed by heifers (24.3%), calves (15.8%) and mature bulls 1.5% (Fig.4). As can be noted in this figure, the percentage composition of the bulls was low because the bulls were sold while still young as yearlings. The pastoral herds in the study area were structured to provide supplies of milk, high rates of reproduction, and rapid herd recovery following disasters thus contributing to the low observed cattle sales rate since sale of the productive cows would compromise the pastoralists' herd milk production and herd growth objectives. These observations concur with the findings of O'Leary (2006) among the Rendile of Marsabit Kenya, Serunkuuma and Kent (2001) among the Bahima of Nyabushozi Uganda and Ocaido (2003) among the pastoralist of Mbarara who noted that pastoralist kept a higher female cattle composition geared towards herd build up and milk production. Young bulls are sold early after weaning to avoid competition for pasture with the productive female cattle leaving one or two mature bulls for breeding purposes. This practice can be taken advantage of in terms of policy and development plans for the pastoral communities in Uganda. The immature bulls and other culled animals especially the non milking cows and heifers can be fattened to produce heavier weight and better quality meat animals which can be sold at higher prices than disposing them off early. Setting up of finishing feedlots in the pastoral areas tapping on these immature bull sales can contribute significantly in improving on the sales rates and income of the pastoralists in the cattle of Uganda.

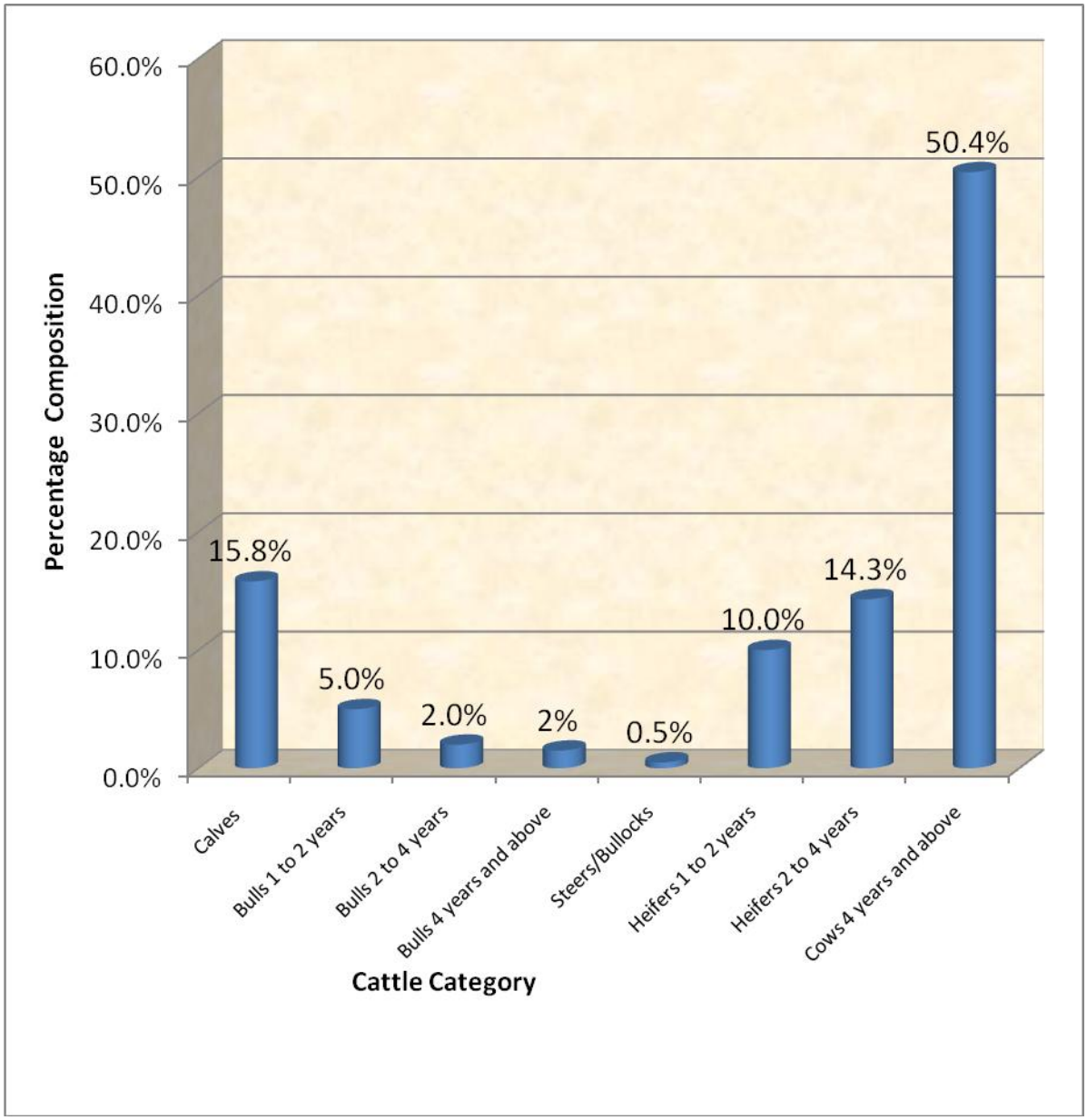


Figure 4: Cattle herd Structure of the Pastoralists in the Central and Western Regions of Uganda, July 2007

4.1.3 Purpose for Keeping Cattle

The respondents indicated that there was a wide range of reasons for which households kept cattle which varied across households reflecting the individual household's needs either directly (e.g. food) or indirectly (e.g. income) as shown in Table 4.2 below. These results

revealed the low importance attached to keeping cattle for commercial purposes (33.1%) as opposed to provision of security / insurance (78.9%) followed by being a store of wealth (66.3%) and source of income (44.6%) to finance the expected expenses such as school fees, purchase of animal drugs, acaricides and payment of labour.

Table 4.2: Purposes for Keeping Cattle by Pastoralists

Cattle Purpose **N= 180**	**Strongly Agree (%)**	**Agree (%)**	**Disagree (%)**	**Strongly Disagree (%)**
Prestige	25	53.3	16	5.6
Way of Life	42.7	53.3	4.4	00
Store of Wealth	66.3	30.0	2.8	1.1
Security/insurance	78.9	21.1	00	00
Food	50.2	47.8	2.0	00
Source of Income	44.6	48.3	7.8	00
Commercial Purposes	33.1	16.1	26.7	23.9

Source: Survey Data 2007

Use of cattle as a store of wealth was also reported by Serunkuuma and Kent (2001) who noted that pastoralists in Nyabushozi county, Kiruhura district used cattle as a store of wealth instead of banking services. The more likely pastoralists use banking as store of wealth or saving storage alternative, the more likely they were to regulate their cattle herds. Kosgey *et al*. (2008) also found that most pastoralists in Kenya kept livestock /small stock for regular cash income or as an insurance against emergencies. Daniel (2008) also found similar practices among the Borana of Ethiopia where pastoralists sold their cattle to meet

acute cash needs. The findings in the present study show that the pastoralists in the study area attached low importance to commercial livestock keeping, in effect explaining the low off take since the cattle keepers' objective is not keeping cattle for selling but rather to maximize milk production and herd growth; thus the few cattle sales that are made are meant for problem solving but not as intentional selling to earn profit from their sales. Fafchamps (1998) contended that unless herders have alternative access to saving institutions so that they can liquidate livestock if they fear losing animals, they will tend to cling onto their assets as highly imperfect forms of insurance. Thus there is need to design acceptable alternative investment opportunities favourable for pastoralists. Consequently, livestock becomes less important as a means of self- insurance, thus reducing the market risks faced by pastoralist. Therefore they will increase their offtake thereby lowering stocking rates to levels that reduce widespread losses during droughts. As a result, it will stabilize livestock throughput volumes and enhance incentives to invest in meat processing capacity.

4.1.4 Cattle Sales among the Pastoral Cattle Keepers

Ninety six percent of the respondents reported to have participated in livestock marketing during the previous calendar year. A sales rate of 17.6% was recorded amongst the respondent cattle keepers in the cattle corridor which was close to 18% reported in other rangelands like in the grasslands of Namibia (15%-25%) and Brazil which fluctuates between 15 to 18% (FAO, 2006). This was attributed to the structure of their cattle herds that were predominantly females and with few bulls designed to produce milk and achieve high rates of reproduction and to recover quickly from shocks (drought and diseases) to the

system which would be compromised by higher sales rates. The willingness of herders to dispose off productive animals, the largest population of the herd is usually a sign of extreme economic and social stress. Pastoralists are more likely to value livestock as a source of income in kind (milk and reproduction) rather than cash under which circumstances these income generating assets will be held until generating value falls below salvage (during drought). This partially explains the limited supply response of pastoralists to favourable market conditions (high prices). Coppock (1994) noted that pastoralists often have low off takes of around 5% to cope with drought, their cash needs and availability of alternative forms of investment.

