GENDER RELATIONS IN LIVESTOCK PRODUCTION AND OWNERSHIP: IMPLICATIONS FOR HOUSEHOLD FOOD SECURITY IN THE TESO FARMING SYSTEM (TFS)

BY

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DECLARATION

I…… declare that this is my original work and has never been presented for a degree in this or any other university or institution of higher learning.

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

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DEDICATION

This thesis is dedicated to the following people: My dear parents, Mr. Lazarus Kirya (deceased) and Mrs. Athanas Gimbo Kirya who laid the foundation for my education; my brother Cephas Wabwire, for greatly supporting my parents in my education; my dear husband Anthony Esenu in appreciation of his enthusiasm, financial, professional and emotional support and whose kind words and friendship inspired me to put in my best; my Children, Joshua, Charity, David and Joanna who faithfully loved me and bore with my long hours away from them.

ABBREVIATIONS & ACRONYMNS:

AGDP	Agricultural Gross Domestic Product
AWEPON	African Women's Economic Policy Network
CSO	Civil Society Organizations
DFID	Department For International Development
EPRC	Economic Policy Research Centre
FAL	Functional Adult Literacy
FAO	Food and Agriculture Organization
GAD	Gender And Development
GDP	Gross Domestic Product
IBRD	International Bank for Research and Development
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
HH	Household
KASO	Katakwi and Soroti Rural Development Project
KDDP	Katakwi District Development Project
LC	Local Council
MAAIF	Ministry of Agriculture Animal Industry and Fisheries
MDGS	Millennium Development Goals
MFPED	Ministry of Finance, Planning and Economic Development
MGLSD	Ministry of Gender, Labor and Social Development
NAADS	National Agricultural Advisory Services
NARO	National Agricultural Research Organization
NAWOU	National Association of Women Organizations
NGO	Non Government Organization
NGP	National Gender Policy
NRI	Natural Resources International
PAF	Poverty Alleviation Fund
PEAP	Poverty Eradication Action Plan
PMA	Plan for Modernization of Agriculture
PRSP	Poverty Reduction Strategic Plan
PRSC4	Fourth Poverty Reduction Support Credit
PSDP	Private Sector Development programme
SAARI	Serere Agriculture and Animal Research Institute
SAP	Structural Adjustment Programme
SEP	Strategic Export Programme
SOCADIDO	Soroti Catholic Diocesan Development Organization
TFS	Teso Farming System
UK	United Kingdom
UN	United Nations
UNESCAP	United Nations Economic and Social Commission For Asia and the Pacific
UPE	Universal Primary Education
UPPAP	Uganda Participatory Poverty Alleviation Project

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ABSTRACT

The registered growth of the livestock sub sector (7.5% of Uganda GDP and 17% of the Agricultural GDP) compared to the crop sector despite the shrinking contribution of agricultural sector as a whole to Uganda's economy cannot be ignored (CSO PEAP 2003 and MAAIF 2000). The revised PEAP 2004/5 that doubles as Uganda's Poverty Reduction Strategic Plan (PRSP) highlighted that more households own livestock than is commonly believed, underscoring the contribution of livestock to incomes, food security and poverty reduction to livestock keeping households (MFPED 2005). To the Teso Farming System (TFS) region, situated in northeastern Uganda, livestock production is a vital component of household livelihoods providing food security and income among others.

However, food insecurity (since the 1980s period of insurgency and cattle rustling that devastated the system) has become a problem especially in the districts of Katakwi and Kaberamaido where the study was focused. Whereas these have significantly contributed to the recurrent food insecurity and poverty situation, underlying gender disparities particularly evident in the livestock sub sector also aggravate the situation. Although research and extension offer potential for improved livestock productivity, for rural farmers especially women, socio-economic barriers may hinder equitable benefits from involvement in livestock keeping. This region vulnerable to food insecurity and recovering from various disturbances mentioned, offers opportunities for understanding gender dynamics around livestock keeping in a traditional system that is attempting to re-gain economic stability.

A study was therefore undertaken to examine key variables affecting improvement of food security through livestock production. 205 households were surveyed but 190 of these were included in the analysis following data cleaning. Descriptive analysis was conducted and a standard linear regression model developed and used to determine the influence of household characteristics, gender and other socio-economic factors on household food security. Food available to the household was used as a proxy for food security.

Among the study findings female ownership of cattle has a positive and significant impact on food available (food security), while male ownership of land bears a negative and significant impact on food security. Availability of credit to female farmers; access to veterinary services; use of improved technologies; acquisition of formal education; land size owned and the diversity of herd reared are significant factors that enhance food security in livestock keeping households.

Men wield power over land and livestock ownership plus use of benefits with disadvantages accruing to women. 50% of women livestock keepers had no formal education compared to men (17%) and about 2% had acquired post-secondary education. Few farmers especially women use improved livestock innovations, have access to veterinary services and have acquired loans. Women are focal recipients of the restocking program.

Agricultural sector policy focus revolves around technical aspects particularly agricultural research and extension service delivery as priority interventions for improving livestock production and food security. However the study indicates that, for rural farmers particularly women in livestock production, socio-economic positioning is important in removing bottlenecks to improved livestock production and therefore household food security. Socio economic backgrounds drive the way livestock farmers produce and could also impede realization of full outcomes of government policy. TFS makes a case for attention to affirmatively position women in livestock production as an avenue to improve household food security.

CHAPTER I

1.0 BACKGROUND

1.1 Introduction[1]

The agricultural sector dominates Uganda's economy and offers a great opportunity for 89% Ugandans who derive their livelihood from agriculture (MFPED 2003, MAAIF 2000). In the early 1980s, there was a dramatic decline in growth (minus 2% per annum) of the agricultural sector. Due to the various policy and institutional reforms, the sector registered a significant growth rate averaging 5% from 1989-1999 (MAAIF and MFPED 2000). The trend in later years (the 2000s) has been of a gradual but significant shrinkage of the Agricultural Gross Domestic Product (AGDP). This is reflected by the lower real GDP growth of 4.9% for 2002/03 compared to 5.3% growth in 2001/2002.

Whereas the contribution of the agricultural sector as a whole to Uganda's economy is shrinking the steady growth of the livestock sub sector (contributes 7.5% of the total GDP and 17% of the AGDP) compared to crop sector cannot be ignored[2] (CSO PEAP 2003). (Appendix 1). The revised PEAP (Poverty Eradication Action Plan) which doubles as Uganda's Poverty Reduction Strategic Plan (PRSP) highlighted that more households own livestock than is commonly believed, and that livestock play a major role in household incomes, food security and poverty reduction, with better off households owning four times as much livestock as the poorest households (MFPED 2005). Livestock is also one of the focal commodities under the Strategic Exports Initiative (Stratex) under which hides and skins exports rose to fourth export earner in 2001 (MFPED 2003). The potential of the livestock sub sector has, however, been undermined by various factors. First is lack of proper infrastructure and limited support for disease control, which has effectively reduced Uganda's opportunities to produce meat, milk,

[1] *This thesis has been written according to the format of the Eastern Africa Journal of Rural Development, Volume 19, Number 1 December 2003*

[2] *Livestock production is a vital component of livelihoods of the rural and urban poor providing food security and income as well as non-monetary contribution through provision of animal traction that increases the cultivated area, improvements in soil fertility, recycling of household and industrial waste among others (MAAIF 1997, Reviewed PEAP Pillar III 2003).*

hides and skins for export (CSO PEAP 2003). Second, are the livestock policies that largely support and focus on production under ranching and commercial dairy enterprises and do not adequately address the issues pertaining to smallholder farmers and pastoralists. Yet, the national herd is vested in such farmers who hold 90% of the livestock and produce 90% of Uganda's livestock products (CSO PEAP 2003). Analysis of the Stratex indicates that aggregate benefits do not filter down to the poor, especially women since they do not stand to benefit directly (Booth et al 2003). Thus a deepening of the analysis and construction of gender sensitive interventions to enable the poor especially women equitably benefit from livestock and other agricultural sector opportunities is crucial (Booth et al 2003)..

1.2 Livestock Keeping - The Teso Farming System (TFS) Scenario

To the rural resource poor farmers of the Teso Farming System (TFS) region that covers the districts of Kumi, Katakwi, Soroti and Kaberamaido, livestock production constitutes a very important component of the agricultural economy. Livestock in this region directly contributes to food production through provision of draught power and improved nutrition as well as income and social stability among others (NARO/DFID 1998, Sansoucy 1995, Bakema 1994). Livestock rearing and fishing have been cited as the major economic activities in most TFS households giving the smallholder farmers especially women who have few resources and options to improve their situation (UPPAP 2 2000/01). Livestock in this region are assets that decrease nutritional vulnerability during times of shock such as situations of civil unrest that led to displacement of people from their traditional locations to places such as IDP camps. In such situations of emergence, livestock production that can easily be moved or hidden such as goats and chicken, has given the TFS households/families access to protein in a production pattern that could be termed as "conflict food production".

This region that has suffered insurgency (1980s) and cattle rustling which decimated the livestock population, is one of the regions in Uganda most vulnerable to food insecurity (Awa

et al 1999, Mwaka, 1990). The recent 2003 reoccurrence of insurgency in the TFS region especially Katakwi and Kaberamaido districts have further aggravated the food insecurity and poverty situation.

The loss of cattle from the TFS region has been a major factor in the impoverishment of many households. The lack of oxen has increased dependence on manual labor for food production, which has reduced most households to subsistence level of production (NARO/DFID 1999). Assisting the poor to acquire replacement animals gives them ability to increase farm productivity and boost their household income (PEAP 2002 and PMA 2000). The revised PEAP 2004/5 recognized livestock ownership as a strategic entry point out of poverty and a means to jump start the agricultural economy. This undergirds a shift from a livestock production orientation to a livelihood approach that is more aligned to poverty reduction. Restocking is therefore supported as a priority national expenditure under the Plan for Modernization of Agriculture. Although livestock contribution to poverty reduction has been recognized in the PEAP, the national statistics that fail to capture gender dynamics of production and therefore the gender inequalities and household level gender disparities could undermine the poverty and food security situation in this region and may go beyond household level poverty to impacting overall economic growth (CSO PEAP 2003). The proposed study has therefore been undertaken to assess gender relations in livestock production and ownership among other socio economic factors and how these impact on food security in the TFS households.

1.3 Problem Statement

Livestock farming in TFS region is an important component because of the dry tropical and semi-arid climate (long dry seasons, and recurrent droughts and a weakly bimodal rainfall pattern) that dictates production of annual crops, which require large acreage (Ossiya 2001,

Awa et al 1999). The need for large acreage necessitates use of animal draught power for cultivation making agricultural production in this region highly dependent on livestock (oxen).

Prior to the period of insurgency, people in the TFS region kept large herds of cattle in nearly every household, which provided income and contributed to the food basket, thereby acting as household insurance against poverty and food insecurity (Awa et al 1999, NARO/DFID 1998). This well established system was decimated starting in the mid 1980s due to several factors including insurgency and protracted cattle rustling (Awa et al 1999). Whereas these factors significantly contribute to the recurrent food insecurity and poverty situation in the TFS region, underlying gender disparities particularly evident in the livestock sub sector aggravate the situation with disadvantages accruing to women. Besides, while technology and extension offer potential for improved livestock productivity and returns, it is apparent that for women socio economic barriers may greatly limit their participation, ownership and ability to enjoy the benefits from livestock production (Booth et al 2003). Although both men and women are vulnerable to poverty and food insecurity, there is overwhelming evidence that discrimination against women is a major cause of poverty making women numerically predominant among the poorest (Oxfam 2002, Ossiya et al 2002).

In Uganda the Poverty Alleviation Fund priotizes interventions that are seen to have most direct impacts in addressing poverty. Restocking stipulated to broaden livestock ownership by more sectors of the poor including women is one such intervention. However, although restocking appears to be a viable entry point for women in livestock production, gender disparities and cultural biases towards male ownership and control still leave women vulnerable (Heffernan, Misturelli and Nielsen 2001). The marginalisation of the rural resource poor livestock farmers, women inclusive, was exemplified by the PEAP 2001 thus the current

rethinking towards maximizing livestock production by the PEAP 2004/5[3]. The study examines gender positioning in relation to opportunity to improve food security through livestock production.

It is against this background that the study is therefore proposed to provide a good understanding of the link between gender and other socio-economic factors in livestock production and food security; and to use this information as a basis for helping policy makers and implementers of the restocking program identify strategies for reducing poverty and food insecurity. The study also documents women's potential, opportunities and constraints impeding women's entry and performance in the livestock sub sector to elicit focused interventions that improve and sustain livestock productivity.

1.4 Significance of the Study

In recognition of the importance of livestock to the TFS region, there has been an effort by various stakeholders to restock the region. However one of the major hurdles to the success of the restocking program is the gender imbalance in livestock production that is characteristic of the TFS. Traditionally, livestock, particularly cattle, are still seen as men's resources with the women having limited or no control over this productive resource. Women contribute 50% of the livestock related labor and above 60% towards the economy of the TFS region (AWEPON 2000, NARO/DFID 1999, Vinlaw report 1995). They also play a prime and gatekeeper role in ensuring the food security and nutritional status of their household members through the allocation of their own time and income among other things (Delgado et al 1999, IFAD 1999).

The agricultural sector public expenditure prioritizes research and extension, which are indicated to have higher returns on income poverty than spending on roads, education and health (Booth et al 2003). The socio economic barriers may greatly limit participation in,

[3] *The current focus on maximizing livestock production alone needs to be replaced by one that recognizes the multiple contributions that livestock make to livelihood. This will require a greater understanding of who the clients of livestock development efforts/services and what their priorities are.*

ownership and ability to enjoy benefits from livestock keeping by particularly women. This serves to minimize or negate the potential benefits of investment in research and extension. This study is undertaken to inform stakeholders in the restocking program on the likely impact on household food security of empowering women in livestock ownership and production. The study will also help policy makers, development practitioners and agricultural researchers to assess and choose strategies that are cognizant of gender issues in their effort to reduce poverty and improve food security.

1.5 Objectives of the Study:

1.5.1 General Objective:

To examine gender roles and other socio economic aspects of livestock ownership and production, and the implications for food security of livestock producing households in the TFS.

1.5.2 Specific Objectives:

1. To characterize gender roles in livestock ownership and production in the TFS.
2. To determine the influence of gender and other socio economic factors on the food security status of livestock producing households in the TFS.
3. To identify gender balanced strategies for enhancing household food security through livestock production in the TFS

1.6 Research Hypotheses

1) Gender relations in livestock ownership and production do not affect food availability (security) among livestock keeping households in the TFS.
2) Lack of female farmers' access to resources and services and opportunity to use such resources and services including credit, extension and formal education negatively affect food availability (security) among livestock keeping households in the TFS.

1.7 Structure of the Thesis Report

The remaining part of this thesis is organized as follows; Chapter two reviews the literature on emerging issues in livestock production, food security, restocking program and several aspects of gender and gender analysis. Chapter three discusses the study area and its justification, methods and tools used in selection of sample and collection of data, and presents the data used. The chapter further shows how the data gathered was analysed including the models used in the analysis. Chapter four presents and interprets the results of both descriptive and empirical/regression analyses. Chapter five gives recommendations, summary and conclusion.

CHAPTER II:

2.0 LITERATURE REVIEW:

2.1 Introduction:

Livestock production is a vital component for the livelihoods of rural and urban poor. It contributes a central component of farming systems in Uganda and accounts for 19% of the agricultural gross domestic product (AGDP) and 9% of the total GDP (MAAIF 2005). Livestock is the main stay of pastoral people providing food security in harsh conditions under which they live and is one of the few assets available to the poor and especially women to bring them successfully to the cash economy (Carney 1998, MAAIF 1997). Livestock in Uganda not only contributes to production and marketing in growth strategies but nutrition, asset accumulation, risk diversification and coping strategies plus social obligations among the rural and urban poor.

Livestock products contribute two thirds of the marketed agricultural output compared to food crop produced, although food crop production predominates the agricultural sector contributing 71% of the total AGDP (PMA 2000). Livestock also strengthens the food security status by improving the nutritional status of farm households and provides a safety net for vulnerable groups notably widows, the elderly, women and most adults with none or limited education (Ossiya et al 2003). Needless to mention is the crucial role in the development of sustainable and environmentally social and sound agricultural production systems giving smallholder farmers who have few resources and options to improve their situation by integrating crop and livestock, which serves to protect natural resources (Laker et al 2001 and Biennial report 2000). Improvement of livestock production and productivity could boost the goal of the PMA of increasing the share of the agricultural product that is marketed, the available food and the raising of incomes of the poor subsistence farmers (Heffernan C., Misturelli F., Nielsen L. 2001, NARO 2000, and PMA 2000). The multiple contributions of

livestock to rural livelihoods have long been recognized, although the dynamic implications of these roles and the players in livestock production in poverty reduction and food insecurity have not been fully appreciated.

