EFFECT OF SMALL-SCALE HIDES AND SKIN BUSINESS ON TRADER'S INCOME IN NAKURU COUNTY, KENYA

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A Thesis Submitted to the Graduate School in Partial Fulfillment of the Requirements for the Master of Science Degree in Agribusiness Management of Egerton University

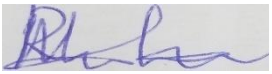
EGERTON UNIVERSITY

AUGUST, 2023

DECLARATION AND RECOMMENDATION

Declaration

I hereby do declare that this research thesis is my original work and to the best of my knowledge, has not wholly or in part been submitted for an award of a Master's degree in any other institution.

Signature: …  ……..... Date: …02/08/2023……

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Recommendation

This Research thesis has been submitted for examination with our approval as university supervisors

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DEDICATION

This work is dedicated to my husband Kallen Mulilo Nalyanya my parents Mr. and Mrs. David Lumarai, my brothers; Moses, Timothy and Mathew, my sons Joshua Murunga Mulilo, Joseph Lumarai Mulilo and my daughter, Tabitha Grace Mulilo.

ACKNOWLEDGEMENTS

First and foremost, I am thankful to Almighty God for taking me through the study period. My sincere gratitude goes to Egerton University for giving me the opportunity to pursue my Master's degree. In a special way, I would like to sincerely thank my university supervisors, Prof. George Owuor and Dr. Edith Wambui Gathungu for their tireless supervision, guidance and support throughout my study period. I also acknowledge the support from staff members of the Department of Agricultural Economics and Agri-business Management of Egerton University. Appreciation also goes to my colleagues for sharing with me useful ideas during the entire period of study and research. Also, my sincere gratitude goes to my family and friends for the unconditional moral support and encouragement they have accorded me. Without you, I would not achieve this success. I pray that the Lord may reward you abundantly for your support morally, spiritually and financially. Lastly, I am grateful to the hides and skin traders who voluntarily provided data, enumerators who assisted in data collection, and all my colleagues whose ideas were useful during the entire study period.

ABSTRACT

Hides and skin, the by-product from cattle and small ruminants forms an important business from the meat industry which forms part of livestock production. There is concentration on hides and skin production in the high potential Arid and SemiArid regions in Kenya while neglecting the regions that produce them on small scale thus creating the research gap. The aim of this study was to contribute to the development and sustainability of the leather sector among the non-pastoralist communities by determining the challenges facing the traders in the industry, factors influencing the trader's participation in the industry and the effect of the hides and skin business on the income of the trader. A census of 100 hides and skin traders was done in Nakuru County (0.4254° S, 36.0023° E). The study used both primary and secondary data and data was collected using a questionnaire. The Cronbach Alpha reliability coefficient for the questionnaire was 0.928, which was within an acceptable threshold of 0.7. Percentiles were used to determine the challenges facing the hides and skin traders in the industry in objective one. The logistic regression model was used to determine the factors influencing the participation of the hides and skin traders in the leather sector and lastly a combination of the Gross Margin (GM) and the Endogenous Switching Regression (ESR) model to evaluate the impact of the hides and skin business to the income of its traders in the county. The results indicated that the main challenge that affects hides and skin traders is fluctuating prices at 56% and the lowest being poor condition of their working premise at 2%. Age, education, ability to store hides and skin, amount of legal fee that traders pay to do business, the approximated income that they get from the business, the actual gross margin realized, the average price of hide and the average price of sheep skin were important factors that influenced traders participation in the leather industry. Lastly from the study, if a middleman had decided to be an owner of a registered premise, then he/she would be expected in a month, to have attained more income by $18 (KES.2, 174) than the owners of registered premises and on the Contrary, if an owner of registered premise had decided to be a middleman then his/her income would reduce by $54 (KES 6,371). In conclusion, Ownership of a registered hides and skin premise leads to an increase in the income of a hides and skin trader. Consequently there's need for youth empowerment and sensitization on proper utilization of hides and skin to not only earn income but also minimize on wastage of a useful resource which is byproduct from livestock industry and also supports a valuable leather industry.

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LIST OF ABBREVIATIONS AND ACRONYMS

ASALs	Arid and Semi -Arid Lands
BMZ	Federal Ministry for Economic Cooperation and Development
CFC	Common Fund for Commodities
CIA	Conditional Independence Assumption
CRS	Corporate Social Responsibility
ESR	Endogenous Switching Regression
FAO	Food Agriculture Organization
GDP	Gross Domestic Product
IGAD	Intergovernmental Authority on Development
KES	Kenya Shillings
KIRDI	Kenya Industrial Research and Development Institute
KLDC	Kenya Leather Development council
Mo ALF	Ministry of Agriculture Livestock and Fisheries
NMP	National Manufacturing Policy
PSM	Propensity Score Margin
TVEs	Town and Village Owned Enterprises
UNIDO	United Nations Industrial Development Organization

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The Kenyan economy majorly depends on agriculture which generates about 75% of rural employment, accounts for 27.3% of the country's Gross Domestic Product (GDP) and also accounts for 60% of the value of the country's exports (Ministry of Agriculture Livestock and Fisheries (MoALF), 2015). Agriculture and its related economic activities are particularly critical for the development of Kenya's rural economy since about 80% of the Kenyan population live in the rural areas especially the small scale farmers and derive their daily livelihoods largely from agriculture and agricultural related activities (Alila & Atieno, 2006). The livestock subsector operates under the ministry of agriculture and contributes about 18% of the Agriculture GDP and about 4.9% of National Agricultural GDP. It also employs 50% of the agricultural labor force and over 10 million Kenyans living in the Arid and Semi -Arid Lands (ASALs) derive their livelihood largely from livestock (MoALF, 2015).

The leather industry forms part of the agricultural sector because it derives its raw material from livestock which is in the agricultural sector. It is mainly dependent on animal production with human skills, equipment and chemicals needed for the production of top quality leather hence the hides and skins from livestock are the raw materials for the leather industry (Mattila & Memedovic, 2008). The demand for leather and leather products is growing faster than its supply and in 2013 the leather traded commodities accounted for US dollar 53.5 billion a year (World Bank Group and Economic Transformation Group, 2015).

The world leather footwear market is dominated by China which produces 63.7% of the global production. Asia, Eastern Europe, North Africa, and Brazil are the other competitive countries, serving some of the major import markets like Germany, France, Switzerland and Austria (United Nations Industrial Development Organization (UNIDO), 2010). The success of China's leather industry is attributed to the first wave of economic reforms in 1978 with rapid development of Town and Village Owned Enterprises (TVEs) and second wave with foreign firm's investments, Pakistan's success lies in aggressive government schemes for enhancing exports of leather sector while Italy's competitiveness lies in its design & marketing capabilities (National Manufacturing Policy (NMP), 2012).

Asia is the leading consumer of leather products and has the highest production of footwear with 83% of a total of 13 billion pairs of shoes produced globally while Africa is at the bottom producing 1.3% surpassing only Australia at 1.2% of the global production (Food Agriculture Organization (FAO), 2010). Africa's global share in the production of leather shoes is 3.8% (4,498.10 million) with Kenya accounting for 2.40% of Africa's share and 0.09% of the global production while on exports Kenya has a global share of 0.02% valued at US$ 78 million per annum. African countries have a fifth livestock which accounts for 21% of the world's livestock population (Mwinyihija, 2015) but they only account 4% of world leather production and 33% value addition in leather.

Kenya is the third largest livestock holder in Africa and it has been a net exporter of meat as well as hides and skins for decades. Although it served as a leather footwear hub for east Africa two decades ago, it is currently a very minor exporter of leather and leather products with 0.14% as at 2013. The export of raw hides and skins was banned in 1980 but was reversed quickly which encouraged the rise of the tanning industry which made the tanning sector to thrive well in the 1990's (Mwinyihija, 2009). There was an improved leather sector performance in quality noted for hides and skins in the year 2004 to 2006 with 10.8% Economic growth of the sub-sector (Central Bureau of Statistics, 2007). The leather subsector in Kenya is part of the livestock sector which is a major component of the agricultural sector whose performance has declined since 2008 (Kurtis, 2010). The livestock sector contributes 12% to the GDP with a share of 40% to the agriculture GDP while the leather sub sector contributes 4% of agriculture GDP and 1.5% of the national GDP (Mwinyihija, 2010). The livestock sector also represents 50% of the agricultural labor force and it is estimated that 70% of the livestock population supports 10 million people in the country and therefore the availability of raw materials and labor for the leather industry within the country (Mwinyihija, 2015).

The local uses for hides and skins within the country were for necessity and include; roofing traditional houses, making ropes, guards, drums, seats, sandals, mats, water and milk containers and is eaten as food especially during famine among the Turkana community Kagunyu *et al*.(2013). From the recent few decades, it has taken the place for status symbol and when the hides and skins are processed to leather, it is used to make bags, shoes wallets, clothing, leather furniture, leather seats for vehicles, and leather covers for books (Jabbar *et al*., 2002).

Most of the leather goods manufacturers operating in Kenya today are considered small and microenterprises. There are only a few medium enterprises but majority prefer to be in the informal sector in order to avoid the tax burden (World Bank Group and Economic Transformation Group, 2015). There is minimal value addition in the leather sector and Kenya's exports are in the form of unprocessed raw hides and skin. The potential for hides, skins and leather business in the pastoral areas of northern Kenya is estimated to be high but it has not been realized as the prices offered by businessmen are very low (Kenya Industrial Research & Development Institute (KIRDI), 2015). There is 99% usage of leather in the international market whereby; 57% of a dried hide is converted to leather and used to manufacture the products mentioned above, 20% of the hair on the hide can be used for various products, 5% of the shavings from the hides can be recycled and re- used as construction material and 5% of the fat in the hide can be isolated and used for fuel (Tegtmeyer, 2012).

Nakuru is a County that has one of the earliest tanneries to be constructed within the country and has been in operation since 1960 amongst other 14 tanneries: 1 in Limuru, 2 in Athi River, 1 in Sagana, 1 in Thika, 8 in Nairobi. There have been initiatives to improve the leather industry throughout the country with the Kenya Leather Development Council (KLDC) proposing the construction of six other tanneries in Baringo, Bungoma, Kajiado, Garissa, Makueni and Wajir Counties. The aim of constructing these tanneries is to increase the production of footwear and other finished leather items by domestic producers. The tanneries are expected to have a weekly production capacity of 1,000 hides.

1.2 Statement of the Problem

The leather sector in the country is performing poorly unlike before 1990's when the country was one of the leading producers and exporter of leather and the leather products hence trade in hides and skin is a good business opportunity. This is in spite of the availability of hides and skins in all parts of the country with increased demand for leather products and decreased supply from the local market. The study therefore seeks to identify whether the presence of a tannery is an adequate investment that will motivate the hides and skin traders to continue trading in hides and skin and increase the number of participants in the leather supply chain.

1.3 Objectives

1.3.1 General Objective

To contribute to development and sustainability of the leather industry amongst the nonpastoralist communities within the country by examining the contribution of hides and skin business to the income of hides and skin traders in Nakuru County.

1.3.2 Specific Objectives

i) To determine challenges facing the hides and skin traders in the leather industry in Nakuru County.

ii) To determine the factors influencing the participation of the hides and skin traders in the leather industry in Nakuru County.

iii) To evaluate the effect of the hides and skin business on the income of its traders in Nakuru County.

1.4 Research questions

i) What are the challenges facing the hides and skin traders in the leather industry in Nakuru County?

ii) What are the factors that influence participation of the hides and skin traders in the leather industry in Nakuru County?

iii) What is the effect of the hides and skin business to the traders' income in Nakuru County?

1.5 Justification of the study

Hides and skin are the main raw materials for the leather industry and therefore focusing on hides and skin business considered a section of the leather value chain which is between livestock production and the end product which is leather. This business is important because it creates employment to those who deal in it, earns income to the traders, minimizes wastage of useful by product of livestock production, promotes both economic and industrial development within the country and in the long run earns the country foreign exchange when the hides and skin are converted to leather and exported.

Nakuru County is known for crop farming and livestock keeping as its main economic activity. However, despite not being a pastoralist region, it also produces hides and skin on small scale from the few livestock it slaughters for meat consumption as compared to the counties that mainly practice livestock keeping as their main economic activity. It also has a tannery and the area is also surrounded by communities that produce hides and skin on a large scale. The study therefore seeks to identify whether the presence of tanneries in such regions which are many throughout the country will benefit the hides and skin traders who are part of the stakeholders in the leather chain and play a key role in linking the producers of hides and skins with the market and will help improve the performance of this sector which is almost collapsing.

1.6 Scope and Limitations

This research was conducted in Nakuru County. The study focused on the hides and skin traders who had been in the industry for more than 2 years and dealt with hide, goat and sheep skin traders. The main limitations to this research were that there is inadequate record keeping on hides and skins as the leather industry is mainly operated informally with many stakeholders. This was overcome with the use of probing questions during data collection.

1.8 Operational Definition of terms

Small scale hides and skin traders: hides and skin traders in the non-pastoralist regions

Participation; trading in hides and skin as either a middle man or owner of registered premise

Dried hide or skin: a hide or skin that is dried without prior salting

Green hide or skin: this is a hide or skin as removed from the animal

Salted hide or skin: this is a hide or skin that is treated with salt

Hide: The outer covering of a mature or fully grown bovine, equine, camel or other domestic or wild animal o f a larger kind.

Skin: The outer covering of a goat, sheep, game animal, reptile, bird or any other domestic or wild vertebrate of smaller kind.

Leather: a durable and flexible material created by tanning animal rawhide and skin, often cattle hide.

Sustainability: the ability to continue at a particular level for a period of time or continuous existence.

Tannery: a place where hides and skins are processed.

Tanning: the art or process of making leather from rawhides

Trade: the action of buying and selling of hides and skin

Income: The revenue that a small scale hides and skin trader receives from selling hides and skin

Middleman: A trader who sells green hide within day or sells salted hide and skin within a week

Owner of Registered Premise: A trader who has registered his/her business with the county government and sells salted or dried hide and skin that has accumulated for a month.

CHAPTER TWO

LITERATURE REVIEW

2.1 Hides and skin Production

Hides and skin is a secondary product of meat production whose supply is dependent on the demand for meat, rearing management and slaughtering of animals with little response to change in price and demand for products Fereja *et al*. (2017). Hides and skin are the main raw materials for the leather industry but its supply is dependent on livestock production which is in the agricultural sector. Contrary to other commodities, hides and skins are produced everywhere, in each village, town or metropolis, in each and every country, all over the world, without exclusion (Ralph, 2006).

Hides and skin are converted to leather through tanning which can be done in the following ways; Chrome tanning which is a process that was invented in 1858 and is done using chromium sulfate and other chromium salts. It is also known as wet blue for its color derived from the chromium and it does not discolor or lose shape drastically, more exotic colors are possible and the method only takes a day to finish (Mendere, 2002) and Vegetable tanning which involves using tannins and other ingredients found different vegetable matter such as tree bark. In Kenya, tanning operations is mostly a family business which is carried out in small to medium scale semi-mechanized units (Gupta & Tamra, 2007). It is very frequently grouped tightly in clusters which used to be outside residential areas and are supple and brown in color with the exact shade depending on the mix of chemicals and the color of the skin Kuria *et al*. (2016).

Leather is a durable and flexible material that is created by tanning animal raw hides and skin mainly cattle hide. It is produced at manufacturing scales ranging from the cottage industry to heavy industry where it is produced in a variety of types and styles then decorated by a wide range of techniques. It is then used to make various goods like clothing, book binding, leather wall paper and furniture covering (World Bank Group and Economic Transformation Group, 2015). The leather industry involves three sub clusters which are livestock breeding, raw hides and skins and leather and leather products.

There is poor performance of leather industry in most developing countries because it has basically remained a supplier of low value added, semi- processed hides and skin to the international market (Federal Ministry for Economic Cooperation and Development (BMZ), 2008).

2.2. Structure of the leather industry in Kenya

In line with the country's Vision 2030 which is to make Kenya a middle-income country, the manufacturing industry provides a good platform for industrialization. The country is the third largest livestock holder in Africa and therefore has an opportunity participate and improve its citizen's welfare by increasing its market share in the Global leather industry where the demand for leather and leather products is growing faster than supply. The leather market in Kenya is divided into three sectors as follows (Mwinyihija, 2010); Primary markets which is characterized by livestock traders, butchers and the local buying group, Secondary markets which consists of main collection centers characterized by hides and skins traders and Tertiary market which is the highest market level that is characterized by exporters, tanners and major buyers in urbanized localities.

The leather industry in Kenya is headed by the Leather Development Council (LDC) whose principal function is to oversee and advice the Government on the processing and trade in hides, skins, leather and leather goods. Other stakeholders include; the Livestock Marketing Council, slaughter houses association, hides and skins traders, tanners, footwear and leather goods manufacturers, informal leather manufacturers and academia (World Bank Group and Economic Transformation Group, 2015).

The Kenyan leather market is divided into low end producers who are small scale low end product producers who normally produce low quality finished leather and high end producers who are involved in high end leather products and tend to purchase directly from tanneries for higher quality finished leather (World Bank Group and Economic Transformation Group, 2015).

The supply of hides and skin is not price elastic, since they are a by-product; the supply is driven by demand for meat and changes in agricultural policy rather than price Fereja *et al*. (2017). The leather supply chain is explained in three phases (Marieke, 2013) as follows; Phase 1: This includes livestock and slaughter. It involves obtaining raw materials which is hides and skins that is a byproduct of the leather industry, Phase 2 which includes; preparation, tanning, crusting finishing. In this phase, the raw hides and skins are tanned and finished to convert them to leather and it is capital intensive and Phase 3 which includes; the leather product where the leather products are manufactured in this phase and it is labor intensive.

Hides and skin production and marketing adopts two value chains whereby, in the agricultural sector, its value addition involves improving the natural and conventional form, quality

and appeal of a product subsequently increasing the consumer valuation beginning from farm level to marketing of finished products (Negusse, 2009) while in the leather industry it involves; animal husbandry, industrial and assembly processes and branded marketing (Mattila & Memedovic, 2008). The leather industry processes raw hides and skins and produces both semi-processed and finished leather are then sold and exported between companies and countries (Kiruthu *et al*., 2002). Within the country, 45% of leather is gotten from slaughterhouse, 14% locally and 42% from imports (Mulu, 2019).The leather value chain is peculiar because it depends on the animal production value chain and its ability to collect and preserve the pelts. The stakeholders in the leather value chain are as shown in figure 1.

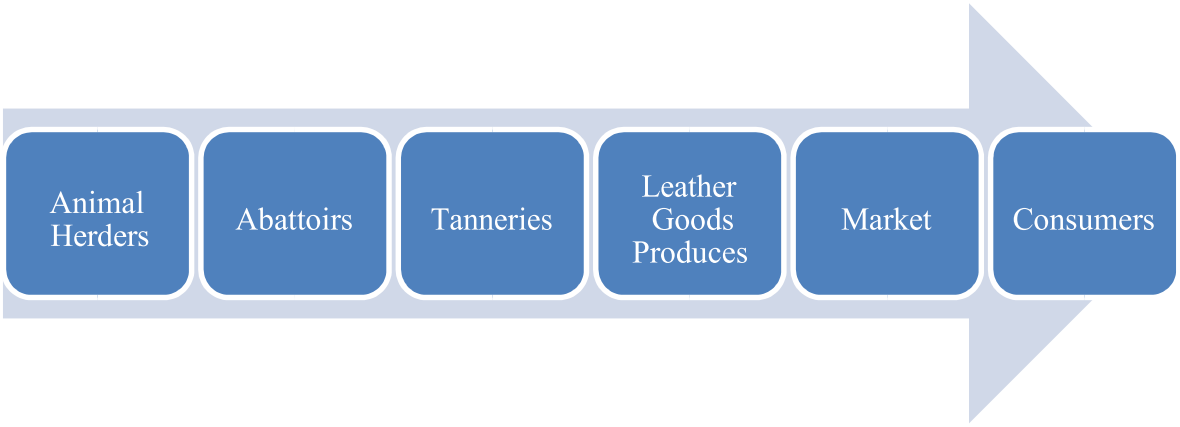

Figure 1: Leather value chain flowchart (World Bank Group and Economic Transformation Group, 2015)

According to Wayua and Kagunyu (2012), each of the stakeholders in the chain has a role in adding value to the hides and skins and in the country, value addition of hides and skins is relatively undeveloped although it has the potential of increasing incomes

2.3 Opportunities and challenges in the Leather industry

The leather industry in the country also has the following opportunities despite the challenges mentioned that it faces; there is availability of raw materials especially from the pastoral communities, there is ready market for hides and skins and leather products both nationally and internationally, use of wet salting technology to improve curing and preservation technologies, the farmers practice local processing and value addition in community based tanneries, there are opportunities in upgrading the channel and establishing backward linkage with farmers, slaughter

houses and slabs and the government is willing to revitalize the hides and skins and the leather sector through private and public partnerships (Kagunyu *et al*., 2013).

