

**A Gendered Analysis on the Role and Potential of Goat Production to Improve Income and  
Food Security in Semi-Arid Areas of South Africa**

**Susan Tsvuura**

**A thesis submitted in fulfilment of the academic requirements for the degree  
of  
Doctor of Philosophy**

**School of Agricultural, Earth and Environmental Sciences**

**College of Agriculture, Engineering and Science**

**University of KwaZulu-Natal**

**Pietermaritzburg**

**May 2020**



**Dedication**

To my son, Nkosinathi, and daughter, Palesa, may you be inspired to do your best in life!

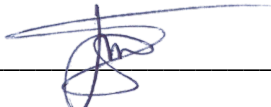
## Declaration 1

I, Susan Tsvuura, declare that,

1. The research reported in this thesis, except where otherwise indicated, is my original research,
2. This thesis has not been submitted for any degree or examination at any other university,
3. This thesis does not contain other people's data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other people,
4. This thesis does not contain other authors' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:
  - a. Their words have not been re-written, but the general information attributed to them has been referenced,
  - b. Where their exact words have been used, their writing has been placed inside quotation marks and referenced,
5. This thesis does not contain text, graphics or tables copied and pasted from the internet, unless specifically acknowledged and the source being detailed in the references section of the thesis.

Signed  \_\_\_\_\_ Date 03 May 2020 \_\_\_\_\_

As the candidate's main supervisor, I, Prof. M. Mudhara, agree to the submission of this thesis.

Signed  \_\_\_\_\_ Date 04/08/2020 \_\_\_\_\_

As the candidate's co-supervisor, I, Prof. M. Chimonyo, agree to the submission of this thesis.

Signed  \_\_\_\_\_ Date 4 August 2020 \_\_\_\_\_

## **Declaration 2 – Publications**

Author's contribution to publications that form part of this thesis:

Publication 1 (Chapter 3)

**Tsvuura S., Mudhara M. and Chimonyo M. Gender-differentiated ownership and participation in decision-making and income generated from goats at household level in semi-arid areas of South Africa**

*Author contributions:*

Tsvuura S. collected data and wrote the paper. Mudhara M. and Chimonyo M. contributed invaluable comments to the manuscript.

Publication 2 (Chapter 4)

**Tsvuura S., Mudhara M. and Chimonyo M. Gender disaggregated analysis of goat production in semi-arid areas of South Africa**

*Author contributions:*

Tsvuura S. collected data and wrote the paper. Mudhara M. and Chimonyo M. contributed invaluable comments to the manuscript.

Publication 3 (Chapter 5)

**Tsvuura S., Mudhara M. and Chimonyo M. The effect of gender on the commercialisation of goat production in the semi-arid area of Msinga, South Africa**

*Author contributions:*

Tsvuura S. collected data and wrote the paper. Mudhara M. and Chimonyo M. contributed invaluable comments to the manuscript. The paper was submitted to *Journal of Asian and African Studies* and is under review.

#### Publication 4 (Chapter 6)

**Tsvuura S., Mudhara M. and Chimonyo M. Gender-differentiated contribution of goat farming to household income and food security in semi-arid areas of Msinga, South Africa**

*Author contributions:*

Tsvuura S. collected data and wrote the paper. Mudhara M. and Chimonyo M. contributed invaluable comments to the manuscript. The paper was submitted to *Food Security* journal and is under review.

## **Acknowledgements**

I greatly acknowledge the contribution of various persons, without whom the study would not have been accomplished.

Firstly, I thank my supervisors, Prof Maxwell Mudhara and Prof Michael Chimonyo, for their constant invaluable guidance and patience.

Great appreciation is awarded to the Farmer Support Group of the University of KwaZulu-Natal for providing the funding to carry out the research.

I thank the community of Msinga for their voluntary participation in the study. Data collection was made possible by the permission of inkosi Mthembu, inkosi Mchunu and extension officer Ntwana Mahlobo. The following individuals are acknowledged for their assistance with data collection: Gugu Mbatha for sourcing the enumerators; gogo Yengwa for her modest but warm accommodation; and the following enumerators for their assistance, Khulakusa Phungula, Senzekile Mntungwa, Sihle Shelembe, Thenjiwe Buthelezi, Thulanezwi Mchunu and Zanyiwe Ziqubu.

To my mother Mrs Maira, my husband Dr Zivanai Tsvuura, my son Nkosinathi and my daughter Palesa, thank you for your moral and emotional support.

Above all, I express gratitude to the Lord Almighty who gave me strength throughout the course of the study and allowed it to reach completion. Proverbs 19:21 ‘Many are the plans in a man’s heart, but the counsel of Jehovah is what will prevail’.

## **Abstract**

Small scale goat farming has a potential to contribute to livelihoods particularly in semi-arid areas where rainfall is erratic and crop farming is too risky. The broad objective of the study was to conduct a gendered analysis on the role and potential of goat production to improve income and food security in semi-arid areas of South Africa. The study used focus group discussions, key informant interviews and a questionnaire survey of 241 households for data collection. Descriptive statistics, general linear models, Chi-square tests and the Tobit regression model were used for data analyses. Male-headed households were mostly young, married and educated whilst female-headed households largely belonged to the old aged, were single or widowed and had little or no formal education. Male-household heads generally owned goats. In female-headed households, both the head and elder sons owned goats. In male-headed households, the head made decisions on goat marketing and on use of goat income whilst in female-headed households, both the head and elder sons made decisions ( $p < 0.01$ ). Male-headed households had larger goat flock sizes (mean 26.78 goats per household) than female-headed households (mean 15.59 goats per household) ( $p < 0.05$ ), lower goat mortality rates and achieved higher goat reproduction rates ( $p < 0.05$ ) as they followed better health control. Their goat annual net gains were higher than those of female-headed households ( $p < 0.05$ ). The motivations of male and female-headed households for keeping goats were different, with female-headed households rearing primarily for cultural ceremonies and males for sales. Goat sales were generally low, with mean of 2.1 for male-headed households and even lower for female-headed households with mean of 1.0 ( $p < 0.05$ ) in 12 months. The determinants of goat commercialization were gender of household head, location, education level of household head, occupation of household head, total household income, number of goats a household owns, goat marketing price, goat losses through death from diseases and theft, and whether a household

receives remittances. The main constraints to goat commercialisation were poor condition of goats and mortality, high illiteracy rates of women, cultural settings biased against women, which discouraged them from owning and selling goats, shortage of transport to take goats to the market, poor confidence in the newly set up auction system of marketing and limited access to information. The reason for the low goat sales could be due to farmers' failure to build up suitable flock sizes (due to losses through poor nutrition, diseases, predation, and theft), and this made it more unlikely to sell goats. Goat numbers were also an indicator of wealth. The Chi-square statistic showed a significant relationship between food security and household socio-economic parameters such as education level of household head ( $p < 0.05$ ), gender of household head ( $p < 0.05$ ) and the total household income ( $p < 0.01$ ). The study found that in gendered analysis, goat production does not contribute significantly to the improved income and food security in semi-arid areas of South Africa. Goats did not emerge as one of the main determinants of food security as their contribution to household income was limited. This is because goat flock numbers for most households did not grow significantly due to poor nutrition, diseases, predation, and theft. Where goat flock sizes were low, households limited goat sales to maintain their flock sizes and only sold goats when there were household emergencies such as funerals and ill-health. The main determinants of household food security were education levels, gender, saving money, location with access to irrigation to sustain gardens, sale of goats in the previous 12 months and the total household income. Female-headed households were less food secure than male-headed households, partly because they did not have reliable employment to provide adequate and nutritious food for their households. The food security situation was lower for households with lower education levels, and those who received less household income.



Strengthening the role of women in household decision-making process is best done by increasing literacy levels among females so that they become empowered to achieve gender equality and their abilities within the society. Household commercially oriented goat production is a prerequisite for the commercialization of goats, particularly in female-headed households. For a successful goat production, female farmers need to regard goat farming as a source of income and to be convinced that their standard of living can improve through goat farming. Hence, there is need to improve the capacity of rural women and strengthen their resource base to enable them to play better roles in goat production. Participation of women in goat ownership, production, marketing, as well as decision-making on their income is critical in achieving food security. Empowering women by promoting rural education can contribute to improved food security. Increasing goat flock numbers enable farmers to make more sales, which can improve household welfare. Therefore, extension workers need to assist farmers to manage and utilize goats to their full potential. This may be done by assisting goat farmers to improve goat nutrition, health, and management; thereby increasing production efficiency of goats.

**Keywords:** gender inequality; socio-economic factors; female literacy; assets; goat flock numbers; goat management practices; goat annual net gain; goat sales; determinants, Tobit regression model

## List of Acronyms

ASGISA	Accelerated and Shared Growth Initiative for South Africa
CAHW	Community Animal Health Worker
CSI	Coping Strategies Index
FANTA	Food and Nutrition Technical Assistance
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
FGD	Focus Group Discussion
GAP	Goat Agribusiness Project
GDP	Gross Domestic Product
HDDS	Household Dietary Diversity Scale
HFIAS	Household Food Insecurity and Access Scale
HHS	Household Hunger Scale
HIV/AIDS	Human Immuno-Virus/Acquired Immuno-Deficiency Syndrome
IFAD	International Fund for Agricultural Development
KZN	KwaZulu-Natal
NDP	National Development Plan
NGO	Non-Governmental Organisation
RDP	Reconstruction and Development Programme
rCSI	Reduced Coping Strategies Index
SD	Standard Deviation
StatsSA	Statistics South Africa
UN	United Nations

WHO	World Health Organization
ZAR	South African Rand
MHH	Male-headed household
FHH	Female-headed household

## Table of Contents

Dedication .....	ii
Declaration 1 .....	iii
Declaration 2 – Publications .....	iv
Acknowledgements .....	vi
Abstract .....	vii
List of Acronyms .....	x
Table of Contents .....	xii
List of Tables .....	xviii
List of Figures .....	xx
CHAPTER 1: INTRODUCTION .....	1
1.1 Background .....	1
1.2 Problem Statement .....	2
1.3 Relevance of the research.....	4
1.4 Objectives.....	5
1.5 Structure of the thesis .....	5
1.6 References .....	6
CHAPTER 2: LITERATURE REVIEW .....	9
2.1 Introduction .....	9
2.2 Conceptual framework of the literature review.....	9
2.3 Goats as an asset for sustainable livelihoods .....	10
2.3.1 Importance of goats .....	10

2.3.2 Goat production and commercialization .....	13
2.4 Gender .....	14
2.4.1 Definition of gender .....	14
2.4.2 Gender roles.....	15
2.4.3 Theories of gender roles .....	16
2.4.4 Gender challenges facing vulnerable groups.....	17
2.4.4.1 Gender and assets.....	17
2.4.4.2 Decision-making process and income management at household level from a gender perspective .....	18
2.4.4.3 The ‘resources theories’ .....	19
2.5 Food security .....	21
2.5.1 Conceptualization of food security.....	21
2.5.2 Overview of the food security situation in South Africa.....	23
2.5.3 Food security challenges .....	24
2.5.3.1 Lack of income .....	24
2.5.3.2 Disease outbreaks.....	25
2.5.3.3 Weak support networks and disaster management systems .....	25
2.5.3.4 Effect of HIV/AIDS.....	25
2.5.4 Empirical study of food security: A case study of Msinga .....	26
2.5.5 Determinants of food security .....	27
2.5.6 Sources of household income for rural dwellers .....	29
2.5.7 Coping strategies for rural dwellers .....	30

2.5.8 Food security measurement and indicators .....	31
2.6 Linking gender to food security .....	33
2.7 Summary .....	35
2.8 References .....	36
CHAPTER 3: GENDER-DIFFERENTIATED OWNERSHIP AND PARTICIPATION IN DECISION-MAKING AND INCOME GENERATED FROM GOATS AT HOUSEHOLD LEVEL IN SEMI-ARID AREAS OF SOUTH AFRICA.....	
Abstract .....	54
3.1 Introduction .....	55
3.2 Analytical framework.....	57
3.3 Research methods.....	58
3.3.1 Study site .....	58
3.3.2 Sampling and selection of households .....	59
3.3.3 Data collection.....	60
3.3.4 Statistical analyses .....	62
3.4 Results .....	62
3.4.1 Goat ownership.....	62
3.4.2 Household decision-making .....	64
3.4.3 Income management.....	68
3.4.4 Use of income from goat sales .....	69
3.5 Discussion .....	70
3.6 Conclusions .....	72

3.7 References .....	73
CHAPTER 4: GENDER DISAGGREGATED ANALYSIS OF GOAT PRODUCTION IN SEMI-ARID AREAS OF SOUTH AFRICA.....	
Abstract .....	78
4.1 Introduction .....	79
4.2 Analytical framework.....	80
4.3 Research methods.....	82
4.3.1 Study site, sampling and selection of households and data collection .....	82
4.3.2 Statistical analyses.....	82
4.4 Results .....	82
4.4.1 Reasons for rearing goats .....	82
4.4.2 Provision of goat housing and breeding .....	84
4.4.3 Goat castration and culling.....	85
4.4.4 Goat watering, feeding and feed supplements.....	86
4.4.5 Goat health.....	88
4.4.6 Flock sizes .....	92
4.4.7 Goat entries and exits .....	93
4.5 Discussion .....	95
4.6 Conclusions .....	98
4.7 References .....	99
CHAPTER 5: EFFECT OF GENDER ON COMMERCIALISATION OF GOAT PRODUCTION IN THE SEMI-ARID AREA OF MSINGA, SOUTH AFRICA .....	
	105

Abstract .....	105
5.1 Introduction .....	106
5.2 Conceptual framework .....	107
5.3 Research methods.....	110
5.3.1 Study site, sampling and selection of households and data collection .....	110
5.3.2 Statistical analyses .....	110
5.4 Results .....	116
5.4.1 Socio-economic factors affecting sale of goats .....	116
5.4.2 Goat selling options available .....	120
5.4.3 Type of goats sold .....	125
5.4.4 Determinants of goat commercialisation.....	125
5.5 Discussion .....	127
5.6 Conclusions .....	133
5.7 References .....	134
 CHAPTER 6: GENDER-DIFFERENTIATED CONTRIBUTION OF GOAT FARMING TO HOUSEHOLD INCOME AND FOOD SECURITY IN SEMI-ARID AREAS OF MSINGA, SOUTH AFRICA.....	 142
Abstract .....	142
6.1 Introduction .....	143
6.2 Conceptual framework .....	146
6.3 Research methods.....	148