2.1.1 The Characteristics of Teso Farming System (TFS)

The TFS is an agro-pastoral system that is characterized by the integration of annual crops and livestock with the use of animal traction as a distinct component (NARO/DFID 1999, Awa et al 1999). Prior to the 1980's insurgence, the TFS had the highest cultivated land in the country of nine acres per capita giving a cropping intensity of 150 percent compared to most of the country owing to animal drought power, (NARO/DFID 1998). The TFS region has a distinct communal land tenure system with easy access to wetlands, fallows and cropland after harvest providing the livestock keepers with grazing grounds (NARO/DDFID 1999). The phenomenon that large ruminant livestock populations cause overgrazing, deterioration of natural resources base and competition between livestock and crops had not manifested in alarming propositions to this system, and the region was believed to have the most untapped grazing land potential attributed to the relatively low stocking rate over the last decade (Kyagala, 1999, NARO/DDFID 1999). However, the issue of forage management and grazing land availability for livestock especially during the dry season is becoming a challenge given the climatic changes and diverse use and alienation of wetlands for cultivation that were originally set aside as communal grazing areas (NARO/DFID 1999). Rice growing in the swamps has particularly stressed the wetlands (NARO/DFID 1999). Annual migrating herds from the neighboring Karamoja district in search for pasture during the dry season have also had a negative influence on the grazing areas of this region.

2.1.2 Major Challenges to the TFS Region:

Although the system is dynamic with many positive characteristics and developments incorporated such as use of improved drought driven cropping implements and improved plant

varieties from Serere Agricultural and Animal Research Institute (SAARI), cattle rustling and civil unrest have caused massive de-stocking and displacement of many people in this region (NARO/DFID, 1999). The recent 2003 insurgence aggravated the situation. Other challenges include nature driven challenges like inadequate and poorly distributed rainfall; high temperatures (favouring rapid development of pests, diseases and weeds); the light sandy soils that precipitate high soil erosion (Akwang et al 1998); the entry and prevalence of HIV/AIDS; the collapse of the cotton marketing system and the onset of the African Cassava Mosaic virus and Striga among others (Akwang, Kisauzi, Boyd and Oryokot 1998 NARO/DFID and Wange NARO/NRI 1999). These challenges have led to insufficient food production and persistent food insecurity and reduced household income (Akwang et al 1998).

2.1.3 Restocking in the TFS area: An Opportunity for Women:

In the early years after insurgency (late1980's) in TFS area, the government of Uganda and NGOs recognized the agency to restock the region first in response to disaster but later in the years, as a means to jumpstart the agricultural economy in the TFS households (Mugenyi and Pablo 2000). The government sponsored Poverty Eradication Action Plan (PEAP) established the Poverty Alleviation Fund (PAF) to allocate funding to the five priority programmes of direct benefit to the poor of which restocking is one (PEAP 2002, PRSP 2004). The TFS has therefore recorded a gradual increase in livestock numbers that continues to steadily rise due to the restocking exercise in the region (NARO/DFID 1998). The rate of restocking varies with the highest rate of 50% of the households in Usuk Sub County, Katakwi district, due to access to fairly priced cattle from Karamoja and the lowest rate, less than 20% in Kaberamaido district (Akwang et al 1998).

In a number of areas e.g. Mukura, Orungo, and Kibale, individual farmers have restocked/stocked using high cash incomes mainly from the growing of early convertible crops such as sweet potatoes, groundnuts and rice (Mugenyi and Pablo 2000, Akwang et al 1998).

96% of the restocking agencies in the TFS area target women (Mugenyi and Pablo 2000). The on going restocking process led by the government of Uganda and NGOs has opened opportunities for women many of whom are owning livestock individually or as part of a group for the first time. Although restocking is a viable entry point for women the socio-economic and cultural barriers could negate their potential to benefit from livestock keeping.

2.2 Gender Analysis and Relations in Livestock Production and Food Security

2.2.1 Gender Analysis

Gender refers to the social-economic and cultural distinctions between women and men which include the different attributes, roles, responsibilities, opportunities and privileges as well as access to and control over resources and benefits accorded to men and women within a specific socio-cultural and economic context (Baumann 2000, MGLSD1999, IFAD 1999).

Gender analysis is a useful tool that enhances the understanding of the various roles of men, women and children as well as their different needs based on their responsibilities in existing farming systems and the way these roles are affected by new interventions, strategies and implementation by the development agents (MFPED 2002, Tangka et al 2000). Particular attention should be given to roles of women because in many cases they undertake major responsibilities in agricultural production, processing and marketing in addition to performing household chores, reproductive and child rearing activities (Tangka et al 2000).

Owing to the gender disparities that exist in society, many development programs have supported a ‘Women in Development’ (WID) approach that focuses on the specific needs of women and seeks to address them separately. The WID approach was coined out of the view that women had been either excluded and /or marginalized from the development process (Ossiya et al 2002, UN 1999). Although some success have been registered in boosting the

status of women, problems such as lack of sustainability of some of the WID programs that excluded men's participation has arisen (Ossiya et al 2002).

In this regard, a Gender and Development approach (GAD), in which gender balanced programs that take into account the different needs of women and men and aims to create gender equity and equality between them, has been postulated (MGLSD 1999). The GAD approach seeks to understand the way gender constraints or advances efforts to promote development of the disadvantaged, while ensuring an equitable distribution of its benefits (MGLSD 1999). Emphasis is placed on analyzing the incentives and constraints under which men and women work in order to make visible the differences between them in terms of their roles and work loads, the impact of intervention on them and their ability to gain access to resources and decision making (Ekop 2001).

2.2.2 Gender Relations in Livestock Keeping:

Women's role in livestock production range from no role at all, to high levels of function depending on the enterprise and local situation. Often the contribution of women is grossly underestimated because of the myth of male dominance in livestock production and lack of monetization and statistical recognition of the contribution of women to the production process (IFAD 1999, Fuller 1994).

The major research focus has been on the role of women in crop production with little recognition of their roles versus those of men and children in livestock farming (Tangka et al 2000). Little research effort has been oriented towards livestock and intra-household decision-making and gender disaggregated data on work sharing, access to resources and sharing of benefits (Baumann et al 2000 and Tangka et al 2000). The database on women's involvement in raising livestock especially the large stock and their role in control and decision-making at sub household level is lacking (IFAD 1999, Fuller 1994).

Gender division of labor and participation in decision-making process are influenced by the perceived value attached to the different animal species. If the animal species serve purposes that are within the domain of women's responsibilities, such as feeding the family, women will have greater influence on decisions regarding the animals (Tangka et al 2000). Where animals serve the purpose of generating income then the men play greater influence in the decision-making (Tangka et al 2000). With the increasing commercialization, men are taking over livestock enterprises that were once female dominated (Tangka et al 2000). In general, men control the monetized (cash) sector, while women remain in the unpaid subsistence sector (World Bank 1993). A key implication for gender therefore is related to goals of keeping livestock, the utilization of the livestock products and potential monetary gains.

Livestock production is a composite of a number of issues/concerns that need to be examined on a gender framework. Understanding gender roles in livestock production and ownership could make development more equitable and boost the goal of improving household food security and farm income of the TFS households.

2.2.3 Food Security and Gender Relations:

The concept of food security is centered on two sub-concepts: food availability and food entitlements (Maxwell and Frankenberger 1992, FAO 1974). Food availability refers to the supply of food available at local, national and international levels and food entitlements refer to the capability of individuals and households to obtain food (Maxwell and Frankenberger 1992, Sen 1981). IFAD 1999, defined household food security as the capacity of a household to procure a stable and sustainable basket of adequate food, achieved through the household's ability to produce and/or purchase food plus food aid and distribution. Food security therefore incorporates measures of availability and access to adequate food of good quality at all times by a household.

In Uganda women dominate the food production sector, being largely responsible for making food available for the household through producing it or by purchase, and account for about 80% food production (World Bank 1993, IFAD 1999). Unequal rights and obligations within the household as well as limited time and access to productive and financial resources pose a great constraint to this cause (Quinsumbig et al 1995). In addition the changing roles of women in society today competing with the traditional roles and the gender blind commercialization of agriculture affect women's contribution to food security (NAWOU 2000). For example, in Bushenyi, matooke has not only become a man's cash crop but has also occupied the land, which would have been for other food crops (NAWOU 2000).

Reduction in the asymmetries between men and women as regards access to resources and user rights, decision making and control over use of benefits is necessary if the three pillars of food security i.e. food availability, economic access to available food and nutritional food security are to be improved and strengthened in the household (Quinsumbig et al 1995, FAO 1995 and PSDP1997).

CHAPTER III:

3.0 METHODOLOGY

3.1 Agro-Ecology of the Teso Farming System (TFS) Region

The study was carried out in the TFS area, situated in the North Eastern part of Uganda. This area is a flat plateau terrain with gentle undulating slopes intercepted with a network of large seasonal swamps. The region is situated between 1000-1800m above sea level with a total rainfall of 1000-1100mm per annum. The vegetation is mainly scattered tree grassland savannah with a mixture of grass, trees and shrub species of varying proportions. The soils are sandy but black clay soils are found around lakeshores and swampy areas (Awa et al 1999). The climatic conditions dictate the growth of annual crops that require large acreage.

3.2 Justification of the Study Area:

The area of study, Katakwi and Kaberamaido districts, selected on grounds of high prevalence of food insecurity and funding constraints, offers unique characteristics and opportunities for understanding gender dynamics in livestock keeping as the traditional system attempts to re-gain economic stability. (i) Historical agro-pastoral system based on annual cropping with a significant livestock component (ii) Economic base built on crop-livestock system having been drastically affected by insurgency and protracted cattle rustling (iii) Restocking process in the area that offers opportunity for entry of women in livestock keeping.

3.3 Sample Selection:

The study involved a cross section of 205 randomly selected households of which 190 were used in the analysis after the data cleaning exercise. Administrative structures concerning the number of counties and sub counties in each of the selected districts were obtained from the district offices. Katakwi is composed of four counties and fourteen sub-counties while Kaberamaido has two counties and seven sub-counties. Because of the variation in size of the

two districts, a proportionate sample depending on the number of sub counties was selected to have a fair representation of all households the districts.

Five and three sub counties from Katakwi and Kaberamaido districts respectively were randomly selected from all the counties. Two parishes were randomly selected from each sub-county to make ten parishes for Katakwi and six for Kaberamaido. From each parish three villages were selected to make thirty villages for Katakwi and eighteen for Kaberamaido.

Although the survey involved random selection of households, only those with livestock were considered in the interviewing exercise. Local Council I (LCI) officials at parish level assisted in the exercise. The household head or any other adult person available was interviewed. From Katakwi district, 120 households were interviewed while 85 were interviewed from Kaberamaido district.

3.4 Data Collection:

A structured enumerator administered, pre-tested questionnaires was used to collect qualitative and quantitative information (See Appendix 4). Secondary data was obtained from research centers, MAAIF offices, and districts in the study area, NGOs, UN agencies, libraries, resource centers and the media. The design of the questionnaire benefited from the input of researchers, field staff, technicians, agricultural economists, animal scientists, socio-economic practitioners and statisticians. Enumerators conversant with the local languages were trained to ensure proper administration of the questionnaire. The questionnaire was pre-tested on about sixty households from the study area and revised to suit the targeted population.

Household level information was collected on gender and other socio-economic aspects of livestock farmers including household characteristics. The information included sex, education level, age, marital status, household size and composition. Information on production resources

(ownership and access by gender) land and livestock including size of land owned, the number, types and breeds of livestock reared, livestock production practices and innovations used were obtained. Data on services such as markets, extension, veterinary and credit were also obtained in terms of availability, access and use. Farm production and consumption data such as sales of farm products (animals and crops), food purchases, food consumed (quantities and frequency of consumption) in a specific time limit, the main crops grown, seasonal harvests, post-harvest losses, food and animal stocks, food donations and handouts were collected. Data on gender roles and responsibilities in livestock production and management, acquisition of livestock, various activities performed for a living, were also obtained. All this information was desegregated by gender where possible.

Four focused group discussions were conducted among selected groups of farmers in the districts of Kaberamaido and Katakwi. These were women groups that were composed of 15-17 members a maximum of 4 male livestock farmers the rest being female livestock farmers. This was a condition for the formed women groups that they needed few men to balance but not so many to overshadow their views and interests). The focused group discussions helped to capture qualitative data on issues pertaining to gender, socio- economic and cultural factors that affect women and/or men in livestock production.

3.5 Data Analysis:

The data was analyzed using descriptive statistics and regression methods. Descriptive analysis (means, proportions and tests of differences of means and proportions) was used to answer questions regarding characterization of gender roles in livestock ownership and production. To qualify the effect of gender and other socio-economic factors on the household food security, a standard linear regression model was used. In this study, food availability is used as an indicator for food security, although the latter doesn't necessarily follow from the former. As shown in the work by Maxwell and Frankenberger (1992) household food security (food

available) to the household in a year was computed using the Maxwell food balance sheet model.

3.5.1 Model Characteristics and Description of Explanatory variables:

Explanatory variables included socio-economic factors and demographic variables that took into account life cycle impacts on household ownership of resources and productivity and consequently food security status (Hopkins, Levin and Haddad 1994). Dummies that account for the unobservable effects of variables such as ownership and decision-making including access were also incorporated in the model (Hopkins, Levin and Haddad 1994). The relationship between total household food available for consumption (an indicator of food security) and the explanatory variables was determined using the standard linear regression model as illustrated in section 3.5.5.

3.5.2 Description of the variables:

a) Livestock Ownership:

The study investigates the influence of livestock ownership among men and women on household food security in the TFS. Research in developing countries has found that improvements in household food security and nutrition are associated with women's access to resources, benefits and income and their role in household decisions on expenditure (FAO 1995). Thomas (1991) also urges that the allocation and control of household income and the resultant effects on household welfare depends largely on who owns and controls the resources/benefits and income. Although a male or female may have access to resources, the one who makes decisions regarding the crop or livestock sales and/or use of benefits literally owns the resources, and could affect household food security (Hopkins et al 1994). This study therefore sought to determine the impact of male and/or female ownership (Ownership = own and control use of benefits) of a specific type of livestock on the food security status of the

household. The variable was incorporated in the model as a dummy where female livestock (cattle, goats or poultry) ownership=1, 0 otherwise.

b) Land Size:

The effect of the size of land owned by farmers on the amount of the food available in the household was also investigated in this study. The variable was measured by the acreage of land the farmer owns or has access to for livestock keeping and crop production. Musinguzi (2000) hypothesizes that land size is positively associated with stocking decisions in terms of number and type of animals kept, and the amount and the variety of crops grown.

c) Land Ownership:

The effect of land ownership whether by the men or women on the food security status of the household in the TFS was examined using a dummy variable, female ownership of land = 1, 0 otherwise, in this case where women own and control either all the land or some of the land for production. Uganda is a patriarchal society where men dominate ownership rights of land. Although women have access to land through marriage or a male relative, they do not have ownership rights and yet ownership affects decision-making power, and the ability to control and make use of the proceeds, which consequently affects food available for consumption in the household (Asiimwe and Nyakojo 2002).

d) Diversity of Livestock:

As hypothesized by Maxwell and Frankenberger (1992), diversity of crops/herd and income sources is one of the main “buffers” households develop against risk of food insecurity. The study investigates whether the diversity of livestock herd reared had any effect on the food security status of the households. This variable was measured as an index constructed by assigning each type of animal a number, with the livestock that is ranked highest in terms of value per animal, taking the highest value i.e. (cattle = 4, goats = 3, pigs = 2 and poultry =1).

The number of the corresponding livestock type owned by a household is multiplied by the assigned number, for example if the farmer has 4 cattle, 5 goats, 2 pigs and 10 chicken, then the index would be computed as follows; (4x4)+(5x3)+(2x2)+(10x1)= 45. The assumption is that the higher the index numbers the better off the household in terms of livestock asset endowment.

e) Market Accessibility:

The study investigated whether households located closer to markets are more food secure than those living at distant locations. Market accessibility in terms of distance, size, infrastructure and information is hypothesized to benefit the farmer in terms of better prices for products and, thus boost production in terms of quality and quantity. On the other hand, poor market access could lead to farmers receiving low prices for their products with most of the benefits accruing to middlemen and therefore discouraging farmers from producing more, which could negatively affect the food security status of the households (Musinguzi 2000). In addition, the farther the market the harder it is for female farmers to market their products due to their busy work schedules in the households.

f) Access to Extension Services (veterinary services):

Access to extension services in terms of distances from farmer locations to nearest extension service provider was analyzed to determine if it had any influence on food available in the household. It is hypothesized that farmers with better access to extension services/ are able to use extension services regularly, become more willing to adopt new innovations and technologies since they are more informed and as a result achieve better performance in production, compared to those with little or no access at all (Musinguzi 2000).

g) Availability of Credit:

Availability of credit to female farmers is an important variable used to examine how it influences food security status of the household. This variable entered the model as a dummy, availability of credit to female farmers =1, 0 otherwise. It is hypothesized that for cash constrained farmers to pay for privately delivered veterinary services and improved technologies, they need an efficient delivery of credit and financial services to enable them overcome their cash constraints (Laker et al 2001). Most rural farmers especially women lack information, access to the existing credit programs and/or collateral for obtaining loans, which is likely to affect their food security status (Laker et al 2001).

h) Education level:

Investigation of the impact of education level attained by a farmer on household food security is important to this study. Usually farmers who have received formal education adapt to technological innovations more easily and are able to acquire skills faster compared to those who have no formal education. This tends to translate into higher productivity and thus food security (Musiguzi 2000). According to (IFAD 1999, Fuller 1994), certain technological innovations have had measurable success in enhancing women's productivity in livestock or related tasks. This variable was incorporated into the model as the level of education acquired by the farmer. Primary education level=1, secondary education level=2, tertiary education level=3 and 0 for no formal education.