Despite the industry having benefits, it faces the following challenges; there are technical barriers since the quality and character of leather is prone to changes when the parameters of processing are altered, most of the stakeholders are small and medium enterprises whose operations are mainly a family business and semi- mechanized, there is lack of properly trained staff at different levels of the value chain, there are economic barriers due to high cost of capital and inflation rates, there are also social barriers and there is inability to transfer technology from laboratory and pilot plant of research and development to every day practical use in the industry (Gupta *et al*., 2007).

The main challenges facing the leather industry in Kenya include, high cost of domestically sold leather and leather inputs (including 25% duty on imported inputs), high cost of labor, the high cost of electricity, the inflow of cheap and new leather and non-leather footwear imports from China and India and the growth of the cheap second-hand (mitumba) and scarce design and process skills (World Bank Group and Economic Transformation Group, 2015)

2.4 Factors Influencing Participation in the leather industry

There are several factors that influence individuals' decision to participate in the leather industry. The main factor is the availability of raw materials. Mulu (2019) states that there is a positive relationship between availability of raw hides and skin and growth in leather production which is also influenced by quality of the available hides and skin, accessibility of the raw materials and accessibility of already established centers for collection and processing of the hides and skin.

The other factor that will have an influence is human behavior. According to Kumar and Rao (2023), human behavior as a whole affects the performance of an industry because individuals' perception influences the pricing, quality and safety of the products produced by the industry thus affects the supply chain of the leather industry.

2.5 The contribution of the leather industry to household's welfare

This is a key agricultural sub-sector that has a high potential towards commodity development, socio-economic improvement, positively impacts on rural development, creates wealth and employment (Mwinyihija, 2010). The main benefit of having the leather industry in an economy is that it minimizes the wastage of resources by utilizing hides and skins as its raw materials which is a byproduct of the livestock industry. It also provides employment opportunities

in its value chain, earns the country foreign exchange through export of processed hides and skins and through selling manufactured leather products.

Hides and skin is a readily available renewable resource that has assumed major economic improvements with the potential of generating foreign exchange earnings and creating employment opportunities hence need to overcome factors such as low productivity and low value-addition that hinder its contribution in the leather sector (UNIDO, 2016).

2.5 Interventions in the Leather industry

Interventions in the leather industry that promote sustainability include; mechanization and quality management in abattoirs tasks, support programs for research and development in emerging technologies and tasks, increasing competitiveness of the leather tanning sector and tasks, support for establishing common facilities to enhance collaboration among Small medium enterprises, schemes for encouraging setting up modern Waste Recycling Plants to Produce Products such as Bio-Diesel, Soap and Cosmetics, Database & technology support to SMEs Tasks and focused scheme to improve certification of leather products (NMP, 2012). In order to promote the sustainability of the leather industry within the country, there is therefore the need to assess the market structure, the value chain, government participation and its performance and thus the research is essential.

Initiatives by all the stakeholders in the industry and support of the government, the local labor force and the locational advantage lead to the development of the leather sector. The main inputs in the hides and skins value chain that the government can promote to enhance sustainability include; human resource (technical and managerial skills), live animals, breeding techniques, animal health service, animal feed, Equipment and spare parts, slaughter facilities, Raw hides and skins, chemical and machinery (Inter-Governmental Authority on Development (IGAD), 2013).

According to Abebe and Schaefer (2013), it offers regulation and support policies whereby in the three faces in the hides and skins value chain it provides standards, capital and policies that regulate the various activities in the chain and it also offers institutional support whereby it establishes institutions that specifically focus on the promotion of the industry whose roles are; education, research, training, testing, designing, forecasting, planning, social empowerment, innovations in leather processing, creative designing of leather products, development of modern technologies and dissemination of market information (Aklilu, 2002).

Interventions in industrial development because backward and forward linkages are essential in ensuring the future of the leather industry. The tannery is the central point in the industry that links the backward (livestock resources, raw materials, raw materials, technology (machinery and spare parts), human resource skill and other inputs) and forward (market access, export support institutions and competitiveness) linkages in the industry with the trading channels having several intermediaries involved before the raw materials are purchased by the tanneries Damodaran and Mansingh (2008). The presence of a tannery for the processing of hides and skin is therefore important because the back bone of leather processing in the world so far is not so much the source of raw hides and skins but the strength of finished products industry evidenced by African countries which have a lot of raw materials mostly have a weak tanning sub-sector processing mainly wet-blue leather unlike the developed countries which have few raw materials but strong tanning sectors (Kirithu, 2007).

The tanneries are an important part of the leather industry evidenced by the fact that, in most African countries, the economic loss due to damages and defects on hides and skin are very high and in most cases they cannot be identified until the hides and skin are processed in the tanneries (CFC, 2005). Within the country the most recent intervention to improve the leather industry was to increase the export duty levied on raw hides and skin from 20 per cent to 40 per cent which contributed to the initiative to increase the number of tanneries (Curtis, 2010) in the country from 14 existing tanneries to 21 after the completion of 8 mini leather processing units (Embassy of Kenya - Rome, 2014). This is a sign that the industry is poised for growth as demonstrated in the economic survey of 2008 that established a 10.3% growth (Mbogo, 2010).

2.6 Quality of hides and skin sold

The quality of hides and skin is important in the hides and skin business because it is the main determinant of the quality of the leather that will be processed hence the quality of the final leather product. This depends on how we take care of the livestock, the production of the hides and skin during slaughter, storage of hides and skin and finally processing of leather (Naporos, 2012).

Since the price of the hide is calculated and included in the price paid to farmers for their stock, farm damage is the greatest cause of downgrading the quality of leather produced from the hide.in the leather industry, the damages are known as defects which are classified into three major

factors; pre-slaughter (Tilahun *et al*., 2016), peri- slaughter (Common Fund For Commodities (CFC), 2005) and post slaughter (Selamawit, 2015) defects. In Kenya, the three defects account for 40%, 20% and 40%, respectively, of the defects in hides and skins (Curtis, 2010). These are the things and activities that damage the hides which cause depreciation in the value of the hides and skins (Kahsay *et al*., 2015). The sector loses Ksh 4.5 billion a year by damages to hides and skins, mainly through tick bites, branding and flaying (skin removal) techniques after slaughter of the animal (Curtis, 2010) and they are encountered from the time the animal is born until the leather processing is completed. Therefore, grading of hides and skins is done to determine the relative abundance of defects whereby a hide or skin with no defects is designated as Grade I (perfect), that with intermediate quality as Grade II or III while that with many serious defects designated Grade IV (imperfect) or simply discarded (Yitbarek, 2014).

2.7 Issues and concepts in sustainability of an industry

This is an important aspect that contributes to the research because the Kenya Leather Development Policy Draft 2021 aims at ensuring there is sustainable supply of quality hides and skin and minimizing the challenges that lead to low supply of quality hides and skin. The sustainability of an industry refers to its ability to have energy efficiency, resource conservation to meet the needs of future generations, safe and skill enhancing working conditions, low waste production process and the use of safe and environmentally compatible materials (Kuhlman & Farrington, 2010). Enhancing the sustainability of the leather industry involves the whole supply chain which involves sustaining a dynamic raw material base, tanning, footwear, leather goods and marketing (Mwinyihija, 2015). This will cover issues such as climate change, air, water and soil pollution, water usage and availability, waste, animal welfare, and impact to the community in terms of nuisance and health and safety workers and the community and human rights (Marieke, 2013).

2.13 Theoretical framework

This study is based on Utility maximization theory and sustainability principle of the Corporate Social Responsibility theory.

In the Utility maximization theory, the choice to participate in the hides and skin business is based on maximization of the trader's utility subject to technical, socioeconomic and institutional

factors. Just like the producers who make their decision to participate or not in the market based on options that maximizes their utility (Onionkiton, 2014), the traders do the same.

The trader decides on the marketing channel to used basing on the option to maximize utility subject to internal and external factors. If the costs that are associated with using a particular channel are greater than the benefits, the trader will be discouraged from using it thus shifts to the other option that will maximize their utility. Since the decision maker has incomplete information, uncertainty has to be taken into account making the utility to be modeled as a random variable in order to reflect the uncertainty (Greene & Hensher, 2009).

The utility that the trader obtains in relation to the alternative is expressed as:

$$Max\ U = U\ (S_j, Bf_j, B_{ij}, X_v) \quad \dots\dots\dots\dots\dots\dots\dots\dots \ (1)$$

where, S_j represents the hides and skin sold by the trader, Bfj represents wealth gains of the trader by being a middleman in the hides and skin business, Bij represents wealth gains of the trader by having a registered hides and skin premise and Xv represent all the factors that may affect the utility of the trader. In the utility function, the amount of good j (hides and skin) which is sold shall not exceed the amount collected by the trader.

Sustainability is one of the principles of CSR among accountability and transparency and a sustainable business is one that operates in the interest of all current and future stakeholders in a manner that ensures the long-term health and survival of the business and its associated economic, social and environmental systems (Schaltegger & Herzig, 2002). Since we consider the effect in which the present actions have on the options available in the future and the utilization of the resources should not be more than can be regenerated, this should not only be taken into account for measurement of costs and value created in the present but also for the future of the business itself. The leather sector in the province should therefore attain durable sustainability where there is efficient utilization of scarce resources in an optimal way, value addition through technology and innovation and the outputs of the industry to have distributional effects to all stakeholders (Crowther & Aras, 2008).

2.14 Conceptual framework

The conceptual framework for the study is based on the relationship between the institutional, technical and socio economic factors that affect the activities in the leather industry

and the impact that they will have on the income received by the hides and skin traders in the industry. An individual may decide to participate in the hides and skin business or he may decide not to participate in the business. If one decides to participate (trade in hides and skins) he/ she trade as either a middleman or an owner of a registered premise of which both participation and non-participation will be influenced by socioeconomic factors (age, income, education level, marital status, experience in the leather sector, gross margin), institutional factors (access to extension services, access to credit, group membership, market access, access to information, price) and technical factors (Access to inspection, training in the leather sector, nature of activities in the chain (traditional or modern)). Climate change is a factor that is likely to affect the quality and quantity of hides and skin obtained from the animals while government policies will affect the flow of activities in the leather chain. With the correct standards of the above factors and the intervention of a tannery, the sector is expected to improve the performance of the industry which will be indicated by increased supply of hides and skin, more participants in the leather sector, high quality of hides and skin produced and higher prices for hides and skin. The ultimate effect to the traders (middlemen and owners of registered premises) will be realized in terms of profit and revenues.

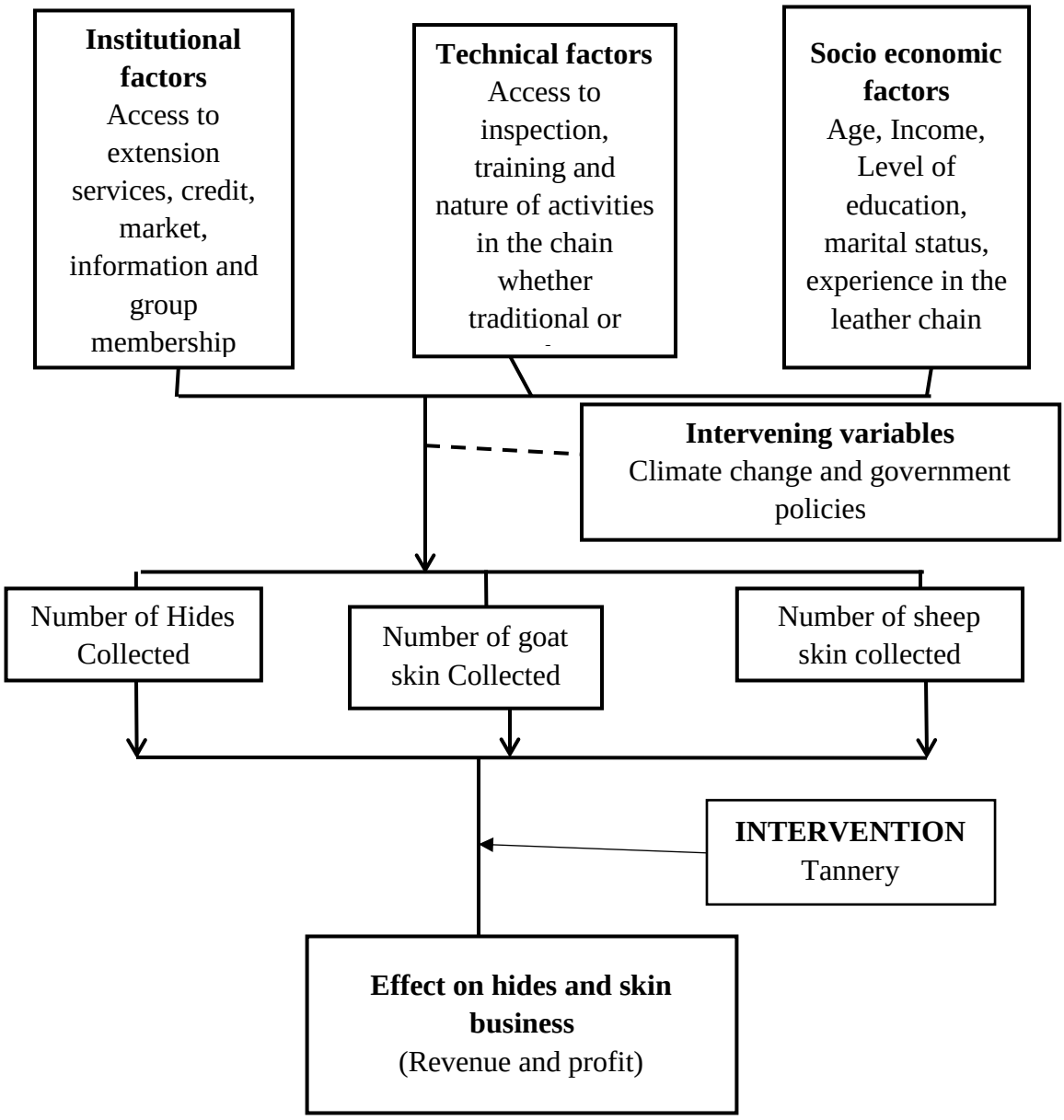

Figure 2: Conceptual framework

CHAPTER THREE

METHODOLOGY

3.1 Study area

This study used primary data which was collected from Nakuru County in the former Rift valley province as shown in Fig. 3 The county was chosen for the study because its main economic activity is farming but has a tannery which has been in operation since 1960 (Common Market for Eastern and Southern Africa (COMESA), 2012).

Nakuru County is located in the former Rift Valley Province on Latitude: 0° 0' 0" and 1° 30' 0" S, Longitude: 35° 30' 0" and 36° 30' 0" E and covers an area of 7496.5 km^2. It is located in the south eastern part of the Rift Valley and borders seven counties namely: Baringo to the north, Laikipia to the north east, Nyandarua to the east, Kajiado to the south, Narok to the south west and Bomet and Kericho to the west. The county has eleven administrative Sub Counties which include: Molo, Njoro, Naivasha Gilgil, Kuresoi South, Kuresoi North, Subukia, Rongai, Bahati, Nakuru Town West and Nakuru Town East with a total of fifty five wards. The main economic activity in the County is farming: Subsistence and commercial agriculture is practiced with dairy and horticulture farming on large scale. The main food crops grown include maize wheat beans, peas, cabbages, tomatoes, kales and carrots. The county experiences two rainy seasons; April, May and August (long rains) and December (short rains) with an annual rainfall of between 700 mm and 1200mm in the highlands and 600mm in the lowland (Kenya Bureau of Statistics (KNBS, 2009).

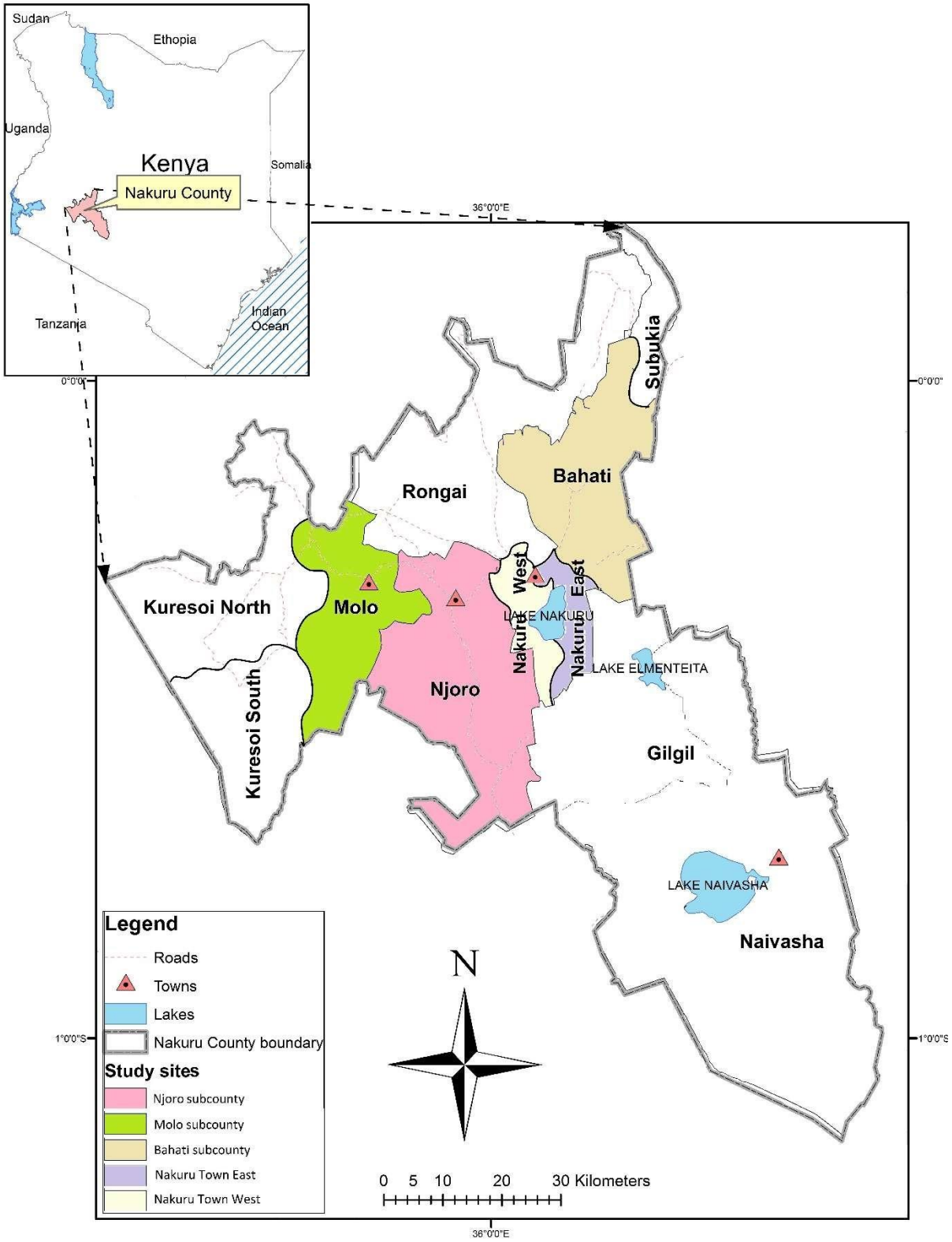

Figure 3: Study Area, Map of Nakuru County

Source: Virtual Kenya and Google Earth Pro. (2015)

3.2 Sampling Procedure

The study used a formative evaluation research design that was aimed at improving the performance of the industry in Nakuru County. The study was done in all the 11 sub counties (Njoro, Molo, Bahati, Rongai, Subukia, Gilgil, Kuresoi North, Kuresoi South, Naivasha, Nakuru Town East and Nakuru Town West). Purposive sampling technique was used to select the sample respondents from the county with the help of a known list of traders in the ministry of livestock and fisheries from the county. From each sub county, five middlemen and five owners of registered premises were interviewed for the study.

3.3 Sample size determination

Since the population of hides and skin traders is small, the study did a census of all the hides and skin traders within the county and it involved 100 respondents. The study mainly targeted hides and skin traders who had been in the business for at least 2 years and obtained a list of the traders from office the Ministry of Agriculture livestock and Fisheries within the county.

3.4 Validity and Reliability of the Research Instrument

Validity of research data refers to how well the collected data covers the actual area of investigation while reliability refers to the extent to which a measurement of a phenomenon provides stable and consist result (Hamed, 2016).

Before the study, a pretest of the questionnaire was done in Ol Kalau Sub County, in Nyandarua County, which boarders Nakuru County and their responses helped to structure the questions to match the objectives of the study and were a prediction of what was found during the actual study. According to Reynolds *et al*. (1993) this helps to identify questions that don't make sense to participants, or problems with the questionnaire that might lead to biased answers. In the study content validity was used whereby in content validity, literature review and expert support from supervisors was done to improve the questionnaire and ensure that it covered the three research objectives.