6.3.1 Study site, sampling and selection of households and data collection .....	148
6.3.2 Statistical analyses.....	149
6.4 Results .....	155
6.4.1 Descriptive statistics and socio-economic characteristics of households.....	155
6.4.2 Household food production .....	158
6.4.3 Household income level .....	159
6.4.4 Use of income from goat sales .....	161
6.4.5 Association between HFAIS and socio-economic characteristics .....	161
6.4.6 Determinants of food security .....	163
6.5 Discussion .....	167
6.6 Conclusions .....	172
6.7 References .....	173
CHAPTER 7: GENERAL DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS.	182
7.1 Recap of the research objectives and methodology .....	182
7.2 General discussion and conclusions.....	182
7.3 Policy recommendations .....	186
7.4 Areas for future research .....	188
APPENDICES .....	189

## List of Tables

Table 3.1: Percentages of different categories of women to types of land they own .....	63
Table 3.2: Marital status of household head as a percentage.....	65
Table 3.3: Decision-making on goat marketing and income management.....	66
Table 3.4: Education level of household head and role of decision-making as a percentage.....	67
Table 3.5: Use of income from goats in ranks of importance.....	69
Table 4.1: Reasons for goat rearing in ranks of importance .....	83
Table 4.2: Reasons for castration and culling of goats .....	86
Table 4.3: Source of water for goats .....	88
Table 4.4: Role of goat health management as a percentage .....	90
Table 4.5: Sources of advice on goat health .....	91
Table 4.6: Average goat entries and exits and goat net gain .....	94
Table 5.1: Description of independent variables used in the Tobit model .....	113
Table 5.2: Mean goat sales in male and female-headed households .....	116
Table 5.3: Education levels of household heads and goats sold as a percentage.....	118
Table 5.4: Marital status and goats sold as a percentage .....	119
Table 5.5: Sale of goats in the previous 12 months and easiness of sales .....	121
Table 5.6: Tobit estimates on influence of livelihood factors affecting number of goats sold...	127
Table 6.1: Description of independent variables used in the Tobit model .....	153
Table 6.2: Descriptive statistics for socio-economic characteristics of households .....	156
Table 6.3: Relationship between growing of crops in traditional areas and gender as a percentage .....	158

Table 6.4: Household head occupation, total household monthly income and household income spent on food monthly, as a percentage .....	160
Table 6.5: Food security and household parameters.....	164
Table 6.6: Tobit estimates of the determinants of food security.....	167

## List of Figures

Figure 2.1 Conceptual framework linking goats, gender, and food security (adapted from Gartaula <i>et al.</i> , 2017) .....	10
Figure 3.1: Head of household occupation .....	68
Figure 4.1: Mean flock sizes per household .....	93
Figure 5.1: Reasons for rearing goats in ranks of importance .....	124

## CHAPTER 1: INTRODUCTION

### 1.1 Background

Goats are often associated with resource poor farmers and have exceptional abilities that enable them to adapt to harsh environments (Arowolo and Bankole-Oye, 2014). They provide nourishment through meat and milk, manure for crop production and income from sales. Goats may also serve as a safety net of capital assets in harsh environments (Arowolo and Bankole-Oye, 2014). As a result, they can contribute to livelihood systems (Solomon, *et al.*, 2014). Despite all the potential benefits of goats in creating wealth in resource-poor households, their economic contributions within households varies.

The millennium declaration of the United Nations promotes gender equality and empowerment of women to fight poverty and hunger and to stimulate sustainable development (UN, 2017). Generally, African women face difficulties because of the dominance of patriarchal ethos in resource allocation in many societies (Olowu, 2013). In Tanzania, men owned goats, yet in Kenya and Mozambique, most of the income from the sale of goats and its products is managed by men (Boogaard *et al.*, 2015). The World Development Report (World Bank, 2012) reports that women in some countries are not allowed to make decisions even on the utilization and expenditure of their own incomes. Such existence of gender discrimination is empirically linked to food insecurity and poverty. There are variations in gender roles between socioeconomic context, regions and countries (Doss, 2013; Babajide, 2015). Hence, there is need to contextualize gender inequality in resource ownership and benefit sharing. The income obtained by women and their ability to manage it is important in many households if poverty and food insecurity are to be reduced. Food insecurity challenges cannot be properly articulated if gender dimensions of resource ownership

and benefit sharing are not considered. The gender aspects which the current study focuses on are the married (both males and females), the divorced, the single and the widowed. Young boys and girls did not participate in the study due to ethical considerations, but their views were brought up during interviews and focus group discussions.

## **1.2 Problem Statement**

Women play a significant role in agriculture and in maintaining households (Kapur, 2019). A lot of interventions to increase food security in households are however aimed at increasing the income of the household or head of household. The assumption is that such interventions lead to the income being distributed within the household. The assumption does not consider that men, who are usually the head of the households, may have other uses of income which might not benefit the family *per se* (Njuki *et al.*, 2013). In some households, men may be responsible for decision-making on their livestock and may also control the income generated, whilst women's ability to control livestock resources usually occur with widowhood or with age (Njuki *et al.*, 2013). Such conflicts of gender roles caused by culture and society underestimate women's values and shows gender-blindness (Tudu and Roy, 2015). Adopting gender equality in many societies is a challenge because of these cultural beliefs and practices. As a result, the contributions of goat production to household economies may show discrepancies among households thereby leading to differentiated levels of food security.

The interaction between gender ownership and livestock (particularly goats) productivity has a direct or indirect relationship (Deere, 2012). The reason for this is that the gender of owner may have different motives of rearing goats and management practices, and this affect goat productivity

and their commercialisation (Babajide, 2015). Ownership of goats also brings about division of labour in goat production, particularly in households where it is their major source of income. Men may be responsible for rearing and control, and women for providing care for the goats (Aldosari, 2017). The ability of women to improve food security through access to income may be weakened if the decision-making in goat marketing and control of the proceeds remains under men (Boogaard *et al.*, 2015). By ensuring that women have access to income from goat production, an improvement in their well-being and hence contribution towards food security and household income is anticipated (Adeleye *et al.*, 2016).

Interventions directed at constraints in goat production in semi-arid areas are required to improve the level of goat production (Solomon *et al.*, 2014). The fact that some rural farmers still recognize goat farming only for their cultural beliefs and not as a source of income is a major challenge to commercialization of goats (Ramsay and Donkin, 2000). Farmers, therefore, need to be convinced that their standard of living can be improved through goat farming, apart from other cultural benefits derived.

Gendered analysis on the role and potential of goats to improve income and food security in semi-arid areas have not received adequate attention. It is, therefore, important to investigate goats' potential to improving household income, food security, and in reducing vulnerability to poverty of households in gendered lenses. In addition, it is crucial to investigate gendered perspectives and motives of rearing goats, and gendered goat management practices and their effect on goat production. Highlighting gender dynamics in goat ownership and control of its income and the effect of gender on goat commercialization is also vital.

### **1.3 Relevance of the research**

To develop inclusive food security policies, context-specific and research-informed interventions are important to improve the conditions of vulnerable households in southern Africa. The research is aimed at improving the food security situation in semi-arid areas. The study site of Msinga was chosen because it is amongst the poorest municipalities in uMzinyathi District with few economic activities, resulting in most of the population depending on government social grants (StatsSA, 2016). Due to the availability of suitable rangelands, the area has a potential of having a high population of goats which can be better utilized to their full potential (Dearlove, 2007). Income from goats can assist households in enhancing access to food and improves their purchasing power. Utilizing goats as a source of income not only improves food security situation, but also standards of living of households.

The research also contributes to the pool of knowledge on gender issues that focus on striving to improve the welfare (food security and other socio-economic challenges encountered) of rural women. With an understanding of the challenges of a rural existence with its patriarchal ethos in resource allocation; my contribution will make a small but significant attempt at addressing gender disparities. With women generally playing an important role in maintaining households; any interventions targeting them would go a long way in improving household food security. The research gives guidance for agricultural development programmes on how to integrate gender and assets, especially goats, in the development and implementation of intervention programmes on improving food security. It will also assist extension workers in the study area of Msinga to assist farmers to better utilize goats to their full potential.



## **1.4 Objectives**

The major objective of the study was to conduct a gendered analysis on the role and potential of goats to improve income and food security in semi-arid areas of South Africa. The study highlighted gender dynamics in goat production, ownership and control of its income, and on the marketing and utilization of goats. The hypothesis of the study states that in gendered lenses, goats can be used to improve income and food security in semi-arid areas.

The objectives were to:

1. Investigate gender-differentiated ownership and participation in decision-making and income management of goats at household level,
2. Investigate gender disaggregated analysis of goat production in semi-arid areas,
3. Investigate the effect of gender on the commercialisation of goat production in semi-arid areas, and
4. Investigate the gender-differentiated contribution of goat farming to household income and food security.

## **1.5 Structure of the thesis**

This thesis is written in a paper format. Study findings are presented as independent manuscripts, some of which have been submitted to journals for publication. The thesis consists of an introductory chapter, a literature review, four data chapters, and a concluding chapter. The introduction provides background information that prompted the study, as well as presenting the objectives of the study. The literature review examines related studies that discuss gender issues, household food security and the importance of goats to small scale farming communities. Chapter

Three focuses on investigating gender-differentiated ownership, decision-making and income management of goats at household level. The fourth chapter investigates gender disaggregated analysis of goat production in semi-arid areas. Chapter Five investigates the effect of gender on the commercialisation of goat production in semi-arid areas. Gender-differentiated contribution of goat farming to household income and food security was investigated in Chapter Six. Finally, in Chapter Seven, the main findings of the study are discussed with insights into the extent to which the objectives of the study have been met, as well as providing directions for further research.

## 1.6 References

- Adeleye O., Alli-Balogun J.K., Afiemo O.G., Bako S. 2016. Effects of goat production on the livelihood of women in Igubi, Chikun and Kajuru Local Government Area, Kaduna State, Nigeria. *Asian Journal of Agricultural Extension, Economics and Sociology*, 11(1): 1-8
- Babajide A.A.A. 2015. *Livestock ownership by gender and seasonal impact on production: A case study in Msinga Municipality*. Masters thesis. University of KwaZulu-Natal, Pietermaritzburg, South Africa
- Aldosari F.O. 2017. Gender participation in sheep and goat farming in Najran, southern Saudi Arabia. *Saudi Journal of Biological Sciences*, 25: 144-148
- Dearlove P.D. 2007. *Msinga municipality integrated development plan 2005/2006*. Pietermaritzburg: KwaZulu-Natal Department of Local Governance and Traditional Affairs.
- Deere C.D., Alvarado G., Twyman J. 2012. Gender inequality and asset ownership in Latin America: Female owners vs household heads. *Development and Change*, 43(2): 505-530

- Arowolo O.O., Bankole-Oye T.G. 2014. Women goat farmers in the rural areas of Ogun State: Challenge for extension agents and researchers. *African Journal of Livestock Extension*, 14: 101-105
- Boogaard B.K., Waithanji E., Poole E.J., Cadilhon J. 2015. Smallholder goat production and marketing: A gendered baseline study from Inhassoro District Mozambique. *NJAS-Wageningen Journal of Life Sciences*, 74-75: 51-63
- Doss C. 2013. *Data needs for gender analysis in agriculture*. IFPRJ. Discussion Paper 01261. IFPRI, Washington, DC.
- Kapur R. 2019. *The role of women in the management of household responsibilities*. [www.researchgate.net](http://www.researchgate.net). Retrieved on 010/07/2020
- Olowu D. 2013. Gendered aspects of food security in Lesotho: Implications for an integrative rights-based approach. *Gender and Behaviour*, 11(2): 5378-5392
- Njuki J. Mburu S. and Pimentel P. 2013. Livestock markets and intra-household income management. In: *Women, livestock ownership and markets: bridging the gender gap in eastern and southern Africa*. Ed. Njuki J. Sanginga P.C. Earthscan Routledge. <http://books.google.co.za> Accessed on 13 March 2018
- Ramsay K.A. and Donkin E.F. 2000. A review of the current status of goat research and development in South Africa. Paper presented at the Regional Workshop on Goat Development in Southern Africa. Paper presented at the Regional Workshop on Goat Development in Southern Africa, Malawi
- Solomon A.K., Mwai O., Gram G., Haile A., Rischkowsky B.A., Solomon G. and Dessie T. 2014. *Review of goat research and development projects in Ethiopia*. ILRI Project Report. Nairobi, Kenya. International Livestock Research Institute.

Statistics South Africa, 2016. *Community Survey 2016*. Statistical release P0301 / Statistics South Africa, Pretoria

Tudu N.K., Roy D.C. 2015. Participation of women in decision making in goat rearing in Nadia District of West Bengal. *International Journal of Social Sciences and Management*, 12 (2): 114-122

United Nations, 2017. *Gender equality and women's empowerment*. Retrieved on 4 February 2018 from [www.un.org/sustainabledevelopment/gender-equality](http://www.un.org/sustainabledevelopment/gender-equality)

World Bank, 2012. *Gender equality and development*. World Development Report. <https://openknowledge.worldbank.org> Accessed on 13 March 2018

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

The literature review examines related studies that discuss the importance of goats in semi- arid areas, gender issues, and food security. The review of literature is aimed at identifying the knowledge gaps that exist in the literature and detail the contribution of this study to closing the knowledge gaps. It also highlights important issues and areas of interest in the role that gender (particularly women) plays in providing food security at the household level and attempts to resolve the inconsistency between the national and household food security.