The results of this study clearly revealed that pastoralists sell their animals despite the different reasons that instigate sale of their cattle. Respondents indicated that only 2.3 % of them sold their cattle as a business while 97.7% sold to meet their immediate cash needs. This observation concurs with the hypothesis that livestock sales are largely driven by households' immediate cash needs as postulated by Osterloh *et al*. (2004). School fees, medical bills, payment of farm labour and purchase of household needs were the most common immediate needs for which cattle were sold (Fig. 5). Elsewhere, cash proceeds from sale of ruminants in Kenya were used for paying school fees, paying medical bills and a small percentage (4 %) on restocking (Kosgey *et al*., 2008). The majority of the respondents (70%) reported to use the cash proceeds from cattle sales to pay school fees (Fig. 5). This observation corroborates with the findings of Barton *et al.* (2001) who found that many pastoral households need to find cash throughout the year to pay for school fees because they recognize the value and availability of education for their children therefore

have to sell their livestock. Similar findings were reported in Ethiopia where pastoralists were found to have sold their livestock to cover cash needs to fill the household food gaps, clothing, medical fees, social events, credit repayment, payment of labour, buy other inputs as well as forced sale due to the feed shortage during the dry period (Gebremedhin *et al*., 2007; Ayele *et al*., 2003).

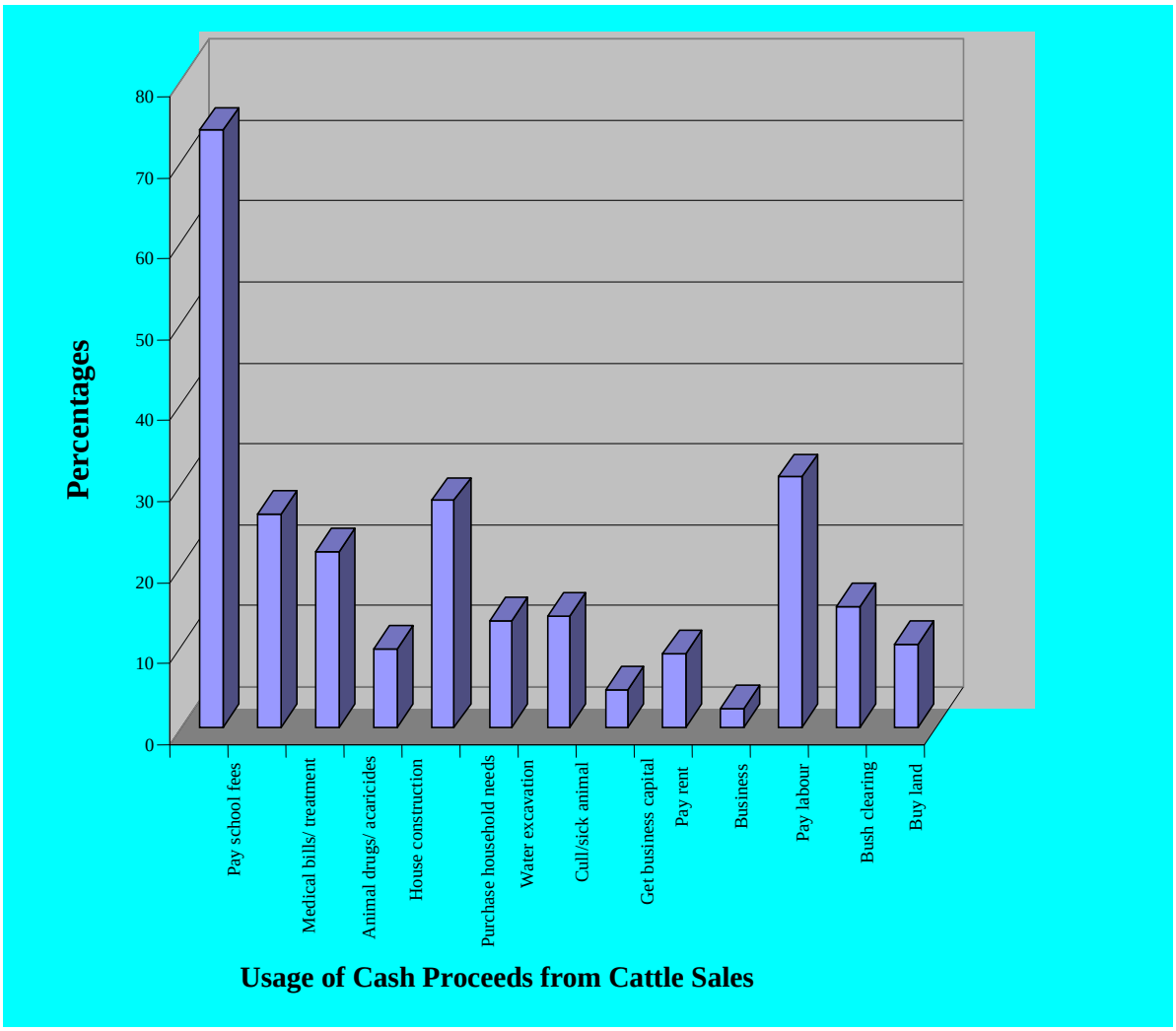


Figure 5: Utilization of Cash from the Sold Cattle by Pastoral Cattle Keepers

Cattle keepers' perception on livestock sales is based on the decision making behaviour. They consider livestock as a productive asset that generates future income therefore the incentive to sell or buy animals in response to shocks and / to price fluctuations is more complex and militates against sales. Mcpeak (2004) noted a similar observation in Northern Kenya. The possible reasons why most cattle keepers (78.9%) were more concerned with their security / insurance than profits could be due to the ease of animal liquidation into cash when need arises instead of holding liquid cash which depreciates due to inflation thus loosing value and purchasing power. As such, livestock serve as banks-on-hooves and productive assets that generate future household income in form of calves, milk and meat therefore pastoral households accumulate herds over time (Lybert *et al*., 2004). Gebremedhin *et al*. (2007) found that average rural households in Ethiopia with limited investment opportunities were using cattle as a store of wealth and hedge against inflation. Imai (2003) noted that pastoralists in Kenya used livestock as a liquid asset due to the feeling of uncertainty about the future, enforced by long periods of inflation and weak social and economic institutions.

Sometimes cattle wealth is used directly through slaughtering and meat consumption but is more often sold to purchase food, pay school fees as a method of consumption smoothening (David *et al*., 2001). Cattle keepers across the 4 districts preferred keeping cattle on the farm than hold liquid cash at hand or at bank. They argued that whereas the liquid cash held depreciates due to inflation and loses its purchasing power, the cow will have produced a calf as a profit. If there is need for money, they will sell off mother cow at the same or higher price better still and at the same time remain with a calf. However, it should be noted

that cattle keepers have at times not responded to the demand, held onto their livestock in the face of rising prices and sell when cash constrained (Bailey *et al*., 1999) not when it is profitable. As a consequence, they are offered low prices which translate into low levels of income. Pastoralists prefer minimization of risks to optimization of incomes (Djamen *et al*., 2008). Anderson *et al*. (1997) found that the number of female cattle rose sharply in 1990s even as cattle prices rose among the cattle ranchers in the United States of America. Cattle keepers hold onto their animals despite the high prices may be because livestock offer the best rate of return of asset in the pastoral areas, thus their prices increase with improvement in underlying forage and water available, reflecting greater animal productivity as noted by Barrett *et al.* (2004) among the pastoralists in Northern Kenya and Southern Ethiopia.

4.1.5 Types of Cattle offered for Sale among the Pastoral Cattle keepers

The type of cattle offered for sale was largely a function of the type of stock cattle keepers were prepared to sell as well as the herd structure. Fifty eight percent of the respondents reported to have sold cows aged between 4 to 10 years followed by twenty six percent who sold immature bulls aged between 12 to 48 months then nine percent sold bulls aged 4 to 7 years while seven percent sold heifers aged 12 to 48 months (Fig. 6). Important to note is the age at which animals are sold; sixty seven percent preferred selling old animals of 4 years and above. Low levels of nutrition combined with the poor local breed result in delayed reaching a marketable age thus contributing to a low offtake rate.