To test the reliability of the research instruments, Cronbach's Alpha coefficient was computed to determine the extent to which the questionnaire was without bias and the coefficient

was 0.928 as shown in appendix 6 which falls between the value of 0 and 1 but most preferably above 0.7 (Mohajan, 2017).

3.5 Data collection and analysis

The study used both primary and secondary data. Primary data was collected from participants in hides and skin business (the two types of traders). It also involved physical visits to the sites of the tannery in operation and the hides and skin registered premises. The study used a questionnaire which had three sections: the first section A contained personal information; the second section B will included constraints in the leather industry and the third one part C had other information relevant for determining the income earned from the business. Enumerators assisted in administering the semi structured questionnaire for primary data collection. Secondary data on the other hand was collected from the Ministry of Agriculture Livestock and Fisheries from the county, the KLDC and Research Institute. SPSS and STATA were used for data management (data entry, organization, cleaning and analysis).

3.6 Analytical framework

3.6.1 Characteristics of hides and skin traders in the leather industry in Nakuru County

To identify the socio economic technical and institutional factors of hides and skin traders, both qualitative and quantitative variables were considered for the study. Mean standard deviation and percentages of the variables were obtained. The chi- square test and t- test were then used to compare the characteristics of the traders (middlemen and owners of registered premises).

3.6.2 Challenges facing the hides and skin traders in the Leather industry in Nakuru County.

To identify the challenges facing trade in hides and skin in leather industry in the county key informant interview and Thematic Content Analysis were used. Key informant interview was used to determine the challenges faced by traders in the leather industry and to assess whether having a tannery was a good intervention to improve the performance of the sector.

Key informant interview is a technique that involves interviewing a selected group of individuals who are likely to provide needed information, ideas and insights on a particular subject. This is a qualitative method of analyzing qualitative data. It allows one to speak to someone with first-hand knowledge of the information needed. It provides flexibility to explore new ideas and issues that had not been anticipated while planning the study but are relevant the purpose of the study (Kumar, 1989).

The study interviewed 10 staffs in the Ministry of Livestock and Fisheries within the county to identify the challenges that affected the leather industry. The identified challenges were then included in the questionnaires then percentiles were used to categorize the challenges agreed upon by respondents which were then presented using graphs.

3.6.3 Factors influencing the participation of the hides and skin traders in the leather industry in Nakuru County

To determine the factors influencing the participation of the hides and skin traders in the leather sector in the county, the logistic regression model will be used. The probit model could have been used for the study as well but due to its computational burdensomeness and weaker assumptions than the logistic regression model Caliendo and Kopeinig (2005), the logistic regression model is more preferred for the study. This model is the standard method for estimating unordered, multi category dependent variables since it allows one to analyze data where participants are faced with more than two choices (Gujarati, 2012). In the study, it is therefore used to determine the factors that influence the choice of traders to participate in the hides and skin business. This model was chosen because in the hides and skin marketing channel, the trader has two choices: the trader may decide to participate as a middleman or the trader may decide to have a registered premise dealing in hides and skin. If an individual decides to trade in hides and skin, they decide whether to participate as middlemen or have a premise registered for hide and skin business.

The logistic regression described the relationship between the dependent variable Y which took the value of 1 for middlemen and 0 for owners of registered premises and the independent variables shown in table1 and adopted the method proposed by Borucka (2022) . Since *Y* which was occupation of the trader was a dichotomous variable with values of *1* – for the middlemen and *0* – for the opposite case (owners of registered premises) the logistic regression equation was specified as follows:

$$P(Y = 1x_1, x_2, \dots x_k) = \frac{e^{\beta_o + \sum_{i=1}^{k} \beta_i \cdot x_i}}{1 + e^{\beta_o + \sum_{i=1}^{k} \beta_i \cdot x_i}} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Where β_i i=0…k are the logistic regression coefficients with $x_1, x_2, \dots x_k$ were independent variables that were both measurable and qualitative

The results of the logistic regression were interpreted from the point of view of the odds of occurrence of one being a middleman in the hides and skin business eqn 3.

$$\frac{P(Y=1X)}{1-P(Y=1X)} = e^{\beta_o + \sum_{i=1}^{k} \beta_i \cdot x_i} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

The odds ratio was therefore defined as the probability of one being a middleman divided by the probability of one being an owner of a registered premise as shown in eqn 4

$$((Odds)S(A) = \frac{P(A)}{P(non-A)} = \frac{P(A)}{1-P(A)} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

Table 1: Description of Variables to be used in the model

Variable	Definition	Expected sign
Age	Traders actual age (years)	+
Gender	Traders gender (1=male; 0=female)	+/-
Marital status	The traders marital status	+
Education	Actual years of schooling (years)	+
Training	Training in the leather sector (1=yes; 0= no)	+
Experience	Experience in the hides and skin business (years)	+
Market information	Access to market information (1=yes; 0=no)	+
Market access	Access to markets (1=yes; 0=no)	+
Trans	Transportation of hides and skin to the tannery (1= trader; 0= buyer)	+/-
Market infra	Access to Market infrastructure (1= yes; 0= no)	+
Credit	Access to credit for the business (1= yes;0= no)	+
Storage	Access to storage facilities for collected hides and skin (1= yes; 0= no)	+
Legal fee	Amount of legal fee you pay to do the business (Ksh)	+/-
Policy	policies that affect your business (1= yes; 0= no)	+
Price	Average price of hides and skin(Ksh)	+
TR Business	Total Revenue from the business	+/-
TVC Incurred	Total variable cost incurred	+/-
GM	Gross margin from the business (Ksh)	+

3.6.4 Effect of the hides and skin business on the income of its traders in in the Leather industry in Nakuru County.

To evaluate the effect of the hides and skin business to the income of its traders in the county a combination of Gross Margin (GM) analysis the Endogenous Switching Regression (ESR) models was used. GM analysis was used to establish the amount of profit earned by the hides and

skin traders and the ESR was used to evaluate whether the hides and skin business had a positive or negative impact to the traders income and was also be used to establish who made better returns from the business between the two types of traders.

GM Analysis

The benefits of using the GM analysis are that it is a widely used model by researchers, it has a forecasting ability for rational variants for the operational structure of an enterprise and it has the ability to draw logical interrelations of economic and technological parameters. GM analysis was used to evaluate the profitability of urban agriculture as compared to other sources of household income (Shimbe, 2008) and to determine the performance of key actors in the leather value chain in Tanzania (Mwangosi, 2014). The empirical model was as follows:

GM = TR – TVC…….. (5)

GM – The average gross margin in KSh of the hides and skin business for the trader

TR- The average total revenue in KSh of the hides and skin business for the trader

TVC – The average total variable cost in KSh incurred by the trader in the hides and skin business

The TR will be the average monthly income of the maximum monthly income (average number of hides and skin collected per month in kg* the maximum price of selling a kg of hide or skin) and the minimum monthly income (the average number of hides and skin collected per month in kg * the minimum price of selling a kg of hide or skin).

The ESR model

There are several methods to impact evaluation which include: Cross sectional difference (1), Before and After (2), Double Difference (3), Propensity Score Matching (PSM) (4) and ESR (5). The first four methods could not be used for the study because of the following reasons: 1 considers participants and non-participants from the same area of study yet the study will consider the two groups of respondents from the sub counties within the study area, 2 considers the status of the same individuals before participation in an activity or program and after participation, this would therefore be unsuitable for the study since the study only considers the effect due to participation in the hides and skin business, 3 is a method suitable for time series data hence not suitable for the study because it will used cross sectional data and 4 would have been suitable for

the study because it solves the selection bias problem but its challenge is in the fact that it only considers the effect of participation due to observable factors yet there may be unobservable factors that may influence the participation of the traders in the hides and skin business hence the method is unsuitable for the study.

The ESR model addresses the selection bias and endogeneity problem and is able to capture the effects of participation due to both the observed and unobserved factors hence suitable for the study (Tran, 2014). This is an econometric model that specifies a decision process and the regression models associated with each decision option and is used to address issues of selfselection and the estimation of treatment effects when there is non-random allocation of subjects to treatment and non-treatment groups as is generally the case with observational data as opposed to experimental data (Awotide & Abdoulaye, 2015). The study will use the multinomial ESR treatment effect approach according to Dubin and McFadden (1984). This approach captures both self-selection bias and the interactions between choices of different alternatives (Teklewold, 2013). This approach involves two stages whereby in the first stage, the choice of combinations is modeled using a multinomial logit selection model, while recognizing the inter-relationships among the choices and In the second stage of the estimation, the impacts of each combinations on outcome variables are evaluated using Ordinary Least Squares (OLS) with a selectivity correction term from the first stage.

In the study the first stage will be done in the second objective where the probability of participation in the hides and skin business as either a middle man or an owner of a registered premise with non-participation as the reference category will be done using the multinomial logit model. The second stage is the one that will be done in this objective. The relationship between the outcome of participation (income) and a set of exogenous variables will be estimated for the two types of traders.

The expected income that the trader receives from participation in the hides and skin business is a latent variable determined by observable characteristics (X_i) and unobserved Characteristics (ε_{ij}), the income equation is specified as:

$$Y_{ij}^{*} = X_i\beta_j + \varepsilon_{ij} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

The base or reference category is non-participation in the hides and skin business is denoted as j= 1, if the individual is not a trader in hides and skin, j= 2, if the individual is a middle man and

j= 3, if the individual has a registered hides and skin premise hence the outcome equation for each of the possible choices is given as:

$$Y_{ij} = Z_i\alpha_j + U_{ij} \ if \ I = j \quad \ldots \ldots (7)$$

Where Y_{ij}, the outcome of the ith trader with the choice j, Z_i is the set of exogenous variables, I is made to be the index of the j choices, α_j are the coefficients of the exogenous variables and U_{ij} is the error terms distributed with $E(U_{ij}/X,Z) = 0$ and $var\ U_{ij}/X,Z = \sigma_j^2$ the outcome (GM) only observed if the ith individual makes one of the j choices which occurs when the utility derived from the choice made is greater than the other choice available. With the linearity assumption which involves the construction of the correlation between u's and ε's sums to zero the equation of the multinomial ESR in equation (8) is specified as:

$$Y_{ij} = Z_i\alpha_j + \sigma_j\lambda_j + \omega_{ij} \ if \ I = j \quad \ldots \ldots (8)$$

Where σ_j is the covariance between ε's and u's, λ_j is the inverse Mills ratio computed from the estimated probabilities in equation (2) and ω_{ij} is the bootstrapped standard error to account for the heteroskedasticity arising from the generated regressor λ_j.

This model will be applied to produce selection-corrected predictions of counterfactual income using the Average Treatment Effect on the Treated (ATET).This method was used to evaluate the effect of the treatment "adoption of strategy" on the net revenues of the farm households that adopted strategy of Veronesi and Salvatore (2012) and will be used in the study to evaluate the effect of participation in the hides and skin business on the income of the two types of traders that participated in the business. The expected income of the traders that participate in the hides and skin business: j= 2, 3 with j= 1 for non-participants as the reference category will be derived as:

$$(Y_{i2}|I = 2) = Z_i\alpha_2 + \sigma_2\lambda_2 \quad \ldots \ldots (9a)$$

$$(Y_{i3}|I = 3) = Z_i\alpha_3 + \sigma_3\lambda_3 \quad \ldots \ldots (9b)$$

Thereafter, the expected income of the traders that participated in the business in the counterfactual hypothetical case that they did not participate (counterfactual) will be derived as:

$$(Y_{i1}|I = 2) = Z_i\alpha_1 + \sigma_1\lambda_2 \quad \ldots \ldots (10a)$$

$$(Y_{i1}|I = 3) = Z_i\alpha_1 + \sigma_1\lambda_3 \quad \ldots \ldots (10b)$$

The Treatment Effects for the middlemen and the owners of registered premises will therefore be calculated as the difference between 9a, 10a and 9b, 10b respectively given as:

ATT for middlemen will be:

$$E(Y_{i2}|I=2) - E(Y_{i1}|I=2) = Z_i(\alpha_2 - \alpha_1) - \lambda_2(\sigma_2 - \sigma_1) \quad \ldots\ldots\ldots\ldots\ldots\ldots (11)$$

ATT for owners of registered premises will be:

$$E(Y_{i3}|I=3) - E(Y_{i1}|I=3) = Z_i(\alpha_3 - \alpha_1) - \lambda_3(\sigma_3 - \sigma_1) \quad \ldots\ldots\ldots\ldots\ldots\ldots .. (12)$$

Whereby, for the equations 11 and 12, the first term on the right-hand side represents the expected change in participants mean outcome, if the participants characteristics had the same return as non-participants while the second term (λ) is the selection term that captures all potential effects of difference in unobserved variables.

Table 2: Treatment, heterogeneity and transitional heterogeneity effects

Treatment Effect	Income Based on Occupation		Treatment Effect
	GM for middlemen	GM for Owners of Registered premises	
Group 2-Middlemen	a) $(Y_{i2}\|I=2)$	b) $(Y_{i1}\|I=2)$	On the treated (ATT)
Group 3-Owners of Registered premises	c) $(Y_{i1}\|I=3)$	d) $(Y_{i3}\|I=3)$	On the untreated (ATU)
Heterogeneity Effect	BH_{i2}	BH_{i3}	TH

Notes Outcomes (a) and (d) represent the observed logs of the gross margins of the middlemen and owners of registered premises respectively. (b) and (c) represent the counterfactual of the traders' income. A trader in hides and skin is represented by i while Y_{i2} is the income for a trader who is a middleman while Y_{i3} is the income from a trader with a registered premise. ATT is the effect of the treatment (ownership of a registered premise) on the treated (middlemen) while ATU is the average effect of the treatment on the (middlemen) on the untreated (owners of registered premises.BH are the effects of base heterogeneity effects while TH is the transitional heterogeneity.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter discusses empirical findings on the effect of small scale hides and skin business on traders' income. Hides and skin traders participate in the leather industry as either middlemen or owners of registered premises. The findings were presented in four major sections. It starts by presenting descriptive statistics for socio-economic and institutional characteristics of hides and skin traders based on their level of participation in hides and skin trade as either middlemen or owners of registered premises.

It then presents the results of the challenges faced by the traders in the industry which were tabulated using excel and presented using graphs, then the results of logistic regression model on the factors influencing participation of the hides and skin traders in the industry and lastly the impact of the hides and skin business to the income of the traders using the Endogenous Switching regression model.

4.1 Descriptive results of variables

4.1.1 Socio- economic and institutional characteristics of hides and skin traders

Table 3 and appendix B presents the characteristics of hides and skin traders as either middlemen or owners of registered premises with respect to gender, marital status, level of education, training, reason for staring the business, access of information , access of storage facility, length of stay with the collected hides and skin, ownership of storage facility, period of storage, market access, inspection, transportation, mode of transport, contract, group membership, credit access, legal fee, government policy, preservation, grading, category and product. Among the 23 characteristics, 10 are significant while 13 are non-significant.

Table 3: Association of trader characteristic based on their level of participation in the business (Significant Dummy variables)

Variable	Description	Owner %	Middle man %	Aggregate %	Confidence Interval
Reason for starting business	Family	40	30	35	15.8272**
	Own butchery	4	18	11	
	Lack of employment	18	18	18	
	Booming business	18	28	23	
	Part time business	12	2	7	
	Other	6	0	3	
Access of storage	Yes	96	6	51	81.0324***
	No	4	94	49	
Length of stay	Day	0	94	47	89.7026***
	Week	16	4	10	
	Month	76	2	39	
	Other	4	0	4	
Own storage facility	Yes	68	6	37	41.2269***
	No	32	94	63	
	None	62	96	79	
Market	Yes	92	78	85	3.8431**
	No	8	22	15	
Mode of transport	Bicycle	0	4	4	17.4077***
	Motor bike	2	26	14	
	Vehicles	98	66	82	

Market Infrastructure	Yes	44	22	33	5.4726**
	No	56	78	67	
Legal Fee	Yes	90	28	51	39.7272***
	No	10	72	49	
Preservation	Yes	100	6	53	88.6792***
	No	0	94	47	
Product	Green	0	94	47	88.6923*
	Salted	98	6	52	
	Dried and salted	2	0	1	

*, **, ***: significant at 10%, 5% and 1% level respectively

Explanation of the characteristics of the hides and skin traders (Table 3 and appendix B):

Hide and skin business is a type of business that is associated with meat business of which most of the stakeholders are males (Fairlie & Robb, 2009). Thus, also influences the gender of participants in the hides and skin business. The study confirms this because the results showed that generally, 89% of the traders were male while 11% were female. Among owners of registered premises, 88% were male while 12% were female and among the middlemen, 90% are male while 10% are female.

The study considered the marital status of the hides and skin traders because it is a type of business that is that is passed on from one generation to another. The results showed that 78% of the traders were married, 12% were single, 6% were divorced and 4% were widowed. Among the owners of registered premises, 74% were married, 14% single, 6% divorced and 6%widowed while among the middlemen, 82% were married, 10% were single, 6% were divorced and 2% were widowed. These results show continuity of this business because since the family members take part in either collection, preservation or sale of the collected hides and skin. This is a positive indicator on the performance of the business in future because according to Adjei *et al*. (2018)

family relationships involving children and couples are more likely than any other family constellations to impact on productivity.

The level of education of an individual affects his or her ability to engage in value addition practices, the ability to access information and ability to expand the marketing network for his/her commodities. According to Ja'afar-Furo *et al*. (2021), an increase in the knowledge of a marketer, there is a likely increase in the marketing output. 37% of the traders had only attended primary school, 58% had gone to secondary school and only 5% had gone to either colleges or university. Among the owners of registered premises, 30% had attained primary, 64% secondary and 6% tertiary level of education while among middle men, 44% had primary, 52% secondary and 4% tertiary level of education. These results show that traders from this county are better placed to do this business as opposed to those of this section of the value chain in Somaliland Wanyoike *et al*. (2018) where 56% are either illiterate or just knew how to read and write but had no formal education.

The study also considered whether the traders had received both formal (in colleges) and informal (from experienced traders) training on how to handle the hides and skin in order to maintain high quality before it reaches the tannery for processing. The results showed that only 14% of the traders had gone for training to deal in hides and skin while 86% of the traders had not gone for any training. 18% of the owners of registered premises had gone for training while 82% had not and among the middle men, 10% of the traders were trained while 90% were untrained. According to Mwondu (2017) there is therefore need for training of hides and skin traders on basic principles of hides and skin production, preservation and processing of hides and skin in order to provide quality products in the leather market.

Access of information is important in the marketing of hides and skin because it helps to ascertain differential prices with respect to quality. According to Omiti (2004) limited information on prices and other transaction costs makes the farmers not to produce better quality hides and skins. The results showed that for both owners of registered premises and middlemen, 82% of the traders' accessed information on hides and skin while 18% of them did not and the main means by which they accessed it was through phone which was 39% and experienced traders which was 34%. The information that they accessed was mainly on the price and market for their products and which was mainly amongst themselves and therefore this was expected to impact positively on their performance. According to Alemnesh *et al*. (2018), accurate and timely market information

enhances market performance by improving the knowledge of buyers and sellers concerning prices, production, supply movements, stocks, and demand conditions at each level of the market.

According to the Hides, Skin and Leather trade Rules (1990) the Hides and skin Officers in the Ministry of Agriculture need to inspect the flaying, preservation and storage of hides and skin to ensure that the right quality is sold to the tanneries. 53% of the traders received inspection on their products from the technical personnel while 47% of the traders' products were not inspected. Among the owners of registered premises, half of the traders received inspection while the other half did not while among the middlemen, 56% of the traders received inspection while 44% did not. The middlemen got their products directly from the slaughter houses and this was when their hides and skin were inspected and for the owners of registered premises, their products were inspected at their premises before they were transported to the tanneries. Jabbar *et al.* (2002) confirms that inspection of hides and skin by technical personnel is an important tool for improving the quality of hides and skin sold in the market.

The study also considered who transported the hides and skin from one point to another from production at the slaughter houses till they reached the tannery.38% of the traders transported their own products while 62% issued the products to other buyers for transportation. Among the owners of registered premises, 36% of the traders transported their hides and skin to the tanneries while 64% waited for collectors from the tanneries like Apharama and Athi River to collect them and take them to the tanneries. 40% of the middlemen transported their hides and skin collected from the slaughterhouses to the owners of registered premises while 60% of them waited for the owners of registered premises to pick their hides and skin from their stores.

Contracts are important in business because they increase both the purchasing and supplying power of the parties in business. In the hides and skin business the traders have contracts amongst each other is in terms of delivery of hides and skin and payment for the delivered goods. 22% of the traders had contracts with each other while 78% of them are not. Considering the owners of registered premises, 24% of them have contracts while 76% did not have and among middlemen, 20% of them had contracts with each other while 80% did not have. The contracts in hides and skin fall under the category of either Customer to customer contract or business to customer contract as described by Goodchild *et al*. (2000). This is because the traders enter into an agreement with other traders or with the tanning company to buy a certain number of hides and skins or to buy over a certain period of time, after which, payments are made.