3.5.3 Modeling the Household's Food Security Determinants:

The second objective, of determining the influence of gender and other socio economic factors on the food security status of livestock producing households in the TFS was analyzed using a standard linear regression model. Various models have been used to measure food security. Gundersen and Gruber (2001) used the utility function method (that showed the consumption choices of food and non-food goods by a household against a budget constraint in a given

period), to measure food insufficiency in a household. The model involved maximization of utility subject to a budget constraint over multiple periods. However, this model is tenable where households earn a regular income and buy all the food consumed in addition to non-food items. In the study area, most households are primarily involved in agricultural production and depend on home produced food with minimal out of pocket expenditure on food.

The second model commonly used is the standard recall period model, based on 24-hour recall of food consumed by individual members of a household. The caloric content of each type of food is computed and the amount of calories or nutrients consumed by an individual in a given period (usually 24 hours) is measured (Hoddinott, 1999). Though the model may give more reliable consumption data and captures intra-household distributional differences, it is subject to a number of drawbacks such as memory lapses, observer bias, respondent fatigue, a short and potentially unrepresentative recall period and high data collection costs that constrain analysis to relatively small samples.

The third model is the dietary diversity model, which involves simple sum of the number of different foods eaten by an individual over a specified period and a weighted sum of the number of different foods within a group of foods that reflects frequency of consumption. This model is built on the assumption that as households become better off, they consume a variety of foods. This measure though simple, does not record quantities thus making it impossible to estimate the extent to which diets are inadequate in terms of caloric availability (Maxwell, 1995).

The fourth model is the Food Balance Sheet Model, which estimates total household food income/available food for consumption (total food production plus purchases) less depleted food stocks (total food sold, wasted, food losses and given out) over a specified period of time

(Maxwell and Frankenberger 1992). The model has the advantage of ease in the collection and availability of production and consumption data, which are converted to standard units such as kilograms (Chung *et al*, 1997). Thus, in the context of the study in TFS, the food balance sheet model was the appropriate measure for the food security in terms of available calories for household consumption though not necessarily the nutrient value. Usually households produce and consume a variety of foods from their own production, donations, and purchases and/or in return for labor given, and free collection from natural sources. The roots and cereals are specifically considered because they are the commonly consumed foods in the TFS households and as Ssewanyana (2001) observes, they contribute the largest percentage of calories consumed by any individual i.e. 37% and 25% of the caloric intake respectively. Estimates of the amount of foods purchased for consumption for a given household in a given period say, a week/month were also obtained and amounts consumed in a period of one year computed. The amount of food items sold in that given year, stolen/lost and/or given out were also obtained using seasonal recall method. For animal products, the amounts of foods such as milk, meat, eggs, fish that have been consumed in the household both through purchase, donation or own production were obtained and used in the analysis. It is important to note that for this particular study, live animals were not considered given the fact that the TFS households keep livestock as saving or as insurance in times of financial needs for issues/items such as school fees, medical expenses, dowry, land purchases, food crop shortage crisis, draught power etc but not necessarily for regular consumption. Other foods such as; leafy vegetables, sugar, fish etc consumed were obtained but not used in the model due to the inability to quantify such foods into their nutritional equivalents, over aggregation of foods such as oils and vegetables and the inability to get reliable conversion rates e.g. leafy vegetables such as “Ebbo” and “Bboga” commonly consumed in TFS Households. (Nagujja and Mugisha 2003). Alcohol was not considered because not every household member derived utility from such a food item.

Using the Food balance sheet model, Total food available to the household for consumption was estimated as follows:

[Total food produced] + [total food purchased and food donations] less [total food sold, wasted and given out (food losses)] = the total food available for HH consumption:

$$(F_o + F_p + F_{d)} - (F_s + F_l) = F_y \text{ at time } t = \text{a year} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$

Where F_o is total food output (production)

F_p is total food purchases,

F_d is total food donations,

F_s is total food sold out,

F_l is total depleted food stocks (food wasted, stolen, given away),

F_y is total food available for consumption.

The actual amounts of each food produced and/or purchased and donated to the household in a year was computed in kg or litres to give an estimate of the gross amount of food income to that particular household. The actual amounts of food products sold and/or lost through theft, death etc from the household in Kg/litres in a year gives the gross food deficit for consumption. Each of the food amounts was multiplied by its caloric conversion rate to obtain the amount of calories derived from it, using the food conversion rates from food composition/nutrient value tables (Health Canada, 1999, FAO 1995 and West, 1987). (See Appendix 2). The estimate of total Available Food Caloric Content (AFCC) for consumption in the household was computed by subtracting (sum of all the calories of different foods sold/stolen/lost) gross food deficit caloric content (FDCC) from (sum of all the calories of different foods produced/purchases/donated) gross food income caloric content (FICC) i.e. AFCC = Gross FICC – Gross FDCC. For example all food items were computed in kg/liters, i.e. 1kg of millet =3150 kilocalories which is the conversion factor. The estimated AFCC measured in kilocalories was then used as the proxy for food security, thus the dependent variable.

Household food availability for consumption is commonly believed to be dependent on household factors of production such as land and household food expenditure as well as other household characteristics and socio-economic factors such as land ownership, access to the market, access to credit, access to extension services, land size, livestock diversity, control and use of benefits from livestock production, livestock ownership, education level, age and household size. This relationship is expressed in equations 2 and 3 below;

$$Y = f(P_f, H_{ex}) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

Where, Y is household food availability for consumption measured in calories

P_f – household factors of production such as land

H_{ex} – household food expenditure

As well as

$$Y = f(P_f, Hex, X_1, X_2, X_3, X_4, X_5) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3$$

Where X1-X5 are the other socio- economic factors and household characteristics

It is assumed that resource ownership in the TFS household has three categories: Female ownership, Male ownership and Joint ownership. In this model only male and female ownership have been considered. Following the rule that the number of dummies must be one less than the number of categories of the variable, one dummy was introduced to take care of the two categories of ownership for each qualitative variable used in this model (Gujarati 1995). The model explaining food security variation across households is written as follows:

$$Y = \alpha_1 + \alpha_n D_{ni} + \beta X_1 + \beta X_2 + \beta X_3 + \beta X_4 + \beta X_5 + \beta X_6 + \mu_i \ldots\ldots\ldots\ldots\ldots\ldots 4$$

Where Y =Food availability (food security status of the household)

Thus X_1 = Dependency Ratio

X_2 = Herd diversity index

X_3= Land size

X_4 = Household size

X_5 = Age of the livestock farmer

X_6 = Access to veterinary services

X7 = Access to market

μ_i is the error term

α = Constant

β = Coefficients

D= vector representing variables that entered the model as dummies such as cattle ownership1 if female ownership and 0 otherwise

Goat ownership 1 if male ownership and 0 = otherwise

Poultry ownership 1 if male ownership and 0 = otherwise

Land ownership 1 if male ownership and 0 otherwise

Availability of credit 1 to female farmers and 2 otherwise

Use of improved pastures 1 use and 2 otherwise

Use of veterinary services 1 use and 2 otherwise

In some cases a specific category such as female category was treated as the base category, therefore the intercept α_1 would reflect the intercept for the base category. The differential intercepts say α_2, α_3, α_4, α_5, α_6 show by how much the intercepts of the other categories differ from the intercept of the base category (Gujarati 1995). After running the regression the differential intercepts α_2, α_3, α_4, α_5 and α_6 are tested to determine whether they are individually significant from the base group.

3.5.4 Regression diagnostics

Data checking for errors preceded the regression analysis. Data screening for potential errors started with the issue of normality. Exploration of distribution of variables was done and apt transformation of variables to a more normal shape was also done with the help of STATA

numeric and graphic displays. Regression outliers, leverage and influential data points were identified using studentized residuals, leverages and a plot of leverages versus residual squared to check for potential influential observations and outliers at the same time. More specific measures of influence that assess how each coefficient is changed by deleting the observation were done using DFBETA created for each predictor. Heteroscedasticity was tested using Cook-Weisberg test where fitted values of the dependent variable were employed. Multi-co linearity was checked using variance inflation factor (VIF) and correlation matrix. The model passed all the tests. Model specification error was detected using regression specification error test (RESET) and the model was specified correctly.

CHAPTER IV:

4.0 RESULTS AND INTERPRETATIONS

4.1 Descriptive Analysis and Interpretation of the Results

The data collected for this study permits a delineation of socio-economic factors that affect livestock ownership and production among men and women, which consequently have implications for household food security. The analysis categorizes farmers based on various factors associated with resource ownership and food security stability in relation to gender (Hopkins, Levin and Haddad 1994).

4.1.1 Demographic characteristics of livestock farmers

Table 1: Characteristics of livestock farmers

Household characteristics	Female farmers	Male farmers	Chi-Square	Number of Observations (N)
Sex				
Male		76.3	52.63***	190
Female	23.7		52.63***	190
Age group				
Elderly (above 60yrs)	22.73	25.17	2.1338	143 men, 44 women
Adults (18-60yrs)	77.27	70.63		
Youth (12-18yrs)	0	4.20		
Marital status				
Married	33.33	94.48	84.9038***	145 men, 45 women
Single	17.78	2.63		
Widow/widower	48.89	2.07		
Education level				
No formal education	48.89	17.24	18.8048***	145 men, 45 women
Primary	40.00	61.38		
Secondary	8.89	14.48		
Post secondary	2.22	6.90		

*** represents *significance at 1% level.*

Age and sex

Most the livestock farmers were male (76.3%) reflecting in part male dominance of livestock enterprise in the TFS. The average age of farmers was 43 years with most of them between 19 and 60 years. (See table 1 above). Very few livestock farmers were of age between 12-18 years and all these were male children. The fact that only male children are involved in livestock production depicts male dominance in inheritance. The mean dependence ratio was 1.67.

Marital Status and Education level

Most livestock keepers (80%) were married although there were a good number of widows (11.1%), the rest being single and widowers. 56.3% of all the farmers had attained primary level education, 24.7% had no formal education, 13.2% had secondary education and 5.8% post secondary education. (Appendix 2).

Of the 23.7% female livestock farmers, 48.9% were widows, 33.3% married and 17.8% single women. The majority of the male farmers (95%) were married with only 3% single men and 2 % widowers. Most of the female livestock keepers (48.9%) had no formal education compared to 17.24% of the male farmers and few had acquired secondary and post secondary education. (See table 1 above). These results are consistent with the Uganda Education White paper 1992 and 10th Education Sector Review (ESR) 2003 that still registers more females than males in the illiterate bracket in a ratio of (49.4%: 50.6%) in 2003 primary education sub sector. Completion rates at primary are still very low with more girls dropping out of school at primary level than boys i.e. 24% boys and 21% girls completed primary level education in 2003 (10th ERS 2003).

4.1.2 Resource Endowments: Gender desegregation

Table 2: Size of Land owned by livestock keepers and the proportion cropped in female and male-headed households:

Variable	Entire sample	Male headed Households	Female Headed Households	t-value
Mean size of land owned by household heads in acres	7.59 (6.46) N=190	7.6 (6.24) N=145	7.56 (7.2) N=45	0.0402
Mean land area cultivated under crop	4.58 (2.35) N=190	4.78 (2.41) N=145	4.01(2.07) N=45	1.8467*

** represents significance at 10% level. Numbers in parenthesis are standard deviations. N is the sample*

The results show no statistical significant difference in the size of land owned by female and male-headed households although a significant difference in the areas cultivated by male-

headed (4.78 acres) and female-headed households (4.01 acres) is indicated[4]. The plausible explanation to this could be the lack of access to production resources such as ox ploughs, oxen and income by women and their heavy workloads and responsibilities in the household compared to their male counterparts. The mean acreage owned is 7.6 acres.

Table 3: Patterns of land ownership in male and female-headed Households:

Variable	**Male headed HH Proportion who owns as a percentage**	**Female HH Proportion who owns as a percentage**	**Chi- Square**
Man owns the land	79.67	27.5	58.13***
Woman owns the land	4.07	45	58.13***
The son/daughter child owns the land	6.5	7.5	58.13***
Joint ownership between man and woman	6.5	2.5	58.13***
The clan own the land	3.25	17.5	58.13***

N=163, *** represents significance *at 1% level.*

In 79.67% male-headed households, it is men who own land. There are few male (6.5%) and female (2.5%) headed households where joint ownership of land is acknowledged. Whereas it is common that land ownership is vested in a male head, results show that in 4% of the male-headed households sampled, women own the land. In 45% female-headed households, women own the land, however in a significant percentage of female-headed households (27.5%) it is the men who own the land. In 17.50% of the female-headed households the land belongs to the clan compared to 3.23% of the male-headed households. Ownership of land by sons/daughters among the TFS households also exists at an insignificant level. (See table 3)

[4] *It is important to note that livestock farmers in the TFS region reported that no specific areas were allocated to livestock as grazing land. Usually animals are grazed in parts of land under fallow or are taken to the common communal grazing grounds e.g. wetlands*

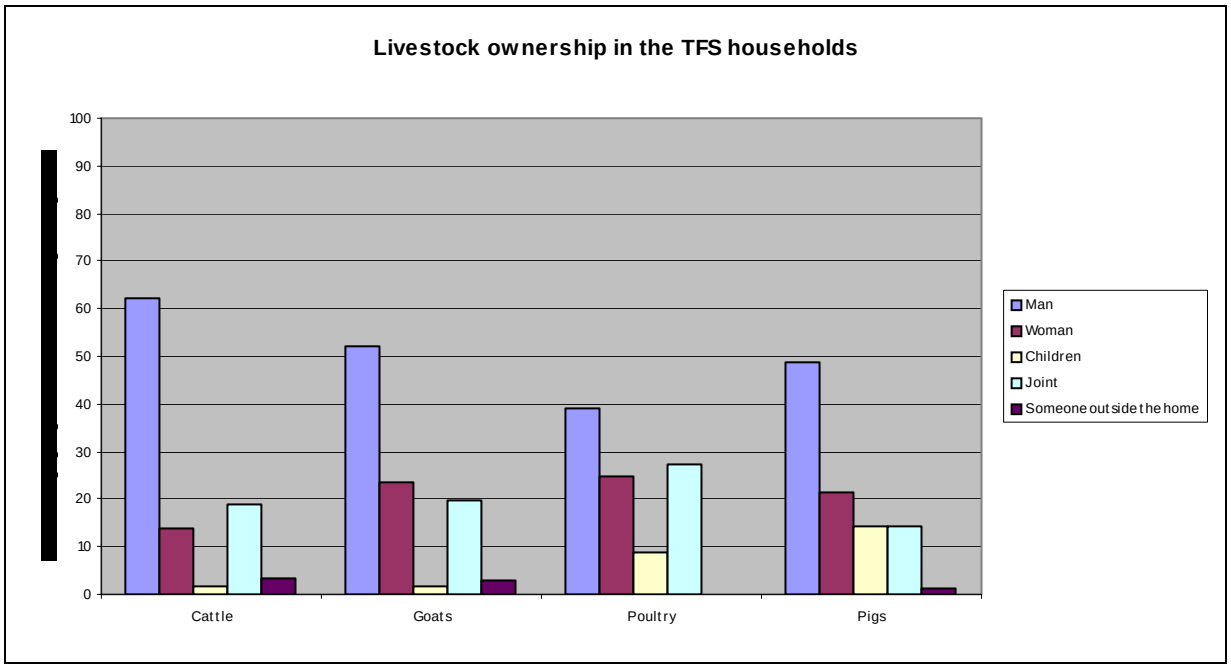
c) Patterns of Livestock Ownership, Control and Decision making Power in the TFS Households

Table 4: Livestock Ownership in TFS households

Descriptions	Cattle	Goats	Poultry	Pigs
Man	62.3	52.05	39.13	48.57
Woman	13.92	23.39	24.84	21.43
Children	1.64	1.75	8.7	14.29
Joint	18.86	19.88	27.33	14.29
Someone outside family	3.28	2.92	0	1.43
Sample size	125	176	166	74
Chi- Square	148.56***	145.875***	27.1084***	45.3243***
Average number of animals owned in a household	5	6	11	2
Standard Deviation	4.656383	5.13199	8.752	1.438617
Minimum No. of animal type owned	1	1	1	1
Maximum No. of animal type owned	24	38	47	7