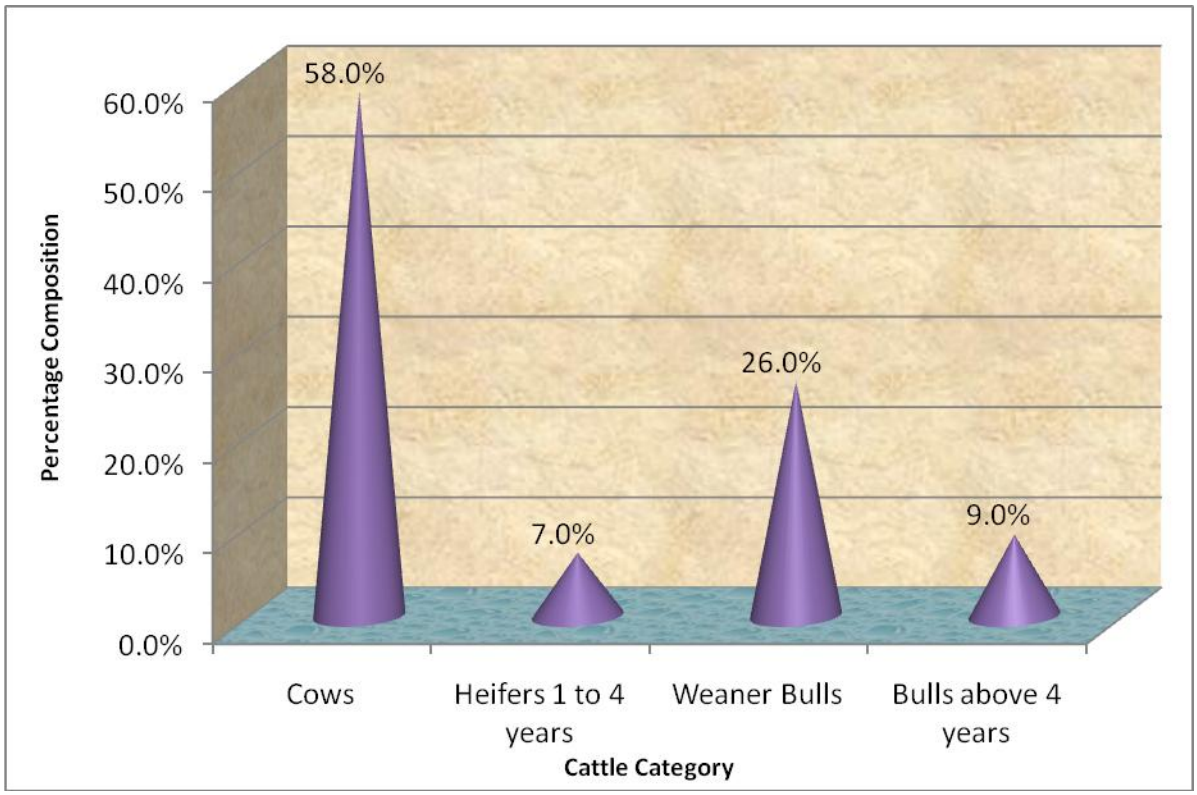


Figure 6: Category of Cattle mostly Sold by the Pastoralists in the Western and Central Regions of Uganda, July 2007

The pastoral herds are dominated by female cattle (74.7%), the majority being cows (50.4%) aged 4 years and above. Therefore the cattle keepers sell culled cows because they are the majority of the available animals. The sales are also influenced by the magnitude of immediate cash needs such as school fees, medical bills which usually requires large sums of money thus making mature culls cows the appropriate target for sale. In addition, the pastoralists in the cattle corridor of Uganda kept dual purpose breeds (i.e. mix of milk and meat animals) therefore pastoral herders offer cull cows, low or poor milk producing cows, infertile heifers for sale as a way of balancing the marketing preferences against the fundamental pastoral considerations such as securing the future reproduction of the herd and

maximizing milk flows. John (1987) reported that when herders are confronted with the necessity of selling cattle, they prefer to restrict such offtake to non productive elements such as sterile heifers, non- breeding males and bull yearlings. Sale of immature bulls was reported to be influenced by the farmer's strategy to reduce pressure on the pastures, reduce milk consumption and allow quick improvement in the body condition of the lactating cows. Marshall (1990) and Semenye (1980) had earlier observed that pastoralists when stressed may be forced to cull male animals shortly after birth to reduce competition with humans and female calves for milk. The sold cows and weaner bulls due to stress and pressure reduction on the grazing pastures usually fetch low prices compared to when they have been fattened and sold at a later date when prices have improved. The cattle sales as bull yearlings and cow culls reported by the cattle keepers in the study presents an opportunity to purchase and castrate the weaner bulls and the poor body conditioned cows, fatten and sell them at better prices at later time. The fact that cattle keepers reported to have sold some of their cattle in order to solve some problems shows that they are willing to sell some of their livestock due to cash needs and this can be taken advantage of by establishing strategic feed lots in an effort to commercialize livestock production in the pastoral communities.

4.1.6 Major Sources of Cattle for Stocking among Pastoralists

Results presented in figure 7 revealed that 84.6% of the cattle keepers acquired their animals from relegated births, 54.1% inherited their animals and 67.4% bought their herding stock from the market as well as 40.6% of the replacement stock. Herding stock acquired through gifts/ exchange locally referred to as "*Empano*" accounted for 70.2% of the respondents and

only for 6.9% of the replacement stock. While pastoralists actively use the markets to off load animals in small quantities, restocking is typically relegated to births than purchases. It was observed that animal births are more important than purchases from the market in building and maintaining the size of the cattle herd. Generally pastoralists in western and central Uganda, depend on the relegated births within their herds, inheritance and social networks in form of gifts to acquire, build and replace their herds than buying from the livestock market. They use livestock markets more in selling than in buying cattle. Similar results were reported by Wurzinger *et al*. (2008) who found that majority of pastoralists replace their breeding stock from their own herd, from neighbours, friends or relatives and to a lesser extent through purchases at local markets. The Bahima have an informal insurance plan through which they insure each other against the risk of total loss of cattle. If a Muhima loses a significant number of cattle usually to disease, he would be almost guaranteed of at least a partial compensation from friends and relatives. Therefore, although these people have a special love for their cattle, they will give some of their own heifers to friends or relatives who have lost cattle, knowing that should it happen that they suffer such losses, those who had been helped will reciprocate. Barrette *et al*. (2004) noted a similar scenario among the pastoralists in Ethiopia and this may partially be attributed to lack of cash liquidity since most cattle keepers sell due to immediate cash needs.

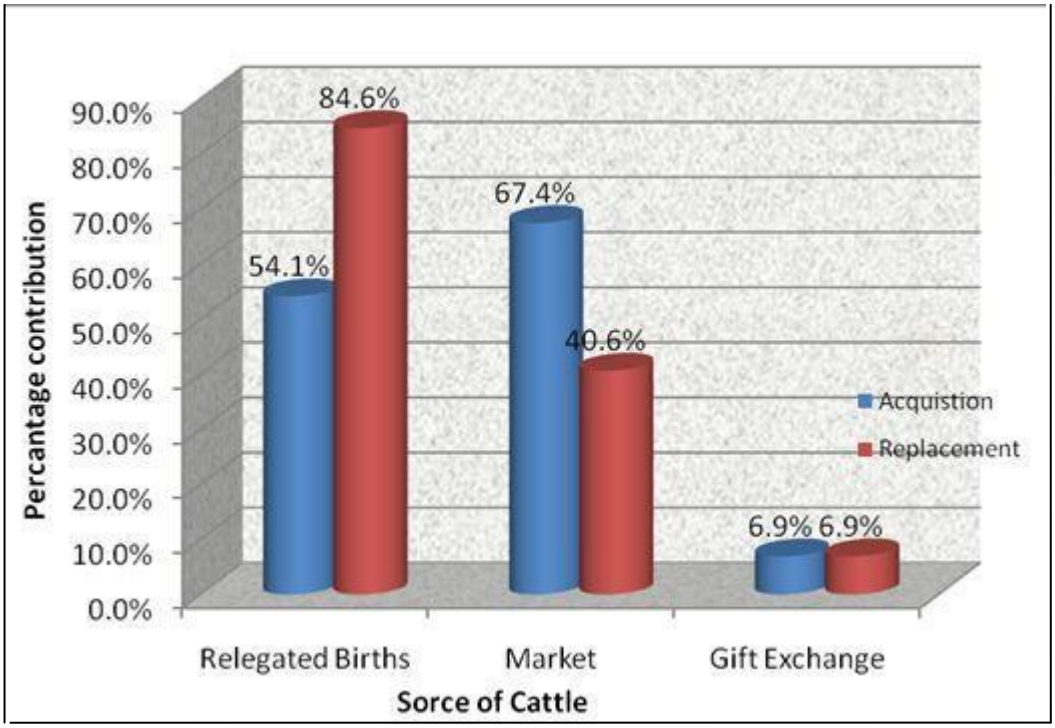


Figure 7: Major Sources of Cattle for Pastoral Cattle Keepers

4.2 Cattle Marketing System among the Pastoralists in the Cattle Corridor

4.2.1 Cattle Marketing Channels

Cattle marketing in the study area encompassed the performance of all business activities which involved moving the animals from the producers (cattle keepers) to the consumers. The system is complex whereby many actors play different roles of transporting, brokerage and financing the trade all of which have implications on the pricing mechanism (Ajal and Adesehinwa, 2007).