In the leather value chain within the county, there were only two groups known by the traders which were called the Leather Apex Association and East Africa Hides and Skin traders Association of which for both owners of registered premises and middlemen, only 2% of the traders belonged to these groups while 98% did not belong to them. This implies that there needs to be sensitization of the existence and benefits of belonging to such groups in the leather value chain because they aim at improving the leather value chain (Mwasi, 2019).

The hides and skin traders in the leather industry also got credit to do their business from both banks and tanneries. The requirements needed for one to get credit from the tanneries included; one had to prove that he or she was a hides and skin collector by providing the valid working license, one had done the business for not less than 6 months, one was selling good quality hides and skin, and should have supplied to the tannery for not less than 6 months. only 21% of the traders had acquired credit from either of the above sources while 71% had not of which among owners of registered premises,26% had used credit for their business while 74% had not and among middlemen, only 16% had acquired credit as capital for their business while 84% had not. Wanyoike *et al*. (2018) confirms that lack of credit to finance the hides and skin traders is a major challenge in the industry.

Policies made by the government also determine the type of products sold by the traders and how the traders do their business both locally and internationally. From the study, 43% of the traders agreed that there were government policies that affected them while 57% were not affected. The policies that affect the owners of registered premises were that: they had to get licenses to do the business, get transportation permit for every trip they made to the tannery and high taxes for their turn over while for middlemen, they were affected because they also had to pay the sub counties for transporting the hides and skin to the stores. All the rules that affect hides and skin traders are contained in Hide, Skin and Leather Trade Rules of 1990.

The quality of the collected hides and skin was determined through grading when the hides and skin were collected by the traders from either the slaughterhouses or directly from the farmers depending on the presence of damages. Grade 1 to 4 were perfect or with very few damages, then reject and double rejects which had so many damages hence could be partially used or were discarded This agrees with Wayua and Kagunyu (2012), on the method of grading hides and skin.63% of the traders graded their hides and skin while 37% of them did not. Most of the owners of registered premises (70%) graded their products while a few (30%) accepted all the collected

hides and skin and sold them as they were and among the middlemen, 56% of them graded their collected hides and skin while 44% did not.

The study also considered the quality of the collected hides and skin from the slaughterhouses and farmers and was termed as category. The presence of damages was the factor that was considered of which some occurred before slaughtering the animals, some during slaughter and others after slaughter. Only 21% of the hides and skin collected were perfect without any damages and majority (79%) were intermediate with damages. These results show that trade in hides and skin has not fully agreed with the leather trade rules, Hide, Skin and Leather Trade Rules, 1990 and there is need to create and enforce laws that will reduce the occurrence of these damages in order to improve the quality of our hides and skin.

There were several reasons that were identified as being contributors to individuals' participation in the hides and skin business. The main reason why the participants engaged in this business was family at (35%) followed by the fact that it was a booming business in the country at the time they started (23%), then they lacked employment with 18%, then being owners of butcheries with 11% of which among the middlemen it accounts for 18% and among the owners of registered premises it only accounts for 4% then as apart time business with 7% and lastly other reasons like leisure with 3%. This showed that hides and skin business is characterized by being passed on from one generation to another with very few new entrants. This character was significant at 5%. This might be the main reason for the decline in performance of the hides and skin business because according to Saan *et al*. (2018) there is danger of family business discontinuation.

Access of storage facility was the main determinant of whether one became an owner of a registered premise or a middleman and was significant at 1%. 51% of the traders' accessed storage facility either own constructed or rented while 49% did not. Among the owners of registered premises, 96% of them accessed storage facility (they had built their storage structures) and among the middlemen, only 6% of them accessed storage facility because they were far from the owners of registered premises hence preferred to collect the hides and skin for at most a week then the buyers (collectors from the tanning industries) come to pick them. In the storage structures the traders used the method proposed by Mwondu (2017) where platforms were used: wooden platforms made of timber were raised and hides were stored on separate platforms from skins depending on whether they were salted or dried.

The study also considered how long the traders stayed with the hides and skin before they were taken by other traders to their stores or to the tannery and this character was significant at 1%. Among the owners of registered premises, 76% stayed with them for a month, 16% a week and 4% 2 to 3 weeks and among the middlemen, 94% of them stayed with the collected hides and skin for a day, 4% a week and 2 % a month. This was possible because the hides and skins were preserved hence could be stored, (Muhammad *et al*., 2021).

Ownership of storage facility was considered in the study whereby it was concerned with whether the traders had a place where they stored their hides and skin before taking them to the tannery. Only 37% of the trader's owned storage facilities while 63% did not. Among the owners of registered premises, 68% of them had constructed their own storage facility while 32% did not have hence rented out buildings and converted them into stores. Among the middlemen, only 6% owned storage facility while 94% of them did not because they only collected the hides and skin and took them to the owners of registered premises or waited for them to come and pick them within a day and at most a week. This character was significant at 1%.

The study considered whether the traders had a market where they sold their products. This was significant at 5% , 85% of the traders' accessed market for their raw hides and skin but among them only 2% exported their goods to other countries while 98% did local business. Mwondu (2017) confirms that the pyramidal system is the most commonly practiced marketing network in East Africa whereby small collectors (also known as buyers) buy a couple of hides and skins here and there, they sell to other small local collectors who store them then in turn sell their collected quantities of hides and skins to regional collectors and at the end of this pyramid is the big-time collector who can act also as exporter, or in some cases can be a local tannery.

The mode of transportation used by hides and skin traders was considered. This looked at whether the hides and skin collected from the slaughterhouses were taken to other traders or the traders transported the collected hides and skin to the tannery and if they transported themselves or collectors from the tannery came to pick them and was significant at 1%. Among the owners of registered premises, 36% of them transported the collected hides and skin to the tannery while for 64% of them they were collected by owners of tanneries of which 2% was done using motor bikes while 98% was done using vehicles. Among the middlemen, 40% of them transported their hides and skin to the owners of stores while for 60% of them, the owners of registered premises come and picked them and this is done using bicycles (4%), motor bikes (26%) and vehicles (66%).

Evidenced from this result, the mode of transportation of the collected hides and skin in Kenya is below the standard proposed by (Cargo Incident Notification System, 2017).

The hides and skin traders also pay some legal fee to do their business and this character was significant at 1%. For owners of registered premises, 90% of them paid the legal fee while 10% did not and among the middlemen only 28% paid the fee because they transported the collected hides and skin themselves to the owners of stores while 72% didn't pay any fee for doing the business. According to Hide, Skin and Leather Trade Rules, 1990 there are several legal fees that a trader should pay the government while doing business basing on the type of product that the trader deals in and how he does his/her business whether it is locally or internationally which was not fully considered in the leather chain within the county.

Preservation of raw hides and skin was also an important characteristic of hides and skin trade because the raw hides and skin were preserved with salt before they were taken to the tannery for processing and was significant at1%. 100% of the owners of registered premises preserved their hides and skin while among the middlemen, only 6% practiced preservation of hides and skin because they stayed with them for at most a week before they were taken by the owners of registered premises who then transported them to the tanneries. Leach and Wilson (2009), confirms that preservation of hides and skin is important because it makes them stay up to 1 year.

The type of product sold by the hides and skin traders was also considered in the study whereby the hides and skin sold by the traders were either raw (green), salted or dried. This character was significant at 1%. 98% of the owners of registered premises sold salted hides and skin while 2 % sold dried ones and among the middlemen, 94% of them sold green hides and skin while 4% sold salted ones. This confirms the study of Wanyoike *et al*. (2018) where the local traders mainly deal in three types of products; fresh, wet salted and air dried.

4.1.2 Mean Difference of trader Characteristics by level of participation (Continuous Variables)

Table 4 and appendix C presents the characteristics of hides and skin traders as either middlemen or owners of registered premises with respect to age, experience, cost of building stores, cost of storage if paying rent, legal fee paid, income, gross margin, total revenue, number of hides, number of goat skin, number of sheep skin and total variable cost incurred. Among which 4 characteristics were not significant while 8 were significant.

Table 4: Mean Difference of trader Characteristics by level of participation (Continuous Significant Variables)

	Occupation		Mean	Std dev	Confidence interval	
cost of building	Owner	50	22000	22790.08	15523.13	28476.87***
	Middleman	50	500	3535.534	-504.788	1504.788
	Combined	100	11250	19493.26	7382.113	15117.89
cost of storage	Owner	50	970	1762.448	469.1177	1470.882***
	Middleman	50	50	252.5381	-21.7705	121.7705
	Combined	100	510	1335.188	245.0697	774.9303
Amt lgl fee	Owner	50	1892	1661.919	1419.688	2364.312***
	Middleman	50	208	635.6228	27.358	388.642
	Combined	100	1050	1511.003	750.1841	1349.816
Income	Owner	50	46100	32107.76	36975.08	55224.92***
	Middleman	50	25630	25191.68	18470.61	32789.39
	Combined	100	35865	30498.62	29813.41	41916.59
TR buss	Owner	50	126975.5	140555.4	87030.09	166920.9***
	Middleman	50	54174.8	63102.26	36241.34	72108.26
	Combined	100	90575.15	114399.9	67875.72	113274.6
TVC incurred	Owner	50	83000.38	107896.9	52336.41	113664.3***
	Middleman	50	18136.4	22057.09	11867.84	24404.96
	Combined	100	50568.39	84055.55	33889.94	67246.84
NOG	Owner	50	262.04	449.8015	134.2078	389.8722**
	Middleman	50	119.98	172.7698	70.87936	169.0806
	Combined	100	191.01	346.4232	122.2721	259.7479

*, **, ***: significant at 10%, 5% and 1% level respectively

The traders had an average age of 46 years of which the middlemen had an average of 44 years while owners of registered premises had an average of 48years. This showed minimal chance of continuity of the business if the current participants passed on. This also confirms the study of (Wangui, 2016) where majority of the hides and skin traders were the aged with 86 % of them being between the age of 46 and 65 and only 14% being between the age of 36 and 45.

Majority of the hides and skin traders had been in the business for 14 years of which among the middlemen the average was 13 years and among owners of registered premises the 15 years. This was because most of them joined the business a decade ago when the industry was doing well in the country and were positive that the industry would be revived. These traders had been dealing in hides and skin without proper training in handling hides and skin which concurs with the study of Jabbar *et al*. (2002) who agreed with the problem of inadequate supply and poor quality of manpower to deal with hides and skin in the leather industry.

The gross margin or profit realized from the business by a trader was obtained by deducting the total variable cost incurred while doing the business from the total revenue realized from selling the collected hides and skin. On average, a middleman received a gross margin of Ksh.36038 while an owner of registered premise received a gross margin of Ksh.43, 975.

The number of hides collected was tabulated basing on the number of kilograms of hide sold because the price sold was per kg. On average, a cow hide weighed 25 kg which was calculated by getting the average of the highest weight and the least weight that the traders ever sold. From the county, the traders sold an average of 1628 kg of hides per month

Number of sheep skin collected was considered in the study and on average the traders sold 489 pieces of sheep skin per month. Comparing the number of sheep skin sold and that of the goat skin sold, the sheep skin sold were almost double the number of goat skin sold. This showed that more sheep was reared within the county than goats hence more of them slaughtered.

Since there were traders who had constructed permanent (made of bricks or stones) or temporary (made of timber) structures to store their hides and skin as they awaited being picked by other traders or transport them to the tannery, the cost of building those structures was considered in the study. Most of the owners of registered premises had constructed permanent structures and they used approximately Ksh.22, 000 while the middlemen who had storage facilities were mainly temporary and on average, they used Ksh.500 to construct them. This factor is significant at1%.

For the traders who did not own a storage facility, the cost of storing their hides and skin was considered which was the amount of money that the traders paid as the cost incurred to do their business and the findings were that the owners of registered premises usually paid an average rent of Ksh. 970 while middle men paid an average of Ksh. 50 as charges for storing their hides at the slaughterhouses as it awaited transportation on the same day and this factor was significant at 1%.

The traders also paid money to the sub county offices as license to do their business. The owners of registered premises paid an average of Ksh. 1892 per year which was mainly license for transportation of the hides and skin and permit to do the business within the county while the middlemen paid an average of Ksh. 208 per month which was mainly the local charges for transporting the hides and skin from one sub county to another.

The estimated income that the traders got from doing the hides and skin business as opposed to their other businesses was considered and on average the traders got Ksh. 35,865 per month with middlemen getting an average of Ksh.25, 630 and owners getting an average of Ksh. 46,100 which was higher than that of the middlemen. This character was significant at 1% which was expected because it is the driving force for the traders to do business.

Total revenue from the business considered the total amount of money that the trader got from the business depending on whether he/she dealt in all the three products (hide, goat and sheep skin) or 2 of them or one of them. The revenue from a product was calculated by adding (number of product*minimum price of product) to (number of product*maximum price) then dividing the total by 2. On average, a middleman got a total revenue of Ksh.54, 175 while an owner of registered premise got a total revenue of Ksh.126, 975. This was significant at 1%

Total variable cost incurred for doing hides and skin business included the cost of salting, rent, the cost of hiring an employee and the cost of transporting the hides and skin and it varied from one trader to another. On average, an owner of registered premise incurred a total variable cost of Ksh.83000 while a middleman Ksh.18, 136. This characteristic was significant at 1%.

Considering the average number of hides, sheep and goat skin collected from the county within a month, the number of goat skin collected is the least at an average of 191 pieces per month showing that in Nakuru County, it is a rare product to be found because the environment does not favor keeping goats and is significant at 5%. This supports the study of Katiku *et al*. (2013) who

stated that consumers prefer sheep meat more than goats and hence resulting in availability of more sheep skin than goat skin.

4.2 Challenges facing hides and skin traders

To analyze the challenges facing hides and skin traders within the county, Stata was used to tabulate the percentage of the respondents who agreed that the challenges were being experienced in the leather sector within the country and then the graphs were plotted using SPSS. The y- axis represents the percentage of the effects of the challenges based on the number of respondents who ranked the challenges which are on the x-axis as either Series1- not important, Series 2- very important, Series 3- less important and lastly Series 4- as just important.

4.2.1 Challenges facing owners of registered premises:

Series1- for the challenges that affect the leather industry but are not important to the traders, the highest was inadequate water supply at 68% and the least was fluctuating prices at 2%. This confirms with the study of Ofosu-koranteng (2014) that water is essential in the slaughter houses and is mainly used for maintaining the hygiene of meat to a great extent but for hides and skin is on a low extent.

Series2- these are challenges that greatly affect the traders and were ranked as very important. The highest was fluctuating prices at 56% and the lowest being poor condition of the working premises at 6%. Fluctuating price is an important challenge because the traders themselves agree on the price they sell their products though there are cartels in the industry and therefore end up harassing the minority in the industry by determining the price for hides and skin in the industry. This supports the finding of Wanyoike *et al*. (2018) who indicated that the sales prices that collectors received varied from time to time and were determined through negotiation between them and the seller

Series3- these are challenges that affect the hides and skin traders and are moderately important, the highest was low level of technology at 40% and the lowest being inadequate water supply to the slaughter houses at 4%. According to Ogolla and Wanjau (2013), technology is one of the pillars of the success of the leather industry in Kenya.

Series 4- these are challenges that generally affect the hides and skin traders but do not have a great impact on their business. The highest was harsh government policies in the sector at

28% and the lowest being fluctuating prices at 4%. According to Mwinyihija and Quiesnberry (2013), the public sector, through various national policies needs to redefine and strategize on the leather sector's economic growth.

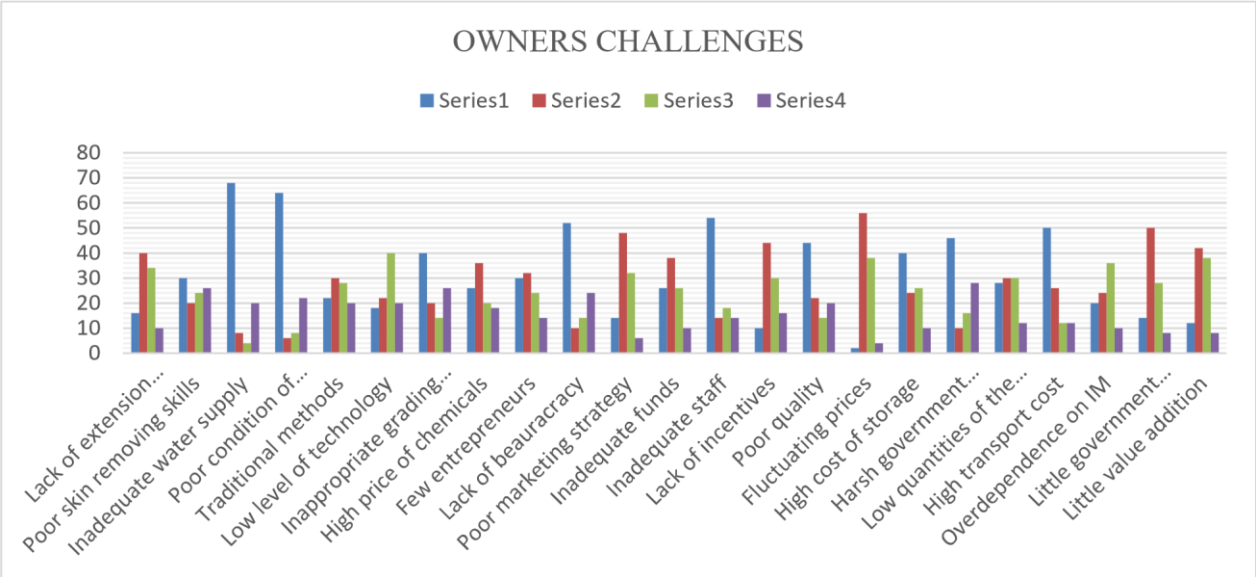

Figure 4: Challenges facing owners of registered premises

4.2.2 Challenges facing Middlemen:

Series 1- among the challenges which are in the industry but do not affect the traders, the greatest was inadequate staff at 82% and the least was fluctuating prices at 0%. This was because the middlemen usually did the work of delivering the collected hides and skin to the owners of registered premises and they do it using their own means and fluctuating prices is at 0% because all the middlemen agreed that this challenge affects them in the industry.

Series 2- among the challenges that greatly affect the middlemen, the highest is fluctuating prices at 58% and the lowest being both inadequate water supply to slaughter houses and poor condition of working premises each of them being at 2%. According to Alemnesh *et al*. (2018), middlemen sell their raw materials to collection centers and the selling price increases as it goes from producers to tannery and therefore with the shifting prices of hides and skin they are likely to be greatly affected.

Series 3- for the challenges that are less important to the middlemen, the highest is poor marketing strategy at 42% and the least being inadequate water supply at 4% to the slaughter

houses which affects the quality of the hides and skin. According to Wanyoike *et al*. (2018) the quality of facilities where slaughtering is done impacts on the quality of hides and skins.

Series 4- for the challenges that affect the middlemen but its impact in the business is not significant, the highest is poor quality of the collected hides and skin at 28% and the lowest being inadequate staff at 4%. The quality of hide and skin collected determines the price that it will fetch in the market. According to Wangui (2016) the price of hides and skins is determined by the species of the animal, weight, curing technique used, size, shape, pattern and finally extent of damage.