### **2.2 Conceptual framework of the literature review**

Figure 2.1 below which is adapted and modified from Gartaula *et al.* (2017) provides the summary of the conceptual framework that guides the research study. The three-dimensional framework summarises the three aspects which are detailed in the literature review which are food security, food sovereignty (with goats as assets) and social wellbeing (with emphasis on gender). The objective aspect of the framework relates to food availability, access and utilization which are important aspects of food security (FAO, 2008). The subjective aspect of the framework refers to how assets such as goats, as detailed in the study, can influence livelihoods and shape long-term food production and income generation amongst small-scale farmers in semi-arid areas. The relational aspect, particularly gender, relate to people's interaction with others, rules and norms, which can influence social differences on decision-making and may have long-term effects on food security.

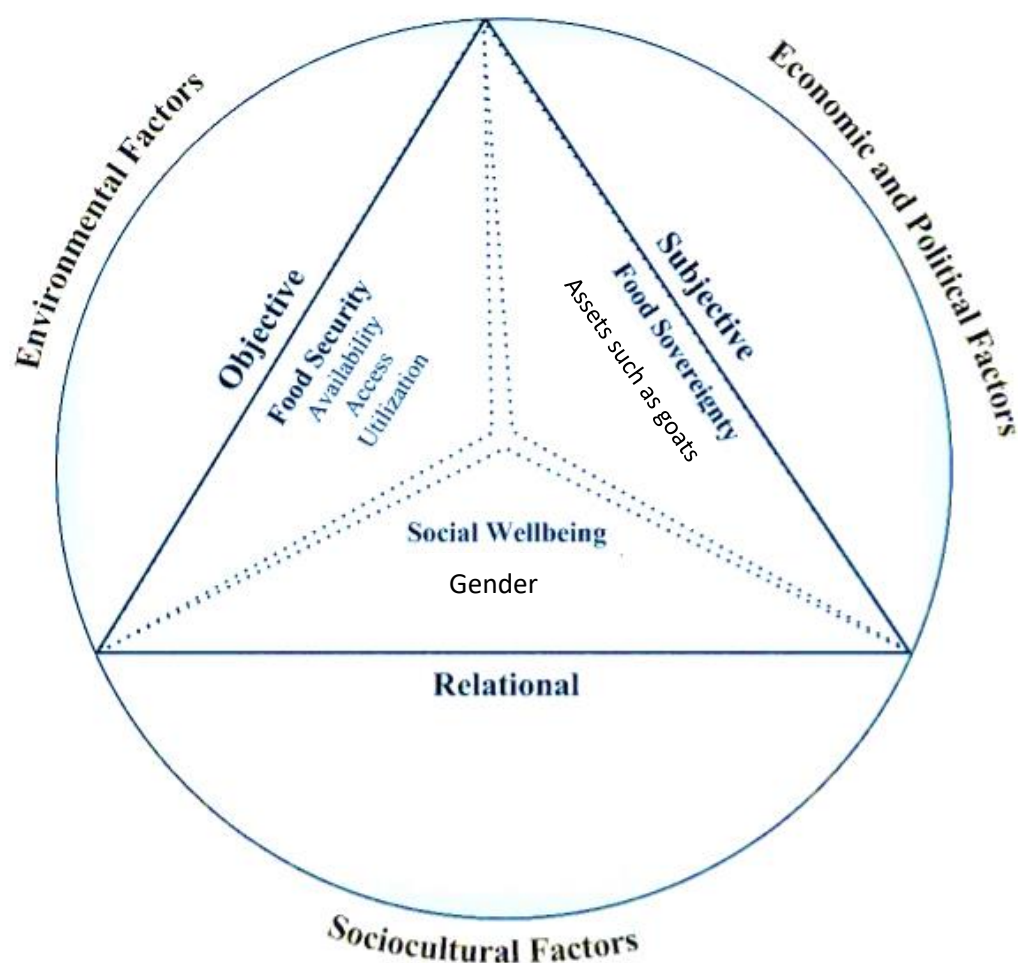


Figure 2.1 Conceptual framework linking goats, gender, and food security (adapted from Gartaula *et al.*, 2017)

## 2.3 Goats as an asset for sustainable livelihoods

### 2.3.1 Importance of goats

In the livestock sector, goats are often the only asset possessed by resource-poor households. There is remarkably low capital required to invest in goat production, yet there is high productivity of

meat and other products (García-Winder and Chavarría, 2017). In times of crop failure due to drought or ill-health within the household, households may sell goats to buy food or medicine (Aziz, 2010). Goats can also provide money needed to meet household expenditures (Aldosari, 2017). Goat meat and milk provide the best quality protein which is important particularly for children who are prone to suffer from malnutrition (Pollot and Wilson, 2009). Goats' milk is useful for those allergic to cow's milk or with poor immune system (DeVries, 2008). There is also a potential for income generation from cashmere production from indigenous goats (cashmere is the fine, soft unmedulated undercoat from goat). It is only possible if goats are handled daily and penned, making it simpler for farmers to comb them (de Villiers *et al*, 2001). Goat production and productivity, if sustained, can help deal with the challenges of food security and alleviate poverty.

Goats are relatively tolerant to drought and can adapt to harsh environments as they are able to utilize coarse roughages and are generally disease resistant. They are easier to handle than dairy cattle because they require low amounts of food and can reproduce at a young age with multiple births (Rahman *et al.*, 2016). Goats are also used in traditional rituals and ceremonies (Bettencourt *et al.*, 2015).

The importance of goats should not be generalised but be linked to traditions as these may impact on the perceptions of the role of goats in households. Goat-related priorities may differ depending on religion, traditional beliefs, values and gender (Babajide, 2015). Priorities may vary from main source of capital, income and cultural ceremonies; and traditional beliefs may restrict consumption of goat meat by certain categories of people. Goat ownership may also be used to determine social

status; being kept as a sign of wealth without the intention of extracting from them any net income (Bettencourt *et al.*, 2015).

The largest proportions of agricultural households in South Africa are found in Eastern Cape (27%), Limpopo (24%) and KwaZulu-Natal (KZN) (19%), whilst the number of households engaged in livestock farming in KZN is 256 000 (Stats SA, 2016). Studies on goats have been fewer than on other livestock species such as cattle (Aziz, 2010), and this has led to restrictions in goat production (Ngambi *et al.*, 2013). Hence, more studies to overcome the dearth of literature could assist goat farmers, particularly those in semi-arid areas where cropping is a challenge because of erratic rains.

It is notable that researchers such as Twine (2013) and Vetter (2013) have contradictory ideas about using livestock as a source of income in communal production systems. These researchers argued that livestock should be used only as savings and not for cash sales because commercialization of livestock requires that households have adequate access to capital to serve as insurance risk. They also argued that only the wealthy, powerful and less vulnerable can specialize in livestock farming because they own large herds, and they have better access to markets and information. Rigg (2006) went as far as arguing that the best way to assist the poor is to promote skills development so that they abandon farming and migrate to towns.

Literature has highlighted what several studies have attributed to the importance of goats in diversifying income of the rural poor (Njuki and Sanginga 2013; Aldosari, 2017; García-Winder



and Chavarría, 2017). Henceforth, there is need for a great deal of evidence to be provided which links goat production and poverty reduction.

### **2.3.2 Goat production and commercialization**

Generally, constraints in goat production and commercialisation include high mortality losses due to feed shortage (quantity and quality), diseases, predation, uncontrolled grazing management, water shortages and a lack of marketing infrastructure (Solomon *et al.*, 2014). Interventions targeting these constraints should be implemented to achieve improvements in goat production and commercialisation. Activities performed by women in goat production often involve low skill levels, such as feeding and cleaning. These activities are, however, more important for goat production of goats. Yet those conducted by men such as deworming and purchase of medicines may involve greater mobility away from the household and require access to information on marketing (Bravo-Baumann, 2000).

Diseases represent one of the greatest threats to goat production, and there are costs associated with disease control (Bettencourt *et al.*, 2015). Animal diseases lead to goat mortality, reduction of goat numbers, and reduces production parameters such as weight gain, milk production and quality of goat products. Climate change is creating and increasing livestock disease occurrences (García-Winder and Chavarría, 2017). Inappropriate breeding programs limit long-term genetic improvement of goat production. Often in many rural households, there is an absence of a defined reproductive season and this results in reduced fertility and genetic progress. Low fertility rates can also be caused by using male animals in cultural rituals; with often the younger ones being

selected for slaughtering during rituals, leaving behind older males to be used in reproduction. (Bettencourt *et al.*, 2015).

Interventions to improve goat production are better sustained by considering marketing activities. Marketing of goats beyond home consumption ensures that the household obtains income to the benefit of its well-being. Improving marketing opportunities such as through the promotion of marketing associations where rural farmers organize themselves into bargaining groups is required (Olowu, 2013). In addition, it is also important to strengthen goat market systems such as information and infrastructure. Gender specific market possibilities and control of the income should be considered because women tend to lose control to men when marketing and income from livestock increases (Bravo-Baumann, 2000). Hence, when undertaking interventions at household level, agreements with both men and women, should be made for the position of women in projects not to be eroded.

## **2.4 Gender**

### **2.4.1 Definition of gender**

The World Health Organisation (2018) defines gender as the socially accepted attributes of men and women, such as their norms and roles. According to Carter (2014), gender is created and sustained by performing tasks often associated with a certain gender. Carter (2014) also referred to this fulfilling of gendered tasks as ‘doing gender’. These attributions of gender norms and roles, however, change over time and vary across societies (Blackstone, 2003). The gender role needs to be properly defined because it is one of the important factors of the inter relationship between men and women.

### 2.4.2 Gender roles

Gender roles are described as an individual's shared values based on their socially identified sex (Eagly, 2009; Eisenclas, 2013). Eagly (2009) argued that gender roles have descriptive and prescriptive features. The descriptive element informs men and women what is expected for their sex in certain circumstances. Stereotypes demonstrate the attributes that an individual should have and hence interprets and justifies certain social practices (Hogg, 2016). The prescriptive aspect on the other hand, informs men what is expected or desirable (Rudman and Glick, 2001). Men are generally perceived to be self-confident and independent, and women to be interdependent and emotionally expressive (Eagly and Mladinic, 1989). Socialization facilitates these stereotypes, or gender role beliefs, resulting in the development of corresponding personality attributes (Eagly and Wood, 2012).

Gender roles are also associated with gender differences in status and relate to divisions of household labour, with traditional gender roles being linked to females as homemakers and males as breadwinners (Harrison and Lynch, 2005; Kray *et al.*, 2017). Although some characteristics of gender roles may seem to be changing with females entering male-dominated jobs in recent years (Croft *et al.*, 2015), there is still resistance in the mind set of reducing gender inequality with men enjoying more status and power in society. Changes in gender role orientations are often met with negative attitudes toward individuals who diverge from traditional gender role norms (Harrison and Lynch, 2005). Although there are no constitutional barriers to gender equality, laws that govern inheritance and marriage are often the cause of discrimination against women (Olowu, 2013).

### 2.4.3 Theories of gender roles

To comprehend the challenges that vulnerable groups are facing because of gender inequality, there is need to understand the origins of gender role disproportionateness. Understanding this will assist intervention programmes designed to deal with challenges that women face when performing their roles. Several authors have come up with theories of gender roles (O'Neil, 2008a, b; Hogg, 2016; Kray *et al.*, 2017).

Kray *et al.* (2017) argued that there are two theories of gender roles and these are the fixed theory (entity theory) and malleable theory (incremental theory). A fixed gender role promotes identification with masculinity, with men identifying more with their gender. It relies on stereotypes to interpret social information to reinforce belief that inequality between men and women is justified. The malleable theory, however, see roles and behaviours as flexible, that they are associated with specific circumstances and do not have a fixed relationship with gender. (Kray *et al.*, 2017). A shift from being an entity theorist to an incremental theorist is required as it will allow for constructive debates in gender issues. With men being the decision makers, their opinions will likely shape community norms (Santos *et al.*, 2014).

Another theory which is used to explain gender roles is the social identity theory as described by Hogg (2016). It points to the fact that self-perception and identification are a result of social groups, and that individuals define own identities based on group membership (Hogg, 2016). The social identity theory gives an insight regarding the root causes of discrimination, prejudice and gender inequality since they are a result of group-based categorization (Bosson and Michniewicz, 2013).

The gender role conflict theory states that socialized gender roles can lead to negative consequences (O'Neil, 2008a, b). The theory emanates from restrictive masculinity ideologies and stereotypes which are internalized in men at a young age (O'Neil *et al.*, 2016). O'Neil (1981a) explained that men's gender role conflict is a result of their aversion to feminine qualities and behaviours which they regard as inferior and should be avoided. These sexist or stringent gender roles may violate or limit other people's potential and freedom.

#### **2.4.4 Gender challenges facing vulnerable groups**

##### **2.4.4.1 Gender and assets**

A better understanding of the importance of gender and assets in agriculture is needed. Johnson *et al.* (2016) stated that women's ownership and control of assets is associated with poverty reduction at household level, yet cultural gender roles prevent them from owning assets (Njuki *et al.*, 2014).

As heads of households, men tend to own more assets and even those with higher values than women (Deere *et al.*, 2013). Even though women may be the rightful owners of assets, decision-making and control of the assets still belong to men (Bravo-Baumann, 2000). Studies have also shown that there can be joint ownership of assets within households. This joint-ness of assets can be explained as individuals sharing rights to the same asset and making decisions collectively (Das *et al.*, 2013; Quisumbing *et al.*, 2013; Paris *et al.*, 2015; Roy *et al.*, 2015). Olowu (2013) reported that inheritance rights to property is often unequal with women being denied such rights due to cultural norms. In other cases, men may also have more rights over an asset than women. For

instance, women may manage milk for household consumption, but men have control over the proceeds of milk sales (Johnson *et al.*, 2015).

Although in some production systems goats are regarded as ‘women’s animals’, household allocation rules determine their ownership patterns. In other countries, however, there is joint ownership of goats and collective decision-making where married women will jointly own goats with their husbands but cannot be sole owners if the husband is still alive (Boogaard *et al.*, 2015). Despite the disparities in household goat ownership, some studies have highlighted that goat farming may help women increase their income and social status (DeVries, 2008; Hulela, 2010). It is thus imperative that in this study goat ownership in South Africa be contextualized.