**** represent significance at 1% level*

Figure 1: Ownership of livestock in the TFS household



These findings highlight gender disparities in livestock ownership in the TFS households, with the women being disadvantaged. Of all the households sampled, in 62% households, men dominate ownership of cattle with women owning cattle in only 14% of the households. Cattle were jointly owned in 19% of the households. Children owned cattle in only 2% of the households. In the majority households, men too dominate ownership of the small stock, as is the case for cattle. Results indicate that men dominate ownership of poultry as well, that were

formerly a female domain. The plausible explanation could be the recurrent rustling that have deprived men of cattle, hence the adoption of the small stock even poultry for income gains. Besides, the lucrative poultry market, in the neighboring Lira district, which supplies Kampala, has attracted men to poultry production and ownership. Joint ownership of livestock has been shown to be higher than land ownership. Most households however, jointly own the small stock compared to those jointly owning cattle. (See table 4 above)

Figure 2: Control over disposal of livestock products in male and female headed households

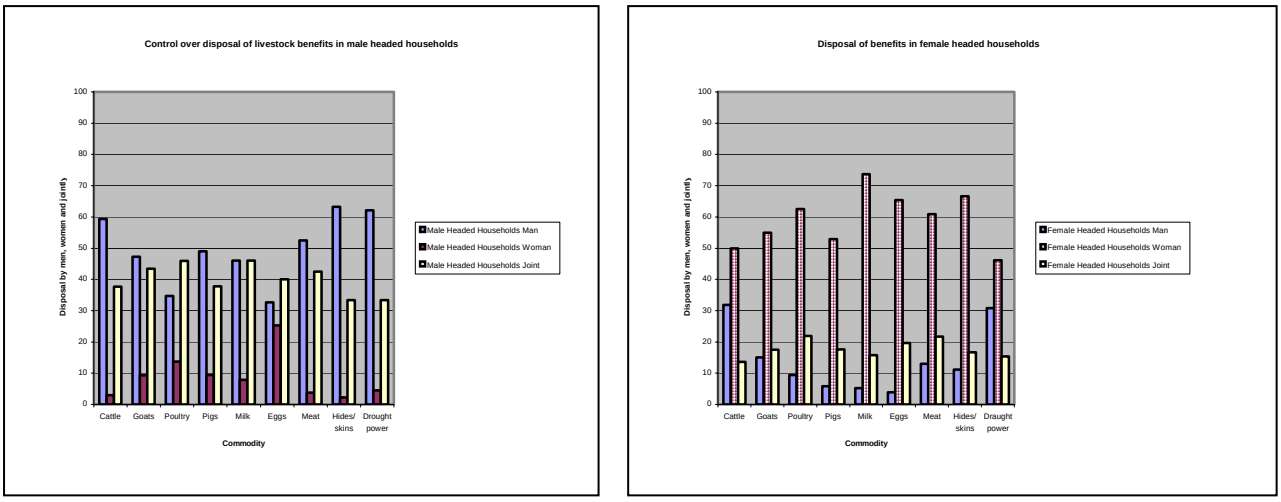
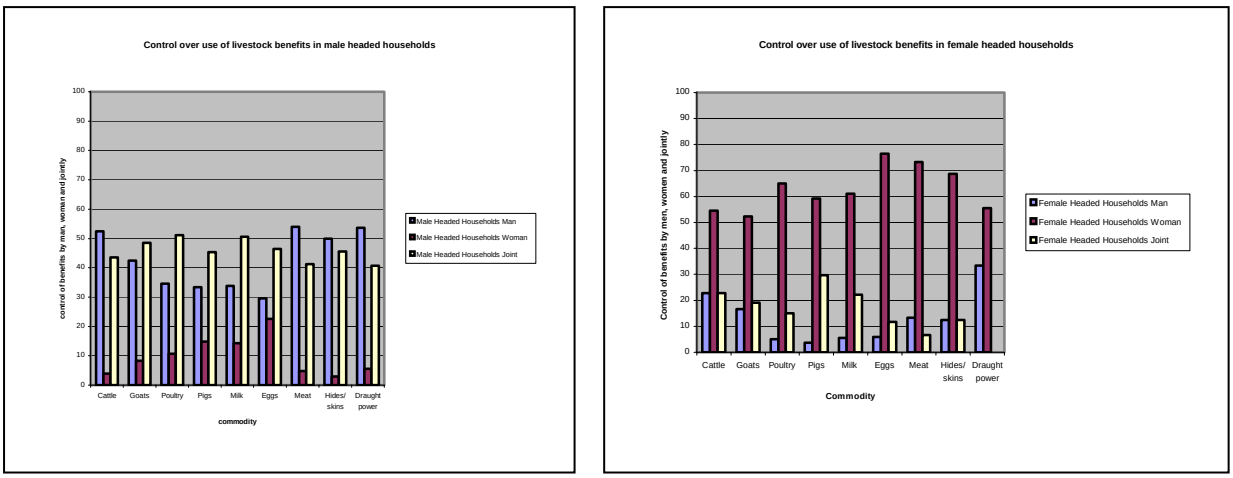


Figure 3: Control over use livestock in male and female-headed Households:



Besides dominating livestock ownership in the majority households, men also dominate the decision to dispose off and use of benefits across commodities although joint control was significant. Male dominance in disposal and control over use of livestock benefits is evident in both male and female-headed households. Women in male-headed households mainly control

commodities from the small stock such as poultry, eggs and milk. The avenue where women control the disposal and use of benefits from cattle is mainly among female-headed households. However in a significant number of female-headed households, men significantly control disposal and use of benefits from cattle and goats. Only 3% of the male-headed households had women controlling the disposal and use of benefits from cattle. See figures 2 and 3 above.

Joint decision to dispose and control use of livestock benefits across households is indicated. The results shows that joint decision surpass individual women decisions to dispose and control use of benefits across commodities in male-headed households. In some instances such as the disposal and use of commodities from poultry and milk, the joint decision surpassed the individual male or female decision in male-headed households. Joint control in female-headed households is lower than female control across commodities. See figures 2 and 3 above.

It is important to note that the decision to dispose off livestock and use benefits from livestock production by women increases, as the stock type gets smaller and is common in female-headed households. Usually the larger stock brings higher benefits compared to the smaller stock. Men tend to dominate control over stock with more value attachment.

4.1.3: Livestock production activities; Roles and responsibilities

Table 5: Activity Roles and Responsibilities in livestock production in a TFS household

Activity	Male headed; Whose responsibility?					Female headed; Whose responsibility?					Chi-square
	Man	Woman	Children	Joint	Hired labor	Man	Woman	Children	Joint	Hired labor	
Watering	31.43	15.71	9.27	23	5.71	13.95	32.56	27.9	16.28	9.3	24.02*** (N=183)
Herding	47.06	5.88	6.72	29.28	11.76	15.63	28.13	28.13	12.5	15.63	34.31*** (N=119)
Milking	61.18	2.35	9.42	16.47	10.59	35.29	17.65	23.53	5.88	17.65	14.31* (N=102)
Treatment of animals	59.35	2.44	0	19.51	18.7	21.21	24.24	12.12	3.03	39.39	49.23*** (N=156)
Caring for sick animals	62.5	1.92	3.84	26.92	4.81	32	32	20	8	8	40.85*** (N=129)
Caring for calves	53.75	7.5	11.25	25	2.5	6.67	26.67	33.34	20	13.33	27.7*** (N=95)
Construction of Kraal	71.96	2.8	3.74	14.95	6.54	24.14	24.14	27.59	6.9	17.24	41.69*** (N=136)
Tethering animals	17.16	12.69	24.63	44.78	0.75	7.69	30.77	43.59	15.38	2.56	22.5*** (N=173)
Keeping records	89.28	5.35	0.02	5.35	-	40	55	5	-	-	28.32*** (N=102)
Breeding	78.94	5.26	1.75	14.05	-	31.57	31.57	-	5.26	10.53	20.94*** (N=102)
Burning of grazing land	71.74	6.52	2.17	19.56	-	33.33	38.09	9.52	14.28	-	14.31** (N=155)
Cleaning kraal	27.87	33.61	14.76	22.14	1.64	12.12	45.45	33.33	6.06	3.03	14.32** (N=155)

, **, * represent significance at 1%, 5% and 10% respectively. N is the sample size*

Men and women participate in all livestock production activities across households. In male-headed households the men provide most labor in all livestock production activities compared to women. Whereas this is the case, women too are a significant source of labor for livestock production in male-headed households participating mainly in cleaning of kraals/animal houses, tethering and watering of the animals. The children in male-headed households also participate in nearly all livestock production activities especially tethering animals, cleaning and caring for the young.

Women play a major role in provision of labor for livestock production in female-headed households participating in nearly all activities even those regarded culturally as male activities such as herding, construction of kraals, and breeding. However the role of milking, burning of grazing grounds, breeding, kraal construction plus record keeping in female headed household is mainly played by men. Whereas children have few livestock production

responsibilities to shoulder in male-headed households, they play a significant role in provision of labor for nearly all livestock production activities in female-headed households. They provide labor for tethering animals, cleaning kraals, construction of kraals, milking cows, herding, watering animals and caring for the young. There is role sharing in livestock production activities in both male and female-headed households, although this is more common in male-headed households than female-headed households. See table 5 above.

Hired labor is minimally used in both male and female-headed households. Most households hire labor for treatment of animals, herding, construction of kraals and milking especially among female-headed households. The average cost of hiring labor for herding livestock is 12500/= per month with a standard deviation of 11,000. The major reason for limited use of hired labor include; (i) high cost of labor cited by 78.8% of the farmers, (ii) labor scarcity cited by 18.7% of the farmers while 2.5% said that most people felt it, a social disgrace to look after some else's animals. Provision of family labor by children in livestock production has been greatly reduced due to most children attending school since the introduction of the Universal Primary Education (UPE) program. Female farmers cited this issue as a challenge.

In conclusion, men and women have different standing in terms of access to resources, ownership of resources, control and decision making power over use of the benefits, which has resulted in women being socially and economically deprived in the household especially as regards the livestock enterprise. Cultural beliefs and social economic aspects still drive participation by women and men in livestock production activities.

4.1.4 Access and Utilization of services; Gender aspects

Table 6: Location of the veterinary services from the farmers and frequency of visits to these services

Variable	Entire Sample	Male headed household	Female headed household	t-value
Distance to veterinary services in kms	4.52 (4.04) (N=110)	4.78 (4.36) (N=83)	3.74 (2.76) (N=27)	1.164
Distance to drug store for /vet drugs/chemicals in kms	6.13 (6.57) (N=167)	6.128743	6.567351	0.740
Number of visits made to veterinary service providers	4.28 (2.996) (N=115)	4.55 (3.02) (N=95)	3 (2.58) (N=20)	2.132**
Cost of the vet drugs/services Ug Shs	15365/= (16897) (N=72)	14064/= (16326) (N= 59)	21269/= (18840) (N= 13)	-1.401

*** represents significance at 5% level. N is the sample size*

80% male farmers have access to veterinary services/innovations compared to 20% female farmers. The farmers stipulated a number of challenges that limit the use of services and innovations. The major challenges identified were high cost of inputs (29.29% of the farmers), scarcity of information and training on the technical use/handling of the inputs (27.27%), lack of funds to purchase them (20.20%), scarcity of service providers and services being far (10.10%).

Livestock farmers in the study area visit veterinary service providers four times a year on average. Descriptive results indicate that female farmers utilize veterinary services fewer times on average in a year (thrice) than the men (five times). Less than 1% farmers use artificial insemination. 2.5% of farmers who rear cattle have improved breeds and 1.5% of those with goats have improved breeds. Only 6.32 % of all farmers use improved pastures of these 91.7% are men and 8.3% women. The average cost of the veterinary services per visit made by the farmers to either hire vet services and/or purchase drugs for animals is 15350/= Uganda shillings.

Table 7: Credit service access, utilization and types of available credit service providers

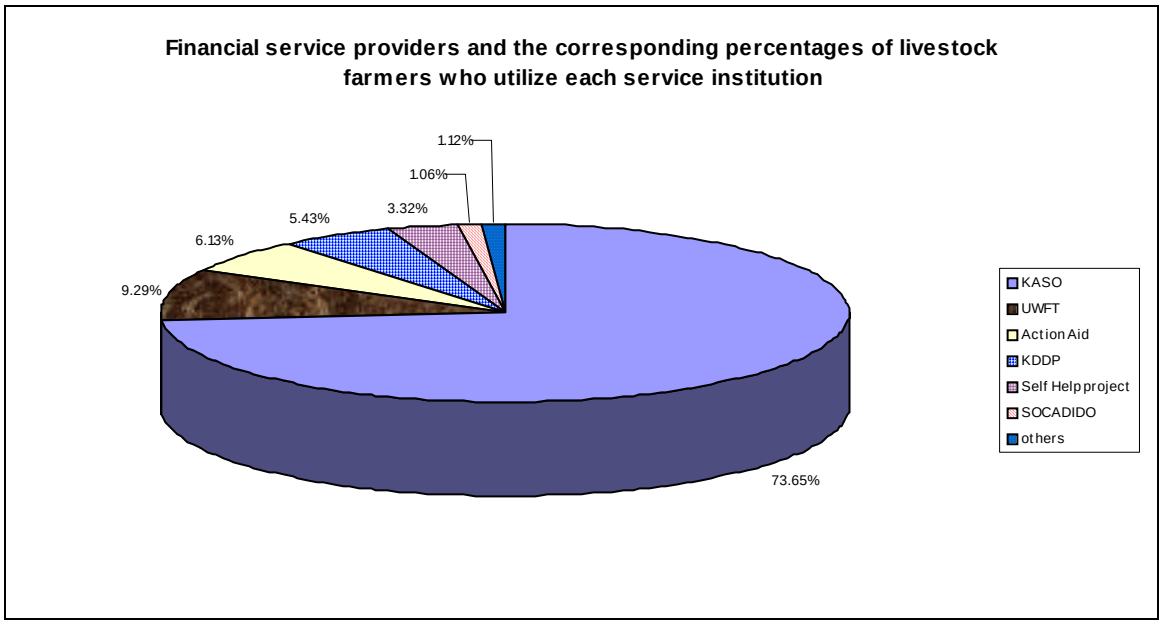
Variable	Entire sample	Male farmers	Female farmers	t-value/chi-square
Distance to credit services in km	2.73 (0.77) (N=157)	2.733 (0.79) (N=120)	2.97 (0.69) (N=37)	-1.668*
No. of farmers who Use credit services (percentages)	28.95 (N=55)	31.72 (N=46)	20 (N=9)	2.295
No. of farmers who do not use credit services (Percentages)	71.05 (N=135)	68.28 (N=99)	80 (N=36)	2.295
No. that have received loan for livestock (Percentages)	15.26 (N=29)	17.24 (N=25)	8.89 (N=4)	1.852
Farmers who have not received loan for livestock (Percentages)	84.74 (N=161)	82.76 (N=120)	91.11 (41)	1.852

The values in parenthesis are standard deviations and N is the sample size.
**represents significance at 10% level*

Livestock farmers (males and females) on average move 3km to access credit services with a standard deviation of 0.77. About 29% of all the livestock farmers sampled have used credit services, 31.7% males and 20% females, the rest do not use. Only 15.3% of all livestock farmers have received loans for livestock, 17.24% males and 8.9% females. See table 9 above.

Lack of information about the existing financial services, how to access and make use of them, cited by 56.63% of the farmers, short pay back period given by micro finance institutions cited by 13.25% farmers and lack of collateral cited by 12.05% of the farmers are among the challenges limiting access to credit. Other challenges included; consequences of not paying the loan being too harsh for them e.g. loss of property and dignity, embarrassment and harsh treatment from the loan recovering officials (8.43% of the farmers), nepotism/corruption by the financial service providers (6.02% of the farmers) high interest rates (2.41%) and insecurity (1.21%).

Figure 4: Financial Service providers in the Study area

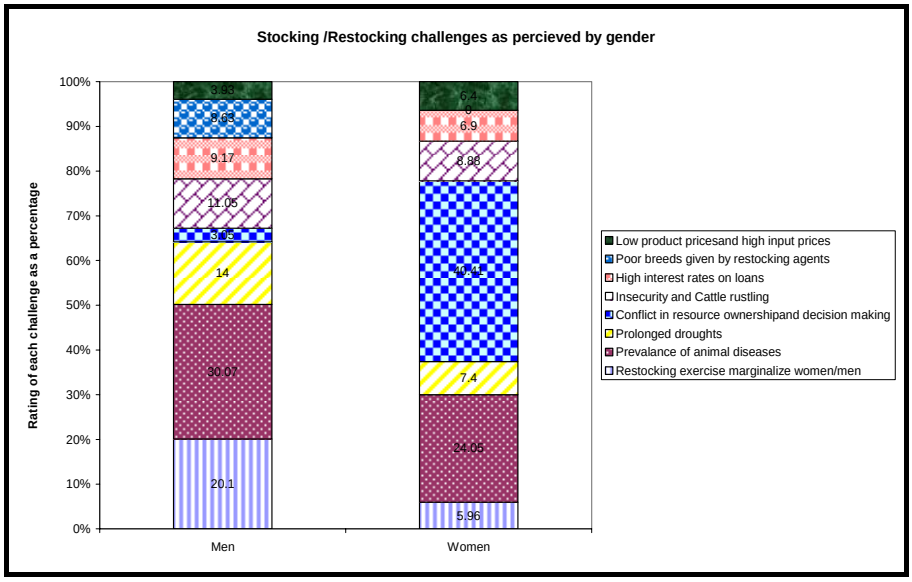


4.1.5. Gender Issues in Stocking and Restocking:

a) Sources of livestock

Most farmers (73.7%) restock or stock animals through their own effort either buying animals or trading crop products for animals or smaller stock for large stock as individuals or collective efforts as a group. 13% farmers acquired animals through dowry and 10.7% from friends and relatives. Only 3.8% of the farmers had acquired animals through restocking agents such as NGOs and Government indicative of a limited coverage of the restocking program in the area. Despite this, the restocking program was ranked the second source of livestock acquisition for women. Mugenyi and Pablo (2000) revealed that about 56% of the restocking agents in the TFS were targeting widows and 50% were targeting women). More women (58%) than men (42%) have acquired animals through the restocking agents. This suggests that women are focal recipients of the restocking program. The restocking exercise in the TFS indeed offers a great opportunity for women to participate in livestock ownership and production despite the small coverage. 13% of the male farmers acquired animals from dowry compared to only 1.6% of the women. 11.6% of the women acquired animals through friends and relatives compared to 6.29% of the men.