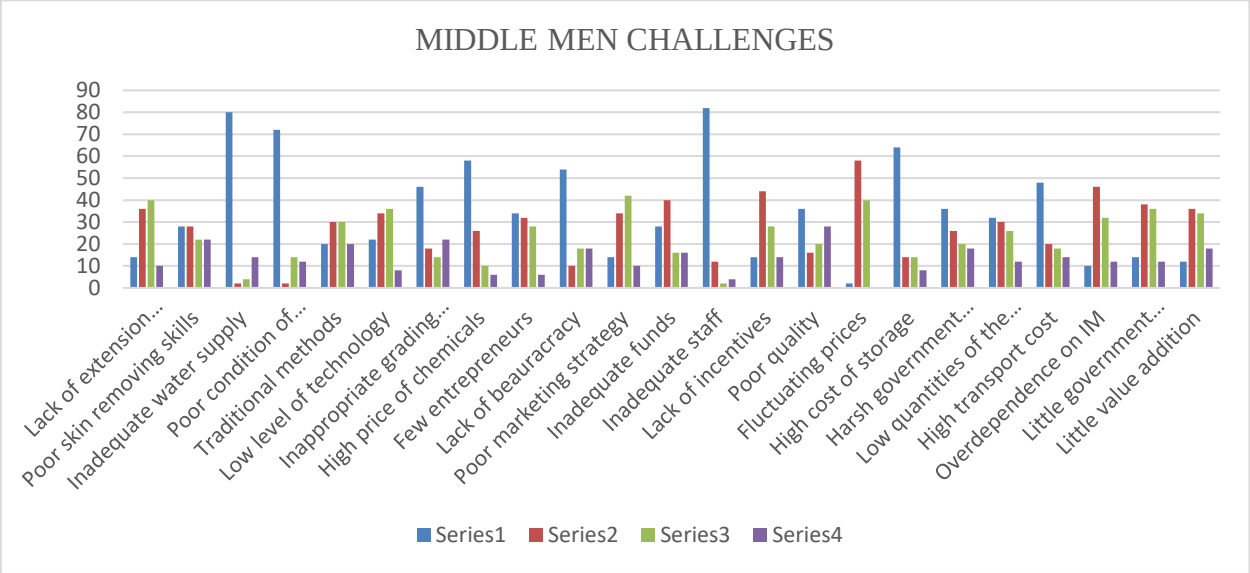

Figure 5: Challenges facing middlemen

4.2.3 Considering the aggregate;

This is the average of how the challenges affect both the owners of registered premises and middlemen i.e. the challenges that affect hides and skin traders in general, the challenges will be listed for each series to include the highest median and the lowest:

Series1- the highest is inadequate water supply to the slaughter houses at 74%. This is because the slaughter houses have adequate supply of both piped and rain water which is used while slaughtering the animals to wash away blood from the meat and hides and skin while slaughtering the animals and therefore this challenge does not affect the hides and skin traders. The median is few entrepreneurs in the business at 30%, this challenge has an impact in the business though not great because presence of more entrepreneurs would lead to more innovations

and competition for the hides and skin collected by the hides and skin traders leading to increased demand for the raw materials in the leather industry. This finding is similar to a study that was done by Hamid *et al.* (2013) who stated that his study was limited to selected business operators managing hides business and there is need for further research and an opportunity for future hides entrepreneur to kick start their business with minimum risks. The least challenge is fluctuating prices at 2% because only 2% of the respondents ranked it as not being a challenge that affect the hides and skin traders.

Series 2- for the challenges that greatly affect the hides and skin traders and were ranked as very important: the highest is fluctuating prices at 57% because there are cartels that determine the prices for hides and skin. Price plays a great role in determining the market forces of demand and supply in any industry, when the price of the hides and skin is high, the hides and skin traders get more income from the business by selling the hides and skin at a higher price while if it is low, they get little income from the business because they end up selling their products cheaply. Ayalew *et al*. (2018) supports this challenge by stating that, hide and skin producers were price takers and buyers had power on price determination. UNIDO (2002) also states that the international market pays for better quality in hides and skin but these additional benefits are not transmitted down through the chain to the livestock producers not even to those people who directly engage in handling of the hides and skins. The median challenge is traditional methods in handling hides and skin at 30% which is mostly in the villages where the animals are slaughtered using traditional methods and therefore end up damaging the hides and skin which lowers the quality of the product and the traders end up selling them at a throw away price or incur losses due to rejection of these hides and skin by the agents of the tanneries. This supports the finding of Naporos (2012) who stated that slaughter and post slaughter poor handling of hides and skin affect their quality. The least challenge in this series is poor condition of working premise at 4% because some the owners of registered premise use the available materials such as timber to construct temporary structures for storing their hides and skin while others have permanent buildings for their stores of which they have made them conducive for storing their hides and skin and therefore incur minimal losses due to rotting and prevent them from being eaten by rats and dogs.

Series 3- the highest challenge in this group is fluctuating prices at 39% which is similar to series 1 though the percentage of series 3 is lower than that of series 1. This implies that this challenge has a significant influence in the hides and skin trade and greatly determines the amount

of income that a trader gets from the business. The median is poor skin removing skills at 23% which occurs due to lack of training of some of the flayers especially those who slaughter the animals in the villages especially when there are celebrations and call the traders to collect the hides and skin. This usually lowers the quality of the hides and skin due to presence of cuts and holes. The least is inadequate water supply to the slaughter houses at 4% which is challenge that greatly affects the ones who deal with meat and not the hides and skin traders.

Series 4- these challenges are in the leather industry but have minimal impact on the hides and skin business. The highest is poor skin removing skills at 24%. The median is little value addition to the collected hides and skin at 13% because the traders only sell raw or salted hides and skin and do not make other products such as bags, sandals and shoes which would have earned them some extra income from the business. The least is fluctuating prices at 2% because there are hides and skin traders especially the owners of registered premises who deal directly with the tanneries who have a great influence on setting the price of the hides and skin and therefore, they are not affected by the regular shifts in the prices.

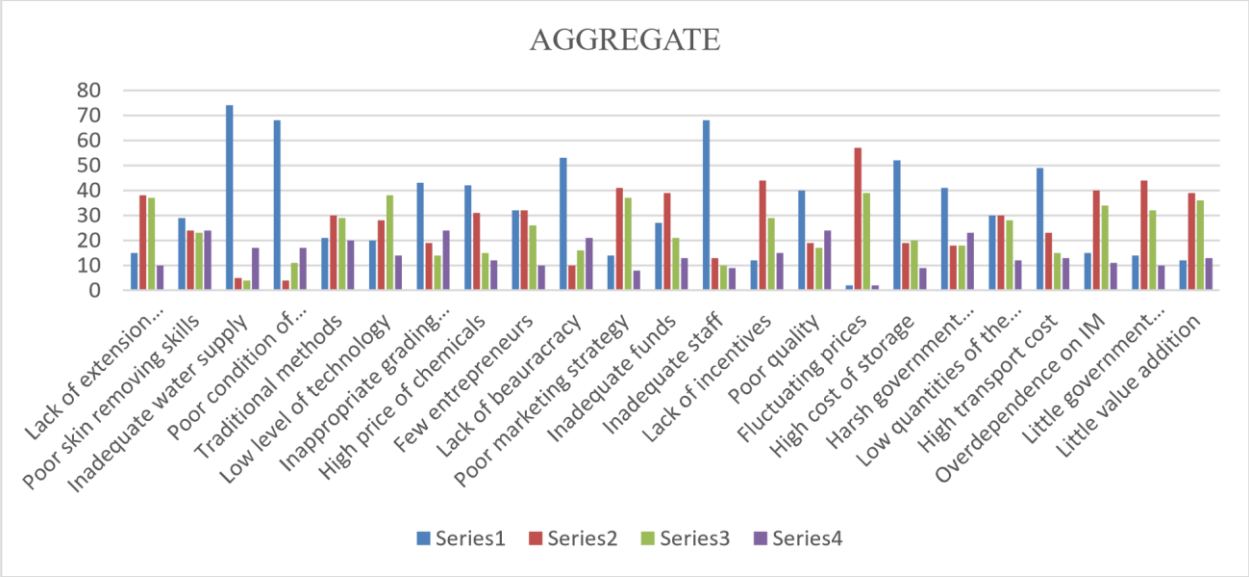

Figure 6: Challenges facing the hides and skin traders (aggregate)

4.3 Factors influencing participation of hides and skin traders in the leather industry

The factors that influence traders' participation in the leather industry are significant in table 5 and Appendix E are explained as follows;

Age played a key role in participation in this industry whereby majority of the traders were aged (above 40years). The odds ratio is < 1 implying that an increase in the age of an individual increases the chances of an individual participating in the hides and skin business as an owner of registered premise as opposed to middlemen hence they are younger in age as compared to the owners of registered premises. This is because the owners of registered premises are likely to have started participating in the business as middlemen when they were in their late twenties or early thirties and had expanded to being owners of registered premises. This supports the study of Wanyoike *et al*.(2018) who stated that majority of hides and skin traders are middle aged or elderly (>45 years old) and had been in the hides and skins collection business for many years (over 10 years) and worked with specific buyer. The P value of this factor is > 0.05 implying that there is no statistically significant difference between the ages of middlemen and owners of registered premises.

The level of education also plays an important role in influencing the individuals' choice to participate in the business. The odds ratio is < 1 implying that an increase in the level of education decreases the chances of participating in the hides and skin business as middlemen but increases the chances of an individual participating in the hides and skin business as owners of registered premises because they have more knowledge on the effect of value addition on their product, availability of market for their products and are more risk takers. The P value is > 0.05 showing that there is no statistically significant difference between the level of education of middlemen and that of the owners of registered premises. From the study, majority of the traders had secondary and primary education with only few (5%) who had attained tertiary education. This supports the study of Naporos (2012), whose findings showed that majority of hides and skin traders are those who drop out of school at either primary or secondary level.

The ability to store hides and skin also plays a significant role in influencing the trader's participation in the industry bearing in mind that this is a perishable commodity and without proper care it is likely to rot giving the traders losses. The odds ratio is > 1 implying that they are favored when it comes to storage of hides and skin because they do not incur storage costs for doing their business and if they do it is very minimal as compared to owners of registered premises. This is because if one cannot preserve the hides and skin, he or she will opt to be a middleman hence sell the product within a day after acquisition but if one can own a storage facility and maintain it well, he or she will opt to be an owner of a registered premise in this value chain and preserve the hides

and thus add value to it and staying with it longer before it is taken to the tannery. According to Jabbar *et al*. (2002), poor handling of hides and skin during storage may lead to further damage such as scratches and tearing, wetting and contamination and infestation by insects. The P value is < 0.05 implying that there is a statistically significant difference in the ability to store hides and skin between the middlemen and the owners of registered premises.

The other significant factor that influences the individual's participation in the industry is their ability to pay legal fee to do business because if the amount they pay to the government is high they will not afford it hence will not be able to trade in hides and skin but if it is manageable, they participate at different levels of the chain depending on their ability. The odds ratio is >1 showing that the middlemen are favored when you compare the amount of legal fee that they pay to do business with that paid by the owners of registered premises hence an increase in the amount of legal fee payable reduces the chances of an individual being a middleman but increases the chances of an individual being an owner of a registered premise. The P value is < 0.05 showing that there is a statistically significant difference between the amount of legal fee paid by middle men and that paid by owners of registered premises to do their business.

The amount of income that one gets from the business influences their participation in the business. The odds ratio is < 1 implying that the if the approximated proportion of income earned from doing hides and skin business as compared to the other increases, it increases the chances of one becoming a middleman whereby most of the middle men were farmers and therefore engage in hides and skin business which is less involving to earn an extra income while others had butchery businesses hence engaged in hides and skin business to earn an extra income by selling the byproducts of the animals which they usually buy as a whole for meat. On the other hand, the owners of registered premises were not greatly affected by the proportion of income that they earned from the business as compared to other businesses as they were risk takers hence had made a long term investment to do the hides and skin business. The P value was < 0.05 showing that there was a statistically significant difference in the approximated proportions of income that the traders earned as compared to other sources of income that they had between middlemen and owners of registered premises.

The gross margin has a significant influence on participation which is gotten by deducting the expenses that one incurs while doing the business. This greatly affected the decision of middlemen to participate in the hides and skin business. The odds ratio was > 1 showing that an

increase in the gross margin from the hides and skin business led to more participants being middlemen because they earned gained more from the business while incurring low costs within a short period of time as opposed to owners of registered premises who had to accumulate their products for at least a month while incurring storage and salting costs in order to enjoy economies of large sales. The P value was < 0.05 showing that there is a statistically significant difference between the gross margins earned by middlemen as compared to that earned by owners of registered premises whereby that of the owners of registered premises is higher due to their large scale sales.

Considering the price of the hides and skin, the price of hide and sheep skin are the ones that greatly influence the traders' participation in the industry. The price of a hide ranges 10ksh to 50ksh per kg for an average weight of 25kgs for the hide that they usually get while the price of a sheep skin ranges 40ksh to 180ksh per sheep skin. Considering the odds ratio for both factors, it was < 1 showing that the owners get better prices for their products as compared to middlemen which is mainly because they add value to their products through salting and drying thus fetch a better price for their products in the leather market. The P value was < 0.05 showing that there was a statistically significant difference between the prices that the two types of hides and skin traders charged for their products. The price of goat skin was not significant because within the county, the farmers majorly reared cows and sheep because the weather conditions favored their survival and therefore becoming a major source of meat and concurrently major source of hides and skin thus little trade in goat skin. According to the study of Wangui (2016) a camel hide fetches the highest price in the market, followed by cattle hide then lastly both sheep skin and goat skin.

Table 5: Factors influencing participation of hides and skin traders in the leather industry

FACTOR	Odds ratio	Std. Err.	z	P>z	[95%	Conf. interval
Gender	1.001239	0.6936346	0	0.999	0.257541	3.892511
Age	0.9616571	0.0205472	-1.83	0.067	0.922217	1.002784**
Marriage	0.7811908	0.2237994	-0.86	0.389	0.445554	1.369662
Education	0.488955	0.1955074	-1.79	0.074	0.223315	1.070581**
Training	1.898056	1.195943	1.02	0.309	0.552048	6.525911
Information	2.762646	3.212131	0.87	0.382	0.2829	26.97852
Storage	647.3539	789.608	5.31	0	59.27767	7069.56***
Market	0.9258377	1.386072	-0.05	0.959	0.049227	17.41281
Transport	1.110622	1.12033	0.1	0.917	0.153789	8.020624
Market Infrastructure	6.556719	7.969539	1.55	0.122	0.60544	71.00718
Credit	0.9594499	0.6179884	-0.06	0.949	0.271492	3.390683
Legal fee	29.0769	18.1072	5.41	0	8.57976	98.54191***
Policy	0.3670415	0.2057983	-1.79	0.074	0.122307	1.101488
Income	0.9998903	0.0000252	-4.35	0	0.999841	0.99994***
Gross Margin	1.000051	0.000014	3.6	0	1.000023	1.000078***
NOH	1.000031	0.0001604	0.2	0.845	0.999717	1.000346
NOG	0.99725	0.0017117	-1.6	0.109	0.993901	1.000611
NOS	1.000799	0.0007773	1.03	0.304	0.999277	1.002324
AVPH	0.8390196	0.037138	-3.97	0	0.769299	0.91506***
AVPG	1.013658	0.0152473	0.9	0.367	0.98421	1.043987
AVPS	0.9515265	0.0197875	-2.39	0.017	0.913524	0.99111**

***, **, *: Significant at 1%, 5% and 10% respectively

4.4 Impact of the hides and skin business on the traders' income

This was analyzed using a combination of Gross Margin analysis and Endogenous Switching Regression Model as shown below.

4.4.1 Gross Margin analysis

This analysis was computed as shown in Appendix D which was done to provide comparison between the average monthly total revenue that a middleman earns and that of an owner of registered premise. This was summarized and presented in Table 6 as shown

Table 6: Gross Margin Difference between Owners of Registered Premises and Middlemen

Variables	Owner Of Registered premise (Mean)	Standard Deviation	Middleman (Mean)	Standard Deviation	t-Value
TR (KES/ Trader)	126975.5	140555.4	54174.8	63102.26	-3.3412***
TVC(KES/Trader)	83000.38	107896.9	18136.4	22057.09	-4.1648***
NOH (Kgs)	1756.02	2039.638	1500.12	2938.333	-0.5059
NOG (Pcs)	262.04	449.8015	119.98	172.7698	-2.0847**
NOS (Pcs)	608	974.3088	369.6	484.6295	-1.5491
GM (KES/Trader)	43975.12	5670.509	36038.4	6262.164	-0.9395

***, **, *: Significant at 1%, 5% and 10% respectively

Comparing the Total Revenue earned by the two types of traders, the Owners of registered premises earn on average KES 126,975.5 while middle men earn on average KES 54,174.8 which is lower than that of the Owners of Registered premises. This is attributed to the fact that they deal in large numbers of hides and skin because they collect them from several middlemen and accumulate them while preserving them during storage before they sale their products.

The Total variable costs incurred by a trader included the sum of the cost of salting the hides and skin and other variable costs which included transportation, labor and rental costs that

they incurred for their businesses. The Owners of registered premises incurred more variable costs (KES 83,000.38) which was almost four times that incurred by the middlemen (KES 18,136.4) because they deal in preserve their hides and skin hence incur the cost of salting, they hire people to help them do the salting hence incur labor costs and store them thus pay rent if they have not constructed their own and transportation costs if they either transport their products from middle men or transport their products themselves to the tannery. For middlemen, the main variable cost they incur in doing their business is transportation and partly rental cost.

The Gross Margin earned by an owner of registered premise (KES 43,975.12) was more than that of a middleman (KES 36,038.4) implying that the little value addition (salting) done by the owners of registered premises and dealing in large volumes of hides and skin hence enjoying economies of scale helps them increase the income earned from the hides and skin business.

4.4.2 Instrumental Variables

To analyze the impact of the hides and skin business on the traders' income the endogenous switching regression (ESR) model was used. This study used two instrumental variables (Table 7) which included availability of contracts between the traders and the buyers of the collected hides and skin and the period of storage of the hides and skin. Firstly, contracts were important in this hides and skin business because they assured the traders of the availability of market for their products and secondly the period of storage was important because it determined the choice of occupation of the trader in this business as either a middle man or an owner of the registered premise. In the study, the wild test was significant and hence indicated the goodness of fit of the endogenous switching regression model hence solving the problem of endogeneity.

Table 7: Validity of the selected instruments

Variable	Occupation of the trader	
	Coef	Std error
Contract	0.424588	0.26218
Period	-0.08527**	0.03115
Constant	-1.59512*	1.86756
Wald test	-20.707928***	

***, **, *: Significant at 1%, 5% and 10% respectively

4.4.3 Endogenous Switching Regression estimates for the selected outcome

Table 8 and Appendix F gives the results of the ESR model whereby the first column presents the determinants of an individual participating in the hides and skin business while the second and the third column provides the coefficients and standard errors of the first column respectively. The fourth and fifth columns present the coefficients and standard errors respectively of the logs of the Gross Margins as returns from the business for middlemen (1) and lastly, the sixth and seventh columns present the coefficients and standard errors respectively of the logs of the gross margin from the business as the returns for owners of registered premises. The Wald chi2 (13) =24.89 and the P value < 0.001 showing the validity of the selected instruments being used in the model.

Table 8: Endogenous switching regression model estimates for selected income from the business

Model Dependent Variables	Occupation of the trader		Returns from the Business			
			Middlemen lgGMBUSS = 1		Owners of registered premises lgGMBUSS = 0	
	Coef	Std. Err.	Coef	Std. Err.	Coef	Std. Err.
Gender	0.345256	0.46133	0.01228	0.06029	0.30333	0.19601
Education	-0.01293	0.04147	0.00508	0.00383	-0.00928	0.01825
Age	-0.00189	0.00901	-0.00187*	0.00104	-0.00738*	0.004
Experience	-0.00525	0.00988	-0.00148	0.00103	0.0045	0.00444
Time in Business	-0.03235*	0.01767	-0.0029	0.00297	-0.00212	0.00733
lnNOH	-0.03604	0.06253	0.0005	0.00647	0.08428***	0.02654
lnNOG	-0.09977	0.10492	0.00708	0.0107	-0.01436	0.04807
lnNOS	0.056863	0.10274	0.0068	0.00943	0.09717**	0.04767
Business	0.068669	0.53765	0.0193	0.04422	0.31948	0.22549
Mkt typ	0.690195	0.92348	0.02924	0.15258	0.1976	0.42849
Grading	0.315707	0.30264	0.02468	0.04422	0.13713	0.14193
Credit	0.571325	0.37592	-0.06236	0.04878	-0.08169	0.20002
Training	0.282144	0.40588	0.11698*	0.0684	0.35635**	0.16863
Contract Prd	0.424588 -0.08527**	0.26218 0.033115				
Constant	-1.59512	1.86756	7.9946***	0.4352	2.84493***	0.70714
/lns			-2.42532***	0.17522	-0.80136***	0.13395
/r			0.20184**	1.40566	1.60371***	0.42272
sigma			0.08845	0.0155	0.44872	0.06011

rho	0.19915	1.34991	0.92223	0.06319

LR test of indep. eqns.: chi2(1)=5.18***

Wald chi2(13)=24.89 Log likelihood= -20.707928

***, **, *: Significant at 1%, 5% and 10% respectively

From Table 8 above, the lns 1 and 0 were significant at 1% showing that the logarithms of the number of hides and goat skin collected were suitable to be used in the endogenous switching regression model. Rho shows the sensitivity of the choice of either of the two occupations and both of them are positive although rho 0 is higher than rho 1 implying that ownership of a registered premise results in more income in the hides and skin business as compared to being a middleman. Sigma 1 and 0 are both positive and hence both traders deviate from the average income. The correlation coefficient (r) is both positive for 1 and 0 showing that both middlemen and owners of registered premises have a positive contribution in the leather value chain although middle men have a low contribution (the linear relationship is below +0.3) while owners of registered premises have a greater contribution in the leather value chain (their linear relationship is above +1.0)

Determinants of occupation of the hides and skin traders (column 2)

The time that one has been in the hides and skin business and the period that one stays with the collected hides and skin before selling them have a great influence on the occupation that a trader takes part in this business. The time in business is significant at 10%. Both middlemen and owners of registered premises have been in the business for more than 10 years although for the owners of registered premises have been in the business longer than the middlemen. This is likely to be because the traders have had direct business deals with the tannery making it easier for them have better access there hence selling their products to them.