#### **2.4.4.2 Decision-making process and income management at household level from a gender perspective**

Collective household decision-making entails combining inputs of more than one member before reaching an agreement (Kiani, 2012). However, in some households, decision-making is the sole responsibility of one member. The wellbeing of a household is greatly improved if women have decision-making power, because women play vital roles in the welfare of households due to their reproductive and caring roles. Despite the importance of women’s roles and in household decision-making, men generally have greater authority in household decision-making (Sultana, 2011).

Gender stereotypes often shape beliefs about the ability and willingness to make decisions or to contribute ideas (Coffman, 2014; Bordalo *et al.*, 2016), with men playing a substantial role in belief distortion. In many decision-making contexts, the beliefs of relative ability maybe more

predictive, with men being more optimistic and overconfident about their own ability whilst women generally have lower beliefs of relative ability (Bordalo *et al.*, 2016).

In early societies, because of traditions and religion; men, by virtue of them being breadwinners in the household; performed activities which usually required skill and predominantly made the important decisions. Women on the other hand, were mostly involved in household work which was barely appreciated (OlaOlorum and Hindin, 2014). With modernization and education in some societies, there has been a shift of stereotype sex roles with women being empowered to make decisions. Sultana (2011) revealed that the ability of women to participate in decision-making is positively associated with their education level, occupation and income. Women's education improves food security as it has a positive impact on household dietary intake. This is attributed to higher education levels being associated with earning an income, making women financially independent and hence able to make own decisions about households' diets (Amugsi *et al.*, 2016).

#### **2.4.4.3 The 'resources theories'**

The theory of resources as explained by Lott (2012) indicates that spouses' decision-making depends on resources such as income and educational attainment, with the person who has more resources having more power to exercise decision-making in households. Hence, according to the theory, women employment within a household plays a significant role in increasing her decision-making power which in turn increases the welfare of the household (Sultana, 2014). In addition, the relative resource theory developed by Martinez and Polo (1999) stated that the ability of each spouse to participate in decision-making processes directly depends on the resources that each one contributes in the household. The two resources theories can be summarized as that a household

member in possession of higher education levels or receiving more income will have more influence on others. Older children who may have more resources than other siblings may also influence decisions to be made in the household.

The theory of resources in a culture, as explained by Xu and Lai (2002), implies that culture plays a role in decision-making. Women's rights and access to resources is often based on their husband's kindness and on the husbands being alive (Santos *et al.*, 2014), placing them in a weaker bargaining position and in turn it affects the well-being of the household. FAO (2000) and Kiani (2012) explained that marriage duration and quality of marital relationship affect women's participation in decision-making because the longer the women stay in the marriage and the older they become with age, they become more assertive and confident about their views and opinion. Amugsi *et al.* (2016) revealed that women in monogamous households were better able to make decisions than those in polygamous households. The absence of co-wives minimizes competition on the limited resources of the household (Santos *et al.*, 2014). Polygamous households also tend to operate in segregation with senior and junior or husband making decisions separately.

Even though women are becoming more educated, most rural societies still maintain the traditional household chore division and leave important decision-making powers to men. Women are still viewed as homemakers; with their decision-making lying on trivial issues such as house decorations, household meals and daily shopping. On the other hand, men still have the power on important decisions such as the general financial affairs of the household (Kiani, 2012).



In Rwanda, it was observed that literacy and having access to financial resources is not associated with women's ability to make decisions on resources such as land in a household (Santos *et al.*, 2014). De Laat (2005) in Kenya found that women resorted to forming 'secret savings societies' in order to keep extra income they own out of their husbands' knowledge. This was also common with women who had migrant husbands and received remittances from them. This suggests that the decision on income may be linked to opportunities and incentives for enacting own preferences. Collins (2002) stated that based on the world that human beings create for themselves, men dominate decision-making in households in order to control women who attempt to participate in making household decisions.

Most literature on gender and gender roles have generalized about household division of labour and socialization. The theories presented in this literature review need to be explored and tested on to what degree such claims about gender (essentially pertaining to women) are empirically viable in an attempt to analyze, in gendered lenses, the role of goats in improving income and food security in the context of rural areas in semi-arid areas.

## **2.5 Food security**

### **2.5.1 Conceptualization of food security**

The 2030 Agenda for Sustainable Development sets out 17 goals, two of which are aimed at reducing poverty and achieving food security (García-Winder and Chavarría, 2017). The current study focuses on food security which is known to have about 200 definitions in different literature (Hoddinott, 2001). According to FAO (1996) and the National Department of Agriculture (2002), food security exists when all people have social, physical, and economic access to adequate, safe,

and nutritious food continuously, which meets the needs of their diet and preferences for healthy living. Food security also includes the ability of individuals to access nutrients to maintain or improve their well-being (FAO, 2017). Conversely, food insecurity is when the availability of healthy and safe foods is limited (Castell *et al.*, 2015). A household is considered food secure if it can provide for its members all the usual healthy and safe meals daily (Banwat *et al.*, 2012; Zakari *et al.*, 2014). The four dimensions of food security are: availability, stability, its ease of access and utilization. The inability of a household to meet any of these four food security dimensions leads to its vulnerability (FAO, 2008).

A household may be able to meet its food security requirements through own production, food purchasing or donations (Chakona and Shackleton, 2017a). Food security within households need to be studied because a household may have adequate food, but it may not be distributed equally within the household (Abdu-Raheem and Worth, 2011). Studies conducted in Zimbabwe (Muza, 2015) revealed that gender, age, occupation, education level, land ownership and asset endowment were determinants of household food security. Naser *et al.*, (2014) reported that there is a strong correlation between income and household food security, food expenditure and dietary diversity and this affects food security.

In rural areas, food insecurity is worsened by limited infrastructural development of power, roads and markets and poor health conditions which reduce rural labour participation on agriculture. Moreover, food insecurity is further worsened by rising food prices and climate change (Abegaz, 2017). Poor households' access to better quality and diverse food can be compromised by high

food prices (Sonnino *et al.*, 2014). In Sub-Saharan Africa, poor rainfall, extreme poverty and HIV/AIDS makes it a challenge to access food (Igwowski, 2012).

In developing countries, rural poverty is often associated with food insecurity (Naminse and Zhuang, 2018). Rural poverty is defined as the lack of socio-economic ability of individuals which prevents them from participating in activities and diets commonly approved by society (Sen, 1985). Household food insecurity manifests from rural poverty. As such, there is need to focus on assisting farming areas to access resources to improve productivity and to increase household incomes (Lemba, 2010).

### **2.5.2 Overview of the food security situation in South Africa**

Stats SA (2015) revealed that the proportion of South Africa's population living in poverty increased to 55% (30 million) in 2015 from 53% (27 million) in 2011. Children, women, black Africans, rural dwellers, and those with little or no education are most vulnerable to poverty (Stats SA, 2016).

Since 1994, the South African government has prioritized spending to reduce poverty and improve food security conditions of the historically underprivileged through programmes such as Reconstruction and Development Programme (RDP, 1994); the Accelerated and Shared Growth Initiative for South Africa (ASGISA) in 2005; and the National Development Plan (NDP) Vision 2030, amongst others. Programmes aimed at reducing food insecurity such as school feeding schemes and government social grants have also increased (Du Toit, 2011).

In as much as the South African government has come up with such programmes to increase the ability of its citizens to have access to food; there are, however, widespread inequalities (Mathebula *et al.*, 2017). The country is rated as one of the most unequal countries in the world (Stats SA, 2016; Chakona and Shackleton, 2017b). Although the country is rated as food secure, many households are food insecure with high incidences of malnutrition, caused by poverty and lack of income (Labadarios *et al.*, 2011; De cock *et al.*, 2013). Food security interventions should largely focus on rural areas because majority of those identified as poor (65%) and chronically poor (78%) reside in rural areas (Abdu-Raheem and Worth, 2011). Policy measures targeting reducing poverty and food insecurity have been made difficult due to inequalities in incomes and asset ownership and it has been a challenge to establish the link between poverty, incomes and food insecurity in some areas (De Cock *et al.*, 2013).

### **2.5.3 Food security challenges**

#### **2.5.3.1 Lack of income**

Manyamba *et al.* (2012) stated that in the South African context, food security is less about the availability of food, but its accessibility caused by insufficient cash to purchase adequate food. Although it has a high per capita income, structural poverty and inequalities are the leading causes of the inability of some households to buy adequate food. This is worsened by continuously rising food prices which reduce purchasing power and erode incomes. Most food insecure households are consumers and not food producers, hence, they require more reliable incomes apart from social grants and occasional earnings (Mokwena, 2016).

### **2.5.3.2 Disease outbreaks**

Outbreaks of diseases have had a great impact on South Africa's food security situation. An example is in 2017 when the country was hit by a highly pathogenic Avian Influenza or Bird Flue (H5N8) outbreak and this greatly affected the poultry industry. It led to the culling of millions of birds and prices for eggs rose by as much as 20% (Farmer's Weekly, 2017). The rise in egg prices greatly affected low income households who were relying heavily on eggs as a cheaper source of protein.

### **2.5.3.3 Weak support networks and disaster management systems**

South Africa's weak institutional support network relating to disaster was observed in the years 2015/2016 when the government failed to adequately warn farmers about the impending drought. The drought led to high crop failures and livestock losses and an increase in the prices of maize and beef (Farmer's Weekly, 2015). The increase in food prices negatively influenced household food security as those which lacked purchasing power could not afford food. The drought also resulted in the inability of households to produce adequate food. The event underlined that in future, the country's food security situation may be undermined by climate change (Devereux and Waidler, 2017).

### **2.5.3.4 Effect of HIV/AIDS**

HIV/AIDS greatly affects household food security because together with food security, they can become entangled in a vicious cycle. Although South Africa has made great strides in reducing new HIV/AIDS infections and the vast roll out of ARVs to assist those infected; HIV/AIDS continues to negatively affect households. It increases vulnerability to food insecurity because

when household members become ill, the capacity to generate income decreases and deaths strips households of their breadwinners. As a result, they are forced into poverty and deprivation (Manyamba *et al.*, 2012). HIV/AIDS can therefore be said to increase vulnerability to food insecurity; at the same time, vulnerability to food insecurity increases vulnerability to HIV/AIDS through irresponsible behaviours because of desperate measures to bring food to the table. The victims of these being mostly the rural poor; female-headed households and children.

#### **2.5.4 Empirical study of food security: A case study of Msinga**

Msinga Local Municipality is in the uMzinyathi District Municipality in the province of KwaZulu-Natal (KZN), south eastern part of South Africa. The district has the highest levels of unemployment and illiteracy rates in the province (Msinga Municipality, 2011). The population of Msinga is estimated to be 177 000 people with 38 000 households. Females make 58% of the population (City Population, 2012). Poverty is rife in the area with 88 % of the population depending on government social grants (Statistics South Africa, 2016). Despite having the highest population in the district, it is one of the most underdeveloped municipalities with few economic opportunities.

Msinga is in a semi-arid area with erratic rainfall patterns averaging annual rainfall of 600 mm, ranging between 350 and 900 mm. The area experiences warm summer temperatures that reach up to 44° C. The erratic nature of rainfall and its rocky landscape makes investing in crop production risky (Cousins, 2012). Thus, dryland farming is better suited to livestock than crop production (Urban-Econ Development Economists, 2012). Msinga Municipality has a potential to produce goats due to its suitable rangelands. An estimated 45 000 goats are kept by residents of the

municipality (Msinga Municipality, 2011). Creating a sustained and lucrative source of income by developing a market orientated goat production sector is required if goats can be used to improve the economic and food security situation of the area.

### **2.5.5 Determinants of food security**

Knowledge of the determinants of food security is important when coming up with coping and poverty alleviation strategies. FSIN (2017) reported that the determinants of food insecurity are high poverty rates, scarce rural employment opportunities and drought. Sekhampu (2013) mentioned factors such as human capital (which entails age, gender, and education level of head of household), race, location (rural or urban) and lack of assets as some of the determinants of food security.

Different opinions have been raised concerning the effects of age and household size on food security and poverty. Meyer and Nishimwe-Niyimbanira (2016) indicated that the relationship between poverty and household size is ambiguous. Households may choose to have more children so that they can work on the land with the hope of increasing income; but the magnitude of its sustainability in many years to come may become a challenge due to environmental degradation (Oyekale, 2013). On the contrary, large households with many dependents are likely to be poor and hence food insecure because they require a big income to keep the household out of poverty and to provide daily meals. According to Obi and Tafa (2016), poverty may be prevalent in households whose heads are younger in age due to the youth's dependence on adults for food provision; or as Baiyegunhi and Fraser (2010) argued, households headed by the aged may be more vulnerable because they cannot fend for themselves due to their old age.

Food insecurity and poverty is generally higher in female-headed households when compared to male-headed households (Baiyegunhi and Fraser, 2010). There is a strong correlation between poverty and unemployment, with poor households being mostly unemployment or underemployed (Obi and Tafa, 2016). Baiyegunhi and Fraser (2010) reported that in households where the head's education levels are low, they are more vulnerable to poverty because the more years spent in school increases the chances of obtaining better paying work. Hence, promoting education may largely contribute to the improvement of food security because education is significantly associated with food security (Gebre, 2012; De Cock *et al.*, 2013). Even though poverty is not linked to one racial group, it is however, more clustered among black Africans living in rural areas and informal settlements (Obi and Tafa, 2016) who often lack viable employment opportunities. However, in some regions of southern Africa, high unemployment levels amongst graduates has led to household food insecurity (Tawodzera *et al.*, 2012).

With most of rural households depending largely on the land; lack of secure land tenure has resulted in the inability of households to use the land productively and sustainably. Hence the land reform programme was initiated with the aim of equitable distribution of farmland (Ahmed, 2014). The result of the 1913 Land Act had led to huge inequality patterns with the majority black people of 16 million owning about 122 million hectares of land. The land reform process has, however, been sluggish and faced with numerous difficulties such as the failure to meet targets and the preferences for financial compensation over land (Makhado, 2012; Pringle, 2013; Binswanger-Mkhize, 2014; Hall and Williams, 2018). Therefore, this brings about questions on whether land is seen as key in poverty reduction.