Livestock trade was based on the live animals and the major value added activity of collectors, traders and abattoir dealers was transfer of live animals from one location/ owner to the other. Both producers and traders were involved in selling and buying of Cattle. Every

producer marketed animals individually, thus sellers usually sold animals to whoever offered higher prices.

Information presented in figure 8 revealed that trade in live animals in the cattle corridor generally starts with collection of animals from the farm gate and village markets where local cattle keepers and traders visit cattle keepers to buy small number of animals per transaction. The small traders and speculators who buy animals with hope to sell them at higher prices to earn a profit bring their livestock to the local markets. Traders purchase a fairly large number of animals to sell to the primary markets. The primary markets usually operate on a weekly basis. In the secondary markets, both smaller and bigger traders, butchers, abattoir dealers from the terminal markets come to buy livestock. The secondary markets usually operate fortnightly and the stock transacted in is mostly destined for slaughter. In the terminal markets big traders and butchers transact in large numbers of animals mainly for slaughter. The terminal markets are usually abattoirs, slaughter houses and across border trade. The observed livestock marketing system (Fig.8) within the Ugandan cattle corridor is a replica of those operating in other pastoral production systems reported by Ayele *et al*. (2003) in Ethiopia and Williams *et al*. (2006) in West Africa.

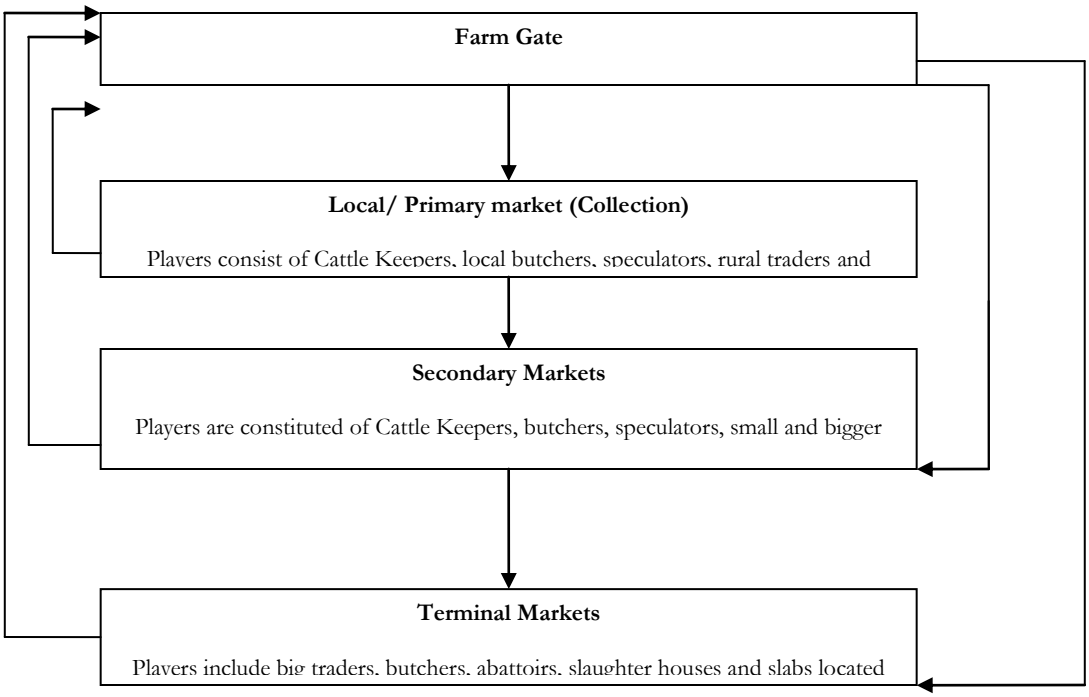


Figure 8: Cattle Marketing Channels for the Pastoralists in the Cattle Corridor of Western and Central Uganda

4.2.2 Cattle Marketing Outlets

The survey revealed that 96% of the respondents had participated in livestock marketing in the last calendar year with most sales through the abattoir dealers (56%), followed by local markets (18.2%); 16.3% sold to fellow cattle keepers and 10% sold to butcheries (Fig.9). A different scenario for small ruminants was reported by Kosgey *et al*. (2008) who found that pastoral cattle keepers in Kenya sold their small stock to butchers, followed by individual cattle keepers, auctions and hardly ever to abattoirs; this suggests a possibility of competitive prices.

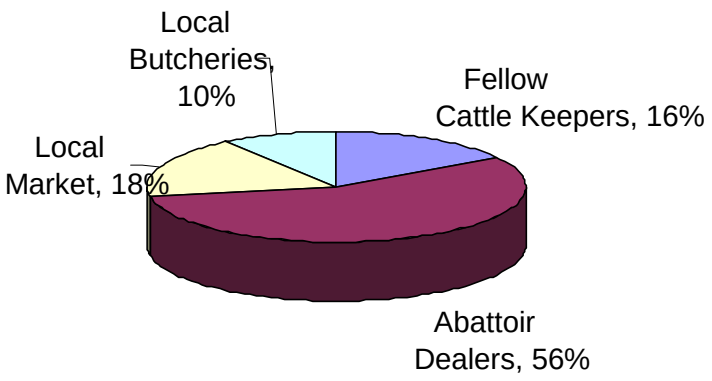


Figure 9: Marketing Outlets used by the Pastoralists

Source: Survey Data 2007

Abattoir dealers dominated sales because they are the major source of information to cattle keepers, assembled cattle from various cattle keepers and organized delivery which reduced their transaction costs and unit transport cost enabling them to offer higher prices than other buyers. Over the years, a close relationship has been built between cattle keepers and abattoir dealers. Sometimes they offer loan facilities to cattle keepers who sell through them; recovering the loan when selling their cattle which strengthens their relationship. Creating and sustaining reputation and trust between buyers and sellers is an important strategy for attenuating transactions costs that leads to efficiency enhancing repeat transactions thus reducing transaction costs and more efficient marketing. Fafchamps and Minten (1999) reported that relationships play a wide variety of roles in agricultural trade such as provision of commercial advice, information and risk sharing, credit provisions and prevention of contract breach. Jean- Joseph *et al*. (2003) noted that vegetable wholesalers in South East

Asia-Vietnam treated better their respected suppliers with whom they had built relationship over years than the less regular ones from whom they purchased when necessary.

Local markets were the second mostly used channel because there were several traders in the market thus reduced chances of colluding and depressing prices amongst themselves. Fellow farmer sales were high because cattle keepers selected specific classes of animals with desired traits such as coat colour, horns size and shape, fertility, milking history for breeding purposes (Wurzinger *et al*., 2008) thus offered higher prices than local butcheries. Duvel (2003) also noted that 80% of the cattle keepers in Northern Namibia sold to their neighbors/ cattle keepers anticipating to receive some help in the future.

Government policy on liberalization has greatly contributed to the strength of livestock marketing system within the cattle corridor. As result, considerable volumes of livestock have flowed through the various channels as smallholder producers attempt to get the utmost benefits from their marketed animals and competitive efforts on the part of traders to ensure the best possible deals. Cattle keepers who sold most of their animals at the farm gate reported doing so as a strategy to avoid the high transport, handling market and transaction costs that would be involved in selling at the primary / secondary collection markets. In addition, they are in position to determine price for their stock (Nkosi and Kirsten, 1993).