The period of storage is significant at 5% and is important because those traders who cannot preserve their collected hides and skins and stay with them longer than a day opt to be middlemen while those who preserve and can stay with them for a month or longer opt to be owners of registered premises. The owners of registered premises, prefer this occupation because they have

ever dealt with green, salted and dried hides hence have opted to deal in salted hides which can stay for a longer time without being spoilt thus incurring little losses and also their daily collection is accumulated for a at least a month thus making them enjoy economies of scale due to cheaper salting costs (salt and employees) and transportation costs to the tannery while the middlemen opt for their occupation due to lack of capital to maintain and run a registered hides and skin premise.

Factors influencing the gross margin earned from the business

For the middlemen (column 4), age and training have a significant influence on the gross margin earned from the business. Both of them are significant 10%. The average age of the middlemen is 44 years they are younger than the owners of registered premises hence likely to be less risk takers to engage in value addition of the hides and skin therefore opt to make easy money quickly by just collecting the hides and skin and selling them while still raw to the owners of registered premises. Very little training has been done among the traders and therefore little or no knowledge on proper preparation and maintenance of the collected hides and skin to ensure delivery of high quality raw materials to the tanneries. In the study, only 18% of the owners of registered premises and 10% of the middlemen have received training on how to handle hides and skin.

For the owners of registered premises (column 6), age, the number of hides collected, the number of sheep skin collected and training have a significant influence on the amount of gross margin that one earns from the business. The average Age of the owners of registered premises is 48 years and their years of experience are higher than that of the middlemen. From the study, they started as middlemen and discovered the benefits of owning a registered premise and therefore ventured into it. The number of hides collected is significant at 1%, this is because the hides prices are @ a kg of hide sold and it fetches a higher price when salted and therefore the more the number of hides collected by a trader, the more the income will be earned from the business. Number of sheep skin collected is significant at 5%, comparing the number of sheep skin collected with the number of goat skin collected, the sheep skins are more which confirms the study of Korir (2016) which stated that the increase in population of sheep and goats recorded was 60% and 39% respectively between 2010 and 2014. Training is significant at 5%, this helps the traders while doing business and are able to maintain high quality for their products and thus minimizing wastage due to poor handling of the collected hides and skin and ensuring that they maximize on the income they earn from their business.

4.4.4 Mean treatment effects on the gross margin from the business

The results in Table 9 show the impact of the hides and skin business on the traders' income (gross margin from the business) which was estimated.

Table 9; Mean Treatment Effect on Gross Margin from the Business

Sub samples	Income Based On Occupation		Treatment Effects
	lgGMBUSS-1 (N=50)	lgGMBUSS-0 (N=50)	
Group 1; Middlemen	a) 8.2586	b) 8.2299	TT= 0.0295***
Group 0; Owners of Registered Premise	c)4.9213	d) 4.4257	TU= -0.4961***
Heterogeneity Effect	3.3373	-3.8042	-0.4666

***, **,*: Significant at 1%, 5% and 10% respectively

The values in the cell (a) and (d) represent the mean values of the logarithms of the gross margin as the incomes for the middlemen and owners of registered premises while cell (b) and (c) represent the counterfactual expected values. The average treatment effect on the treated (ATT) was 0.0295 (2.95%) which represents the actual effect that a trader earns from being a middleman.

On the other hand, the findings on the average treatment effects on the untreated (ATU) shows that the income of the owners of registered premises would decline by 0.4961 (49.61%) if they were to be middlemen.

Comparing the amount that the traders earn from the two occupations, an owner of a registered premise would lose by being a middleman (49.61%) and that which a middleman earns from operating a business (2.95%), the middlemen would have earned more if they owned a registered premise. This implies that being an owner of a registered hides and skin premise increased the likelihood of having a higher income as compared to the counterfactual case of being a middleman.

The traders would probably be constrained socially and economically for example their low level of education and lack of training on handling hides and skin would limit them from

operating a registered premise and inadequate funds might also hinder them due to higher operational costs for maintaining a registered hides and skin premise.

The row of heterogeneity effects shows what each of the groups would have attained if they chose the other occupation. If a middleman had decided to be an owner of a registered premise, then he/she would be expected in a month, to have attained more income by log 3.3373 (Ksh.2174) than the owners of registered premises. This implies that the middlemen would be better off than the owners because they would deny the owners the raw materials that they supply to them yet they are the ones who directly source the raw materials from the slaughter houses and the community then supply to them. This implies that the owners of registered premises would be worse off than the middlemen and would likely quit the business. Contrary, if an owner of registered premise had decided to take the role of a middle man and source the hides and skin directly from the slaughter houses and the community and sold their collected hides and skin without adding value to them, then they would have reduced their income by log 3.8042 (Ksh.6371). The transitional heterogeneity effect is negative, implying that the effect realized on income is attributed to unobservable trader characteristics and not the occupation of the hides and skin trader.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

In the study, the effect of the leather industry on the hides and skin traders' income in Nakuru County was investigated with an aim of contributing to the development and sustainability of the leather industry amongst the non-pastoralist communities. This was done by analyzing; the challenges faced by the traders, factors influencing their participation in the business and the returns they get from the business in terms of profits. The data used in the study involved 100 respondents with 10 traders (5 middlemen and 5 owners of registered premises) interviewed from each of the 11 sub counties of Nakuru county.

A special case was found in Nakuru County, (Naivasha Sub County) where there was a slaughterhouse for donkeys hence providing donkey hides. They collect on average 150 hides per day and therefore 45,000 hides per month of which they sell at a minimum price of Ksh. 4,000 and maximum price of Ksh. 16,000 per hide. These hides are sold whole unlike those of sheep goats and cows which they remove the section of the head. They are exported to china where they are used in the manufacture of medicine. This shows that for all the animals we encounter, their hides and skin are useful and we can get additional income from them. They may not be used locally but may be useful as raw materials in other countries.

The characteristics of the hides and skin traders were first identified using descriptive statistics and the results showed that; reason or starting business, access of storage facility, length of stay with the collected hides and skin, ownership of storage facility, market accessibility, mode of transport used, market infrastructure, payment of legal fees, preservation of the collected hides and skin, the type of product sold, the cost of building a storage facility, the cost of storage, the amount of legal fee paid for doing business, the income, total revenue, total variable cost and the number of goat skin sold are the important characteristics that determine an occupation of a trader in the leather industry.

In the first objective, several challenges that face the hides and skin traders were identified but among them, fluctuating prices was a key challenge that affects hides and skin trade while

inadequate water supply to the slaughter houses was a challenge that affect the leather industry but does not affect the traders, while poor skin removing skills was a lesser challenge that affects the traders.

To determine the factors that influence participation in the leather industry, the logistic regression model was used and the results showed that, age, education, storage, legal fee payable, income, gross margin, the average price per hide and the average price per sheep skin are the important factors that determine an individual's participation in hides and skin business within the county.

Lastly, to determine the impact of the hides and skin business to the traders', income, the endogenous switching regression model was used and the results showed that hides and skin business has a positive effect on the income of the traders because both middlemen and owners of registered premises earn an income from the business although ownership of a registered premise has a more positive impact than operating the business as a middleman.

5.2 Conclusions

The following conclusions were drawn from the study;

a) The major challenges facing the hides and shins traders in Nakuru County are fluctuating prices as the main challenge with others including high cost of permits to undertake the business, high cost of the special salt used to preserve the hides and skins and lack of capital for the traders to participate effectively in the hides and skins trade.
b) Age, education, ability to store hides and skin, amount of legal fee payable, the approximated income earned, the gross margin earned from the business, the average price per hide and the average price per sheep skin are important factors that influence an individual's decision to participate in the hides and skin business.
c) From the results of this study, the owners of registered hides and skins premises were found to earn more income from the hides and skin trade as compared to the middlemen.

5.3 Recommendations

Based on the findings of the study, the following recommendations provide a framework for improving hides and skin business;

a) The government should empower the traders by providing incentives such as lowering permit costs, subsidizing the salt used preserve the hides and skin and providing funds to encourage more participants and hence a healthy competition among the traders.
b) More awareness should be made on the importance of hides and skin with its value addition to encourage more participation and investment in the leather sector. Similarly, more training on tanning and value addition on hides and skin should be done to increase the earnings from hides and skin business.
c) Perfect competition market system should be encouraged within the industry because the prevailing market within the county is monopsony whereby the main buyer of the collected hides and skins is Alpharama

5.4 Areas of further research

While the study focused on the effect of the hides and skin business on the traders' income, future studies may focus on the Impact of leather goods trade on the income of individuals (take 3 goods example, shoes, bags and belt then look at its return if locally produced then find out how we can minimize production cost)

Another area would be to analyze the performance of the leather industry on the traders' income in the pastoralist region, compare their income with that of traders in the non-pastoralist regions, importance of education on participation of individuals in the leather value chain, sustainable supply chain incentives for stakeholders in the leather industry and ways of promoting participation of vulnerable groups (women, youths and people with disabilities) to participate in the leather industry.

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APPENDICES

Appendix A: Questionnaire

Questionnaire for: contributing to development and sustainability of the leather industry amongst the non-pastoralist communities within the country

My name is Ruth Mwenje Lumarai a postgraduate student at Egerton University, Njoro Campus. In partial fulfillment of the requirement for the masters of Science in Agribusiness Management, I am conducting a research on the impact of the leather industry on small scale hides and skin traders' income, case of Nakuru County of Kenya. Your participation in answering these questions will be highly appreciated. Information given will be completely confidential and used solely for research purpose.

Questionnaire No: _____

Sub county _____

Date: _____

SECTION A: RESPONDENT INFORMATION

A.1 Information of the leather stakeholder

1. Occupation of the stakeholder in the leather sector

- Technical personnel [ ]
- Middleman [ ]
- Owner of a registered premise [ ]

2. Stakeholder information:

   a) Gender M [ ] F [ ]

   b) Age in years …….

   c) Marital status Married [ ] Single [ ] Divorced [ ] Widowed [ ]

   d) Level of education Primary [ ] Secondary [ ] Tertiary[ ] University [ ]

3. Have you received any training to deal in hides and skin

Yes [ ] No [ ]

If yes, what kind of training have you received and where did you train from?

……

……

4. Livestock Information

List down all animals kept in the farm for meat in order of importance

	Current	Which animals have shown declining numbers	Which animals have shown increasing numbers	Which animals have been abandoned	Which animals have emerged since 1990?
1					
2					
3					
4					

5. What are the main uses of hides and skins produced within the county?

……

SECTION B: CONSTRAINTS FACING THE LEATHER INDUSTRY

(Rank the importance's as 1= very important, 2= moderately important, 3= less important)

	Challenges in the leather sector	Middleman		Owner of registered premises	
		Is the challenge an issue in hides and skin trade? 1=yes; 0= no	Rank its importance (only those with Yes in column 2)	Is the challenge an issue in trading in hides and skin? 1=yes; 0= no	Rank its importance (only those with Yes in column 4)
1	Lack of extension services				
2	Poor skin removing skill				
3	Inadequate water supply to slaughter houses				

4	Poor condition of working premises				
5	Traditional methods in handling hides and skin				
6	Low level of technology				
7	Inappropriate grading standards for hides and skin				
8	High price of preserving chemicals				
9	Few entrepreneurs in the sector				

10	Lack of bureaucracy in getting permits				
12	Poor marketing strategies				
13	Inadequate funds				
14	Inadequate staff				
15	Lack of incentives to encourage more participants in the sector				
16	Poor quality of hides and skin				
17	Fluctuating prices of hides and skin				
18	High cost of storage for the collected hides/skin				

19	Harsh government policies in the sector				
20	Low quantities of the produced hides and skin				
21	High transportation costs to the market				
22	Overdependence on the international leather market				
24	Little government investment in the sector				
25	Little value addition for the hides and skin				
26	Other (specify) a) b) c)				

What do you think can be done to improve the hides and skin industry?

a. ……
……

b. ……
……

c. ……
……..

d. ……
……

e. ……
……

f. ……

……

g. ……

……..

h. ……

……..

SECTION C: PARTICIPATION OF TRADERS IN THE LEATHER SECTOR

1. How long have you been in the hides and skin business? ……

…

2. What made you start trading in hides and skin?

…….

3. Do you access information about the hides and skin business?

Yes [ ] No [ ]

If yes, how do you access it? Through:

- Technical personnel [ ]
- Radio [ ]
- Television [ ] □ Phone [ ] □ Internet [ ]
- Other, specify ……

4. Do you have access to storage facilities for the collected hides and skin?

Yes [ ] No [ ]

If yes, where do you store the hides and skin?

……..

How long do you stay with the hides and skin before taking them to the tannery?

- A day [ ]

- A week [ ]
- A month [ ]
- Other, specify

  …….

Do you own the storage facility for the hides and skin?

Yes [ ] No [ ]

If yes, how much did it cost you to build the storage facility?

……

If no, what is the basis for payment of the storage fee?

The number of hides and skin [ ] the period of storage [ ]

How much do you pay for the storage of the hides and skin based on the answer selected above ……..

…….

5. Do you access the market for hides and skin?

   Yes [ ] No [ ]

   What is the target market of your products?

   - Local market [ ]
   - Export market [ ]
   - Both local and export [ ]

6. Do you receive inspection services for the collected hides and skin from the technical personnel dealing in hides and skin?

   Yes [ ] No [ ]

7. Are you the one who transports the hides and skin to the tannery?

   Yes [ ] No [ ]

If yes, which mode of transport do you use to transport the hides and skin?

Bicycle [ ] Motorbike [ ] Vehicles [ ] If

No, who transports the hides and skin to the tannery?

……

8. To which tannery are the collected hides and skin taken?

……

9. Are there contracts between you and the buyers of the collected hides and skin?

Yes [ ] No [ ]

If yes, which type of contract?

……

10. Do you belong to any kind of group in the leather sector within the county?

Yes [ ] No [ ]

If yes, which one?

……..

Apart from the one you belong to, what are the other groups in the leather sector and their functions?

GROUP	FUNCTION

11. How is the road infrastructure within the county?

Good [ ] Bad [ ]

12. Do you have access to market infrastructure in the leather sector?

Yes [ ] No [ ]

13. Where is the local market (within the sub county) where you take the collected hides and skin?

    ……

    What is the average distance in Km to the local market?

    ……...

14. Where is the central market (within the county) where you take the collected hides and skin?

    ……..

    What is the average distance in Km to the central market?

    ……..

15. Do you access credit for doing the hides and skin business?

    Yes [ ] No [ ]

    If yes, who gives you this credit?

    …….

    If yes, what are the qualifications for one to access this type of credit?

    a. ……
    b. ……
    c. ……
    d. ……
    e. ……

16. Do you pay legal fee for trading in hides and skin?

    Yes [ ] No [ ]

    If yes, how much money do you pay and for what period of time?

    Amount (Ksh)…… period…….

17. Are there government policies that affect your trade in hides and skin within the county?

    Yes [ ] No [ ]

If yes, what are these policies?

a. ……

b. ……

c. ……

d. ……

e. ……

How do these policies affect you?

a. ……..

b. ……..

c. ……..

d. ……..

e. ……..

SECTION D: CONTRIBUTION OF THE HIDES AND SKIN BUSINESS TO THE INCOME OF ITS TRADERS

Do you participate in the following activities before selling the hides and skin?

Preservation of hides and skin?

Yes [ ] No [ ]

If yes which method do you use?

Air drying [ ]

Wet salting [ ]

Other (specify) …….

Grading of hides and skin? Yes [ ] No [ ]

If yes, which of the following parameters is used?

Weight [ ]

Shape or pattern [ ]

Breed or source [ ]

Other (specify)…….

For the parameter selected above, explain how it is done

……

……

…….

In which category does the collected/sold hides and skin fall?

Perfect without any damages [ ]

Intermediate with few damages [ ]

Imperfect with many serious damages [ ]

If they have damages, when do the damages occur?

Before slaughter [ ]

During slaughter [ ]

After slaughter [ ]

18. Indicate your main sources of income and estimate the average monthly income obtained from each source

SOURCE	Income received per month
Hides and skin trade	

Non hides and skin business sources a. b.	

19. What are you selling?

- Green hides/skins (fresh hides from the carcass) [ ]
- Salted hides/skins (those preserved using salt) [ ]
- Dried hides/skins (those dried in the sun or using electricity) [ ]
- Other, specify

……

…….

20. What makes you prefer doing business as a middle man [ ] or owner of a registered premise [ ] (tick what you are then answer the question)

a. ……

b. ……

c. ……

d. ……

e. ……

f. ……..

g. ……..

21. Would you like to remain in this business?

Yes [ ] No [ ]

Give a reason for your answer

……

……

……

22. Would you encourage others to join the business?

Yes [ ] No [ ]

21. Gross margin from hides and skin business

(while giving the approximations for the variable costs: for green hide or skin, give the cost of flaying a cow or bull, goat and sheep: for the salted hide or skin, give the average cost incurred in preserving a hide, goat or sheep skin: for the dried hide, give the average cost incurred in drying a hide, goat or sheep skin)

MONTHLY INCOME	Quantity	Amount in Ksh
Hide		
Hides collected in a month		
Minimum price per hide		
Maximum price per hide		
Goat skin		
Goat skin collected a month		
Minimum price per goat skin		
Maximum price per goat skin		
Sheep skin		
Sheep skin collected a month		
Minimum price per sheep skin		
Maximum price per sheep skin		
VARIABLE COSTS INCURED PER ITEM		
Hide		
Green hide		

Dried hide		
Salted hide		
Goat skin		
Green goat skin		
Dried goat skin		
Salted goat skin		
Sheep skin		
Dried sheep skin		
Green sheep skin		
Salted sheep skin		
Average of other costs incurred in the business that vary from time to time		
1.		
2.		
3.		
4.		
5.		