### **2.5.6 Sources of household income for rural dwellers**

Addressing food security at national level may involve long term measures which include policy changes aimed at increasing food production and employment generation, but at household level, problems of food security can be addressed by increasing income measures. Such livelihood strategies adopted by households to obtain income need to be understood (Mathebula *et al.*, 2017).

Activities to create income may include farming, employment wages and social transfers (Chitiga-Mabugu *et al.*, 2014). Sources of households' income may be categorized by sector (farming and non-farming activities); by function (self-employed or salaried); by location (on-farm or off-farm); or by a combination of on-farm activities (crop and livestock) (Hilson, 2016). Due to land constraints resulting from increasing population and inadequate rains which has led to inability to produce adequate yields, there has been a decrease in smallholder farming activities (Israr *et al.*, 2017), and a shift towards participation in non-agricultural activities (Jayne *et al.*, 2014; Headey and Jayne, 2014; Selepe *et al.*, 2015). Households with weaker access to external income, therefore, struggle to meet food security requirements (De Cock *et al.*, 2013). Perret *et al.* (2005) confirmed that due to poverty, lack of relevant skills, and limited economic activities, most rural households in South Africa survive on government social grants and remittances (Adams-Kane and Lim, 2016). Income from government social grants, however, is often inadequate and so households need to find other ways to enhance incomes and diversify livelihoods (Mathebula *et al.*, 2017).

### **2.5.7 Coping strategies for rural dwellers**

De Janvry and Sadoulet (2001) identified pathways used by rural households to reduce food insecurity and poverty. The pathways include agriculture, multi-activity, assistance, exit and micro-enterprise. The agricultural path refers to using farming as a means of livelihood; whilst the multi-activity path is using both agricultural production and off-farm jobs to get income. The assistance path refers to households depending on remittances from a household member who does not reside at the homestead as a main source of income. The exit path is a situation where the rural poor migrate to urban areas in the hope of escaping poverty; whereas with the micro-enterprise path, rural households own and manage small business for a livelihood. However, off-farm job opportunities may be limited in rural areas mainly because of limited or lack of education and economic opportunities. Overdependence on remittances from urban areas may lead to the transfer of poverty to urban areas while migration may likely result in poverty due to the reduction of the labour force especially the young leaving behind the old to work on the land. Combining agricultural production and micro-enterprise pathways may assist in increasing income by integrating agricultural production with markets and hence in the reduction of poverty and increase in food security among the rural poor.

As means to cope with food insecurity, households may obtain remittances from relatives, sell assets, whilst low income households may reduce the quantity and quality of food consumption (Adebayo *et al.* 2012; D'souza *et al.*, 2012; Ngidi and Hendriks, 2014). Households may also borrow from micro-lenders who often charge substantial interest rates (Devereux and Waidler, 2017). Selepe *et al.* (2014) reported that food security is improved by employment opportunities although when the employment period ends food insecurity may be experienced.

Almost 30% of the country's population are dependent on government social grants, and this has greatly improved household food security (Ferguson, 2015). In cases where the recipient of an old age grant is a woman, children have been seen to benefit more than they did if the grant was being received by men (Duflo, 2003). Social grants benefits, however, tend to be diluted in terms of what they are spent on because they tend to have multiple users and uses and this reduces the impacts on intended beneficiaries (Taylor and Chagunda, 2015). In some households, the social grants may be the only income source shared by the entire household and become inadequate to feed large family sizes (Mokwena, 2016; Xaba, 2016). Finally, the annual increment of the grants, particularly the child support grant annual adjustments, are regrettably not index-linked regardless of inflation rates (Devereux and Waidler, 2017) and this makes them inadequate to reduce food insecurity.

#### **2.5.8 Food security measurement and indicators**

Accurate measurement of food security is challenging because food security is multidimensional in nature (Gary *et al.*, 2000; De Cock *et al.*, 2013). The complexity of the food security concept makes it difficult to identify measurable indicators that capture the full meaning of food security. Finding the suitable indicators that are universal for all situations is challenging and hence there might be a need for a more contextual understanding of food insecurity than what general international or national indicators present (Haug, 2018).

Currently, several indicators are used for food security analysis to describe the degree of severity of different combinations of food insecurity conditions and experiences (Carletto *et al.*, 2013).

However, various measures of food insecurity are used interchangeably, and this leads to the risk of underestimating food insecure households (Coates, 2013). The preferred indicators should be able to follow the four components which define food security which are availability, access, utilization, and stability (Daniel *et al.*, 2013). The data collected should be adequate to monitor food assistance programs (Gary *et al.*, 2000).

Daniel *et al.* (2013) assessed the correlations of various indicators which assess different components of food security. These were: Coping Strategies Index (CSI); Reduced Coping Strategies Index (rCSI); Household Food Insecurity and Access Scale (HFIAS); The Household Hunger Scale (HHS); Food Consumption Score (FCS); and the Household Dietary Diversity Scale (HDDS). The results showed that CSI, rSCI and HFIAS had a greater correlation of capturing the element of quantity. On the other hand, FCS and HDDS had a greater correlation to capture quality and diversity. HHS only measures the most extreme indicators of insufficiency where the situation is quite severe as it only measures hunger, its use is therefore limited in evaluating food insecurity.

Of all the indicators that capture the element of quantity, the HFIAS assesses a greater range and estimate of the food security range by probing whether the household experienced any form of insufficient access to food. The HFIAS is commonly used to assess the food security situation of households (Swindale and Bilinsky, 2006; Coates *et al.*, 2007). Nine questions probe whether the household experienced one form of insufficient access to food in the past 30 days and if yes, with what frequency (De Cock *et al.*, 2013; Pérez-Escamilla *et al.*, 2017). Households have three possible answers to each of the nine questions, which ranges from zero to 27; the higher the score, the greater the food (access) insecurity the household experienced (De Cock *et al.*, 2013).

However, although this indicator is considered a cross-sectionally acceptable measure for food insecurity in different countries (Naja *et al.*, 2015); its shortcoming is that it has not been endorsed for universal application (Deitchler *et al.*, 2011).

## **2.6 Linking gender to food security**

The thinking of food security has gradually moved from global and national food supply concerns to those of households' access to food. This shift brings in the argument of gender, with the need to establish the gender which should drive household food security (Watuleke, 2014). Gender is considered an important socio-economic factor when investigating the roles and restrictions of people involved in agriculture (Deere *et al.*, 2012). Some findings have suggested that food security interventions can improve gender equality and food security (FAO, 2017). Although several studies have reviewed aspects of gender and food security, in much of Southern Africa there has been a failure in addressing food insecurity (Olowu, 2013), reflecting the complexity of the relationship between the two. The failure to produce results has been to a large extent due to the inability to understand the fundamental issues of gender dynamics in decision-making, asset ownership and control of income.

Food insecurity disproportionately affect women and girls largely due to cultural restrictions on access to education, assets and land. Households and society may restrict women's decision-making power over household income (Brody, 2015; FAO, 2015b). Even though in Africa more women are dependent on farming as opposed men, gender inequalities continue (FAO, 2017).

Studies found that gender equality programmes aimed at empowering women by increasing their bargaining power within households were associated with improvements in health, food and education, particularly of girls (Attanasio and Lechene, 2010; FAO/ADB, 2013; Brody, 2015). Improving gender equality positively affects food security mostly in children. Household allocation of resources and decision-making that favour women are positively linked to improved food security (FAO, 2017). Duflo (2003) indicated that old age pensions received by women led to considerable increase in childhood development. Food security outcomes are enhanced with an improvement in gender equality (FAO, 2017), and so gender targeted interventions should be aimed at improving food security as women have a key interest in investing in household consumption needs. Women's rights to land, control over assets and livelihood opportunities should be equal as this positively affects food security (Doss *et al.*, 2017).

In many rural areas, women rely on subsistence agriculture, but their biggest constraint is land tenure (Selepe *et al.*, 2015). Cultural laws deny women the same rights to property as men, and female-headed households often struggle to ensure food security for their households because they are denied security of land tenure and access to loans due to lack of collateral (Olowu, 2013). In addition, culture lead to women having less personal autonomy, fewer resources and limited influence over household decision-making processes (Selepe *et al.*, 2015). Although there are no constitutional barriers to gender equality, the laws that govern inheritance and marriage are often the cause of discrimination against women. Local authorities and traditional councils also tend to have limited factors to gender equality through the land tenure system which discriminates against women (Babajide, 2015). Hence, crop production is generally in favour of men because of their land ownership (Olowu, 2013).

Bahta *et al.* (2017) indicated that livestock farming, unlike crop production, may not contribute to gender inequality because both genders may have equal access and right of ownership to livestock and can be involved in production, unlike cropping which is allocated by households and not by gender. Livestock farming may be an important sector towards developing and improving rural livelihoods and alleviation of malnutrition, especially among the poor. Exploring perspectives of women and men on livestock, particularly goats is therefore important in alleviating food security (Desta *et al.*, 2017).

## **2.7 Summary**

The literature review has made great strides in addressing the issues of gender, goats and food security. It presented the details of the gender-food security link which lead to women being treated as unequal members of their households and society. There is a need to strengthen knowledge of how to improve food security by conducting a gendered analysis on the role and potential of assets such as goats to improve income and food security in semi-arid rural areas. Qualitative and quantitative research which is context specific is used in the study to understand men's and women's roles in goat ownership and production, commercialisation and constraints; and hence address issues related to gender and food security. The study investigates whether the involvement of goats as an asset has a possibility of contributing towards sustainable food security. It hypothesized that household food security can be improved by commercializing goat farming to increase income among households that are food insecure, particularly in semi-arid areas where crop production is a challenge due to erratic rains. The following data chapters present findings of the research.

## 2.8 References

- Abdu-Raheem K.A and Worth S.H. 2011. Household food security in South Africa: Evaluating extension's paradigms relative to the current food security and development goals. *South African Journal of Agricultural Extension*, 39 (2): 91-103
- Abegaz K.H. 2017. Determinants of food security: Evidence from Ethiopian rural household survey (ERHS) using pooled cross-sectional study. *Agriculture and Food Security*, 6(70): 1-7
- Adams-Kane J. and Lim J.J. 2016. Institutional quality mediates the effect of human capital on economic performance. *Review of Development Economics*, 20: 426-442.
- Adebayo C.O., Akogwu G.O. and Yisa E.S. 2012. Determinants of income diversification among farm households in Kaduna State: Application of Tobit regression model, *Production Agricultural Technological Journal*, 8 (2): 1-10.
- Adeleye O., Alli-Balogun J.K., Afiemo O.G., Bako S. 2016. Effects of goat production on the livelihood of women in Igubi, Chikun and Kajuru Local Government Area, Kaduna State, Nigeria. *Asian Journal of Agricultural Extension, Economics and Sociology*, 11(1): 1-8
- Ahmed M. 2014. *Inadequate Land Reforms Reason for Poverty and Social Unrest*. Paper prepared for presentation at the "2014 World Bank Conference on Land and Poverty" The World Bank - Washington DC, March 24-27, 2014.
- Aldosari F.O. 2017. Gender participation in sheep and goat farming in Najran, southern Saudi Arabia. *Saudi Journal of Biological Sciences*, 25: 144-148



- Amugsi D.A., Lartey A., Kimani-Murage E. and Mbaru B.U. 2016. Women's participation in household decision-making and higher dietary diversity: Findings from nationally representative data from Ghana. *Journal of Health, Population and Nutrition*, 35: 16
- Arowolo O.O., Bankole-Oye T.G. 2014. Women goat farmers in the rural areas of Ogun State: Challenge for extension agents and researchers. *African Journal of Livestock Extension*, 14: 101-105
- Aziz M.A. 2010. Present status of the world goat populations and their productivity. *Lohmann Information*, 45(2): 42-52
- Babajide A.A.A. 2015. *Livestock ownership by gender and seasonal impact on production: A case study in Msinga Municipality*. Masters thesis. University of KwaZulu-Natal, Pietermaritzburg, South Africa
- Bahta S., Wanyoike F., Katjiuongua H., Marumo D. 2017. Characterization of food security and consumption patterns among smallholder livestock farmers in Botswana. *Agriculture and Food Security*, 6(65): 1-11
- Baiyegunhi L.J.S. and Fraser G.C. 2010. *Determinants of household poverty dynamics in rural regions of the Eastern Cape Province, South Africa*. In poster presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa. Available online: <http://ageconsearch.umn.edu/bitstream/97078/2/63.%20Poverty%20dynamics%20in%20South%20Africa.pdf>. Accessed 9/9/2018

- Banwat M.E., Lar L.A., Dakum L.B., Igoh C.S., Daboer J.C. and Ogbonna C. 2012. Factors affecting household food security in a rural community in Northern Central Nigeria. *International Journal of Community Research*, 1(1): 23-29
- Batti S. and Srivastava R. 2003. Participation of working women in decision-making process as consumer. *International Journal of Consumer Studies*, 27: 218-251
- Bettencourt E.M.V., Tilman M., Narciso V., da Silva Carvalho M.L. and de Sousa Henriques P.D. 2015. The Livestock Roles in the Wellbeing of Rural Communities of Timor-Leste. *Revista de Economia e Sociologia Rural*, 53 (1): 63-80
- Binswanger-Mkhize H.P. 2014. From failure to success in South African land reform. *African Journal of Agricultural and Resource Economics*, 9 (4): 253-269
- Blackstone A. 2003. "Gender Roles and Society." In: *Human Ecology: An Encyclopedia of Children, Families, Communities, and Environments*, (ed) Miller J.R., Lerner R.M. and Schiamberg L.B. p335-338. Santa Barbara, CA
- Boogaard B.K., Waithanji E., Poole E.J., Cadilhon J. 2015. Smallholder goat production and marketing: A gendered baseline study from Inhassoro District Mozambique. *NJAS-Wageningen Journal of Life Sciences*, 74-75: 51-63
- Bordalo P., Coffman K.B., Gennaioli N. and Shleifer A. 2016. *Beliefs about Gender*. Working Paper 22972. National Bureau of Economic Research, Cambridge
- Bosson J.K. and Michniewicz K.S. 2013. Gender dichotomization at the level of in-group identity: What it is, and why men use it more than women. *Journal of Personality and Social Psychology*, 105: 425-442