Figure 5: Restocking/ Stocking challenges perceived by male and female livestock farmers



The most widespread challenge reported by 40.41% female livestock farmers was conflict in ownership and control of benefits from livestock (mainly cattle). Situations of outright disenfranchisement to dispose off and use benefits from livestock by women even those they acquired by themselves or obtained as gifts from their parents/friends and/or restocking agents are still commonplace in the TFS region (Ossiya 2001). Prevalence of diseases, prolonged droughts, insecurity and cattle rusting, low output and high input prices, poor breeds given by restocking agents, high interest rates on loans are among the other challenges women face in livestock production. See figure 5 above.

The greatest concern of men is the prevalence of animal diseases, which reduces animal productivity and increases the cost of raising them. 20% of the male farmers reported that most of the restocking agents marginalized them in favor of female farmers. Since the men also suffered livestock loss due to various factors, they plead to be considered by restocking agents. Many male farmers (14%) said that cattle rustling had left them in a hopeless situation and reduced their ability to stock animals. The low output and high input prices, high interest rates on loans and lack of labor are other challenges cited by men. The farmers especially male farmers echoed that the breeds given to them as "*Entadikwa*" or startup capital through the

local government in effort to restock the TFS region were not adaptive to the conditions of the region and most of them died.

b) Benefits of the livestock production to the Households in the TFS:

Male and female livestock farmers attached different values to livestock keeping with a convergence to draught power (50% female and 67.64% male). Women (25%) placed value on improved household nutrition and less (8.33%) to income generation. Unlike women, 10.22% male farmers attach value to improved nutrition and more (20.6%) to income generation. 16.67% female farmers attach value of livestock to manure provision while 1.54% male farmers attributed livestock to provision of dowry.

4.1.6 Marketing of livestock products in the TFS: Challenges

a) Types of markets and means of transport used

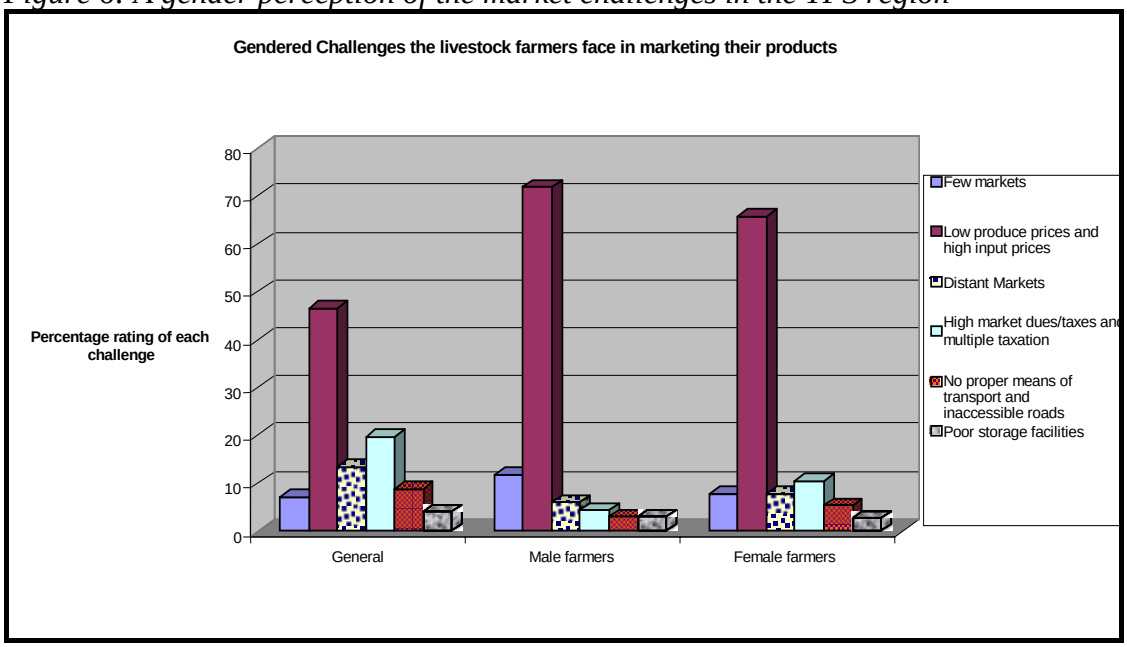
The most common markets used by livestock farmers in the TFS are the weekly markets (about 92% of the livestock farmers use these local markets located in every sub-county to serve the communities). Middlemen from various places also use this as an opportunity to buy farmers produce. 3.95% and 3.39% use daily road markets and sell produce in homes respectively. A very insignificant number of farmers market in shops. Most livestock farmers (58.86%) access markets on foot, a significant number of them (39.43%) use bicycles. Very few farmers use motorcycles. Only 1.14% and 0.57% use vehicles and motorcycles respectively. This could be due to lack of funds to hire or board vehicles and/or poor infrastructure in these rural areas that makes roads inaccessible.

b) Market locations from farmers' homes

Markets used by most farmers (64%), are located within 0 to four kilometers from farmers locations. A significant number of farmers (20%) sell produce in markets located between three to four kilometers and 19.58% farmers sell produce to markets located between five to seven kilometers. About 16% farmers are able to go beyond distances of 8km.

c) Market Challenges

Figure 6: A gender perception of the market challenges in the TFS region



Livestock farmers in the TFS face a number of market challenges that negate farming as a business. The outstanding challenge registered is the low output and high input prices. Other challenges include, high market dues/ taxes and multiple taxations charged on the produce especially livestock; distant markets; few potential markets; poor infrastructure and poor post storage systems. Male and female livestock farmers some common market constraint such as low profits. Women ranked high market dues and multiple taxation, distant markets, lack of means of transport and poor post harvest storage as other significant constraints. Men ranked few potential markets, distant markets, and high market dues plus multiple taxation as significant constraints to them. Men's perception of the marketing challenges hinge around the expansion of their market scope and acquisition of more market information while the women seem to perceive the challenges with regard to accessibility.

4.1.7 Factors that affect household food security (availability):

Table 8: Multiple comparisons of the household characteristics and their impact on food security

Section one				
(I) Age groups	(J) Age groups	Mean difference (I-J)	Standard Error	P-Value
Adults (19-60yrs)	Elderly (>60yrs)	4091839.5*	2319088	.079
(I)Education level	(J) education level			
None	Post secondary	9152779.5**	4519420	.044
Section two				
(I)Who owns cattle	(J) who owns cattle			
Woman	man and woman	12733212**	5708740	.028
Woman	Whole family (man, woman, children)	8155400.4*	4716769	.086

****, ** and * represent significance at 1%, 5% and 10% levels respectively 0*

The food available in households with heads in the productive age category (19-60yrs) is significantly more than that in households headed by the elderly (above 60yrs). The productive age bracket offers labor for production and usually have employment opportunities outside farming that bring in income. There was a positive and significant difference between the food security status of households with heads who acquired post secondary level education than that in households with heads who had no formal education. The regression model also reflected this. This supports the hypothesis that farmers who have acquired formal education have more access to information and can adapt to technology innovations more easily than those with no formal education (Musinguzi 2000). The results showed that households where women own cattle had more food available compared to those with joint ownership. This is indicated by the mean difference between households where the women own cattle and those where cattle is jointly owned. The regression analysis also indicates this.

4.2. Modeling Food Security in a Livestock Keeping TFS Household:

To determine the influence of gender and other socio-economic factors on household food security, the total available food caloric content (AFCC) (food available) to the livestock-keeping households in one year was computed (Nagujja and Mugisha 2003, Maxwell and

Frankenberger 1992). This was used as the dependent variable. Explanatory variables used in the model are defined in table 9 below.

Table 9: Determinants of Household Food Security

Variables	Coefficient (Proportion of the variability in the dependent variable that is explained by the independent variable)	Standard Error	P-value
Square root of dependency ratio	-166.567	193.349	0.390
Square root of livestock index (livestock types owned by the farmer)	88.258*	51.034	0.086
Logarithm of total land owned in acres	299.0509*	158.196	0.060
Logarithm of HH size	-40.708	193.439	0.837
Logarithm age of livestock farmer	-113.869	384.724	0.768
Square root of the distances to veterinary services	187.666*	101.707	0.067
Primary level education	543.039**	277.868	0.052
Secondary level education	437.751	399.800	0.275
Tertiary level education	1397.912**	541.924	0.011
Distance to markets 3-4 km	343.359	313.574	0.275
Distance to markets 5-7 km	455.216	321.899	0.159
Distance to Markets above 8 km	389.704	343.597	0.258
Land ownership by the man = 1, 0 otherwise	-491.769*	264.224	0.064
Cattle ownership by woman =1, 0 otherwise	689.469*	397.521	0.085
Goat ownership by man =1, 0 otherwise	497.330*	275.195	0.072
Availability of credit services to female farmers = 1, 0 otherwise	534.847**	252.224	0.035
Farmers use veterinary services =1, 0 otherwise	498.570*	283.595	0.081
Farmers use improved pastures =1, 0 otherwise	756.609*	434.206	0.083
-cons	2274.694	1476.194	0.125

Number of observations= 188. *, **, ***, represents significance at 10%, 5% and 1% respectively. F- value =2.65***, R^2 =0.2096

4.2.1 Education Attained by Household Head

The level of education attainment contributes significantly to achievement of food security of livestock keeping households. This supports Swift (1989) who cited that few households with an educated member starve. Such farmers as observed by Kallisa (2002), usually have better access to and are able to utilize technologies and knowledge in agricultural production and nutrition more easily than those without. While the government policy places more focus on attainment of primary education, the model indicates that tertiary education is particularly significant. More male livestock farmers had tertiary education than females and more female farmers had no formal education compared to males. As demonstrated by Nagujja and Mugisha 2003, farmers who acquired formal education have diversified means of accessing adequate food for their households.

4.2.2 Farmers use of improved Agricultural Technologies

There is a positive and significant relationship between use of improved agricultural technologies (improved pastures) and food security. However very few livestock farmers in the TFS region are actually using improved technologies; less than 1% use artificial insemination, only 2.5% use improved cattle breeds, 1.5% use improved goat breeds and 6.3% use improved pastures. Of the farmers who use improved pastures, 91.7% are men and 8.3% women. The TFS region houses one of the national agricultural technology research institute (SAARI) mandated to generate innovations for dry land environments. The low use of technologies undermines the investment into research and extension.

4.2.3 Livestock Ownership (cattle and small ruminants)

Cattle ownership by women is a positive and significant contributor to food security in livestock keeping households. This corroborates the findings by Valdivia (1998) that providing more access to and control over resources, in the hands of women has more impact on nutrition. FAO (1995) also observes that improvements in household food security and nutrition are associated with women's access and control over resources and benefits and their decision on the expenditure. Further these findings support IFAD (2004) argument that where women own livestock but have little control over benefits is a situation, which undermines their contribution to household food security. Opening opportunity for women to own and control over benefits from cattle could enhance improved food security however data indicates that ownership and control over cattle is male dominated.

Goat ownership by men is positively related to household food security. This could reflect the greater willingness of men to dispose of goats (as compared to cattle) to address household security needs. Poultry ownership did not show up in the model as one of the significant contributors to household food security.

4.2.4 Land ownership

Ownership of land is predominantly vested in males. However, the regression results show a negative and significant impact of male ownership of land on the amount of food available to the livestock-keeping households. As demonstrated by Asiimwe and Nyakojo 2002, landowners dictate what to produce, how much and in what season and also control the use of benefits. To heighten economic security for women, increase women's productivity, improve household food security and improve gender equity, the policy makers therefore need to attempt to address the issue of women's land rights (Rugadya and Busingye 2002, Lastaria 1995). Government is addressing resource and property ownership in the country through the Domestic Bill and the Land Act but it is still a contested issue (PEAP 2004/5, Rugadya and Busingye 2002).

Land size owned positively impacts on food available to the livestock-keeping households. As demonstrated by a number of authors such as Awa et al 1999, Ossiya 2001 plus Nagujja and Mugisha 2003, an increase in the area allocated to agricultural production especially in areas that grow annual crops, has a positive impact on household food security. The customary patrilineal inheritance of land in the TFS is not only a factor of discrimination against women and girl children but has led to dwindling land sizes. Besides, grazing land in the TFS has increasingly reduced due to high population pressure, which has led to land fragmentation and encroachment of wetlands through rice growing and tree harvesting for charcoal and firewood (NARO 1999). The dwindling land sizes visa vis production and productivity among the rural poor who depend on agriculture for livelihoods is a crucial issue that needs to be addressed at policy level.

4.2.5 Access to Veterinary Services:

The model shows that access to veterinary services has a positive and significant impact on household food security. There is also a positive association between use of veterinary services

and food security of the livestock-keeping households. When veterinary services are within reach to farmers, there is a high possibility of access and/or usage of these services/innovations than if they were not. This corroborates the findings of Musinguzi 2000 that farmers with improved access to extension services achieve better performance in production and have high productivity although access does not necessarily mean adoption. The PMA policy framework through NAADS is intended to ensure that the rural poor have access to agricultural services such as extension, veterinary and market with an ultimate goal of increasing farmers' productivity and production for both subsistence and the market. The NAADS programme needs to incorporate a process that ensure improved adoption as well. Data indicates that fewer farmers have access and use veterinary services but men use the veterinary services more times on average (five times) in a year than women (three times). Improving the capacity of female farmers to access and ability to use extension services is an added advantage to achieving the goal of increasing the productivity of the rural farmer since the majority of the rural populations are women (World Bank 1993).

4.2.6 Access to Credit by Livestock Farmers

Availability of credit to female farmers is a positive and significant factor that enhances food security in livestock keeping households. Women however are more constrained in access to credit than men and yet the farmers who get credit are able to purchase privately delivered veterinary inputs and services that boost their productivity and production (Laker et al 2001, Musinguzi 2000). As observed by Hulme and Mosley (1997), public resources devoted to micro finance have in some countries had higher returns in terms of poverty reduction than those devoted to other public interventions.

4.2.7 Herd (livestock) Species Diversity

Households in the TFS tend to keep more than one type of livestock e.g. cattle, goats, poultry, sheep and pigs, which is probably a coping strategy against risk or food insecurity. The results

suggest a positive relationship between diversity of herd kept by the household and food available to that household. Maxwell and Frankenberger (1992) similarly reported that, the diversity of production (crops/herd /income sources) is considered to be one of the main “buffers” households develop against risk of food insecurity.

CHAPTER VI:

5.0 Summary, Conclusion and Recommendations

5.1 Summary and conclusion:

Whereas the contribution of the agricultural sector as a whole to Uganda's economy is shrinking, the steady growth of the livestock sub sector (contributes 9% of the total GDP and 19% of the AGDP) compared to crop sector cannot be ignored (CSO PEAP 2003).

The revised PEAP (Poverty Eradication Action Plan) which doubles as Uganda's Poverty Reduction Strategic Plan (PRSP) highlighted that more households own livestock than is commonly believed with better off households owning four times as much livestock as the poorest households (MFPED 2005). Livestock ownership was recognized by the PEAP 2004/5 as a strategic entry point out of poverty and a means to jump start the agricultural economy. This reflects a shift from a livestock production orientation to a livelihood approach that is more aligned to poverty reduction. Restocking, a program being implemented in the Northern and the TFS region (Northeastern) Uganda among other areas, is therefore supported as a priority national expenditure under the Plan for Modernization of Agriculture.

In the TFS region, livestock farming contributes directly to food production through provision of draught power and improved nutrition. It also ensures a stable farm income base and enhances social security and prestige among livestock farmers. The TFS region has however experienced recurrent food insecurity and devastating poverty blamed mainly to war insurgency and cattle rustling.

Underlying gender disparities in participation and contribution as well as access to benefits in livestock production, have also aggravated the situation of food insecurity. Although research and extension offer potential for improved livestock productivity and returns, for women socio

economic barriers may greatly limit their participation, ownership and ability to enjoy the benefits from livestock production (Booth et al 2003). This study therefore examines gender positioning in relation to opportunities to improve food security through livestock production.