THANK YOU FOR YOUR CO-OPERATION

Appendix B: Characteristics of hides and skin traders, (Discrete variables)

Variable	Description	Owner %	Middle man %	Aggregate %	Confidence Interval
Gender	Male	88	90	89	0.1021
	Female	12	10	11	
Marital status	Married	74	82	78	1.5385
	Single	14	10	12	
	Divorced	6	6	6	
	Widowed	6	2	4	
Level of education	Primary	30	44	37	2.145
	Secondary	64	52	58	
	Tertiary	6	4	5	
Training	Yes	18	10	14	1.3289
	No	82	90	86	
Reason for starting business	Family	40	30	35	15.8272**
	Own butchery	4	18	11	
	Lack of employment	18	18	18	
	Booming business	18	28	23	
	Part time business	12	2	7	
	Other	6	0	3	
Information	Yes	82	82	82	0.0212
	No	18	18	18	
Access of storage	Yes	96	6	51	81.0324***
	No	4	94	49	
Length of stay	Day	0	94	47	89.7026***
	Week	16	4	10	
	Month	76	2	39	
	Other	4	0	4	
Own storage facility	Yes	68	6	37	41.2269***

	No	32	94	63	
	None	62	96	79	
Market	Yes	92	78	85	3.8431**
	No	8	22	15	
Inspection	Yes	50	56	53	0.548
	No	50	44	47	
Transport	Trader	36	40	38	0.1698
	Buyer	64	60	62	
Mode of transport	Bicycle	0	4	4	17.4077***
Variable	Description	Owner %	Middle man %	Aggregate %	
	Motor bike	2	26	14	
	Vehicles	98	66	82	
Contract	Yes	24	20	22	0.2331
	No	76	80	78	
Group	Yes	2	2	2	0.3436
	No	98	98	98	
Road Infrastructure	Good	76	80	78	0.2331
	Bad	24	20	22	
Market Infrastructure	Yes	44	22	33	5.4726**
	No	56	78	67	
Credit	Yes	26	16	21	1.5069
	No	74	84	79	
Legal Fee	Yes	90	28	51	39.7272***
	No	10	72	49	
Government Policy	Yes	38	48	43	1.02
	No	62	57	57	
Preservation	Yes	100	6	53	88.6792***
	No	0	94	47	
Grading	Yes	70	56	63	2.1021
	No	30	44	37	

Category	Perfect without any damages	22	20	21	0.0603
	Intermediate with few damages	78	80	79	
	None	12	0	6	
Product	Green	0	94	47	88.6923*
	Salted	98	6	52	
	Dried and salted	2	0	1	

Appendix C: Characteristics of hides and skin traders, (Continuous variables)

	Occupation		Mean	Std dev	Confidence interval	
Age	Owner	50	47.62	11.05624	44.47785	50.76215
	Middleman	50	44.22	9.427035	41.54087	46.89913
	Combined	100	45.92	10.36377	43.8636	47.9764
Experience	Owner	50	15.12	8.53956	12.69308	17.54692
	Middleman	50	13.2	6.706683	11.29398	15.10602
	Combined	100	14.16	7.699823	12.63219	15.68781
cost of building	Owner	50	22000	22790.08	15523.13	28476.87***
	Middleman	50	500	3535.534	-504.788	1504.788
	Combined	100	11250	19493.26	7382.113	15117.89
cost of storage	Owner	50	970	1762.448	469.1177	1470.882***
	Middleman	50	50	252.5381	-21.7705	121.7705
	Combined	100	510	1335.188	245.0697	774.9303
Amt lgl fee	Owner	50	1892	1661.919	1419.688	2364.312***
	Middleman	50	208	635.6228	27.358	388.642
	Combined	100	1050	1511.003	750.1841	1349.816
Income	Owner	50	46100	32107.76	36975.08	55224.92***
	Middleman	50	25630	25191.68	18470.61	32789.39
	Combined	100	35865	30498.62	29813.41	41916.59
TR buss	Owner	50	126975.5	140555.4	87030.09	166920.9***
	Middleman	50	54174.8	63102.26	36241.34	72108.26
	Combined	100	90575.15	114399.9	67875.72	113274.6
GM buss	Owner	50	43975.12	40096.55	32579.81	55370.43
	Middleman	50	36038.4	44280.19	23454.11	48622.69
	combined	100	40006.76	42215.15	31630.36	48383.16
TVC incurred	Owner	50	83000.38	107896.9	52336.41	113664.3***
	Middleman	50	18136.4	22057.09	11867.84	24404.96
	combined	100	50568.39	84055.55	33889.94	67246.84
NOH	Owner	50	1756.02	2039.638	1176.361	2335.679
	Middleman	50	1500.12	2938.333	665.0551	2335.185
	combined	100	1628.07	2519.699	1128.107	2128.033
NOG	Owner	50	262.04	449.8015	134.2078	389.8722**
	Middleman	50	119.98	172.7698	70.87936	169.0806
	combined	100	191.01	346.4232	122.2721	259.7479
NOS	Owner	50	608	974.3088	331.1045	884.8955
	Middleman	50	369.6	484.6295	231.8698	507.3302
	combined	100	488.8	774.8828	335.0464	642.5536

Appendix D: Calculation of the Gross Margin

	NOH(KG)	MINPH	TMINPH	MAXPH	TMAXPH	TRH	NOG	MINPG	TMINPG	MAXPG	TMAXPG	TRG	NOS	MINPS	TMINPS	MAXPS	TMAXPS	TRS	TRBUSS	VCGH	VCSH	TVCH	VCGG	VCSG	TVCG	VCGS	VCSS	TVCS	OVC	TVCINCRD	GMBUSS	AVPH	AVPG	AVPS	LOG GMBUSS
KN	960	10	9600	15	14400	12000	40	50	2000	80	3200	2600	200	50	10000	60	12000	11000	25600	3200	0	3200	1200	0	1200	4000	0	4000	3000	11400	14200	12.5	65	55	4.152288344
KN	1050	10	10500	20	21000	15750	1750	50	87500	120	210000	148750	4000	50	200000	100	400000	300000	464500	4200	6000	10200	78750	45000	123750	160000	31500	191500	18000	343450	121050	15	85	75	5.082964794
KN	240	10	2400	20	4800	3600	10	30	300	50	500	400	150	30	4500	40	6000	5250	9250	1200	0	1200	200	0	200	3000	0	3000	0	4400	4850	15	40	35	3.685741739
KN	450	10	4500	15	6750	5625	20	50	1000	120	2400	1700	70	60	4200	100	7000	5600	12925	1800	3500	5300	900	700	1600	2800	1750	4550	0	11450	1475	12.5	85	80	3.16879202
KN	350	10	3500	15	5250	4375	20	30	600	50	1000	800	150	30	4500	40	6000	5250	10425	1750	0	1750	600	0	600	3000	0	3000	500	5850	4575	12.5	40	35	3.660391098
KN	850	10	8500	20	17000	12750	25	50	1250	120	3000	2125	60	60	3600	100	6000	4800	19675	3400	6600	10000	1125	600	1725	2400	1500	3900	1000	16625	3050	15	85	80	3.484299839
KN	600	10	6000	15	9000	7500	40	50	2000	120	4800	3400	1000	50	50000	100	100000	75000	85900	2500	0	2500	1600	0	1600	20000	0	20000	2000	26100	59800	12.5	85	75	4.776701184
KN	0	0	0	0	0	0	0	0	0	0	0	0	500	50	25000	100	50000	37500	37500	0	0	0	0	0	0	20000	12000	32000	2000	34000	3500	0	0	75	3.544068044
KN	3000	10	30000	20	60000	45000	0	0	0	0	0	0	2500	60	150000	100	250000	200000	245000	0	0	0	16750	0	16750	44750	0	44750	6000	67500	177500	15	0	80	5.249198357
KN	1080	10	10800	20	21600	16200	2000	50	100000	120	240000	170000	3000	50	150000	100	300000	225000	411200	4320	7000	11320	90000	38500	128500	120000	57750	177750	15000	332570	78630	15	85	75	4.895588276
KN	7000	0	0	0	0	0	4000	0	0	0	0	0	15000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
KN	7500	0	0	0	0	0	3500	0	0	0	0	0	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
Molo	540	15	8100	20	10800	9450	0	0	0	0	0	0	0	0	0	0	0	0	9450	2160	3000	5160	0	0	0	0	0	0	500	5660	3790	17.5	0	0	3.57863921

Molo	450	12	5400	15	6750	6075	10	50	500	60	600	550	220	40	8800	60	13200	11000	17625	1500	0	1500	400	0	400	4400	0	4400	1000	7300	10325	13.5	55	50	4.01389006
Molo	300	15	4500	35	10500	7500	200	60	12000	180	36000	24000	250	50	12500	180	45000	28750	60250	1200	1750	2950	9000	4000	13000	10000	5000	15000	0	30950	29300	25	120	115	4.46686762
Molo	360	10	3600	15	5400	4500	0	0	0	0	0	0	120	40	4800	60	7200	6000	10500	1200	0	1200	0	0	0	2400	0	2400	0	3600	6900	12.5	0	50	3.838849091
Molo	2400	15	36000	50	120000	78000	12	50	600	120	1440	1020	1200	50	6000	140	168000	87000	166020	9600	16750	26350	540	250	790	48000	24000	72000	0	99140	66880	32.5	85	95	4.825296264
Molo	750		7500	20	15000	11250	20	40	800	120	2400	1600	200	50	10000	140	28000	19000	31850	2500	0	2500	800	0	800	6000	0	6000	0	9300	22550	15	80	95	4.353146546
Molo	6300	10	63000	20	126000	94500	2000	50	100000	120	240000	170000	5000	50	250000	120	600000	425000	689500	25200	49000	74200	90000	46900	136900	200000	116900	316900	35000	563000	126500	15	85	85	5.102090526
Molo	1050	10	10500	20	21000	15750	25	50	1250	140	3500	2375	650	50	32500	120	78000	55250	73375	4200	0	4200	750	0	750	13000	0	13000	0	17950	55425	15	95	85	4.743705702
Molo	180	10	1800	20	3600	2700	90	50	4500	120	10800	7650	560	50	28000	100	56000	42000	52350	720	1500	2220	4050	1800	5850	22400	12000	34400	1500	43970	8380	15	85	75	3.923244019
Molo	0	0	0	0	0	0	50	40	2000	60	3000	2500	800	30	24000	60	48000	36000	38500	0	0	0	2000	0	2000	16000	0	16000	0	18000	20500	0	50	45	4.311753861
Molo	20000	0	0	0	0	0	2500	0	0	0	0	0	10000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
Molo	15000	0	0	0	0	0	3000	0	0	0	0	0	15000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
KS	480	10	4800	20	9600	7200	50	40	2000	100	5000	3500	100	50	5000	120	12000	8500	19200	1920	3500	5420	2250	1000	3250	4000	2000	6000	500	15170	4030	15	70	85	3.605305046
KS	2500	10	25000	15	37500	31250	0	0	0	0	0	0	0	0	0	0	0	0	31250	10000	0	10000	0	0	0	0	0	0	5000	15000	16250	12.5	0	0	4.210853365
KS	750	15	11250	20	15000	13125	0	0	0	0	0	0	0	0	0	0	0	0	13125	3000	4250	7250	0	0	0	0	0	0	1000	8250	4875	17.5	0	0	3.68797462
KS	315	10	3150	20	6300	4725	60	60	3600	140	8400	6000	500	60	30000	100	50000	40000	50725	1050	0	1050	1250	0	1250	10000	0	10000	1500	13800	36925	15	100	80	4.567320504

KS	1800	20	36000	30	54000	45000	80	60	4800	100	8000	6400	700	70	49000	120	84000	66500	117900	7200	15000	22200	3600	1800	5400	28000	15000	43000	0	70600	47300	25	80	95	4.674861141
KS	0	0	0	0	0	0	70	50	3500	70	4900	4200	240	40	9600	60	14400	12000	16200	0	0	0	2100	0	2100	4800	0	4800	0	6900	9300	0	60	50	3.968482949
KS	1200	15	18000	20	24000	21000	240	50	12000	120	28800	20400	70	60	4200	120	8400	6300	47700	4800	6750	11550	10800	5000	15800	2800	1250	4050	0	31400	16300	17.5	85	90	4.212187604
KS	2175	20	43500	30	65250	54375	0	0	0	0	0	0	0	0	0	0	0	0	54375	7250	0	7250	0	0	0	0	0	0	0	7250	47125	25	0	0	4.673251363
KS	0	0	0	0	0	0	120	50	6000	100	12000	9000	150	60	6000	120	18000	12000	21000	0	0	0	5400	3000	8400	6000	3600	9600	0	18000	3000	0	75	90	3.477121255
KS	0	0	0	0	0	0	200	40	8000	80	16000	12000	500	40	20000	70	35000	27500	39500	0	0	0	6000	0	6000	10000	0	10000	0	16000	23500	0	60	55	4.371067862
KS	8000	0	0	0	0	0	1000	0	0	0	0	0	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
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NW	1200	10	12000	20	24000	18000	100	50	5000	80	8000	6500	150	50	7500	80	12000	9750	34250	5000	0	5000	4000	0	4000	4500	0	4500	500	14000	20250	15	65	65	4.306425028
NW	750	25	18750	30	22500	20625	80	150	12000	180	14400	13200	200	100	20000	180	36000	28000	61825	3000	5100	8100	3600	1800	5400	8000	4500	12500	2500	28500	33325	27.5	165	140	4.522770158
NW	600	15	9000	20	12000	10500	150	60	9000	100	15000	12000	180	60	10800	70	12600	11700	34200	2400	0	2400	6000	0	6000	3600	0	3600	2000	14000	20200	17.5	80	65	4.305351369
NW	0	0	0	0	0	0	150	120	18000	180	27000	22500	300	120	36000	180	54000	45000	67500	0	0	0	6750	3000	9750	12000	6000	18000	0	27750	39750	0	150	150	4.599337133
NW	0	0	0	0	0	0	0	0	0	0	0	0	240	50	12000	80	19200	15600	15600	0	0	0	0	0	0	4800	0	4800	500	5300	10300	0	0	65	4.012837225
NW	1500	25	37500	30	45000	41250	250	120	30000	180	45000	37500	200	100	20000	180	36000	28000	106750	6000	8500	14500	11250	4250	15500	8000	3500	11500	6500	48000	58750	27.5	150	140	4.769007871

NW	750	10	7500	20	15000	11250	70	60	4200	80	5600	4900	120	50	6000	80	9600	7800	23950	3000	0	3000	2800	0	2800	3600	0	3600	1000	10400	13550	15	70	65	4.131939295
NW	900	20	18000	30	27000	22500	100	150	15000	180	18000	16500	80	140	11200	180	14400	12800	51800	3600	5000	8600	4500	2000	6500	3200	1750	4950	0	20050	31750	25	165	160	4.50174373
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NE	840	10	8400	15	12600	10500	70	60	4200	80	5600	4900	70	50	3500	60	4200	3850	19250	2800	0	2800	2800	0	2800	1400	0	1400	1000	8000	11250	12.5	70	55	4.051152522
NE	2160	20	43200	30	64800	54000	0	0	0	0	0	0	0	0	0	0	0	0	54000	8640	18000	26640	0	0	0	0	0	0	2500	29140	24860	25	0	0	4.395501124
NE	1200	10	12000	15	18000	15000	0	0	0	0	0	0	0	0	0	0	0	0	15000	4000	0	4000	0	0	0	0	0	0	0	4000	11000	12.5	0	0	4.041392685
NE	0	0	0	0	0	0	240	60	14400	180	43200	28800	360	60	21600	100	36000	28800	57600	0	0	0	10800	5400	16200	14400	7800	22200	0	38400	19200	0	120	80	4.283301229
NE	600	10	6000	20	12000	9000	50	60	3000	80	4000	3500	80	50	4000	70	5600	4800	17300	2000	0	2000	1500	0	1500	1600	0	1600	500	5600	11700	15	70	60	4.068185862
NE	4500	15	67500	35	157500	112500	500	50	25000	180	90000	57500	700	70	49000	90	63000	56000	226000	18000	25000	43000	22500	10000	32500	28000	11750	39750	25000	140250	85750	25	115	80	4.933234129
NE	1440	10	14400	15	21600	18000	240	60	14400	80	19200	16800	350	50	17500	70	24500	21000	55800	4800	0	4800	7200	0	7200	14000	0	14000	0	26000	29800	12.5	70	60	4.474216264
NE	576	15	8640	20	11520	10080	100	60	6000	140	14000	10000	150	60	9000	100	15000	12000	32080	2304	4800	7104	4500	2400	6900	6000	3600	9600	2500	26104	5976	17.5	100	80	3.776410589
NE	600	10	6000	20	12000	9000	140	50	7000	80	11200	9100	336	50	16800	70	23520	20160	38260	2400	0	2400	5600	0	5600	6720	0	6720	0	14720	23540	15	65	60	4.371806459
NE	12000	0	0	0	0	0	1500	0	0	0	0	0	1500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
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Bahati	1050	10	10500	20	21000	15750	0	0	0	0	0	0	0	0	0	0	0	0	15750	3500	0	3500	0	0	0	0	0	0	0	3500	12250	15	0	0	4.088136089
Bahati	360	25	9000	50	18000	13500	10	80	800	130	1300	1050	40	70	2800	100	4000	3400	17950	1440	3000	4440	450	300	750	1600	1200	2800	0	7990	9960	37.5	105	85	3.998259338
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Bahati	1500	10	15000	50	75000	45000	300	70	21000	140	42000	31500	500	60	30000	120	60000	45000	121500	6000	10200	16200	13500	6000	19500	20000	10200	30200	6000	71900	49600	30	105	90	4.695481676
Bahati	336	10	3360	20	6720	5040	100	50	5000	80	8000	6500	200	70	14000	80	16000	15000	26540	1400	0	1400	3000	0	3000	4000	0	4000	0	8400	18140	15	65	75	4.258637283
Bahati	840	30	25200	40	33600	29400	150	70	10500	120	18000	14250	240	70	16800	80	19200	18000	61650	3360	6000	9360	6750	3300	10050	9600	5400	15000	0	34410	27240	35	95	75	4.435207103
Bahati	240	10	2400	25	6000	4200	70	50	3500	100	7000	5250	150	50	7500	70	10500	9000	18450	1200	0	1200	2800	0	2800	3000	0	3000	0	7000	11450	17.5	75	60	4.058805487
Bahati	3000	30	90000	50	150000	120000	0	0	0	0	0	0	0	0	0	0	0	0	120000	12000	20100	32100	0	0	0	0	0	0	5000	37100	82900	40	0	0	4.918554531
Bahati	750	10	7500	30	22500	15000	150	60	9000	100	15000	12000	100	60	6000	80	8000	7000	34000	2500	0	2500	4500	0	4500	2000	0	2000	0	9000	25000	20	80	70	4.397940009
Bahati	15000	0	0	0	0	0	1500	0	0	0	0	0	2500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
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Gilgil	1200	20	24000	25	30000	27000	200	120	24000	160	32000	28000	1200	100	120000	120	144000	132000	187000	4800	6750	11550	9000	3500	12500	48000	20000	68000	8400	100450	86550	22.5	140	110	4.937267072
Gilgil	2000	10	20000	15	30000	25000	400	60	24000	80	32000	28000	700	50	35000	80	56000	45500	98500	8640	0	8640	16000	0	16000	21000	0	21000	0	45640	52860	12.5	70	65	4.723127159
Gilgil	840	15	12600	25	21000	16800	220	80	17600	120	26400	22000	700	80	56000	100	70000	63000	101800	3360	9600	12960	9900	6000	15900	28000	18800	46800	12000	87660	14140	20	100	90	4.150449409