Butchers provide basic marketing services for cattle keepers (10%) who are unable to market their cattle efficiently and profitably through other existing formal channels. Nkhori (2004) reported that cattle keepers were satisfied with sales to butchers because of good

prices they received and the strong bargaining power they had in determining the prices of their stock. Nkosi and Kirsten (1993) also argued that since rural stock owners sell cattle whenever in need of cash, butchers are of importance in that regard.

Given that most animals were destined for abattoirs through abattoir dealers, cattle keepers can organize themselves into association/cooperatives for collective cattle marketing which will help them to reduce excessive price fluctuation, exploitation by middlemen, reduce transport costs through collective transportation to the abattoir as well as negotiating a contract to supply their livestock directly to the abattoir. This is an arrangement that cattle keepers in Ethiopia have benefited from in collaboration with Luna export abattoir. The abattoir arranges for the producers to visit the abattoir to create appreciation of the process and thereby encourage them to increase production and supply of animals of the desired quality.

4.2.3 Market Information

Fifty five percent of the respondents reported not to have received market information while forty six percent cited to have accessed it. Those that received the market information, 58.7% got it from fellow cattle keepers, 21.7% from traders 10.9% from the family members and 4.3% received equally from the radio and farmer groups (Fig.10). There was lack of easily accessible and reliable formal market information such as quality and quantity requirements, prices, delivery time needs. These at times resulted in price slumps at the abattoirs, mistrust and weak relations between the producers and traders thus contributing to decreasing efficiency of the cattle trade transactions.

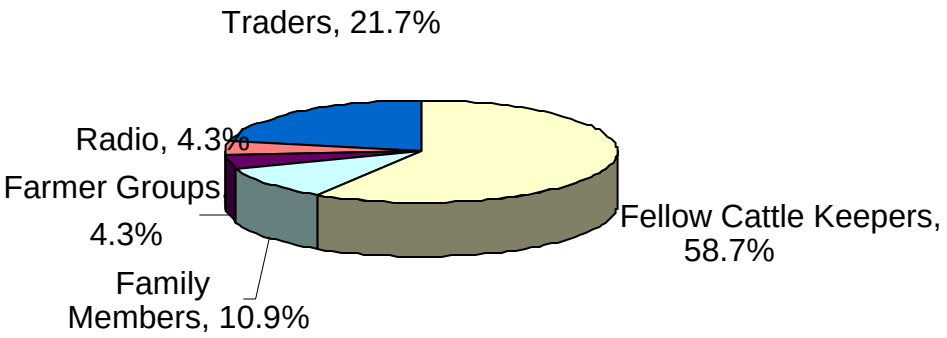


Figure 10: Major Sources of Market Information among Pastoral Cattle Keepers

Source: Survey Data 2007

Traders at times took advantage over cattle keepers due to lack of weighing stations thus they underestimated the live weight of the animal on sale so as to negotiate a lower price thus exploiting farmer since price was agreed between the cattle keeper and the trader on basing on the eye ball observations. Smith *et al*. (1999) also found that pastoralists in East Africa lacked livestock market information especially the prices. Similar observations were made by Gebremedhin *et al*. (2007) in Ethiopia where cattle keepers and traders had very little or no access to formal market information although traders may be better informed about the market conditions and prices than cattle keepers because of their networks. This resulted into information asymmetry where the traders have more information than the cattle producers which is a market imperfection thereby frustrating negotiations between the sellers and traders. Respondents reported to depend on actual market day information or market information obtained from fellow cattle keepers, traders, relatives, friends and farmer groups for prices and selling decisions. Absence of market infrastructure creates an information asymmetry that disadvantages producers. Without weighing stations and

grading systems, traders and cattle keepers relied on the their knowledge in reaching a sale price and traders are likely to have better information; and because traders have been engaged in cattle trade for a longtime and they can look at the animals and know what they weigh, the cattle keepers don't have the same expertise so they are cheated. Subsequently lower prices offered were a disincentive to the cattle keepers who in turn offered few heads of cattle resulting into low cattle sales rates.

Prices offered for cattle on sale were significant (5%) and positively influenced the livestock keeper's sales rates. An increase in the price of cattle by Uganda shillings 100 would lead to increase in the probability of cattle keepers' sales rate by 1 percent. This is an indication that better prices can be used as an incentive to cattle keepers' putting more cattle on market for sale. As observed in Figure 11, high volumes of sales correspond with periods of onset of drought (June/July) and school reporting days (January, May and August) as well as festivities especially Christmas (November/ December) when cash demands are high. Some cattle keepers reported forced sales during periods of severe drought to avoid high incidences of morbidity thus affecting their herd structures and livelihood sources. Cattle keepers were particularly vulnerable during the drought periods in which they had to sell animals to purchase grain. This is worsened by the long distances they have to move to market their animals and the condition of their animals deteriorates during the journey. Because it is unlikely that the animal would survive the return journey, pastoralists have become "price takers", they must accept prices offered even when they know they are unfair, observations similar to those made by Robin (2005).

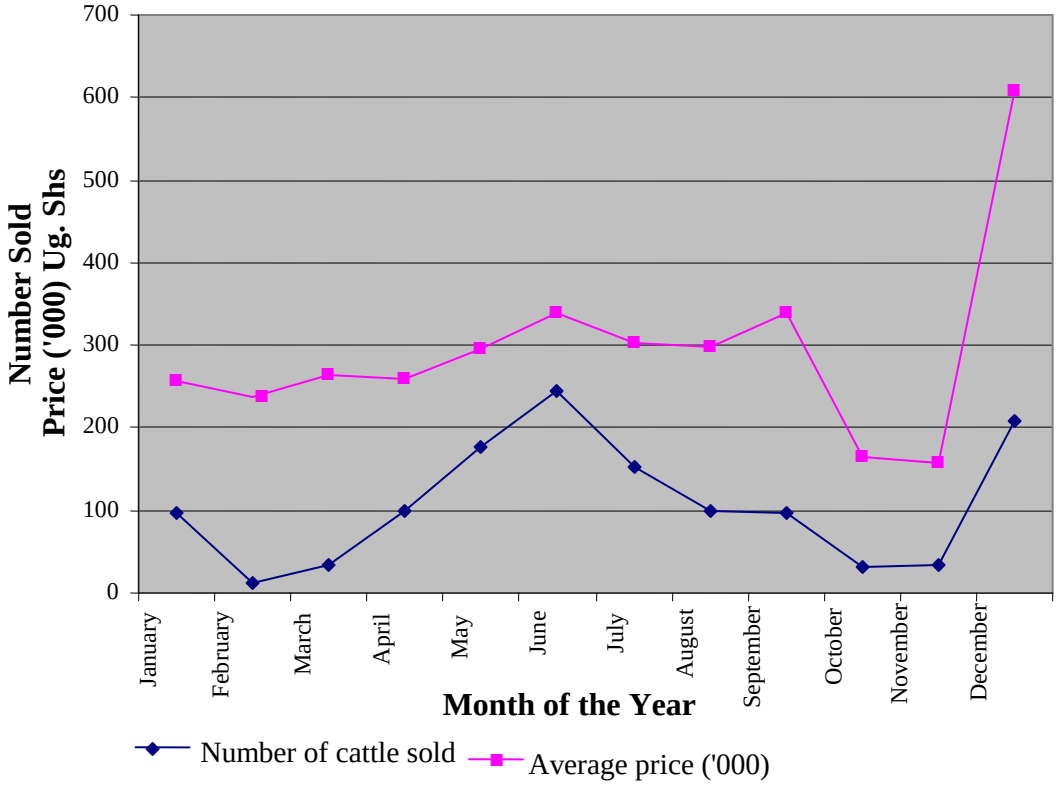


Figure 11: Relationship between Cattle Sales and Price (January -December 2006)

Source: Survey Data 2007

These stressed sales can be taken advantage of to carry out commercial destocking, where the excess stock above their rangelands carrying capacity can be marketed before the onset of drought and restock when the pastures have improved. Sara 2010 noted that the pastoralist in Ethiopia have used commercial destocking to ensure continued steady supplies of household needs during the drought periods as they sell cattle at the onset of drought and buy again at the onset of rains from their counterparts across the border in Kenya. Wurzinger *et al*. (2008) noted similar trend among the pastoralists in Mbarara and Isingiro districts. The results (Fig. 11) revealed a continued sharp decline in the number of animals

offered for sale despite the fairly high prices during the period of June to September. During this period, a large number of animals were offered during June at the onset of dry periods, as the drought progresses through July, there were forced sales due to water and pasture Scarcity. With the onset of rains in mid August, there were very few animals for sale, the few remaining started to realize increased productivity in terms of growth and milk production thus there was little /no incentive for the farmer to sell. This trend was apparently so during the months of September through October because prices improve with the net value of animals offered for sale as determined by the prevailing health and range conditions.