Although livestock contribution to poverty reduction has been recognized in the PEAP, the national statistics that fail to capture gender dynamics of production and therefore the gender inequalities and household level gender disparities could undermine the poverty and food security situation in this region and may go beyond household level poverty to impacting overall economic growth (CSO PEAP 2003).

The study findings show that ownership of land is predominantly vested with males. The model indicates a negative and significant impact of male ownership of land on the amount of food available to the livestock-keeping household. As demonstrated by Asiimwe and Nyakojo 2002, landowners control what is done on the land and use of benefits undermining the contribution of women. Although government is addressing resource and property ownership in the country through the Domestic Bill and the Land Act, it is still a contested issue (PEAP 2004/5, Rugadya and Busingye 2002). The size of land owned positively impacts on food available to the livestock-keeping household. The customary patrilineal inheritance of land and high population pressure has led to dwindling land sizes an issue that requires attention from policy makers.

Men dominate livestock ownership and control across species i.e. cattle, goats, poultry and pigs. Most women who own and have control over livestock are widows but majority married women livestock keepers have limited and/or no control over the livestock especially cattle. Agarwal (1998) observes that gender equality in the legal right to own property does not guarantee gender equality in actual ownership, nor does ownership guarantee control. The dominant role of men in livestock ownership and control as stipulated by (OAU/IBRAR 2004),

should not propagate the presumption that, women play a subordinate role in livestock production in the household. Women provide 50% livestock related labor and contribute 60% to the agricultural economy of the TFS (AWEPON 2000, NARO/DFID 1999). As shown in the results cattle ownership by women is a positive and significant contributor to household food security in the TFS. To disregard women's roles in livestock ownership and control could impact negatively on them and more so the food security of the households involved.

The gender disparity in livestock ownership and production in this region is partly based on cultural ideologies that promote male dominancy. These are usually perpetuated and nurtured within the households by both men and women. The tax burden on men also affects livestock ownership and control patterns in this region. Men strongly justify their dominant control over livestock and use of the benefits from the livestock. A case in point is where rural women are not required to pay tax but have acquired some livestock as gifts. The men still have control over such livestock. Where the rearing of a specific type of livestock is an important source of income for the family, the management of the stock has been taken over by men. This implies that control over livestock and the benefits is determined by the economic function of a specific species to the household. MGLSD and MFPED (2003) findings demonstrated that decreased poverty resulting from increased incomes (as a result of market oriented production) privileges men. This gender disparity not only undermines women's efficient contribution to household livelihood through livestock production but their productivity and the expansion of the enterprise. This may also antagonize the unity in the household between male and female farmers.

Formal education has a positive association with household food security. Swift (1989) observes that few households with an educated member starve. While all levels of education are of importance, tertiary education is particularly significant. More male livestock farmers had tertiary and secondary education compared to female livestock farmers. Current

government policy focuses on attainment of primary education. Most female farmers had no formal education and have no opportunity to attain formal education. Adult literacy however stands to have an impact on attitude change towards technology adoption and empowerment of women (Kallisa 2002). This could also reduce the incidence of societal forces encompassed round the problem of conflict in property ownership and decision-making common in the patriarchal society.

UPE and functional literacy program (FAL) play a crucial role in helping the rural masses (especially girls/women) acquire basic education. However, the integration of FAL into the NAADS programme could be an added advantage. This will enhance capacities of rural farmers especially women to demand and seek for information, training and innovations. A change in the content of instruction/curriculum through integration of theoretical and practical/creativity skills in the learning systems is needed. This enhances sustainable capacity to translate acquired skills and knowledge/ideas into tangible results. The policy to modernize agriculture will be undermined if issues that cut across various sectors that affect agricultural production are not adequately addressed.

Availability of credit to female farmers is a positive and significant factor that enhances food security in livestock keeping households. Women are however more constrained in access to credit than men and yet farmers who gets credit are able to purchase privately delivered veterinary inputs and services thus boosting their productivity and production (Laker et al 2001, Musinguzi 2000). Lack of access to information about the existing financial services; lack of collateral; high interest rates; harsh treatment from the loan recovering officials; short pay back period and insecurity are among challenges that constrain farmers in accessing credit. Interest rates and lack of collateral often exclude poor farmers especially women from the benefits of the credit services (Heffernan 2004). This corroborates with IFAD 2004 findings

that financing mechanisms for livestock services if designed appropriately can be a powerful tool for the empowerment of livestock keepers, their organizations and communities.

The model shows that access to veterinary services and use of innovations both have positive and significant impact on food available to the household. Households that use improved pastures have more food available compared to those who do not use. However, few farmers have access to veterinary services and are actually using improved livestock technologies and veterinary services particularly the women. This suggests low adoption of improved technologies.

Women's focus on household welfare "care economy" has limited their integration into the market economy. This is reflected in the way female and male livestock farmers attach value to livestock. Male and female livestock farmers attached different values to livestock with a convergence on draught power (50% female and 67.64% male). Women (25%) unlike 10% males placed more value to improved household nutrition and less (8% women) compared to 21% males on income generation. This core difference between men and women's priorities could impede realization of full outcomes of government policy such as the PMA that promotes farming as a business.

Most livestock farmers restock/stock through their own effort either buying animals or trading crop products for animals or smaller stock for large stock. More women than men have acquired animals through the restocking agents, thus women are focal recipients of the restocking program. Conflict in livestock ownership and control; high animal disease incidence; limited access to services and inputs; limited access to information; multiple and high taxation on livestock products; insecurity and cattle rustling among others, constrain farmers especially women in livestock production. Claire Heffernan (2004) observes that,

restocked animals should be a benefit rather than a drain on capital assets accumulation for households involved.

In Uganda the Poverty Alleviation Fund priotizes interventions that are seen to have most direct impacts in addressing poverty. One such intervention is restocking which is stipulated to broaden livestock ownership by more sectors of the poor including women. While restocking is a viable entry point for women in livestock production it will be a missed opportunity if the policy makers ignore the socio economic challenges the poor rural farmers especially women face in restocking/stocking. Women have raised concerns of labor dilemma in livestock production. This has been compounded by the UPE policy that has taken away the children who were once a source of labor.

To conclude, the PEAP 2004/5 highlights that continued achievements in national aggregate incomes are undermined by a rise in poverty levels driven by distributional disparities with women as one of the disadvantaged groups. This points to a greater need for attention to sub household interventions that affect welfare, including household food security, of women and children in particular. The livestock sub sector offers potential for addressing household poverty and food security and greater market integration for more sustainable livelihoods. There is potential benefit from government investment in research and extension as a means to improve production and productivity of livestock keepers. This potential could be greatly limited by lack of keen attention to gender related socio-economic issues at household level and market interface. These issues could also impede realization of full outcomes of government policy. There is therefore need to strategically address these issues in policy and interventions in order to position rural farmers especially women to ensure better household food security and equitable benefits from livestock keeping. TFS region makes a case for attention to affirmatively position farmers particularly women in livestock production as an avenue to improve household food security.

5.1 Recommendations and Areas for Further Study

The model indicates that formal education, and in particular tertiary education, has a significant role in ensuring food security in agro-pastoral households. Current government policy focuses on Universal Primary Education (UPE), with subordinate goals of tertiary education and literacy attainment. This presents a challenge for women who are mostly illiterate. There is need for greater attention to Functional Adult Literacy and to link this with livestock keeping knowledge, innovations and extension delivery. Linking FAL to livelihood through emphasis on enterprise and technical skills literacy (thus content that is more relevant to how people (especially women) manage productive work) should be promoted. These together with an appropriate agricultural education policy are important strategies in improving productivity for sustainable poverty reduction and food security among the rural and urban populations. UPE deprives women livestock farmers in the TFS of the labor contribution of children with whom they traditionally share livestock keeping roles and responsibilities. There is a need to substantively study the impact of livestock keeping demands among agro pastoral farmers on UPE outcomes and vice versa given that less than 25% of children initially enrolled reach graduation (MES 2003).

Female ownership of livestock is traditionally limited by cultural norms, and increasingly shaped by market/ liberalization forces. There should be stronger emphasis on strategies to ensure female ownership of cattle such as gender analysis of the restocking process. There should be more attention on the role of small ruminants in household food security given the less significant social, prestige and market status accorded by men to these species. Interventions and best practices at household level that will enhance women's personal autonomy as regards access, ownership, decision-making power, and control over critical

resources including land and their own labor, need to be encouraged and promoted by various development programmes and policy makers.

Unless women can own or have stronger decision-making and control over land, food security remains compromised in livestock keeping households, a finding reflected in the PEAP 2004/5. The Land Act has been amended to support co-ownership by women, and also to provision for Communal Land Associations: these provisions remain challenges for practice/ implementation.

Currently rural credit financial services are business orientated and not suited to agriculture sector needs and even less so to the needs of women (Ossiya 2005; Ossiya 2003). Government is encouraging micro finance institutions not only to give majority loans to non-agricultural enterprises in urban and peri-urban areas, but move to the rural areas and fund agricultural production initiatives (CSO PEAP 2004). An agricultural sector (with keen attention to the unique needs of the livestock sub sector) and gender strategy for rural credit are needed.

Government has prioritized extension delivery to ensure a greater poverty focus via a public-funded, private delivered, client driven and oriented approach, with women as priority clients. However, veterinary service delivery remains market oriented, male focused and largely male delivered creating significant financial and cultural barriers for women. There is need for a review of veterinary services to make them more gender sensitive.

The PEAP 2004/5 posits a scenario of household food security via market integration rather than via subsistence production. The study indicators point to a continued dependence on subsistence rather than a growth of a market orientation among female livestock keepers. Macro-policies such as liberalization, privatization, urban centered agro-processing and markets, crop-focused infrastructure marginalize rural women in livestock production and limit

their opportunities for market integration. There is a need for a more substantive, realistic and pragmatic articulation of the dynamics between attainment of food security and achievement of market orientation in the light of women's priorities and limitations. The PMA policy should expedite food security policy and interventions and then promote farming as a business among rural women.

Investments into research and extension, as Uganda national budget support priorities are negated by lack of attention to ensuring adoption of technologies (Ossiya et al. 2003, Sserunkuma 1999). The results underpin issues of technology adoption that seems to be low. Adoption is bottle necked by socio-economic issues and supply side issues that are largely gender related (Ossiya et al. 2005, Sserunkuma 1999). Better positioning of farmers especially women to take advantage of extension and research is an avenue for increased uptake of improved livestock interventions for improved food security.

There are gains in livestock production to be consolidated: Restocking as an opportunity for women to enter livestock enterprise; the positive advantages of groups and networking; the on going National Agricultural Advisory System; the potential contribution of livestock keeping to the nutritional health of HIV/AIDS affected families; and entry into the diversified national, regional, and global markets for non-traditional livestock products. Challenges that remain in the bid to improve livestock enterprise especially the position of women in livestock keeping, include; marginalisation of women in resource ownership and control which negates their potential in livestock production; the low adoption rates of technologies; the labor vacuum for women in livestock production that challenges the focus on UPE and the current de-link between household food security and the market.

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APPENDICES

Appendix 1 – Comparison of Growth Rate of the Livestock Sector with Other Agric Sectors:

	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
GDP Growth rate	7.8	4.5	5.4	7.4	5.1	N/A
Agriculture	**4.3**	**1.1**	**1.9**	**6.8**	**4.2**	**4.8**
Cash crops	22.6	13.9	-2.8	14.3	9.2	-1.1
Food crops	1.3	-2.0	1.6	7.4	3.9	5.9
Livestock	**9.8**	**5.7**	**4.1**	**3.3**	**3.6**	**4.4**
Forestry	4.4	4.4	4.0	5.2	4.7	5.3
Fishing	2.5	4.5	5.0	0.9	-0.1	4.0

Sources: Republic of Uganda 2002 Summary of the Background to the Budget, 2002/2003. Uganda Poverty Reduction Strategic Paper, Progress Report April 2002. Kampala: Ministry of finance Planning and economic Development (adopted from the Reviewed PEAP Pillar III 2003)

Appendix 2 - General Demographic characteristics of the livestock farmers

Household Characteristics	Percentages	Chi-square	Observations (N)
Sex of livestock farmer			
Male	76.3	52.63***	187
Female	23.7		
Age group			
Elderly (above 60yrs)	24.6	139.9***	190
Adults (18-60yrs)	72.2		
Youth (12-18yrs)	3.2		
Marital status			
Married	80	433.84***	190
Single	6.8		
Widow	11.1		
Widower	2.1		
Education back ground			
No formal education	24.7	113.24***	190
Primary	56.3		
Secondary	13.2		
Post secondary	5.8		

**** represents significance at 1% level. N is the sample size*

Appendix 3: Socio Economic issues, Production and Poverty reduction

Socio-Economic and Policy Matrix for Research Results			
Outstanding Issues as identified by the research	**Current Policy Discourse**	**Suggested Actions (policy options) and Targets**	**Expected Outcomes**
1) Resource/Property Ownership			
Land and livestock ownership is vested with males. Female ownership of cattle is a significant contributor to household food security. Female ownership of livestock traditionally limited by cultural norms and increasingly shaped by market/liberalization forces. Marginalisation of women in ownership and control, negates their potential for livestock keeping	Domestic bill and the Land Act (still a contested issue) Recognition in the PEAP/PRSP IV (the inequitable distribution of wealth plus lack of welfare improvement although there are increases in aggregate national incomes	Promotion of best practices and interventions that offer women personal autonomy as regards, ownership rights, decision making and control plus their labor needs Grassroots sensitization of communities on gender disparities and gender balanced strategies	Attitude change and social stability Equitable resource and benefit utilization Improved household productivity, Poverty reduction
2) Market oriented production for food security and poverty reduction versus subsistence production			
Women are more focused on household welfare than market economy. They do not view livestock enterprise much as a business since they are oriented to welfare priority and have limited gains from the potential benefits. Men more focused on production for market.	The PEAP 2004/5 posits a scenario of household food security via market integration rather than via subsistence production. Thus farming as a business	A more substantive realistic and pragmatic articulation of the dynamics between attainment of food security and achievement of market orientation in the light of women's priorities and limitations. Government to expedite food security policy and interventions	Food Security policy in place Increased food security and marketed output Reduced poverty
3) Restocking/stocking as a means to reduce poverty			
Restocking program has limited coverage. It is an entry point for women in livestock keeping. Preferred investment/entry point out of poverty by rural farmers especially women. Socio economic challenges in livestock production and ownership for women, negate efforts by restocking program to reduce poverty and food insecurity in the TFS households.	Restocking program a PAF priority for poverty reduction among traditional livestock keepers. Poverty Alleviation Fund priotizes interventions that are seen to have most direct impacts in addressing poverty. One such intervention is restocking which is stipulated to broaden livestock ownership by more sectors of the poor including women	Gender analysis of the restocking process Develop appropriate entry points and strategies in the restocking process	Increased women ownership and control opportunities including participation in livestock keeping Improved household food security Sustainable and efficient restocking program Contribution of livestock keeping to sustainable local development and poverty reduction
4) Research and extension			
Farmers especially women have limited access to veterinary services. Very few farmers especially women use improved livestock technologies/interventions. Access to and use of technologies enhances household food security Adoption/use of technologies still low. Adoption is bottlenecked by gender related socio-economic aspects	Government investments focus on research and extension to improve productivity. However, less attention is placed on technology adoption. NAADS in place for improved delivery of services to farmers	NAADS to develop gender strategies and guidelines to ensure efficient and equitable information and service delivery to farmers Government to place keen attention to gender related socio-economic aspects at household level and market interface for efficient adoption of technologies NAADS programme to place greater attention to FAL and	Efficient service delivery through the NAADS programme Increased and sustainable adoption of technologies Improved productivity. Reduced poverty and food insecurity

Socio-Economic and Policy Matrix for Research Results			
Outstanding Issues as identified by the research	**Current Policy Discourse**	**Suggested Actions (policy options) and Targets**	**Expected Outcomes**
		to link it with livestock keeping knowledge, innovations and extension delivery. (With emphasis on enterprise and technical skills literacy). An appropriate agricultural education policy Testing of innovation with farmers in their locations before dissemination (appropriateness and efficiency and sustainability)	
5) Education vital in poverty reduction			
Formal education particularly tertiary level enhances level of food security in the household. Most women have no formal education and have limited opportunities to acquire formal education. Very few women have attained tertiary education compared to men.	UPE policy and FAL in place to provide basic education and adult literacy respectively There is a disconnection between FAL focus and focus of adult skill needs to manage their livelihood and business. Current government policy focuses on Universal Primary Education (UPE), with subordinate goals of tertiary education and literacy attainment. (This presents a challenge for women who are mostly illiterate).	Emphasize, promote, and support higher level education for the girl child Develop appropriate strategies to reduce school dropouts. Greater attention to FAL with a focus to livelihood and technical skills emphasizing gender related socio-economic aspects) Enrich content of instruction through integration of theoretical and practical/creativity skills in learning systems.	Enhanced attitude change towards gender relations and technology adoption More girls attaining basic and higher level education- more access and ability to use information Economic, social and professional empowerment among women Equitable resource ownership and use of benefits Employment benefits Social stability Reduced poverty and food insecurity
6) Labor dilemma for women in livestock production			
Women have raised concerns of labor dilemma in livestock production. This has been compounded by the UPE policy. UPE deprives women livestock farmers of the labor contribution of children with whom they traditionally share livestock keeping roles and responsibilities.	Emphasis on UPE policy. Heavy workloads for women not exclusively tackled in the PEAP Workload /drudgery reducing technology focused on men and their activities (access, costs, physical ability to use e.g Serere weeder)	A substantive study of the impact of livestock keeping demands among agro pastoral farmers on UPE outcomes and vice versa given that less than 25% of children initially enrolled reach graduation (MES 2003). Design and provide cost effective, labor saving technologies and strategies that take into account needs of men and women in rural households Gender sensitization on equitable work sharing and good home management practices for communities.	Less work burden for women farmers Easier integration of welfare and market economy by rural women farmers (able to practice farming as a business) Increased productivity Increased marketed output Reduced poverty and food insecurity

Appendix 4: Food Composition Table for Use in Africa

Food Item	Calories per Kg weight
Millet	3175
Cassava	3610
Sorghum	3314
Sweet potatoes Fresh	840
Sweet Potatoes dried	3441
Rice	3194
Posho	1592
Ground Nuts	3175
Sim Sim	4500
Cow Peas	3320
Beans	3630
Green Grams	3323
Cabbage	258
Cow pea fresh leaves	438
Cow peas Dried leaves	642
Amaranthus	440

Food commonly consumed in considerable amounts, at least periodically in the TFS region have been selected from the comprehensive 'List of Foods Used in Africa' for inclusion in this table.