- Bravo-Bauman H. 2000. Gender aspects in livestock production. In: *Livestock and gender: A winning pair*. Working Document. Swiss Agency for Development and Cooperation. Bern. [www.fao.org/WAIRDOCS/LEAD/X6106E00.HTM](http://www.fao.org/WAIRDOCS/LEAD/X6106E00.HTM). Accessed on 26/08/2018
- Brody A. 2015. *Gender and Food Security: Towards Gender-Just Food and Nutrition Security* - Overview Report. Brighton, UK, BRIDGE Cutting Edge Programmes.
- Carter M.J. 2014. Gender Socialization and Identity Theory. *Social Sciences*, 3: 242-263
- Chakona G. and Shackleton C. 2017a. Minimum dietary diversity scores for women indicate micronutrient adequacy and food insecurity status in South African Towns. *Nutrients*, 9(8): 812.
- Chakona G. and Shackleton C.M. 2017b. Voices of the hungry: A qualitative measure of household food access and food insecurity in South Africa. *Agriculture and Food Security*, 6: 66
- Castell G.S., Rodrigo C.P., de la Cruz J.N. and Bartrina J.A. 2015. Household Food Insecurity Access Scale (HFIAS). *Nutricion Hospitalaria*, 31(3): 272-278
- Chitiga-Mabugu M., Ngepah N., Nhemachena C., Motala S, Mathebula J. and Mupela E. 2014. *The state of poverty and its manifestation in the nine provinces of South Africa*. Johannesburg: National Development Agency.
- City Population, 2012. *Msinga local municipality*. Available at <http://www.citypopulation.de/php/southafrica-admin.php?adm2id=KZN244> Accessed 04 March 2018
- Coates J. 2013. Build it Back Better: Deconstructing Food Security for Improved Measurement and Action. *Global Food Security Journal*, 2 (3): 188-194

- Coates J., Swindale A. and Bilinsky P. 2007. *Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide* (v. 3). Food and Nutrition Technical Assistance Project (FANTA), Academy for Educational Development, Washington, D.C.
- Coffman K.B. 2014. Evidence on self-stereotyping and the contribution of ideas. *The Quarterly Journal of Economics*, 129 (4): 1625-1660
- Collins R. 2002. Black's contributions to a general theory of conflict: *Contemporary Sociology*, 131: 655-658
- Cousins B. 2012. *Smallholder irrigation schemes, agrarian reform and accumulation from below: Evidence from Tugela Ferry, KwaZulu-Natal*. Paper for a conference on strategies to overcome poverty and inequality: Towards Carnegie III, 3-7 September 2012. University of Cape Town, South Africa.
- Croft A., Schmader T. and Black K. 2015. An under examined inequality: Cultural and psychological barriers to men's engagement with communal role. *Personality and Social Psychology Review*, 19: 343-370
- D' souza A.D. and Jolliffe D. 2012. Rising food prices and coping strategies: household-level evidence from Afghanistan. *The Journal of Development Studies*, 48(2): 282-299.
- Daniel M., Coates J and Vaitla B. 2013. *How Do Different Indicators of Household Food Security Compare? Empirical Evidence from Tigray*. Feinstein International Center, Tufts University: Medford, USA.
- Das N., Yasmin R., Ara J., Kamruzzaman M., Davis P., Behrman J. and Quisumbing A. R. 2013. *How do intrahousehold dynamics change when assets are transferred to women? Evidence from BRAC's challenging the frontiers of poverty reduction-targeting the ultra-poor*

- program in Bangladesh*, IFPRI discussion paper 01317. Washington, DC: International Food Policy Research Institute.
- De Cock N., D'Haese M., Vink N., van Rooyen C.J., Staelens L., Schönfeldt H.C. and D'Haese L. 2013. Food security in rural areas of Limpopo province, South Africa. *Food Security*, 5: 269-282
- De Janvry A. and Sadoulet E. 2001. Investing in rural development is good business. In: R. Echeverra R. (Ed.) *Development of Rural Economies in Latin America and the Caribbean*; Inter-American Development Bank (Chapter 1, pp. 1-36). New York, Washington, DC.
- De Laat J. 2005. *Moral hazard and costly monitoring: The case of split migrants in Kenya*. Job Market Paper, Brown University
- De Villiers J.F., Letty B.A. and Madiba S.B. 2001. *Survey of Cashmere Production from Goats in KZN*. KZN Agri-Report (1)
- De Vries J. 2008. Goats for the poor: Some keys to successful promotion of goat production among the poor. *Small Ruminant Research*, 77: 221-224
- Dearlove P.D. 2007. *Msinga municipality integrated development plan 2005/2006*. Pietermaritzburg: KwaZulu-Natal Department of Local Governance and Traditional Affairs.
- Deere C. D., Oduro, A. D., Swaminathan H., & Doss C. 2013. Property rights and the gender distribution of wealth in Ecuador, Ghana, and India. *The Journal of Economic Inequality*, 11: 249-265
- Deere C.D., Alvarado G., Twyman J. 2012. Gender inequality and asset ownership in Latin America: Female owners vs household heads. *Development and Change*, 43 (2): 505-530

- Deitchler M., Ballard T., Swindale A. and Coates J. 2011. *Introducing a Simple Measure of Household Hunger for Cross-Cultural Use*. Food and Nutrition Technical Assistance II Project, FHI 360, Washington, DC (Technical Note No. 12).
- Department for International Development (DFID), 1999. *Sustainable livelihoods guidance sheets*. Section 2. Framework. <http://www.ennonline.net/pool/files/ife/section2.pdf> Accessed 4 March 2018
- Desta H., Kinat W., Alemu B., Mulema A., Van Eerdewijk A., Wieland B. 2017. *Small ruminant production for food security 'Goats are cattle gifted for the poor'*. CGIAR, Addis Ababa
- Devereux S., Waidler J. 2017. “Why does malnutrition persist in South Africa despite social grants?” Food Security SA Working Paper Series No.001. DST-NRF Centre of Excellence in Food Security, South Africa.
- Doss C. 2013. *Data needs for gender analysis in agriculture*. IFPRJ. Discussion Paper 01261. IFPRI, Washington, DC.
- Duflo E. 2003. Grandmothers and granddaughters: Old-age pensions and intra-household allocation in South Africa. *World Bank Economic Review*, 17 (1): 1-25.
- du Toit D. C. 2011. *Food Security*. Department of Agriculture Forestry and Fisheries. <http://www.nda.agric.za/docs/genreports/foodsecurity.pdf>. Accessed on 2 March 2018
- Eagly A. and Wood W. 2012. *Social Role Theory*. <https://www.researchgate.net/publication/285179532> Accessed on 23/08/2018
- Eagly A. H. 2009. The his and hers of prosocial behaviour: An examination of the social psychology of gender. *American Psychologist*, 64, 644-658.
- Eagly A. H. and Mladinic A. 1989. Gender stereotypes and attitudes toward women and men. *Personality and Social Psychology Bulletin*, 15: 543-558.

- Eisenchlas S. A. 2013. Gender Roles and Expectations: Any Changes Online? *Sage Open* p.1-11
- Farmer's Weekly, 2017. *Egg producers extremely concerned about avian influenza*. [www.farmersweekly.co.za](http://www.farmersweekly.co.za). Accessed on 13 January 2019
- Farmer's Weekly, 2015. *Managing for drought conditions*. <https://www.google.com/amp/s/www.farmersweekly.co.za/agribusiness/agribusinesses/managing-for-drought-conditions/amp/^2w>. Accessed on 13 January 2019
- FAO, 2015b. *The State of Food Insecurity in the World 2015*. [www.fao.org](http://www.fao.org) Accessed on 2 March 2018
- FAO, 2017. *Food security, sustaining peace and gender equality: Conceptual framework and future directions*. SP5 Discussion Paper. [www.fao.org](http://www.fao.org)
- FAO/ADB (Asian Development Bank), 2013. *Gender Equality and Food Security: Women's Empowerment as a Tool against Hunger*. Mandaluyong City, Philippines, ADB.
- Ferguson J. 2015. *Give a Man a Fish: Reflections on the New Politics of Distribution*. Durham: Duke University Press.
- FAO. 1996. *Rome Declaration on World Food Security and World Food Summit Plan of Action*. World Food Summit 13-17 November 1996, Rome. <http://www.fao.org/docrep/005/y4671e/y4671e06.htm#fn30>. Accessed on 2 March 2018
- FAO. 2010. *Guidelines for Measuring Household and Individual Dietary Diversity*. Rome: UN Food and Agriculture Organization.
- Food Security Information Network (FSIN) 2017. *Global report on Food Crises*. [www.fsincop.net](http://www.fsincop.net) Accessed on 13 October 2018

- García-Winder M. and Chavarría H. 2017. *The Outlook for Agriculture and Rural Development in the Americas: A Perspective on Latin America and the Caribbean 2017-2018/* ECLAC, FAO, IICA. San Jose, Costa Rica
- Gartaula H., Patel K., Johnson D., Devkota R., Khadka K. and Chaudhary P. 2017. From food security to food wellbeing: Examining food security through the lens of food wellbeing in Nepal's rapidly changing agrarian landscape. *Agriculture and Human Values*, 34: 573-584
- Gary B., Nord M., Price C., Hamilton W. and Cook J. 2000. *Guide to Measuring Household Food Security*, Revised 2000. U.S. Department of Agriculture, Food and Nutrition Service, Alexandria VA.
- Gebre G.G. 2012. Determinants of food insecurity among households in Addis Ababa City, Ethiopia. *Interdisciplinary description of complex systems*, 10 (2): 159-173
- Hall R. and Williams G.P. 2018. *Land reform in South Africa: Problems and prospects* 1
- Harrison L.A. and Lynch A.B 2005. Social role theory and the perceived gender role orientation of athletes. *Sex Roles*, 52 (3/4): 227-236
- Haug R. 2018. *Food security indicators: How to measure and communicate results*. Noragric Report No. 83. Department of International Environment and Development Studies, Noragric Norwegian University of Life Sciences
- Headey D. and Jayne T.S. 2014. Adaptation to land constraints: Is Africa different? *Food Policy*, 48: 18-33
- Hilson G. 2016. Farming, small-scale mining and rural livelihoods in sub-Saharan Africa: A critical overview. *The Extractive Industries and Society*, 3(2): 547-563.
- Hoddinott J. 2001. *Choosing outcome indicators of household food security*. IFPRI, Washington DC



- Hogg M.A. 2016 *Social identity theory*. In: McKeown S., Haji R. and Ferguson N. (eds) Understanding peace and conflict through social identity theory. Peace Psychology Book Series. Springer, Cham
- Hulela K. 2010. The role of women in sheep and goats production. *International Journal of Scientific Research in Education*, 3 (3): 177-187
- Ignowski E. A. 2012. *Two Essays on Food Security in Zimbabwe*. Unpublished thesis. Faculty of Agricultural and Applied Economics in the Graduate College of the University of Illinois at Urbana-Champaign.
- Integrated Food Security Strategy (IFSS)- SA. 2002. Pretoria Department of Agriculture SA
- IOL, 2015. *Drought pushes up food prices*. 2015-11-04. <https://www.iol.co.za/business-report/economy/drought-pushes-up-food-prices-1940037> Accessed 19/09/2018
- Israr M., Yaseen A. and Ahmad S. 2017. Sustainable rural development and livelihood sources of the rural households in mountainous Pakistan. *American Journal of Rural Development*, 5(4): 97-105
- Jayne T.S., Chamberlin J. and Headey D.D. 2014. Land pressures, the evolution of farming systems, and development strategies in Africa: A synthesis. *Food Policy*, 48: 1-17
- Johnson N., Njuki J., Waithanji, E., Nhambeto M., Rogers M., and Kruger E. H. 2015. The gendered impacts of agricultural asset transfer projects: Lessons from the Manica smallholder dairy development program. *Gender, Technology and Development*, 19(2): 145-180.
- Johnson N.L., Kovarik C., Meinzen-Dick R., Njuki J., Quisumbing A. 2016. Gender, assets and agricultural development: Lessons from eight projects. *World Development*, 83: 295-311

- Kiami M. 2012. How much are women involved in decision-making in family in Iran? *Sociology Study*, 2(6): 417-427
- Kray L.J., Howland L., Russel A.G. and Jackman L.M. 2017. Effects of implicit gender role theories on gender system justification: Fixed beliefs strengthen masculinity to preserve the status quo. *Journal of Personality and Social Psychology*, 112 (1): 98-115
- Lemba J.K. 2010. *Intervention model for sustainable household food security in the drylands of Kenya: Case study of Makueni district*. PhD Thesis. Ghent University. National Department of Agriculture (NDA). Integrated food security strategy. Pretoria: NDA
- Leroy J.L., Ruel M., Frongillo E.A., Harris J. and Ballard T.J., 2015. Measuring the food access dimension of food security: A critical review and mapping of indicators. *Food Nutrition Bulletin*, 36 (2): 167-195.
- Lott Y. 2012. *Who has it and who gets it? The role of gender, resources and transitions of power within couples*.  
<https://www.google.com/url?sa=t&source=web&rct=j&url=https://elib.suub.uni-bremen.de/edocs/00102542-1.pdf&ved=> Accessed on 28 April 2020
- Makhado R. 2012. *South Africa's land reform debate: Progress and challenges*.  
<http://ssrn.com/abstract=2181379> Accessed on 15 October 2018
- Manyamba C., Hendriks S.L., Chilonda P., Musaba E. 2012. *Factors Contributing to Inequalities in Food Security in South Africa: Implications for Agricultural Policy*. Strategies to overcome poverty and inequality. 'Towards Carnegie 111' Conference University of Cape Town 3-7 Sept 2012
- Martinez E. and Polo Y. 1999. Determining factors in family purchasing behaviour: An empirical investigation. *Journal of Consumer Marketing*, 16: 461-481