Fewer cattle were offered for sale during the rainy periods of February to April despite the high prices prevailing. This was because of the relatively high pasture availability of (both in quality and quantity) in the area of study which improves the productivity of the animal thus enhancing milk production for household consumption and sale during the rainy season. Therefore few households were willing to sell their cattle because the cattle keepers in the study area balance long term herd building objective with short term consumption smoothing objectives when deciding whether and what to sell (Osterloh *et al*., 2004). These findings are important for the promotion of livestock commercialization in the pastoral communities. This implies that if pastoralists are offered a higher price for their livestock, they will be willing to sell especially during dry periods and times of acute cash needs (e.g. school reporting days). This situation can be taken advantage of by designing livestock production conditions especially the availability of good quality feeds during the dry period to enable the production of suitable livestock for the market on a year round basis.

4.3 Factors Affecting the Livestock keeper's Sales Rates

Econometric analysis results of the Tobit model estimating the factors affecting cattle sales rate among the pastoral cattle keepers are presented in Table 4.3. Of the 11 independent variables hypothesized to affect sales rate; value of milk sold, distance to the market, sex of the household head, market information and price had a positive and significant effect while education, road condition, size of the grazing area owned and alternative source of income were significant and had negative effect.

It was estimated that the total value of milk sold over the past one year was significant (5%) and positively influenced the livestock keeper's sales rates. An increase in the total value of milk sold by shillings 100 holding other factors constant would increase the probability of a farmer's sales rate by 10 percent. This implies that the more money the pastoralist earned from milk sales the more likely the farmer would increase the cattle sales rate. This corroborates the claims made by Kisamba – Mugerwa (1995) that milk is the main product of the pastoral livelihoods (although meat and blood meal are also important) and further confirmed by the findings of Serunkuuma and Kent (2001) which stated that pastoral herds are biased towards milk production.

Table 4.3: Tobit model Estimates for Factors affecting Cattle Keepers' Sales rates.

Explanatory variable	Coefficient	Standard Error	P Value
Sex	0.85559	0.3283	0.013**
Household size	0.00532	0.01701	0.756
Education level	-0.04994	0.27677	0.082*
Grazing Area owned	-0.05014	0.01617	0.004***
Alternative source of income	-0.36418	0.19731	0.073*
Distance to nearest market	0.16555	0.08382	0.056*
Farming organization	-0.18194	0.19322	0.353
Cattle Prices	0.11407	0.04986	0.035**
Road condition	-0.17608	0.07360	0.022**
Access to Market information	0.11398	0.04897	0.026**
Total value of milk sold	0.00003	0.00001	0.021**
Constant	-1.32666	0.5884	0.131
Pseudo R^2	0.2590 ; *** 1 %, ** 5% * 10% level of significance		

Source: Survey Data 2007

Pastoralists have herds bias towards milk production whereby male cattle are considered to be of less value and sold off young usually as yearlings to prevent them from competing with the cows (milk producers) for limited feed resources. This selling of young bulls combined with the cullings of none and poor milkers contribute to the increase in the livestock keeper's sales rates although the volumes transacted in are usually very small with the major goal of meeting household immediate cash expenditure. This agrees with the findings of Walters- Bayer and Wolfgang (1992) which suggest that pastoralists mainly maximize the use from livestock they keep rather than the actual market value of their stock.

Distance to the nearest livestock market positively and significantly (10%) influenced the sales rate. Holding other factors constant, an increase of the distance to the market by 1 kilometer would increase the probability of raising sales rate by 0.2. This is contrary to results of previous studies whereby distance to the specific market destination was one of the elements that condition prices observed at that location (Isabella and Steve, 2007). Long distances increase transaction costs which in effect reduce the prices offered for a given class of animal. Remote location of most communal cattle producers coupled with poor road networks result in high transaction costs especially transport costs thus reducing the price the traders are prepared to pay for cattle (Musemwa *et al*., 2008; Makhura, 2001). Nkhori (2004) noted that even if cattle keepers are in areas with good linkages, the distance from the markets tends to increase transaction costs. The further away the cattle keepers are from the market, the higher the transport costs. As a result, it is a disincentive to the seller who under normal circumstances offers less number of animals for sale. Bailey *et al*. (1999) also identified long distances to the market that require transportation of livestock as the most important weakness to livestock marketing system in Kenya. This is in agreement with the observations of Kyeyamwa *et al*. (2008) that long distances and travel time are correlated to the transport costs; high transport costs increase the transaction costs thus deterring market participation by a pastoral household among the cattle keepers raising cattle from natural grasslands of Uganda. However, findings of this study indicate that a farmer located further away from the market offers more cattle for sale which is contrary to the above argument. This result implies that distance may not contribute positively towards the decision to sell cattle but once the household has decided to, the distance may positively influence a farmer to increase cattle sales to avoid multiple trips a farmer would have to make if he were to sell

in small numbers. Given the distances involved, transport costs represent a major cost to the producer well away from the market and selling in large numbers may reduce the unit cost of transportation. Nkhori (2004) had made similar observations among cattle keepers in Botswana. Cattle keepers cited the challenge of distant located livestock markets which made it too expensive to drive one or two animals, as way of minimizing transport, lunch and cattle drivers' fee so they increased the number of animals to be driven to the livestock market for sale and at times collaborated with neighbours to drive their cattle jointly in a single trip to the cattle market.

Road condition was significant (5%) and negatively influenced the sales rate of the cattle keepers in the study area. Deterioration in the road condition reduces on the number of animals offered for sale. This is because road transportation by truck is the most important mode of transporting trade cattle across the cattle corridor in Uganda. The poor state and network of seasonal roads (gravel, and severely eroded) in the pastoral areas worsen during the el- Niño (the long heavy rains) which slow down the truck movement, stampede vehicles and make movement to and from the rural situated livestock markets difficult thus increasing the cost (Kyeyamwa *et al*., 2008) of transporting animals to the terminal markets. Cattle keepers reported low cattle sales during rainy seasons partially due to the few traders compared to the numbers that visited the local and secondary markets during the dry season. This was attributed to the bad and impassable roads that stampeded and grounded the few livestock carrying trucks that made trips to the interior of such rural areas. The few traders that reached those remote areas at times colluded to depress the cattle prices which demotivated the cattle keepers who ended up offering very few cattle for sale. Watson *et al.*

(2006) also noted a similar observation in Kenya where the Turkana were experiencing livestock marketing problems due to poor road status which discouraged truck owners to operate from the interior areas of the district due to high maintenance costs involved. Consequently a few traders were willing to risk and engage in buying from the rural cattle markets; the few that moved, colluded and lowered prices offered to cattle keepers for their animals which led cattle keepers to offer few animals for sale. Cattle buyers and sellers with good and accessible road network have better access to market and offer more animals for sale. Gebremedhin *et al*., (2007) found that cattle keepers and buyers in Ethiopia who had good roads and better network had access to the market which translated into adequate and continuous demand for livestock and offered more animals for sale in Addis Ababa market. Kangatsi and Mokonene (1997) also noted that lack of properly maintained roads made it very costly for cattle keepers to market their livestock in South Africa.

The sex of the household head had a positive and significant (5%) effect on the sales rate. If the household head was male ceteris paribus, the probability of having a higher sales rate would increase by 95 percent. This conforms to the field observation where any decision regarding day to day management activities of livestock including selling of any animal had to be referred to the husband or son in case the father had died. Kyeyamwa *et al*. (2008) noted a similar observation among the cattle keepers within the Ugandan cattle corridor. This is consistent with earlier studies conducted by Wurzinger *et al*. (2008) and Hodgson (1999) which found that the male household head exclusively owned over 43% of the herds while the rest of the herd (57 %) was co-owned by the household members and the household head. Therefore any decision regarding the sale of cattle has to be consented upon

by the household head. This compares well with the traditional practices of the Borana of Ethiopia and Masai of Kenya. However, this result differs from Makhura's (2001) findings where female cattle keepers tended to sell more of their livestock than male cattle keepers which he attributed to the non applicability of keeping livestock as a measure of social status to cattle keepers in the Northern Province of South Africa. Although this reaffirms the gender inequality existing in the pastoral communities most especially with regard to making economic decisions, it is important for beef commercialization. The targeted households should be those families dominated by males or any intervention in the area targeting livestock should be initiated through men.