The data has been sourced from W.T.Wu Leung, Chief, Food Science Information (NP/NCCD) in English speaking areas and F.Busson, Consultant (FAO) in French and Portuguese speaking areas in close cooperation with local representatives of FAO, WHO and the US Agency for International Development (AID) as well as the local authorities in the areas visited (1966)

Appendix 5: Questionnaire and Code Sheet:

Livestock, Food security and Gender in the Teso Farming System region (Katakwi and Kaberamaido Districts); A Household Level Survey

Date…….. Enumerator…….

Instructions:
Please respond to all the following questions. Tick or fill the spaces provided where applicable. All the information provided will be treated with confidentiality.

SECTION A: GENERAL INFORMATION

1.Location:
District …… County…….

Sub County……. Parish……..

Village…….. GPS……

2. Respondents Bio-data

i. Name:……

ii. Are you the head of the household? Yes ☐ No ☐

iii. If yes, skip and go to section 3.

iv. If not, what is your relationship to the head of the household h/h?

v. Wife ☐ Son ☐ Daughter ☐ Sister ☐ Brother ☐ Oth ☐

vi. Sex: Male ☐ Female ☐

vii. Age group of head respondent: Elderly ☐ Adult ☐ Youth ☐

3.Household head (h/h) Information

i. Sex: Male ☐ Female ☐

ii. Age group of head respondent: Elderly ☐ Adult ☐ Youth ☐

iii. Marital Status: Married ☐ Single ☐ Separated ☐ Widow/Widower ☐

iv. Education level of h/h head:

Primary ☐ Secondary ☐ Post Secondary ☐ None ☐

v. Household Composition (permanent members)

Category	**No. of males**	**No. of females**
Elderly (>60yrs		
Adults (>18-60yrs		
Youth (12-18 yrs		
Children (< 12 yrs)		
Total		

vi. What main activity does the h/h do for a living? (Tick wherever applicable)

Crop farming ☐ Livestock farming ☐ Pottery/Craft ☐ Business ☐

Regular Employment (govt, private, NGOs, e.t.c.) ☐ Casual Labor ☐

Any other, Specify……..

Section B: Production:

4. Production Resources

(a) Land

(i) Does your household have land? Yes ☐ No ☐

(ii) If yes, how much? (Estimate in acres/gardens)

1-5 acres ☐ 6-10 acres ☐ > 10 acres ☐

(iii) Who owns this land?

Man ☐ Woman ☐ Children ☐ Joint ☐ Clan ☐

(iv) Who makes the decision to sell or hire the land?

Man ☐ Woman ☐ Children ☐ Joint ☐ Clan ☐

(v) Who decides on the use of the land? E.g. what to grow?

Man ☐ Woman ☐ Children ☐ Joint ☐ Clan ☐

(vi) Does this in any way affect livestock rearing and food supply in the home?

……

……

(vii) How much of the land is cultivated under crop?

All the land ☐ ½ of the land ☐ ¼ of the land ☐ none ☐

(viii) How much of the land is used for livestock production activities?

All the land ☐ ½ of the land ☐ ¼ of the land ☐ none ☐

(ix) What do you use for the rest of the land if any?

……

……..

(x) Do you hire land for livestock or crop production? Yes ☐ No ☐

(xi) If yes, at what cost and for how long?

Size	Cost	Duration

(xii) Does the size of land owned in any way affect your level of production? Mention ways in which it does.
……
…….

(b) Livestock
(i) Does your household keep animals? Yes ☐ No ☐

(ii) If yes, how many of each type of livestock do you keep? Who owns the Livestock?

Ownership	Type of livestock			
	Cattle	Goats	Poultry	Pigs
Man				
Woman				
Joint				
Children				
Someone outside				

(iii) How did you acquire the livestock?

Inheritance ☐ Individual/group effort ☐ restocking agents ☐ Relatives/friends ☐

Dowry ☐ Any other means, specify……

(iv)Who in the household makes the decision to sell or give away livestock/livestock products?

Livestock/livestock products	Man	Woman	Joint	Children	Others specify
Cattle					
Goat					
Poultry					
Pigs					
Milk					
Eggs					
Hides and skins					
Draught power hire					

(v) Who in the household makes the decision to use benefits of livestock in kind or money?

Livestock/livestock products	Man	Woman	Joint	Children	Others specify
Cattle					
Goats					
Poultry					
Pigs					
Milk					
Eggs					
Meat					
Hides and skins					
Draught power hire					

(c) Labor

(i) How many people are needed to look after livestock in a month?

(ii) What type of labor do you use in livestock production and at what cost if any?

Type of labor	Cost	For what activity
Family		
Communal		
Hired (casual and regular)		

(iii)What problems do you face in acquiring labor?
……
……
(iv)Are you involved in any communal or collective labor in livestock rearing? Yes ☐ No ☐

(v) If yes mention benefits
……
……

(d) Ox-Draught power

(i) How many acres or gardens did your household plant last year?

None ☐ 1-2acres ☐ 3-5 acres ☐ 6-8acres ☐ >8acres ☐

(ii) Do you have oxen? Yes ☐ No ☐

(iii) How many acres/gardens were ploughed using oxen?

None ☐ 1-2acres ☐ 3-5 acres ☐ 6-8acres ☐ >8acres ☐

(iv) How many acres/gardens are you able to plant without oxen?

None ☐ 1-2acres ☐ 3-5 acre ☐ 6-8acres ☐ >8acres ☐

(v) How many acres were you hired to plough in the last year?

None ☐ 1-2acres ☐ 3-5 acres ☐ 6-8acres ☐ >8acres ☐

(vi) What is the average cost of ploughing one acre/garden?…….

What activities and who takes what role in ploughing?

Category of persons	**Training oxen**	**Yoking the animal**	**Controlling the plough**	**Controlling oxen**	**Maintaining plough**
Men					
Women					
Children					
Communally handled					
Hired labor					

(5) Production Skills

(a)Nutrition

(i) How do you feed your livestock?

Species	**Communal grazing**	**Improved pastures**	**Crop residues**	**Commercial feeds**	**Household food residues**	**Cereals**	**Others (specify)**
Cows							
Oxen							
Calves							
Goats/sheep							
Pigs							
Poultry							

(ii) Do you provide mineral salt/licks? Yes ☐ No ☐

(iii) To which livestock type? ……

(iv) What are your water sources for the different types of livestock and how often do you water the livestock?

Species	**Wet season**			**Dry season**		
	Water source	**Distance to source**	**Frequency of watering**	**Water source**	**Distance to source**	**Frequency of watering**
Cattle						
Calves						
Pigs						
Goats/sheep						
Poultry						

(iii) Do you pay for water? Yes ☐ No ☐

(iv) If yes at what cost? ……..

(b) Health

(i) Mention three main diseases affecting each of your livestock species?. How do you treat them? Specify the local or modern treatments used

Species	**Disease**	**Treatment and control**
Cattle		
Goats		

Pigs		
Poultry		
Calves		

(ii) Do you use veterinary services? Yes ☐ No ☐

(iii) If yes which ones and who provides?

Type of veterinary services used	**Service provider**

(iv) Distances to the veterinary staff……..

(v) Distance to veterinary drug stores……

(vi) Frequency of visit/ use of veterinary services in a year…….

(c) Breeding

(i) What are the types of breeds kept in your home?

Breeds	**Cattle**	**Goats**	**Pigs**	**Poultry**	**Others**
Local					
Cross					
Exotic					

(ii) Do you castrate your livestock? How do you do this and why?

Livestock species	**Castrated**	**How?**	**Why**
Cattle		…… ……	…….. ……
Goats		…… ……	…… ……..
Sheep		…….	…….

(iii) Do you have special breeding bulls, buck and cock?

Livestock species	**Do have special breeding male (Yes/No)**	**If yes give type of breed of the breeding male**	**If no give source of your breeding**
Cattle			
Goat			
Sheep			
Poultry			

(iv) Do you use artificial insemination? Yes ☐ No ☐

(v) If yes on what livestock breeds?

……

(d) General Management

(i) What roles in livestock production do men, women, joint, children and hired labor do in the households?

Activity	**Man**	**Woman**	**Joint**	**Children**	**Hired labor**
Watering					
Herding					
Milking					
Treatment					
Caring for lactating cows					
Caring for calves					
Housing/kraal construction					
Tethering animals					
Record keeping					
Breeding					
Burning grazing grounds					
Cleaning housing/kraal					
Supplementary feeding					
Others; specify					

(6) Restocking/Stocking

(i) How did you acquire your animals?…….

(ii) Are you aware of the restocking process? Yes ☐ No ☐

(iii) If yes how are you involved in the restocking/stocking process?
……
……
……..
(iv)Have you received training from the restocking agents? Yes ☐ No ☐

(v) If yes what training?…….
……..
……

(vi) Are you organized in groups? Yes ☐ No ☐

(v) If yes, mention the benefits of being in groups
……..
…….

(vi) What problems do you experience when restocking/stocking?
……..
……..

(vii) How have you tried to solve these problems?
……..
……..

(viii) What are the benefits of livestock to the household?

Female farmers	**Male framers**

(7) Veterinary services and Credit

(a) Veterinary services
(i)Are you have access to veterinary services in your location? Yes ☐ No ☐

(ii) If yes mention the types
……
……

(iii) How do you access these services?

Vet Service	Distance	Means of access	Cost

(iv) If no give reasons for lack of access
……
……

(v) How often do are you visited by local extension or veterinary officials?

Regularly ☐ Not regularly ☐ As per need ☐ none comes ☐

(vi) Are women comfortable approaching or to be approached by male veterinary or extension officers?

(vii) What problems constrain your access of veterinary services?
……..
……..

(b) Credit
(i) Are there credit services in your area? Mention those you know
……
……

☐ ☐

(ii) Do you have access to these services? Yes No

(iii) If no give reasons for your lack of access
…….
…….
……
……

(iv) If yes how easy is it?
Very easy, ☐ Easy, ☐ Difficult ☐ Very difficult ☐

(v) How far are these services from your home location?
Very near, ☐ Near ☐ Far ☐ Very far ☐

(vi) Have you attended training by credit officials? Yes ☐ No ☐

(vii) If yes how often?

Once a month, ☐ Thrice a month ☐ Twice a year ☐ Once a year ☐

(viii) Others specify……..

(ix) How has this training benefited you as livestock farmers?
……..
……
……..

(x) Have received a loan for livestock production? Yes ☐ No ☐

(xi) If yes what kinds?
……..
…….
……

(xii) If no state reasons
……..
……..
……..

(xiii) If yes, how have you benefited from this loan?
…….
……
…….

(xiv) How easy is it to back the loan? For what category give reasons

Reasons	Very easy	Easy	Difficult	Very difficult
Reason1				
Reason 2				
Reason 3				

(xv) What strategies do you have to improve food supply in your home as a livestock farmer?

Female farmers	**Male strategies**

(xvi) What challenges do you face in ensuring food security for your household?

Female farmers	**Male strategies**

(8) Production Economics and Marketing

(a) Markets

(i)Where do you sell your products?

Weekly markets ☐ Daily road markets ☐ Shops ☐ At home ☐

(ii) How far are these markets from your location?

0-2km ☐ 3-4km ☐ 5-7km ☐ above 8km ☐

(iii) What means of transport do you use to access markets?

On foot ☐ Bicycle ☐ Motor cycle ☐ Ox- chartVehicle ☐

(iv) What are your market challenges?

……..

……..

(v) How do they affect your level of production?

……..

……..

……..

(9) Production, Sales and Purchases

(a) Production

Fill in the tables below.

(i) Seasonal Crop Production in the last year

	Season one		**Season two**	
Type of crop	**Area cropped acres/gardens**	**Production (bags[5])**	**Area cropped Acres/gardens**	**Production in bags**

(ii) Seasonal Animal and animal products produced last year

Type of product/animal	**Quantity numbers /kg/litres**	

(b) Food Purchases and Expenditures:

(i) What are the main items that the household purchased in the previous year?

Food items	**Quantity (kgs/litres)**	**Unit cost Ug shs**	**Frequency of purchase/ per week**	**Who decides purchase and controls usage[6]**
e.g meat	1/2	2000	1 in 2 wks	Husband
Non food items	**Quantity (no of items and times in a year)**	**Unit cost Ug shs**	**Frequency (a month/year**	**Who decides payment or purchase**
Medical				
Education				
Clothing				
Taxes				
Loans (interest)/ debts				

[5] Unit of measurement Kgs or litres; 1 bag =100kg, 1 basin= 20 kg ; 1 cup seed threshed = ½ kg

[6] Person responsible may be a husband, male adult in the home, wife, female adult in the home

Funerals				
Gifts				
Seed				
Farm inputs				
Veterinary services				
Fuel and other utilities				
Recreation -alcohol				

(ii) Animal and crop sales in the previous year

Type of product	**Quantity sold number/kg/litres**	**Unit cost Ug shs**	**Total cost ug shs**
Animal products			
Cows			
Goats			
Poultry			
Pigs			
Milk			
Meat			
Eggs			
Others specify			
Crop products			

(iii) Crop and animal products exchanged, given out, stolen/lost in any other way

Type of product	**Quantity exchanged nos/kg/terms of cost**	**Quantity given out nos/kg/terms of cost**	**Quantity stolen or lost nos/kg/terms of cost**
Animal products			
1			
2			
3			
4			
5			
6			
Crops			
1			
2			
3			
4			
5			
6			
7			
8			

Other tools to used INCLUDE: *Focused group discussions; Seasonal calendar and Daily activity Calendar*

……THANK YOU FOR GIVING TIME TO ANSWER THIS QUESTIONNAIRE!……

Appendix 6: Code Sheet For Research Study

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
1. HOUSEHOLD HEAD INFORMATION		**2. PRODUCTION RESOURCES**		**3. PRODUCTION SKILLS**		**4. RESTOCKING**		**5. EXTENSION AND CREDIT SERVICES**	
Sex		**A. Land**		**A. Nutrition**		**Awareness of the restocking programme**		**A. Extension Services**	
Male	1	**Land ownership**		**Livestock feeding table (How livestock are fed)**		Yes	1	**Aware of these services**	
Female	2	Yes	1	Cows	1	No	2	Yes	1
		No	2	Goats	2			No	2
Age group of Household head				Calves	3	How you are restocking			
Elderly	1	**Size of land owned in acres**		Goats/sheep	4	Purchase through business/bartering	1	**Who are the service providers?**	
Adult	2	1 to 5	1	Pigs	5	Loan acquisition	2	Agriculture extension (Govt)	1
Youth	3	6 to10	2	Poultry	6	Received training	3	Agriculture extension (Private)	2
		above 10	3	Not applicable	99	Groups	4	Veterinary services (Govt)	3
Age of the Farmer	Actual figure					Crop production	5	Veterinary services (Private)	4
		Who owns / has power to sell/hire/allocate land?		**Table water sources for each livestock category**		Not applicable	99	Not applicable /no response	99
Marital Status		Man	1	Boreholes	1				
Married	1	Woman	2	Dam	2	**Have you received any training in livestock production?**		**Types of services**	
Single	2	Children	3	Swamps	3	Yes	1	Inputs (Vet drugs, seeds etc)	1
Widow	3	Joint ownership	4	Wells	4	No	2	Treatment of infected animals and crops	2
Widower	4	Clan	5					Training	3
		Someone outside the family	6	**Provide mineral licks**		**What type of training?**		Not applicable	99
Education level reached				Yes	1	Management skills	1		
No formal education	1	**Land use allocation to crop/livestock production**		No	2	Production skills	2	**Means of access to extension services**	