- Mathebula J., Molokomme M., Jonas S. and Nhemachena C. 2017. Estimation of household income diversification in South Africa: A case study of three provinces. *South African Journal of Sciences*, 113 (1/2): 1-9
- Meinzen-Dick R., Johnson N., Quisumbing A., Njuki J., Behrman J., Rubin D., Peterman A., Waithanji E. 2011. *Gender, Assets, and Agricultural Development Programs: A Conceptual Framework*, CAPRI Working Paper No. 99, International Food Policy Research Institute, Washington D.C.
- Meyer D.F. and Nishimwe-Niyimbanira, R. 2016. The impact of household size on poverty: An analysis of various low-income townships in the Northern Free State region, South Africa. *African Population Studies*, 30(2): 2283-2295
- Mokwena M.V.A.P. 2016 *Impact of social grants on food security: Evidence from neighbourhoods in the Gauteng Province of South Africa*. PhD Thesis, University of North-West, Vaal Triangle
- Msinga Municipality, 2011. *IDP 2011/2012*.  
[www.kzncogta.gov.za/Municipalities/UmzinyathiDistrict](http://www.kzncogta.gov.za/Municipalities/UmzinyathiDistrict). Accessed on 01 February 2018
- Muza O. 2015. *An assessment of household food security in urban and peri-urban areas; a case study of Bindura Municipal area, Mashonaland central, Zimbabwe*. Unpublished Masters dissertation, University of Kwa-Zulu Natal, Pietermaritzburg, South Africa
- Naja F., Hwalla N., Fossian T., Zebian D. and Nasreddine L. 2015. Validity and reliability of the Arabic version of the household food insecurity access scale in rural Lebanon. *Public Health Nutrition*, 18(2): 251-258.
- Naminse E.Y. and Zhuang J. 2018. Does farmer entrepreneurship alleviate rural poverty in China? Evidence from. Guangxi Province. *PLoS ONE*, 13(3): 1-18

- Naser A., Jalil R., Wan Muda W.M., Wan Nik W.S., Mohd Shariff Z. and Abdullah M.R. 2014. Association between household food insecurity and nutritional outcomes among children in North Eastern Malaysia. *Journal of Nutrition Research and Practice*, (3): 304-331
- Ngambi J.W., Alabi O.J. and Norris D. 2013. Role of goats in food security, poverty alleviation and prosperity with special reference to Sub-Saharan Africa: A review. *Indian Journal of Animal Research*, 47(1): 1 – 9
- Ngidi M., Hendriks S. 2014. Coping with food insecurity in rural South Africa: The case of Jozini, KwaZulu-Natal, *Mediterranean Journal of Social Sciences*, 25(5): 278–289.
- Njuki J. and Sanginga P. (eds.). 2013. *Women, livestock ownership and markets: bridging the gender gap in Eastern and Southern Africa*. Abingdon, United Kingdom, Routledge.
- Njuki J. Mburu S. and Pimentel P. 2013. Livestock markets and intra-household income management. In: *Women, livestock ownership and markets: bridging the gender gap in eastern and southern Africa*. Ed. Njuki J. Sanginga P.C. Earthscan Routledge. <http://books.google.co.za>
- Njuki J., Waithanji E., Sakwa B., Kariuki J., Mukewa E., and Ngige J. 2014. A qualitative assessment of gender and irrigation technology in Kenya and Tanzania. *Gender and Technology Development*, 18(3): 303-340.
- Obi A. and Tafa S. 2016. The determinants of household poverty in South Africa. *South Africa's public service delivery and performance review*, 4(4): 516-538
- Olowu D. 2013. Gendered Aspects of Food Security in Lesotho: Implications for an Integrative Rights-Based Approach. *Gender and Behaviour*, 11(2): 5378-5392
- O'Neil J. M. 1981a. Male sex-role conflict, sexism, and masculinity: Implications for men, women, and the counselling psychologist. *The Counselling Psychologist*, 9: 61-80.

- O'Neil J. M. 2008a. Special issue. Men's gender conflict: 25-year research summary. *The Counselling Psychologist*, 36: 358-476.
- O'Neil J. M. 2008b. Special Issue: Summarizing twenty-five years of research on men's gender role conflict using the Gender Role Conflict Scale: New research paradigms and clinical implications. *The Counselling Psychologist*, 36: 358-445.
- O'Neil J.M., Denke R. and Blazina C. 2016. Gender Role Conflict Theory, Research, and Practice: Implications for Understanding the Human-Animal Bond. In: Blazina C. and Kogan L.R. (eds) *Men and Their Dogs*. Springer International Publishing Switzerland
- Oyekale A.S. 2013. Gender Role in Agriculture, Climate Change and Food Security in the Sahel Belt of West Africa: Application of Poisson and Negative Binomial Regression. *Gender and Behaviour*, 11(2): 5499-5511
- Paris T., Pede V., Luis J., Sharma R., Singh A., Stipular J., and Villanueva D. 2015. *Understanding men's and women's access to and control of assets and their implications for agricultural development projects: A case study in rice farming households in eastern Uttar Pradesh, India*, IFPRI discussion paper 01437. Washington, DC: International Food Policy Research Institute.
- Perret S., Anseeuw W. and Mathebula N. 2005. *Poverty and livelihoods in rural South Africa. Investigating diversity and dynamics of livelihoods: Case studies in Limpopo*. Number 05/01. Battle Creek, MI: Kellogg's Foundation.
- Pérez-Escamilla R., Gubert M.B., Rogers B. and Hromi-Fiedler A. 2017. Food security measurement and governance: Assessment of the usefulness of diverse food insecurity indicators for policy makers. *Global Food Security*, 14: 96-104
- Pollot G. and Wilson R.T. 2009. *Sheep and goats for diverse products and profits*. FAO, Rome

- Pringle E. 2013. Land Reform and White Ownership of Agricultural Land in South Africa. <https://hsf.org.za> Accessed on 14 October 2018
- Quisumbing A. R., Roy S., Njuki J., Tanvin K., and Waithanji E. 2013. *Can dairy value-chain projects change gender norms in rural Bangladesh? Impacts on assets, gender norms, and time use*, IFPRI discussion paper 1311. Washington, DC: International Food Policy Research Institute.
- Rahman M., Hossain M. and Miah M. 2016. Poverty reduction and livelihood improvement of women through goat rearing. *Asian Journal for Poverty Studies*, 3(1): 59 - 66
- Rezapour Z. and Ansari H. 2014. Studying the factors associated with women's participation in farming decision making (Case study: Northern Khorasan, Iran). *European Journal of Experimental Biology*, 4(1): 553-556
- Rigg J. 2006. Land, farming, livelihoods, and poverty: Rethinking the links in the rural south. *World Development*, 34: 180-202.
- Roy S., Ara J., Das N., and Quisumbing A. 2015. "Flypaper effects" in transfers targeted to women: Evidence from BRAC's "Targeting the Ultra Poor" program in Bangladesh. *Journal of Development Economics*, 117: 1-19.
- Rudman L. A. and Glick P. 2001. Prescriptive gender stereotypes and backlash toward agentic women. *Journal of Social Issues*, 57: 743-762.
- Saghir P. Njuki J. Waithanji E. Kariuku J. and Sikira A. 2012. *Integrating improved goat breeds with new varieties of sweet potatoes and cassava in the agro-pastoral systems of Tanzania: A gendered analysis*. ILRI Discussion Paper 21. Nairobi, Kenya.
- Santos F., Fletschner D. and Savath V. 2014. *An intra-household analysis of access to and control over land in the Northern province, Rwanda: World Bank Conference on land and poverty*.

- The World Bank-Washington DC: Rural Development Institute.  
<http://www.landesa.org/wp-content/uploads/An-intrahousehold-Analysis-of-Access-to-and-Control-Over-Land-Santos-Savath-Fletschner-March-2014pdf>. Accessed 28/07/2018
- Sekhampu T.J., 2013. Determinants of poverty in a South African township. *Journal of Social Sciences*, 34(2): 145-153
- Selepe B.M., Mtyingizane S.S. and Masuku M.M. 2015. Factors contributing to household food security in Mhlontlo area, Eastern Cape, SA. *African Journal of Hospitality, Tourism and Leisure*, 4(1): 1-11
- Sen A. 1985. *Commodities and capabilities*. 1st ed. New York, NY: North-Holland.
- Solomon A.K., Mwai O., Gram G., Haile A., Rischkowsky B.A., Solomon G. and Dessie T. 2014. *Review of goat research and development projects in Ethiopia*. ILRI Project Report. Nairobi, Kenya. International Livestock Research Institute.
- Statistics South Africa (Stats SA). 2016. *Consumer Price index, March 2016*. Pretoria: Statistics South Africa.
- Statistics South Africa, 2015. *Poverty Trends in South Africa: An examination of absolute poverty between 2006 & 2015*. Media Release 22 August 2017
- Statistics South Africa, 2016. *Community Survey 2016*. Statistical release P0301 / Statistics South Africa, Pretoria
- Statistics South Africa, 2016. *General Household Survey, 2016*. Media Release 31 May 2017
- Stewart I.B. 2000. Zulu goats in KZN. *South African Journal of Animal Science*, 30 (1): 134-135
- Sultana A.M. 2011. Factors effect on women autonomy and decision-making power within the household in rural communities. *Journal of Applied Sciences Research*, 7(1): 18-22

- Sultana A.M., Hed M.N., Leh C.F and Fauziah C. 2014. Women's intra-household decision making power and financial resources. *Advances in Environmental Biology*, 7(714): 4703-4708
- Swindale A and Bilinsky P. 2006. *Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide (Version 2)*. Washington DC: Food and Nutrition Technical Assistance Project.
- Tawodzera G., Zanamwe L. and Crush J. 2012. *The state of food insecurity in Harare, Zimbabwe*. Urban Food Security Series No.13. African Food Security Urban Network, Cape Town
- Taylor V., Chagunda C. 2015. *The gender dimensions of food insecurity: Women's experiences of entitlements and deprivation in South Africa*. Chapter 7 in S. Fukuda-Parr and V. Taylor (eds), *Food Security in South Africa: Human rights and entitlement perspectives*. Cape Town: UCT Press.
- Tudu N.K., Roy D.C. 2015. Participation of women in decision making in goat rearing in Nadia District of West Bengal. *International Journal of Social Sciences and Management*, 2(2): 114-122
- Twine W. 2013. Multiple strategies for resilient livelihoods in communal areas of South Africa. *African Journal of Range and Forage Science*, 30(1-2): 39-43
- United Nations, 2017. *Gender equality and women's empowerment*. Retrieved on 4 February 2018 from [www.un.org/sustainabledevelopment/gender-equality](http://www.un.org/sustainabledevelopment/gender-equality)
- Urban-Econ Development Economists, 2012. *Msinga Local Municipality: Local Economic Development Strategy*, Durban
- Vetter S. 2013. Development and sustainable management of rangeland commons- aligning policy with the realities of South Africa's rural landscape. *African Journal of Range and Forage Science*, 30 (1-2): 1-9



- Watt S., Hiqqins C. and Kendrick A. 2000. Community participation in the development of services: A more towards community empowerment. *Community Development Journal*, 35 (2): 120-132
- Watuleke J. 2014. *From sustainable development: The role of food banks in food security in Uganda: A case study of the hunger project food bank-Mbale Epicenter*. Masters thesis. University of Agder, Kristiansand, Norway
- WFP: World Food Programme. 2008. *Food Consumption Analysis: Calculation and Use of the Food Consumption Score in Food Security Analysis*. Vulnerability Analysis and Mapping Branch. United Nations World Food Programme
- World Bank, 2012. *Gender equality and development*. World Development Report. <https://openknowledge.worldbank.org> Accessed on 13 October 2018
- World Health Organisation (WHO), 2018. *Gender, equity and human rights*. [www.who.int/gender-definition](http://www.who.int/gender-definition). Accessed on 28-07-2018.
- Xaba M.B. 2016. A qualitative application of Amartya Sen's 'development as freedom' theory to an understanding of social grants in SA. *African Sociological Review*, 20 (2): 102-121
- Xu X. and Lai S. 2002. Resources, gender ideologies and marital power: The case of Taiwan. *Journal of Family Issues*, 3: 50-69
- Zakari S., Ying L. and Sand B. 2014. Factors influencing household food security in West Africa: The case of Southern Niger. *Sustainability*, 6: 1191-1202

### **CHAPTER 3: GENDER-DIFFERENTIATED OWNERSHIP AND PARTICIPATION IN DECISION-MAKING AND INCOME GENERATED FROM GOATS AT HOUSEHOLD LEVEL IN SEMI-ARID AREAS OF SOUTH AFRICA**

#### **Abstract**

Using focus group discussions, key informant interviews and questionnaire surveys from 241 households, the study analysed gender-differentiated ownership and participation in decision-making and income management of goats at household level in semi-arid areas. In male-headed households, goats were generally owned by the head (98%). In female headed households with single and widowed females, 43% were owned by the head whilst 57% were owned by other household members. In male-headed households, the decision-making process on goat marketing and on income from goats were made by the head whilst in female-headed households, they were made by both the head and elder sons ( $p<0.01$ ). By virtue of men being more educated and earning more income through employment, they were the decision-makers in households ( $p<0.05$ ). The owner of goats was responsible for making decisions on how the generated income would be utilized. Strengthening the role of women in household decision making process is best done by increasing levels of female literacy for women to feel empowered to push for social change in achieving gender equality, perceptions of themselves and their abilities within the society. There is need for engaging men and boys in supporting women empowerment programmes to address gender inequality.

*Keywords:* assets; gender inequality; female literacy

### 3.1 Introduction

Increasing migration by males from resource limited rural areas to bigger cities in search of livelihoods leave women more vulnerable and struggle to make a livelihood and ensure the food security (Olowu, 2013). Although women may have the responsibility of providing food for their households when their husbands have migrated to cities (Ibnouf, 2011), social and cultural inequalities entail that they have little influence over household decision-making.