The quality of the household's decision depends on their market information about prices offered in the respective marketing channels. Agricultural development has been limited in developing countries due to lack, poor/ non existent agricultural information (Bailey *et al*., 1999). Market information was significant (5%) and positively influenced the cattle keepers' sales rate. A unit increase in the access to market information increases the probability of increasing the cattle keepers' sales rate by one percent. This is consistent with the findings of Montshwe *et al*. (2006) and Nkhori (2004) where they found that price information significantly increased the participation of small scale cattle keepers in the formal markets of South Africa and Botswana.

Alternative sources of income were significant (10%) and negatively influenced the household head's sales rates. Cattle keepers with alternative income sources from crop sales, trade and employment reported to have lower sales rates. The reasons advanced were that

they had relatively reasonable cash amounts to cater for the immediate cash needs as opposed to those that relied entirely on livestock sales. An increase in the cattle keepers' alternative income sources by 100 shillings would decrease the cattle sales rate by 36 percent. This is consistent with the observations of Asfaw and Jabbar (2008) who found that off farm income was negatively associated with the household's decision to participate in livestock market as a seller but was positively associated with the household's participation in the market as a buyer.

4.4 Cattle Production and Marketing Challenges

The most important production problems cited to affect the pastoralists in the study area were as reported in Table 4.4 below ranked in their order of importance. Cattle keepers ranked diseases as the most important constraint followed by pasture scarcity, water shortage as the third and inadequate veterinary services as the fourth. Diseases were the most important ranked problem as these were trade sensitive diseases e.g. contagious pleural pneumonia, Lumpy skin disease and zooneses such as foot and mouth disease. Their outbreaks have been culminating into imposition of quarantines and some acute cases leading to cattle mortality thus affecting the cattle herd sizes. Indirectly these diseases affected their accessibility and participation in livestock markets.

4.4: Cattle Production Constraints as Ranked by the Respondents July 2007.

Constraint	Rank (Mean)[1]
Diseases	1 1.6)
Pasture Scarcity	2 (1.96)
Water Scarcity	3 (3.12)
Inadequate veterinary services	4 (4.9)
Kendall's Coefficient (W)[2]	0.92***

[1] The lower the rank, the greater the importance of the constraint.
[2] W ranges from 0 (* no agreement) to 1 complete agreement and the higher its value the higher is the level of agreement between groups.
*** $P \leq 0.001$

Cattle keepers also reported pasture and water scarcity as their second and third most important constraints respectively. These two are interrelated given that pastoralists rely on nature with little /no rangeland improvement and improved water harvesting and conservation strategies. Cattle keepers in the study area cited drought to have affected their accessibility to both pastures and water. During severe droughts, they mentioned to have lost considerable number of their animals due to starvation and desiccation because all the rangelands and water dams dry. Cattle keepers cited inadequate veterinary services as the fourth most important production constraint which they attributed to few numbers of veterinary extension staff and at times their prices are high and in some case in short supplies. This was reported to contribute to the prevalence of diseases and death of their cattle. As a way forward, the cattle keepers recommended increasing the number of veterinary extension staff deployment in the area to treat, vaccinate and control diseases as well advise them on appropriate and improved pasture varieties and water conservation strategies. They further suggested that government and other development partners should

excavate water dams and reservoirs to provide water for their livestock, as well as enforce burning by-laws as solutions to rangeland management.

The major cattle marketing constraints reported by the cattle keepers across the study area in the cattle corridor were ranked as follows; low and fluctuating prices, quarantine, limited number of cattle traders, inaccessibility to market information and poor roads in their descending order of importance (Table 4.5).

Table 4.5: Cattle Marketing Constraints as Ranked by the Respondents July 2007

Constraint	Rank (Mean)[1]
Low and fluctuating prices	1 (1.57)
Quarantine	2 (1.86)
Limited Cattle traders	3 (4.9)
Inaccessibility to market information	4 (6.8)
Poor roads	5 (6.9)
Kendall's Coefficient (W)[2]	0.75***

[1] The lower the rank, the greater the importance of the constraint.
[2] W ranges from 0 (* no agreement) to 1 complete agreement and the higher its value the higher is the level of agreement between groups.
*** $P \leq 0.001$

On interacting with the cattle traders, they cited lack of adequate supply of good condition animals, cumbersome formalities such as getting clearance letters from the district veterinary officer, the Chairperson Local Council one of the village level where the cattle have been bought from, exorbitant and multiple taxes and fees both legal and illegal collected at animal check points, bad roads and occasional shortage of trucks for moving animals to terminal markets. They also highlighted lack of a system of selling on credit particularly to butchers as well as market information that led to over flooding livestock at

the abattoirs and that caused price slumps on some days as some of the factors that hinder efficient functioning of livestock trade within the cattle corridor.

The four highly ranked farmer marketing constraints are interlinked and influence each other; outbreaks of epidemics such as foot and mouth disease usually results into imposition of quarantines to contain the disease and restrict movement of livestock from the producing areas to the consumption areas. This in effect results into limited number of traders accessible to cattle keepers. As a consequence, the few traders that reach cattle keepers at times collude amongst themselves to offer low prices thus perpetuating the low prices which are always fluctuating. This inadvertently affects the number of animals cattle keepers will offer for sale thus influencing their sales rate. The effect of the quarantine restrictions is to further reduce producer prices as it limits opportunities for marketing. This is further exacerbated by lack of market information which creates huge disparities between buyers and sellers and contributes to lower producer prices. Because of the subsistence nature of most cattle keepers whereby they have less numbers for sale, they lacked negotiating power or access to market information and remained dependent on middlemen which kept the transaction costs high. Moreover, the lack of facilitation in the formation of producer associations or other partnership arrangements makes it more difficult for smallholder producers to reduce transaction costs through economies of scale. The poor state of the roads in the rangelands discourages truck owners from operating in many parts of the corridor especially the interior because of the unacceptably high maintenance costs they incur.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary and Conclusions

This study was initiated with the overall objective of assessing the factors affecting the cattle keepers' participation in commercialisation of livestock production within the pastoral communities. Results revealed that pastoralists within the western and central districts of the cattle corridor were willing to offer their cattle for sale mainly to meet immediate cash needs during specific seasons such as dry periods, school opening calendar months and festive seasons. The pastoralists also participated in cattle marketing as net sellers thus they used cattle markets mostly for selling than restocking. It was also found that pastoral cattle keepers mostly sold culled female cattle (i.e. poor milkers, infertile heifers) and young bulls to reduce competition for pastures an indication that the cattle category sold were not specifically raised for commercial purposes. This provides opportunities for initiatives focused at encouraging raising of steers, setting up of finishing feedlots in close proximity to the cattle keepers for improving culled cows and bull yearlings will greatly contribute towards increased cattle keepers' participation in cattle marketing and commercialisation of the livestock sector among the pastoral communities.

Important to note was a positive relationship between access to market information and cattle keepers sales rates suggesting that pastoralists with access to market information offer larger proportions of their cattle herds for sale. Consequently, it is imperative that availing market information to the pastoral cattle keepers would improve their participation in cattle marketing.

Results further revealed that cattle keepers located at longer distances from the cattle markets offered a larger number of cattle for sale. This demonstrates that cattle keepers are willing to offer larger proportions of their cattle herd for sale in reliable cattle markets where better prices are offered despite the distance to the market. Therefore establishing reliable markets to the proximal to the pastoral cattle keepers' communities could improve their participation in cattle markets and increase their cattle sales rates.

Generally, it can be concluded that pastoral cattle keepers are willing to sell their cattle despite the encountered marketing constraints. Hence interventions to alleviate the constraints facing these cattle keepers such as improving market information access and flow as well as upgrading of physical infrastructure (i.e. road networks and cattle markets) and changing from subsistence to market oriented cattle production would potentially increase pastoral cattle keepers' sales rates and consequently improve their participation in livestock commercialisation.

5.2 Recommendations

Based on the findings of this study, the following recommendations are suggested for the improvement of pastoralists' participation in cattle marketing and commercialization of the livestock industry.

- Pastoralists should be sensitized on the importance of market oriented cattle production and the benefits of wealth storage diversification through workshops seminars, farmer – trader sharing platforms, radio programmes and extension education. Subsequently, cattle farmers will appreciate the importance of raising cattle such as steers specifically for beef production that can easily be sold to

generate higher incomes for investment in better business opportunities thus increasing their participation in cattle marketing and commercialisation of livestock production.