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
Primary	2	All land	1			Loan management (acquisition and payment)	3	Bicycle	1
Secondary	3	Half of the land	2	**Distance to water sources**	actual figures	Financial management	4	Foot	2
Post Secondary	4	Quarter of the land	3	**Frequency of watering**	actual figures			Vehicle	3
		None of the land	4	(applicable for each season)		**Are there women groups**		Motor cycles	4
Household Age composition	Actual figures					Yes	1		
		Other Use of land		**Pay for water?**		No	2	**Distances to the extension services**	Actual figures
Activity for a living		Fallowing	1	Yes	1				
Crop Farming	1	Herding/grazing animals	2	No	2	**What benefits are there in groups in relation to livestock production**		**Cost of the Veterinary services**	Actual figures
Livestock Rearing	2	There is no free land left	3			Revolve funds	1		
Pottery/crafts	3			**Cost?**	actual figures	Collective labor/group support	2	**Impact of the services on production**	
Business	4	**Hire land for agricultural production**				Sharing ideas	3	Improved output	1
Regular employment	5	Yes	1	**B. Health**		Ability to restock/acquire animals	4	Unaffordable services lead to poor outputs/loss of animals/crops	2
Casual laborer	6	No	2	**Table livestock diseases**		Easy to acquire loans	5	Inaccessibility of services and scarcity lead to losses	3
None	7			**Common diseases identified in Cattle/Calves**		Not applicable	99	Not applicable	99
		If yes what size, cost and duration?	Actual figures	Ticks	1				
2. PRODUCTION RESOURCES				CBP	2	**Restocking challenges**		**Reasons for lack of access**	
A. Land		**Impact of land size on production**		Bile disease	3	Restocking agents neglect men	1	Lack /shortage of funds	1
Land ownership		Insufficient levels of food produced	1	Swollen stomach	4	Poor animal health care	2	Poor communication system/lack of transport	2
Yes	1	Land overuse	2	Limping	5	Poor pasture due to drought	3	Little or no information about these services	3
No	2	High quantities produced	3	ECF	6	Conflict in ownership and decision making	4	Scarcity of extension workers	4
				Coughing	7	Insecurity/cattle rustling	5	Not applicable	99

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
Size of land owned in acres		**B.Livestock**		Traumatic digestion	8	High interest rates on loans	6		
1 to 5	1	**Own livestock?**		Heart water disease	9	Poor breeds received from restocking agents	7	**Frequency of extension staff visits**	
6 to10	2	Yes	1	Shaking	10	Low crop prices	8	Regulary	1
above 10	3	No	2	Eye disease	11	Lack of funds	9	Rearly	2
				Sores	12	Scarcity of labor	10	As per need	3
Who owns / has power to sell/hire/allocate land?		**Number of each category**		Pneumonia	13	Scarcity of extension services	11	Not applicable	
Man	1	Cattle	Actual figures	Skin rash	14				
Woman	2	Goats	Actual figures	Diarrhoea	15	**Solutions to some of the challenges**		**Problems faced in accessing extension services**	
Children	3	Poultry	Actual figures	Worms	16	Sought veterinary support	1	Lack of sufficient information/training	1
Joint ownership	4	Pigs	Actual figures	Swollen Gall bladder	17	Reported to higher authorities about insecurity	2	Scarcity of services	2
Clan	5			Foot and mouth	18	Move long distances for pastures	3	Services are very distant	3
Someone outside the family	6	**Stockin/restocking (Source of Acquisition)**		Emaciation	19	Sell some food stuff to buy animals	4	Services are expensive	4
		Inhertance	1			Form groups and keep animals together	5	Lack of funds	5
Land use allocation to crop/livestock production		Own purchase/bartering	2	**Common diseases identified in Goats**		Seek and apply for loans	6	Extension staff too busy for farmers	6
All land	1	NGOs/Government	3	Diarrhoea	1				
Half of the land	2	Relatives/Friends	4	Ticks	2	**Impact of restocking to food supply in the h/h**		**B. Credit**	
Quarter of the land	3			Foot and mouth	3	Improved nutrition	1	**Availability of these services**	
None of the land	4	**Who owns animals in the h/h**		Worms	4	Provision of oxen for ploughing	2	Yes	1
		Man	1	Cough	5	Increased acreage	3	No	2
Other Use of land		Woman	2	Loss of appetite	6	Soil fertility/manure availed	4		
Fallowing	1	Children	3	Swollen stomach	7	Dowry for marriage	5	**Service providers**	
Herding/grazing animals	2	Joint	4	Skin rash	8	Income generation	6	KASO	1
There is no free land left	3	Someone outside the family	5	Eye diseases	9	Not applicable	99	AT-UGANDA	2
				ECF	10			Uganda Women Finance Trust	3
Hire land for agricultural		**Who makes the decision to**		Swollen limbs	11			Micro Finance at district	4

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
production		**sell/give away?**							
Yes	1	Man	1	Shaking	12			Action Aid	5
No	2	Woman	2	Bile diseases	13			KDPP	6
		Children	3	Emaciation	14			World Bank Project	7
If yes what size, cost and duration?	Actual figures	Joint	4					UWESO	8
		Someone outside the family	5	**Common diseases identified in Pigs**				Self Help Project	9
Impact of land size on production				Swollen stomach	1			NAWOU	10
Insufficient levels of food produced	1	Who takes the decision to use benefits (money/products)	same as above	Diarrhaea	2			SOCADIDO	11
Land overuse	2	***(this is to be applied to each category of the product)***		Fatigue	3			Agric Department District level	12
High quantities produced	3			Fleas	4			Teso Kick Start Project	13
		C. Labour		Eye Disease	5			Vision TERUDO	14
B.Livestock		Number of people who herd	actual figures	Appetite loss	6			Bululu Multipurpose	15
Own livestock?		Cost of labour	actual figures	Worms	7			SDDP	16
Yes	1	Not applicable	99	Bovine swine fever	8				
No	2	(applicable for each category of labor)		Cough	9			Access to credit services?	
		Challenges of acquiring labor						Yes	1
Number of each category		Limited funds	1	**Common diseases identified in Poultry**				No	2
Cattle	Actual figures	Labor scarcity	2	Chicken pox	1				
Goats	Actual figures	Discouragement/embarrassment	3	Coccocidiosis	2			**If no, Reasons for lack of access**	
Poultry	Actual figures	No challenge	4	New castle	3			Lack of information	1
Pigs	Actual figures			Diarrhaea	4			Distant services	2
		Involved in communal livestock labor activities?		Cough	5			Nepotism and discrimination by loan service providers	3
Stockin/restocking (Source of Acquisition)		Yes	1	Pneumonia	6			Short pay back period	4
Inhertance	1	No	2	Weight loss	7			Harassment/embarrassment by loan officers leading to loss of property in case of failure to pay	5
Own purchase/bartering	2			Blindness	8			High interest rates	6

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
NGOs/Government	3	**Benefits of Communal livestock production labor**		Worms	9				
Relatives/Friends	4	More time to rest	1	Loss of appetite	10			**If yes what is the ease of loan acquisition?**	
		Time for other business	2					Very easy	1
Who owns animals in the h/h		Herding made easier	3	**Treatment of the diseases**				Easy	2
Man	1	Security of animals guaranteed	4	**Cattle**				Difficult	
Woman	2	Increased production (animals/crops)	5	Herbal medicines	1			Very difficult	4
Children	3	Not applicable	99	Burning nodes	2				
Joint	4			Drenching	3			**Distance to these credit services**	
Someone outside the family	5	**D. Ox-Draught Power**		Veterinary drugs	4			Very near	1
		Area cropped previous yr (acres)		Vaccination	5			Near	2
Who makes the decision to sell/give away?		1 to 2	1	Healing vial application	6			Far	3
Man	1	3 to 5	2	Deworming	7			Very far	4
Woman	2	6 to 8	3	Spraying	8				
Children	3	> 8	4					**Any training received in the process of credit acquisition**	
Joint	4	Not applicable	99	**Goats**				Yes	1
Someone outside the family	5			Veterinary drugs	1			No	2
		own oxen?		Spraying	2				
Who takes the decision to use benefits (money/products)	same as above	Yes	1	Vaccination	3			**Frequency of training**	
(this is to be applied to each category of the product)		No	2	Deworrming	4			Once a month	1
				Herbal medicine	5			Thrice a year	
C. Labour		**own ox plough?**						Twice a year	3
Number of people who herd	actual figures	Yes	1	**Pigs**				Once a year	4
Cost of labour	actual figures	No	2	Veterinary drugs	1				
Not applicable	99			Herbal/local treatment	2			**Benefits of Training**	
(applicable for each category of labor)		**Acres ploughed using oxen**		Vaccination	3			Learnt to keep records	1
Challenges of acquiring labor		None	0	Spraying	4			Learnt to save and invest	2
Limited funds	1	1 to 2	1	Deworming	5			Learnt about disease control	3
Labor scarcity	2	3 to 5	2					Learnt how to acquire and manage financial resources	4

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
Discouragement/embarrassment	3	6 to 8	3	**Poultry**					
No challenge	4	> 8	4	Local herbs	1			**Received livestock loan?**	
				Veterinary drugs	2			Yes	1
Involved in communal livestock labor activities?		**Acres cultivated by hoe**		Vaccination	3			No	2
Yes	1	None	0	Red pepper	4				
No	2	1 to 2	1					**If not why?**	
		3 to 5	2	**Utilise vet services**				Lack of training	1
Benefits of Communal livestock production labor		6 to 8	3	Yes	1			Consequences of loan payment too demanding	2
More time to rest	1	> 8	4	No	2			Nepotism and segregation in selection of beneficiaries	3
Time for other business	2							Pay back period too short	4
Herding made easier	3	**Area hired to plough**		**If yes who?**				Lack of collateral	5
Security of animals guaranteed	4	None	0	Govt Veterinaty assistants/ doctors/ animal husbandry official	1			Harsh treatment/loss of property	6
Increased production (animals/crops)	5	1 to 2	1	Local/private provider	2			Lack of information	7
Not applicable	99	3 to 5	2	Not applicable	99				
		6 to 8	3					**Nature of the loan**	
D. Ox-Draught Power		> 8	4	Distance to veterinary staff	actual figures			Monetary livestock loan	1
Area cropped previous yr (acres)				Distance to drug stores	actual figures			In kind	2
1 to 2	1	**Cost of hire for an acre**	actual figure						
3 to 5	2			Frequency of Vet visits				**Benefit of this loan**	
6 to 8	3	**Involvement in ox ploughing in a h/h**		Occasionally	1			Purchase of inputs/drugs/seed	1
> 8	4	Men	1	Once a week	2			Increased stock	2
Not applicable	99	Women	2	Twice a week	3			Business/IGA	3
		Children	3	Thrice a week	4			Increased acreage under crop	4
own oxen?		Communal	4	Every two months	5				
Yes	1	Hired laborers	5	Every four months	6			**Ease of paying back loan**	
No	2	All applicable to each activity in ploughing		Every six months	7			Very easy	1
				Once a year	8			Easy	2
own ox plough?				Once a month	9			Hard	3
Yes	1							Very hard	4
No	2			**C Breeding**					
				Table type of breeds				**If easy give reasons**	

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
Acres ploughed using oxen				Local	1			Period of payment sufficient	1
None	0			Exotic	2			Training helps them manage their loans very well	2
1 to 2	1			Cross	3			when loan payment is in kind it is easy to pay	3
3 to 5	2			Not applicable	99				
6 to 8	3			(Applies to all types of livestock)				**If hard give reasons**	
> 8	4							Money has conflicting demands	1
				Castration				Pay back period short	2
Acres cultivated by hoe				Yes	1			High interest rates on loans	3
None	0			No	2			Embarrassment and loss of property (high opportunity cost)	4
1 to 2	1							Need collateral which most farmers lack	5
3 to 5	2			**Method of castration**				Lack of market for produce/unfavorable produce prices	
6 to 8	3			Burdizzo	1			Unfavorable weather conditions	6
> 8	4			Any surgical method	2			Insecurity/cattle rustling and thefts	7
				Any manual/mechanical method	3				
Area hired to plough								**Strategies to improve food supply**	
None	0			**Reasons for Castration**				**Female farmers**	
1 to 2	1			Fattening	1			Increased cropped area	1
3 to 5	2			Preparation for ploughing/make bulls docile/tame	2			Access to inputs/ability to buy them	2
6 to 8	3			removal of inferior breeds	3			Owning more land	3
> 8	4							Acquisition of more animals	4
				Special breeding males				Increased access to extension services/advice	5
Cost of hire for an acre	Actual figure			Local	1			Increased access to labor	6
				Exotic	2			Access to loans	7
Involvement in ox ploughing in a h/h				Crosses	3			Diversification of animals and crops	8
Men	1								

Category	Code
Women	2
Children	3
Communal	4
Hired laborers	5
All applicable to each activity in ploughing	

Category	Code

Category	Code
Sources of breeding males	
Neighbors	1
Hiring	2
Grazing grounds	3
Home mating	4
Practice Atrificial insemination	
Yes	1
No	2
On what type of livestock	
Cows	1
Goats/sheep	2
Poultry	3
Pigs	4
D.General Livestock production management	
Roles in livestock production activities	
Man	1
Woman	2
Children	3
Hired labor	4
Not applicable	99

Category	Code

Category	Code
Male	
Purchase more oxen for ploughing	1
Diversification of crops and animals	2
Increased acreage planted	3
Ability to acquire more loans	4
Acquire more extension services and advice	5
Ability to purchase more inputs	6
Use more hired labor	7
Increase income base	8
Challenges in improving food supply in h/h	
Poor /lack of storage facilities	1
Limited/scarcity of labor	2
Lack of draught power	3
Lack of funds	4
Pests and diseases	5
Lack of access to inputs	6
Lack of proper markets/poor marketing systems	7
Lack of /liminted extension services	8
6. PRODUCTION ECONOMICS AND MARKETING	
A. Markets	
Common markets	1
Weekly markets	2
Daily markets	3
Shops	4
At home	5

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
								Distances to markets	
								0-2 km	1
								3-4 km	2
								5-7 km	3
								> 8 km	4
								Means of transport	
								On foot	1
								Motorcycle	2
								Ox chart	3
								Vehicle	4
								Problems faced in accessing markets	
								No sufficient markets for produce	1
								Low output and high input prices	2
								Distant markets	3
								High taxes and market dues	4
								Lack of transport	5
								Poor storage facilities	6
								Impact on production level	
								Limited motivation to grow more	1
								Lack of capital for improving farming	2
								Taxes and market dues a disincentive to farmers	3
								Inputs are expensive (Unaffordable) poor production	4
								Inefficient farm management	5
								B. Production Sales and Purchases	
								Common crops grown	
								Crop Type	
								Millet	1
								Cassava	2
								Ground Nuts	3

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
								Sorghum	4
								Sweet Potatoes	5
								Green Grams	6
								Simsim	7
								Maize	8
								Cow Peas	9
								Beans	10
								Area cropped in previous year	Actual figures (acres; 1 garden=1 acre)
								Production (Output)	In kg; 1bag= 100kg, 6basins= 1 bag, 1 basin =15kg
								Yield	Output per unit area cropped
								Season	
								1st season	1
								2nd season	2
								Animals and animal products in previous year	
								Quantity of Animals and animal products	
								Type of animal	Actual numbers that year
								Animal products	Quantity in Kg/liters/numbers/
								Duration of production that yr	Months
								Food purchases and expenditures	
								Food Item	
								Meat	1
								Fish	2
								Beans	3
								Sugar	4
								Salt	5
								Sweet potatoes	6
								Green grams	7
								Cassava	8

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
								Cow peas	9
								Millet	10
								Sorghum	11
								Simsim	12
								Posho	13
								Rice	14
								Cooking oil	15
								Vegetables	16
								Local brew	17
								Quantity of food items	Actual fig. in kg, cereals; 1 cup = 1/2 kg, liquids in liters
								Frequency of purchase	all converted to qtties purchased/yr
								Once a week	
								Twice a week	
								Once every 2 weeks	
								Once a month	
								Once a year	
								Non Food items	
								Medical	1
								School fees	2
								Clothing	3
								Taxes	4
								Loans/debt servicing	5
								Funerals	6
								Gifts/hand outs	7
								Livestock expenses	8
								Seeds	9
								Farm tools and drugs	10
								Veterinary services	11
								Fuel and utilities	12
								Recreation	13
								Quantities	Actual fig. computed per yr
								Costs	Actual figures in shillings

Category	Code	Category	Code	Category	Code	Category	Code	Category	Code
								Duration for non food items	
								Once a month	1
								Quarterly	2
								Once every two months	3
								Once every six months	4
								Once a year	5
								Who takes the decision to purchase food items in the h/h?	
								Man	1
								Woman	2
								Children	3
								Joint Venture	4
								Sales/losses/donations of animals/animal products and crops in the previous yr	
								Quantities	
								Crops	In kg (converted according to given conversion rates above)
								Animals	In numbers/Kg