Gilgil	960	10	9600	20	19200	14400	120	70	8400	100	12000	10200	240	60	14400	80	19200	16800	41400	4000	0	4000	4800	0	4800	4800	0	4800	0	13600	27800	15	85	70	4.444044796
Gilgil	225	15	3375	25	5625	4500	100	100	10000	140	14000	12000	200	100	20000	120	24000	22000	38500	900	1500	2400	4500	2400	6900	8000	4800	12800	0	22100	16400	20	120	110	4.214843848
Gilgil	0	0	0	0	0	0	84	70	5880	100	8400	7140	144	70	10080	80	11520	10800	17940	0	0	0	0	0	0	0	0	0	2000	2000	15940	0	85	75	4.202488317
Gilgil	480	15	7200	25	12000	9600	150	100	15000	140	21000	18000	240	80	19200	120	28800	24000	51600	1920	5600	7520	6750	4400	11150	9600	6000	15600	15000	49270	2330	20	120	100	3.367355921
Gilgil	2500	10	25000	15	37500	31250	500	60	30000	80	40000	35000	1500	60	90000	80	120000	105000	171250	8300	0	8300	20000	0	20000	30000	0	30000	10000	68300	102950	12.5	70	70	5.012626351
Gilgil	420	15	6300	25	10500	8400	240	100	24000	180	43200	33600	300	100	30000	120	36000	33000	75000	1680	3600	5280	10800	6000	16800	12000	7200	19200	5000	46280	28720	20	140	110	4.458184436
Gilgil	1680	10	16800	15	25200	21000	150	60	9000	100	15000	12000	560	70	39200	80	44800	42000	75000	8400	0	8400	4500	0	4500	11200	0	11200	0	24100	50900	12.5	80	75	4.706717782
Gilgil	8000	0	0	0	0	0	2500	0	0	0	0	0	3500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
Gilgil	6000	0	0	0	0	0	2000	0	0	0	0	0	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
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Njoro	300	10	3000	20	6000	4500	130	50	6500	70	9100	7800	120	50	6000	60	7200	6600	18900	1200	0	1200	5200	0	5200	2400	0	2400	0	8800	10100	15	60	55	4.004321374
Njoro	7500	20	150000	40	300000	225000	150	80	12000	180	27000	19500	1200	70	84000	120	144000	114000	358500	30000	41750	71750	6750	2500	9250	48000	20000	68000	47000	196000	162500	30	130	95	5.210853365
Njoro	750	10	7500	15	11250	9375	140	60	8400	120	16800	12600	180	40	7200	80	14400	10800	32775	2500	0	2500	5600	0	5600	3600	0	3600	0	11700	21075	12.5	90	60	4.323767583
Njoro	900	20	18000	35	31500	24750	300	80	24000	160	48000	36000	500	70	35000	120	60000	47500	108250	3600	5000	8600	13500	5500	19000	20000	9000	29000	12000	68600	39650	27.5	120	95	4.598243192
Njoro	480	10	4800	20	9600	7200	100	50	5000	70	7000	6000	120	50	6000	70	8400	7200	20400	2400	0	2400	4000	0	4000	2400	0	2400	0	8800	11600	15	60	60	4.064457989
Njoro	3000	20	60000	30	90000	75000	50	130	6500	150	7500	7000	100	80	8000	120	9600	8800	90800	12000	21000	33000	2250	1000	3250	4000	2000	6000	21000	63250	27550	25	140	100	4.440121603
Njoro	1800	10	18000	15	27000	22500	360	50	18000	60	21600	19800	270	40	10800	50	13500	12150	54450	9000	0	9000	14400	0	14400	5400	0	5400	0	28800	25650	12.5	55	45	4.409087369
Njoro	1800	20	36000	30	54000	45000	100	80	8000	180	18000	13000	250	70	17500	100	25000	21250	79250	7200	12000	19200	4500	2100	6600	10000	6000	16000	7500	49300	29950	25	130	85	4.476396827
Njoro	450	10	4500	15	6750	5625	90	60	5400	80	7200	6300	120	50	6000	70	8400	7200	19125	1800	0	1800	3600	0	3600	2400	0	2400	0	7800	11325	12.5	70	60	4.054038211
Njoro	15000	0	0	0	0	0	2000	0	0	0	0	0	3500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
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Naivasha	14400	10	144000	20	288000	216000	150	60	9000	100	15000	12000	1500	50	75000	80	120000	97500	325500	60000	0	60000	6000	0	6000	45000	0	45000	16000	127000	198500	15	80	65	5.297760511
Naivasha	840	15	12600	25	21000	16800	300	100	30000	150	45000	37500	500	100	50000	120	60000	55000	109300	3360	6000	9360	13500	5500	19000	20000	9000	29000	17000	74360	34940	20	125	110	4.543322901
Naivasha	15750	10	157500	15	236250	196875	0	0	0	0	0	0	0	0	0	0	0	0	196875	0	0	0	0	0	0	0	0	0	10000	10000	186875	12.5	0	0	5.271551206
Naivasha	1350	15	20250	25	33750	27000	0	0	0	0	0	0	250	80	20000	120	30000	25000	52000	5400	7500	12900	0	0	0	10000	5000	15000	0	27900	24100	20	0	100	4.382017043
Naivasha	0	0	0	0	0	0	280	60	16800	80	22400	19600	720	50	36000	70	50400	43200	62800	0	0	0	11200	0	11200	14400	0	14400	0	25600	37200	0	70	60	4.57054294
Naivasha	9000	20	180000	30	270000	225000	400	120	48000	180	72000	60000	1000	100	100000	120	120000	110000	395000	36000	60000	96000	18000	9600	27600	40000	24000	64000	96000	283600	111400	25	150	110	5.046885191
Naivasha	4500	10	45000	15	67500	56250	60	60	3600	120	7200	5400	70	50	3500	80	5600	4550	66200	18000	0	18000	2400	0	2400	1400	0	1400	0	21800	44400	12.5	90	65	4.64738297
Naivasha	6000	20	120000	35	210000	165000	840	100	84000	150	126000	105000	1960	80	156800	120	235200	196000	466000	24000	40200	64200	37800	16800	54600	78400	39300	117700	93000	329500	136500	27.5	125	100	5.135132651
Naivasha	720	10	7200	20	14400	10800	200	80	16000	100	20000	18000	500	50	25000	70	35000	30000	58800	2880	0	2880	8000	0	8000	10000	0	10000	0	20880	37920	15	90	60	4.578868329
Naivasha	25000	0	0	0	0	0	2000	0	0	0	0	0	8000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
Naivasha	30000	0	0	0	0	0	2500	0	0	0	0	0	7000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
Rongai	2000	20	40000	35	70000	55000	120	100	12000	150	18000	15000	180	80	14400	100	18000	16200	86200	8000	14625	22625	5400	2600	8000	7200	3900	11100	2500	44225	41975	27.5	125	90	4.622990705
Rongai	1200	10	12000	15	18000	15000	1050	60	63000	80	84000	73500	1500	50	75000	70	105000	90000	178500	5000	0	5000	31500	0	31500	30000	0	30000	0	66500	112000	12.5	70	60	5.049218023
Rongai	0	0	0	0	0	0	300	80	24000	120	36000	30000	750	70	52500	100	75000	63750	93750	0	0	0	13500	6500	20000	30000	16250	46250	6000	72250	21500	0	100	85	4.33243846
Rongai	600	10	6000	20	12000	9000	120	50	6000	80	9600	7800	150	50	7500	70	10500	9000	25800	2000	0	2000	4800	0	4800	3000	0	3000	1000	10800	15000	15	65	60	4.176091259
Rongai	2880	25	72000	35	100800	86400	0	0	0	0	0	0	0	0	0	0	0	0	86400	11520	28000	39520	0	0	0	0	0	0	1500	41020	45380	30	0	0	4.656864492
Rongai	540	10	5400	20	10800	8100	60	70	4200	100	6000	5100	300	60	18000	70	21000	19500	32700	2250	0	2250	2400	0	2400	6000	0	6000	2000	12650	20050	15	85	65	4.302114377
Rongai	1200	20	24000	35	42000	33000	65	100	6500	150	9750	8125	210	80	16800	100	21000	18900	60025	4800	10200	15000	2925	1800	4725	8400	5100	13500	0	33225	26800	27.5	125	90	4.428134794
Rongai	1500	10	15000	20	30000	22500	0	0	0	0	0	0	0	0	0	0	0	0	22500	0	0	0	0	0	0	0	0	0	0	0	22500	15	0	0	4.352182518
Rongai	4500	25	112500	35	157500	135000	250	100	25000	180	45000	35000	250	80	20000	100	25000	22500	192500	18000	25000	43000	11250	5000	16250	10000	5000	15000	0	74250	118250	30	140	90	5.072801149
Rongai	0	0	0	0	0	0	240	60	14400	80	19200	16800	300	50	15000	80	24000	19500	36300	0	0	0	7200	0	7200	6000	0	6000	500	13700	22600	0	70	65	4.354108439
Rongai	15000	0	0	0	0	0	2000	0	0	0	0	0	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!
Rongai	20000	0	0	0	0	0	1500	0	0	0	0	0	4000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	#NUM!

Appendix E: Logistic Regression Analysis

```
. use "C:\Users\MULILO\Desktop\Ruth\data editors\data 4..1.dta"

. logistic OCC GND AG MRG EDCTN TRNNG

Logistic regression                                     Number of obs =    100
                                                        LR chi2(5)    =   8.21
                                                        Prob > chi2   = 0.1448
Log likelihood = -65.207695                             Pseudo R2     = 0.0593

------------------------------------------------------------------------------
         OCC | Odds ratio   Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         GND |   .9983781   .6920885    -0.00   0.998     .2565849    3.884713
          AG |   .9607887   .0206473    -1.86   0.063     .9211612    1.002121
         MRG |   .7815627   .2240218    -0.86   0.390     .4456369    1.370713
       EDCTN |   .4805994   .1933731    -1.82   0.069     .2184214    1.057478
       TRNNG |   1.899608   1.198742     1.02   0.309     .5514628    6.543528
       _cons |   3.397637    5.62875     0.74   0.460     .1321357    87.36426
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.

.
. logistic OCC INF STRG MKT TRNSPT MKTINFR

Logistic regression                                     Number of obs =    100
                                                        LR chi2(5)    = 102.92
                                                        Prob > chi2   = 0.0000
Log likelihood = -17.854997                             Pseudo R2     = 0.7424

------------------------------------------------------------------------------
         OCC | Odds ratio   Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         INF |   2.762646   3.212131     0.87   0.382     .2828997    26.97852
        STRG |   647.3539    789.608     5.31   0.000     59.27767     7069.56
         MKT |   1.080103   1.617022     0.05   0.959      .057429    20.31417
      TRNSPT |   1.110622    1.12033     0.10   0.917     .1537887    8.020624
     MKTINFR |   6.556719   7.969539     1.55   0.122     .6054396    71.00718
       _cons |   7.59e-07   3.62e-06    -2.95   0.003     6.58e-11    .0087634
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.
```

```
. logistic OCC CRDT LGLFEE PLCY

Logistic regression                                     Number of obs =    100
                                                        LR chi2(3)    =  47.06
                                                        Prob > chi2   = 0.0000
Log likelihood = -45.785908                             Pseudo R2     = 0.3394

------------------------------------------------------------------------------
         OCC | Odds ratio   Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
        CRDT |   .9594499   .6179884    -0.06   0.949     .2714922    3.390683
      LGLFEE |    29.0769    18.1072     5.41   0.000      8.57976    98.54191
        PLCY |   2.724488   1.527607     1.79   0.074     .9078631    8.176161
       _cons |   .0067967   .0093955    -3.61   0.000     .0004525    .1020871
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.

.
. logistic OCC INCM GMBUSS

Logistic regression                                     Number of obs =    100
                                                        LR chi2(2)    =  33.50
                                                        Prob > chi2   = 0.0000
Log likelihood = -52.56343                              Pseudo R2     = 0.2417

------------------------------------------------------------------------------
         OCC | Odds ratio   Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
        INCM |   .9998903   .0000252    -4.35   0.000     .9998409    .9999398
      GMBUSS |   1.000051    .000014     3.60   0.000     1.000023    1.000078
       _cons |   5.332277   2.562678     3.48   0.000     2.078871    13.67722
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.

.
. logistic OCC NOH NOG NOS AVPH AVPG AVPS

Logistic regression                                     Number of obs =    100
                                                        LR chi2(6)    =  52.99
                                                        Prob > chi2   = 0.0000
Log likelihood = -42.819315                             Pseudo R2     = 0.3822

------------------------------------------------------------------------------
         OCC | Odds ratio   Std. err.      z    P>|z|     [95% conf. interval]
-------------+----------------------------------------------------------------
         NOH |   1.000031   .0001604     0.20   0.845     .9997172    1.000346
         NOG |     .99725   .0017117    -1.60   0.109     .9939008    1.000611
         NOS |   1.000799   .0007773     1.03   0.304     .9992768    1.002324
        AVPH |   .8390196    .037138    -3.97   0.000     .7692985    .9150596
        AVPG |   1.013658   .0152473     0.90   0.367     .9842099    1.043987
        AVPS |   .9515265   .0197875    -2.39   0.017     .9135235    .9911104
       _cons |   218.8272   243.3763     4.84   0.000     24.74047    1935.506
------------------------------------------------------------------------------
Note: _cons estimates baseline odds.

.
```

Appendix F: Endogenous Switching Regression Results

```
      name:  <unnamed>
       log:  C:\Users\USER\Desktop\Ruth\Results.smcl
  log type:  smcl
 opened on:   5 Nov 2021, 11:56:58

. movestay lgGMBUSS GND educ TMBS lnNOH lnNOG lnNOS age exp BUSS MKTTYP GRD credit TRNNG , select( OCC = CNTRCT PRD)


Fitting initial values .....
Iteration 0:   log likelihood = -22.861719  (not concave)
Iteration 1:   log likelihood = -22.055934
Iteration 2:   log likelihood = -21.449092
Iteration 3:   log likelihood =  -20.75215
Iteration 4:   log likelihood = -20.708241
Iteration 5:   log likelihood = -20.707928
Iteration 6:   log likelihood = -20.707928

Endogenous switching regression model             Number of obs   =        100
                                                  Wald chi2(13)   =      24.89
Log likelihood = -20.707928                       Prob > chi2     =     0.0239
```

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lgGMBUSS_1						
GND	.0122762	.0602939	0.20	0.839	-.1058976	.13045
educ	.0050846	.0038293	1.33	0.184	-.0024208	.0125899
TMBS	-.0028987	.0029684	-0.98	0.329	-.0087166	.0029193
lnNOH	.0004998	.0064754	0.08	0.938	-.0121918	.0131914
lnNOG	.0070804	.0106999	0.66	0.508	-.0138911	.0280519
lnNOS	.0068049	.0094329	0.72	0.471	-.0116831	.025293
age	-.0018657	.0010398	-1.79	0.073	-.0039037	.0001722
exp	-.0014828	.0010313	-1.44	0.151	-.0035041	.0005386
BUSS	.0193007	.047971	0.40	0.687	-.0747208	.1133222
MKTTYP	.029244	.1525791	0.19	0.848	-.2698055	.3282935
GRD	.0246812	.0442189	0.56	0.577	-.0619862	.1113487
credit	-.0623591	.048784	-1.28	0.201	-.1579741	.0332559
TRNNG	.1169761	.068395	1.71	0.087	-.0170755	.2510278
_cons	7.994597	.4351985	18.37	0.000	7.141624	8.847571
lgGMBUSS_0						
GND	.3033263	.1960109	1.55	0.122	-.0808481	.6875007
educ	-.0092832	.0182519	-0.51	0.611	-.0450562	.0264898
TMBS	-.0021239	.0073297	-0.29	0.772	-.0164898	.0122421
lnNOH	.084279	.0265393	3.18	0.001	.032263	.1362951
lnNOG	-.0143571	.0480722	-0.30	0.765	-.1085768	.0798627
lnNOS	.0971663	.0476716	2.04	0.042	.0037317	.1906008
age	-.0073751	.0040031	-1.84	0.065	-.0152209	.0004708
exp	.0045036	.0044357	1.02	0.310	-.0041902	.0131973
BUSS	.3194812	.2254925	1.42	0.157	-.122476	.7614383
MKTTYP	.1975975	.4284898	0.46	0.645	-.6422271	1.037422
GRD	-.1371268	.1419251	-0.97	0.334	-.4152948	.1410412
credit	-.0816886	.2000257	-0.41	0.683	-.4737318	.3103546
TRNNG	.3563471	.1686306	2.11	0.035	.0258372	.6868571
_cons	2.844934	.7071405	4.02	0.000	1.458964	4.230903

.

OCC						
TMBS	-.0323505	.0176675	-1.83	0.067	-.0669781	.0022771
lnNOH	-.0360385	.0625333	-0.58	0.564	-.1586015	.0865246
lnNOG	-.0997744	.1049232	-0.95	0.342	-.3054201	.1058713
lnNOS	.0568634	.1027379	0.55	0.580	-.1444992	.2582261
age	-.0018884	.0090064	-0.21	0.834	-.0195407	.0157639
exp	-.0052469	.0098838	-0.53	0.596	-.0246188	.014125
BUSS	.0686688	.5376514	0.13	0.898	-.9851086	1.122446
MKTTYP	.6901951	.9234815	0.75	0.455	-1.119795	2.500186
GRD	.3157069	.3026358	1.04	0.297	-.2774483	.9088621
credit	.5713251	.3759247	1.52	0.129	-.1654738	1.308124
TRNNG	.2821436	.4058845	0.70	0.487	-.5133755	1.077663
GND	.3452556	.4613276	0.75	0.454	-.5589298	1.249441
educ	-.0129333	.0414749	-0.31	0.755	-.0942226	.0683559
CNTRCT	.4245875	.2621828	1.62	0.105	-.0892813	.9384564
PRD	-.0852731	.0331151	-2.58	0.010	-.1501776	-.0203686
_cons	-1.595115	1.867561	-0.85	0.393	-5.255466	2.065237
/lns1	-2.425316	.1752224	-13.84	0.000	-2.768745	-2.081886
/lns2	-.8013584	.1339514	-5.98	0.000	-1.063898	-.5388185
/r1	.2018441	1.405659	0.14	0.886	-2.553197	2.956886
/r2	1.603708	.4227201	3.79	0.000	.7751916	2.432224
sigma_1	.0884502	.0154985			.0627407	.1246948
sigma_2	.448719	.0601065			.3451078	.5834372
rho_1	.1991469	1.349911			-.9879572	.9946106
rho_2	.9222248	.0631973			.6499382	.984686

LR test of indep. eqns. : chi2(1) = 5.18 Prob > chi2 = 0.0228

```
. mspredict mymills1, mills1

.
. mspredict xx, yc1_1

.
. mspredict xy, yc1_2

.
. mspredict yy, yc2_2

.
. mspredict yx, yc2_1

.
. ttest xx=xy, unpaired
```

```
Two-sample t test with equal variances

------------------------------------------------------------------------------
Variable |       Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
      xx |        50     8.25858    .0088859    .0628325    8.240723    8.276437
      xy |        50    8.229912    .0084105     .059471     8.21301    8.246813
---------+--------------------------------------------------------------------
combined |       100    8.244246    .0062547    .0625468    8.231835    8.256656
---------+--------------------------------------------------------------------
    diff |            .0286684     .012235                .0043885    .0529483
------------------------------------------------------------------------------
    diff = mean(xx) - mean(xy)                                    t =   2.3432
Ho: diff = 0                                     degrees of freedom =       98

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.9894         Pr(|T| > |t|) = 0.0211          Pr(T > t) = 0.0106

.
. ttest yy=yx, unpaired

Two-sample t test with equal variances

------------------------------------------------------------------------------
Variable |       Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
      yy |        50    4.425711    .0536286    .3792118     4.31794    4.533482
      yx |        50    4.921324    .0519018    .3670009    4.817023    5.025624
---------+--------------------------------------------------------------------
combined |       100    4.673517    .0447065    .4470654     4.58481    4.762225
---------+--------------------------------------------------------------------
    diff |           -.4956132    .0746313               -.6437165   -.3475099
------------------------------------------------------------------------------
    diff = mean(yy) - mean(yx)                                    t =  -6.6408
Ho: diff = 0                                     degrees of freedom =       98

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000

.
. drop mymills1 xx xy yy yx

. log close
      name:  <unnamed>
       log:  C:\Users\USER\Desktop\Ruth\Results.smcl
  log type:  smcl
 closed on:   5 Nov 2021, 11:57:18
```

Appendix G: Reliability Results

Case Processing Summary

		N	%
Cases	Valid	64	53.3
	Excluded[a]	56	46.7
	Total	120	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.928	44

Item Statistics

	Mean	Std. Deviation	N
Trader index	72.02	36.059	64
Subcounty	5.48	2.845	64
Occupation of the stakeholder	2.50	.504	64
Gender	1.11	.315	64
Age	46.02	10.516	64
How long have you been in business	15.66	8.254	64
If yes how much did it cost to build	11093.75	19486.844	64
How much do you pay	578.13	1571.620	64
What is the average distance to the local market	1.36	5.565	64
What is the average distance to the central market	1.84	8.113	64

How much do you pay	1054.69	1160.450	64
The license is paid for what period	1.80	3.635	64
How much income do you earn from hides and skin per month	37257.81	33935.278	64
Number of hides collected in a month	1822.98	2932.018	64
Minimum price per hide	13.36	6.904	64
Total minimum price for the collected hide	27726.33	41806.181	64
Maximum price per hide	22.27	10.194	64
Total maximum price for the collected hide	45823.36	70718.158	64
Total revenue from hide	36774.84	56073.306	64
Number of goat skin collectcted in a month	208.59	351.512	64
Minimum price per goat skin	64.53	39.357	64
Total minimum price for the collected goat skin	15124.22	20688.447	64
Maximum price per goat skin	100.94	57.369	64
Total maximum price for the collected goat skin	25447.66	42469.240	64
Total revenue from goat skin	20285.94	31309.795	64
Number of sheep skin collected in a month	503.69	735.933	64
Minimum price sheep skin	59.53	30.102	64
Total minimum price for the collected sheep skin	32573.44	43589.944	64
Maximum price per sheep skin	85.63	42.831	64
Total maximum price for the collected sheep skin	50161.25	75445.362	64
Total revenue from sheep skin	41367.34	59183.218	64
Total revenue from the business	98428.13	112158.335	64
Variable cost green hide	6044.06	9653.758	64
Variable cost salted hide	5974.61	11335.208	64
Total variable cost hide	12018.67	18667.738	64
Variable cost green goat skin	8994.53	15357.003	64

Variable cost salted goat skin	3011.72	7623.297	64
Total variable cost goat skin	12006.25	22617.991	64
Variable cost green sheep skin	16732.34	27330.173	64
Variable cost salted sheep skin	5672.66	10625.467	64
Total variable cost sheep skin	22405.00	36656.937	64
Other variable cost	7514.06	17712.115	64
Total variable cost incured	53943.98	78111.648	64
Gross margin for hide and skin business	44484.14	47166.030	64

Appendix I: Research Permit

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Date of Issue: **15/September/2022**

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Appendix J: Publication

International Journal of Science and Technology Research Archive

ISSN: 0799-6632 (Online)

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(RESEARCH ARTICLE)

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Factors influencing trader's participation in small scale hides and skin business in the leather value chain, among non-pastoralist

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International Journal of Science and Technology Research Archive, 2023, 04(01), 210–221

Publication history: Received on 15 January 2023; revised on 26 February 2023; accepted on 01 March 2023

Article DOI: https://doi.org/10.53771/ijstra.2023.4.1.0037

Abstract

Hides and skin, the by-product from cattle and small ruminants (livestock production) forms an important business from the meat industry. Through value addition, the hides and skin are processed to leather. It is the main economic activity in both high potential, Arid and Semi-Arid regions and on small scale in other regions of Kenya. The objectives of this study were to determine the development and sustainability of the leather sector among the non-pastoralist communities. The study was carried out in Nakuru County (0.4254° S, 36.0023° E). Purposive random sampling technique of 100 respondents drawn from 10 sub-counties was used. Both primary and secondary data were used. Key informant interviews and percentiles were used to determine the challenges facing traders in the hides and skin industry. The multinomial logit model was used to determine the factors influencing the participation of the hides and skin traders in the leather sector and combination of the Gross Margin (GM) and the Endogenous Switching Regression (ESR) model to evaluate the impact of the hides and skin business to the income of traders. The main challenge that affects hides and skin traders is fluctuating prices at 56% and the lowest being poor condition of their working premise at 2%. This is a type of business that is passed on from one generation to another because most traders are middle aged or elderly (>45 years old). 35% indicated that their main reason for starting the business was family and had over 10 years' experience. The study also showed that ownership of registered business earns more income by $18 and on the contrary a reduction of income by $54. In conclusion proper utilization of hides and skin will not only earn income to the traders but will also minimize on wastage of a useful resource which is by-product from livestock industry that supports a valuable leather industry.