- Cattle keepers should be encouraged to form associations/cooperatives for collectively marketing their cattle to abattoirs. This will help them to reduce transportation costs by collectively transporting their cattle, negotiating better prices and contracts to supply directly to the abattoirs. Such efforts should include initiating, strengthening and supporting pastoral producer marketing associations (e.g. Uganda Beef Producers association - UBPA) and livestock trader - pastoralist associations to enable them access services such as advisory and credit facilities.
- There is also need to develop well functioning information systems that are accessible and can effectively reach the widely dispersed producer populations with information on buyer preferences, animal and meat prices, livestock supply and demand levels within different regions of the country.
- Finally, there is need for investment in areas such as improvement of road networks, transport systems and setting up modern market infrastructure (i.e. weigh stations and slaughter slabs/abattoirs) through increased public investment.

Although this study generated information on the different marketing channels used by the pastoralists to market their livestock and the factors that influence participation in cattle marketing and decisions to sell their cattle, further research should be undertaken on the spatial and intertemporal price transmission as well as and market integration to establish the efficiency of the existing marketing channels so as to attain a successful commercialised livestock industry.

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Appendix I

QUESTIONNAIRE
FACTORS AFFECTING THE LEVEL OF COMMERCIALIZATION AMONG CATTLE KEEPERS IN THE PASTORAL AREAS OF UGANDA

Date……District……. Sub county……

Parish……..Village (cell)……..

Respondent's Names……..

I Background Information

1. Household head's sex 1) male 2) female

2. Age……..years;

3. Marital status 1) single 2) married 3) Divorced 4) widowed

4. Education level…….years (state the class).

5. How long have you been keeping livestock (years) 1) 1-3 2) 4-6 3) 7-9 4) over 10?

6. How many family members in your household are involved in livestock production?

Number of Adults ≥ 18 years		Number of Children ≤ 18 years	
Male	Female	Male	Female

7. Who performs the following activities? State the numbers

Activity	Father	Mother	Sons	Daughters	Hired labour	Others
Grazing						
Cleaning housing/feeding unit						
Dipping/spraying						
Milking						
Milk Sales						

Ghee/butter Sales						
Animal Sales						
Health Management/ care						

8. What is the size of your total land area …… (Hectares)

9. What is the tenure of your land ownership?

1. leasehold 2. Freehold 3. State ranch 4. Customary/ communal property

5. Kalandalanda (open access) 6. Individualized customary land

7. Others (specify) ……

10. What livestock management / production system do you practice on the farm?

1. Paddocking 2. Herding 3. Grazing with some stall feeding

4. Zero grazing 5. Tethering 6.) Others (Specify)

11. Do you rent any land for grazing your cattle? Yes [ ] No [ ], if yes how large…….hectares at how much …….Ug Shs.?

12. Where do you normally water your livestock?

Source of Water	Number on the farm	Distance from the farm (Km)	Ownership 1= individual 2= communal	Distribution on the farm 1=even, 2= uneven
River				
Pond				
Valley				
Dam				
Protected Spring				
Borehole				
Lake				

14. Which breeds of cattle and number in each category do you have your farm?

Category	**Number**
Exotic	
Crossbreeds	
Local indigenous	

15. What is the herd structure by number of your farm?

Category	**Number**		
	Local/indigenous	**Exotic**	**Cross breeds**
Bulls			
Steers			
Weaner bulls			
Bull Calf			
Cows			
Heifers			
Weaner Heifer			

14. Do you own any other livestock? Yes [ ] No [ ]. If yes complete the table

Type	Number	Rank
Goats		
Sheep		
Others		

15. How did you acquire your cattle?

1) Inherited 2) Local market 3) Gifts 4) Others (specify) …….

16. How do you acquire your replacement stock? Tick where applicable

1) Rearm own 2) Buy from market 3) Exchange/butter 4) Others (specify) ……..

17. How many cattle did you inherit, purchase or receive as gifts?

Category	**Inherited**		**Purchased**		**Gifts**	
	Local	**Exotic**	**Local**	**Exotic**	**Local**	**Exotic**
Bulls						
Steers						
Weaner Bulls						
Bull calf						
Cows						
Heifers						
Weaner Heifers						

II Economic Data

18. For What purpose do you keep cattle tick as deemed appropriate?

Purpose of Keeping the Cattle	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**
Prestige				
Way of life				
Store of wealth				
Security/insurance				
Source of income				
Commercial purposes				
Others (specify)				

19. Which of the following form your major occupational activities?

Activity	Livestock keeping	Crop	Trader	Formal employment	Others (specify)
Ranking					

20. What is your major source of income? .....

21. What are your other sources of income?

1) Sale of Cattle 2) Milk Sales 3) Butter/ghee 4) Hides and skins

5) Sale of crops 6) others (specify) ……

22. Do you sell Milk? Yes [ ] No [ ] if yes complete the table.

	Number		Total Milk per day (litres)	
	Indigenous	Exotic	Indigenous	Exotic
Milking				
Dry Cows				
Pregnant				

23. How much do you normally sell per day; to whom and at what price?

Outlet (tick where appropriate)	Quantity Sold per day	Price per litre
Immediate Neighbours		
Local Market		
Cooperative Society		
Others (Specify)		

II Cattle Sales (Marketing)

24. What motivates you sell your cattle?

1) …… 2) …….

3) ……4) ……

25. Have you sold any cattle since July last year? Yes [ ] No [ ]; if yes, complete the complete table

Category	Number Sold		Average Price	Reasons of Sale
	Local	Exotic		
Bulls				
Steers/Bullocks				
Weaner Bulls				
Bull calf				
Cows				
Heifer				
Weaner Heifer				

Reasons of Sale: 1) Pay school fees 2) Pay medical bills 3) Purchase food

4) Animal Sick 5) Purchase household items 6) Animal was old (Culling)

7) Others (specify) ……

26. Over the previous year in which did you sell most/less cattle and why?

Month	Number of Cattle Sold	Average Price	Buyer 1= on farm sale; 2= local butchery; 3= Local Market 4= Abattoirs 5= Friends
January			
February			
March			
April			
May			
June			

July			
August			
September			
October			
November			
December			

27. If you were provided with other alternative sources of money, would you offer animals for sale? Yes [ ] No [ ]; if yes why? ……
if No why? ……

28. Are you satisfied with the marketing system in your area? Yes [ ] No [ ]. If no, which one are you not satisfied with and why? ……

29. When are you paid by each of these marketing systems? Tick as appropriate

	On spot	Within 1 working day	Within 7 days	More than 7 days
On farm sales				
Speculators				
Butcheries				
Local Markets				
Abattoir				
Other (specify)				

30. How do you determine the price per animal?

1) Live weight 2) Body condition 3) Physical appearance 4) Others (specify)…….

31. During which months did you receive the lowest and highest prices?

a) Lowest price ……. Why? ……..

1) …….. 2) ……

3) …… 4) ……

b) Highest …….. Why? ……

1) …… 2) ……

3) ……. 4) ……

32. Are aware of cattle prices in other markets? Yes [ ] No [ ] if yes, where do you get the information? 1) Fellow Cattle Keepers 2) Family member 3) NGOs

4) Farmer Association/cooperatives 5) Radio 6) News Papers

33. How often are you visited by the extension agents in a month? (No) …….

34. Do you belong to any Cattle Keepers' organization? Yes [ ] No [ ]; if yes what benefits have you gained from it? 1) Training 2) Study tour 3) Marketing 4) Others (specify) ……

35. How far are the cattle markets form your home? …….. (Kms)

36. How do you transport your cattle markets to the cattle markets?

	Trekking	Trucking
Speculator		
Butcheries		
Local markets		
Abattoirs		
Others (specify)		

37. What is the state of the road to the cattle market?

1) Properly maintained 2) Fairly Maintained 3) Poorly maintained

38. For the last two years what challenges have you experienced in livestock keeping as a farmer? Rank them in the order of importance.

1) Water scarcity ……. 2) Drought …… 3) Pasture scarcity ……

4) Political interference …… 5) Diseases ……. 6) Lack of marketing infrastructure7) Poor roads ……. 8) Others (specify) ……

39. What constraints do you face in marketing cattle?

1) Low prices 2) Lack / low numbers of traders 3) Traders default to pay

4) Inaccessibility to cattle market 5) Inaccessibility to market news and information

6) Poor road Condition 7) Quarantine 8) Others (specify……

Do you have any suggestions on how the problems raised above can be overcome? Yes [ ] No [ ]

If yes state them.

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THANK YOU FOR YOUR VALUABLE INFORMATION