The decision to participate in household livelihood activities often depends on asset ownership and its control (Udry, 1996). In this regard, individuals without access or control over an asset have less chances to increase productivity. For example, when individuals have no control over land, they tend to have low chances to increase agricultural productivity (Dorward, 1999). With rural women having limited access and rights to household land (Quisumbing *et al.*, 2001); their decision to keep goats is strongly affected by the perceived benefits of doing so (Beckford, 2002). Women may gain access to resources through their husbands but this male-mediated access to resources often leaves them in a more vulnerable position. The differences in resource ownership between men and women negatively impacts women's productivity, income generated, their social standing and their ability to influence decision-making in households and communities.

Gender inequality in resource ownership and decision-making is perpetuated in crop production and irrigation plots in most rural communities through the land tenure system as access is through allocation by households and not by gender (Babajide, 2015). Such allocation generally does not give equal right of ownership to women. Although with livestock production both genders may have access to livestock and be allowed to exercise their rights in production; there is resistance to

reducing gender inequality and discrimination of women where men have higher status and power in society. The resistance result of societal laws that govern inheritance and marriage, as well as many customs regarding gender roles and ownership of assets (Olowu, 2013; Johnson *et al.*, 2016).

Few studies have focused on the interaction between gender ownership, decision-making and income generation in goat production (Deere, 2012; Johnson *et al.*, 2016). It is important to determine this interaction because the perspectives, motives of rearing goats and management practices may depend on the gender of the owner, and affect goat production (Babajide, 2015). Most economic models assume that if households pool their income together, they will not live in poverty (Hamplova *et al.*, 2009; Bonke, 2015). Joint finances assume that activities performed by each partner is of the same value regardless of the financial contribution made. Income management tend to differ significantly depending on marital status, with the unmarried (single and co-habiting) focusing on individual benefits; whilst in married couples, income management is closely associated with the traditional division of labour and attitudes towards gender roles.

The objective of the current study was to investigate gender-differentiated ownership and participation in decision-making and income from goats at household level in semi-arid areas of Msinga, South Africa. Knowledge of the interaction is important to draw recommendations for specific strategies of improved goat management. It also provides a guiding framework in devising action plans to improve the socioeconomic situation of households in semi-arid areas who own goats.

### 3.2 Analytical framework

Webster (1995) used the theory of relative resources in analyzing the participation of women in decision-making. The theory states that having a higher education level or a better paying job influences the ability to make decisions in a household. Hence, authority of spouses in decision-making depends on the contribution made to financial resources. Males usually have power over economic resources. Over the past decades, increased women's literacy, and their involvement in the labour force has changed participation in decision-making in some societies. Participation in household decision-making processes is one of the ways of women empowerment (Kiani, 2012).

Women may play active roles in goat production, but the roles of decision-making as to when to sell goats and how to spend the income from goat sales is often limited, but the ability to benefit from goat production depends on the magnitude of the involvement in decision-making and access to economic opportunities (Osei-Adu *et al.*, 2015). Oyekale (2013) stated that many decisions in households are joint decisions between husband and wife although they may not be formally recognized in households and communities for socio-cultural reasons. Johnson *et al.* (2016) reported on joint ownership of assets, where men and women shared rights to a single asset and made joint decisions. Martinez and Polo (1999) found that in households where the wife participated in the labour force, joint decisions were likely to occur, while a husband had higher controls if the wife did not work. The authors, however, conceded that even with joint ownership, couples had different rights to the same asset, with men's rights being stronger than women's rights. For example, women may manage milk for household consumption, but the men may control the income obtained from milk sales. Husbands usually have the final say when an agreement has not been reached by the couple.

Women are often less confident in making decisions and performing tasks seen as masculine because they are stereotyped as weaker by both themselves and others (Bordalo *et al.*, 2016). Santos *et al.* (2014) reported that women's participation in decision-making at the household level depends on societal perceptions of women's rights and their marital status, although the same does not apply to men irrespective of whether they are married or cohabiting. Kiani (2012) acknowledged that the duration of marriage life also affects women's involvement in decision-making, with mature wives being able to have a say in household matters.

The perspectives, motives of rearing goats and management practices depend on the gender of the owner (Adeyemi, 2015). By defining the gender ownership of goats and household decision-making processes it is important to develop recommendations for specific strategies of improved goat management (Curry, 1996). Women are generally restricted from owning land and livestock, or from making decisions on the use of household income due to their lower social standing in comparison to men (Olowu, 2013). Waithanji *et al.* (2013) showed that there were improvements in child nutritional status in households where women received higher incomes. Hence, there is need to establish the dynamics which influence household resource ownership and control of income as this will assist in maximizing women's income in the households.

### **3.3 Research methods**

#### **3.3.1 Study site**

The study site was Msinga Municipality (28°10'S 30°15'E) and was chosen because it produces indigenous goats. Msinga Local Municipality is one of four municipalities within the uMzinyathi

District Municipality in the province of KwaZulu-Natal, on the south eastern part of South Africa (Tapela, 2011). Msinga is composed of six traditional authority areas (Dearlove, 2007).

The population of Msinga is 190 000, with two out of five of the population being under the age of 15 years SA (StatsSA, 2016). Females make up 57% of the population. It is one of the district's poorest and underdeveloped municipalities with few economic resources and activities. Nearly 90% of the population depends on government social grants. Most of the male household members leave the municipality in search of employment in cities (Msinga Municipality IDP, 2014).

Msinga is in a semi-arid area with erratic rainfall patterns averaging 600 mm annually, ranging between 350 and 900 mm. The area experiences warm summer temperatures that reach up to 44 °C. The erratic nature of rainfall and its rocky landscape makes it risky to invest in crop production (Cousins, 2012). Goats thrive well in this environment.

### **3.3.2 Sampling and selection of households**

Sample selection was done in four stages. The first stage of sampling was purposive. Mthembu and Mchunu traditional authority areas were purposively chosen because of differences in socio-economic opportunities available to them. In contrast to Mchunu traditional authority, many households in Mthembu have a source of income from the Tugela Ferry Irrigation Scheme plots. They have access to or work in irrigation scheme plots. Women are mostly involved in the garden projects. Besides government grants, the income of Mthembu households is obtained from sale of garden produce. The existence of this source of income for the Mthembu households influences their perception on the importance of goats and therefore goat sales are lower than those from

Mchunu traditional area. Of the six traditional areas in Msinga, Mthembu is the only traditional area which has access to Tugela River and therefore makes use of the irrigation scheme plots.

A list of households who owned goats in these two tribal authorities was obtained and was found to be 2148 (GAP Umzinyathi District census, 2017). Using Raosoft's sample size calculator (2004) to calculate sample size (with a 90% confidence level), the sample size used in the study was 241 households. The next stage of sampling was the stratified sampling which divided the population into two strata (each stratum representing a traditional area). Stratified sampling used a sampling fraction in each traditional area that is proportionate to the total number of households that own goats. Samples for each traditional area was therefore calculated relative to its proportion of the full sample size of 241. Sample sizes for Mthembu was calculated to be 128 and Mchunu was 113 households. The final stage of sampling was random. There was random sampling of dip tanks in each tribal area. Each traditional authority area is divided into dip tanks based on livestock ownership. Dip tanks are institutions that keep goat statistics aimed at giving farmers permits which enables them to sell goats or cattle when the need arises. Dip tanks also provide a dipping service for cattle. Households are expected to pay annual contributions to dip tank managers to maintain their membership and access to services. Three dip tanks were randomly selected in each traditional authority area. Lastly, random selection of households in each of the selected dip tanks was conducted on the ground.

### **3.3.3 Data collection**

Data collection was conducted between May and June 2019, using a structured household questionnaire, focus group discussions (FGDs) and key informant interviews. The FGDs and open-



ended key informant interviews were used to formulate data that provided the explanations behind the quantitative data from the questionnaire. Key informants were composed of an equal number of males and females: a male and female Community Animal Health Workers (CAHWs), a male extension officer, a female NGO representative, a female social worker and a male dip tank manager. Four FGDs were conducted, one with men only and the other with women only, each selected from the two traditional authority areas. Each group had 12 participants, two representing a selected dip tank area. Female participants included married, single and the widowed.

During the questionnaire survey, one person was interviewed from each household. Gender of the household head was recorded which enabled the following gender categorization: male-headed households (MHHs) and female-headed households (FHHs). Although women come in different categories such as married women in male-headed households, single unmarried women in female-headed households, and widowed women in female-headed households; during questionnaire surveys, the women were assumed to fall in one category of female-headed. This was due to low sample sizes in other categories. Young boys and girls did not participate in the study due to ethical considerations. Ferdousi (2015) reported that safeguarding the rights of children, who are often unable to provide informed consent, is important. Hence in the study, children's views were only brought up during interviews and focus group discussions although they did not physically participate. Six isiZulu-speaking enumerators administered the questionnaire which was pre-tested.

All ethical considerations were observed during and after the data collection period. Ethical clearance was obtained from the University of KwaZulu-Natal ethics committee (Ref No. HSS/0286/019D).

### **3.3.4 Statistical analyses**

Qualitative data from the focus group discussions and key informant was analysed by explaining the participants' meanings, experiences and views of the questions discussed. Coding was done and themes were created by identifying keywords which were used to present explanations and interpretations. For quantitative data, the gender effect was tested by comparisons of differences between pairs of gender categories using the t-test of SPSS (2017). A chi-square test (Crosstabs) of SPSS (2017) was used to determine the association between gender of household head and goat flock sizes, participation in marketing and decision-making.

## **3.4 Results**

### **3.4.1 Goat ownership**

There was a significant difference ( $p < 0.05$ ) between male and female-headed household in terms of goat ownership. Questionnaire survey results showed that in male-headed households, goats were generally owned by the head (98%). In female-headed households with single and widowed females, 43% were owned by the head whilst 57% were owned by various people who included elder sons. Goat flock sizes were higher (mean 26.78) for male-headed households than for female-headed households (mean 15.59) ( $p < 0.05$ ); whilst flock sizes were higher (mean 24.38) for Mthembu tribal area than for Mchunu households (mean 21.16) ( $p < 0.05$ ).

Land is a starting point for any discussions surrounding goat production because it provides security. Quisumbing *et al.* (2014) reported that ownership of assets such as goats is often associated with ownership of land because a woman may not own goats whilst the land she is using belongs to the husband. Questionnaire survey results in the study showed that there was a relationship between marital status of household head and access to land (Table 3.1). Married males accessed land through allocation by the local traditional authorities. Married women therefore had weaker rights to land as it belonged to their husbands. Single women in female-headed households accessed land through allocation by the traditional authorities or through sales whilst widowed women inherited land from their late husbands.

Table 3.1: Percentages of different categories of women to types of land they own

Marital status	Land	Land	Land bought	Significance level
	allocated	inherited		
Single	82	0	8	
Married	99	0.5	0.5	***
Widowed	0	100	0	
Cohabiting	91	8	1	

Significance level: \*\*\*= $p < 0.01$

Focus group discussions revealed that women in male-headed households may not own goats if the husband is still alive (for the same reason that they cannot own land if the husband is alive). Men owned all household assets, goats included, because they were the heads of households. Even those ‘bought’ by women still belonged to the husband as the head of the household. In female-

headed households, a widowed woman would only inherit goats if she did not have elder sons and only if the family of her deceased husband allowed her to. Death of husband led to loss of goats especially if the marriage was under customary law which does not protect women's rights to property where in some instances the siblings of the deceased took ownership of the assets. However, single women (who never married) in female-headed households, had ownership of goats obtained through sales or donations.

### **3.4.2 Household decision-making**

Focus group discussions revealed that marital status affected the decision-making process of a household because society has traditional beliefs that apply to individuals depending on their marital status. Questionnaire survey results showed that there was a significance difference between gender and marital status ( $p < 0.01$ ) (Table 3.2). About 80% of male-headed households were married, 18% cohabiting, while two percent were either single or widowed. On the other hand, about 80% of female-headed households were widowed, 12% were single and the rest were either married or cohabiting.

Table 3.2: Marital status of household head as a percentage

Household head	Single	Married	Widowed	Cohabiting	Significance level
Male-headed	1	80	1	18	***
Female-headed	12	3	80	5	

Significance level:  $p < 0.01$

Focus group discussions revealed that married women in male-headed households would not make decisions in households since they were expected to be submissive to the men in their households. Widowed women submit to elder sons and siblings of their deceased husband. In addition, married and widowed women were not allowed to sell goats or make decisions on their own to sell goats in the community as it was the responsibility of men to announce the sale of goats at social events. However, single women were free to sell goats or make own decisions in their households although they had to seek assistance from male siblings or neighbours for ease of marketing.

Questionnaire survey results showed that in male-headed households, decisions on goat marketing were made by the head whilst in female-headed households, they were made by both the head and the children ( $p < 0.01$ ) (Table 3.3). In male-headed households, decisions on income were made by the head whilst in female-headed households, they were made by both the head and the children ( $p < 0.01$ ) (Table 3.3).

Table 3.3: Decision-making on goat marketing and income management

	Male-headed	Female-headed	
Category	household	household	Significance level
Decision-making on goat marketing (%)			
Head	98	45	
Both head and spouse	2	0	***
Children	0	3	
Both head and children	0	52	
Decision-making on income management (%)			
Head	91	42	
Both head and spouse	8	0	***
Children	0	3	
Both head and children	1	55	
Significance level: ***= $p < 0.01$			

Eight of ten males in male-headed households were resident on the farm and only 19% worked in cities and returned to the farm on weekends, month-ends or during public holidays. On the contrary, all but 1% of female heads were resident on the farms. Focus group discussions revealed that married females in male-headed households may not make decisions on their own if the head is not present at the farm. In addition, even though women might be the ones looking after goats when the husband is working away from home; when it came to making important decisions such as those requiring money to be spent (vaccinations or buying feed supplements) or buying and

selling of goats; they would not make such decisions without their husband's consent or they might have to wait for his return.

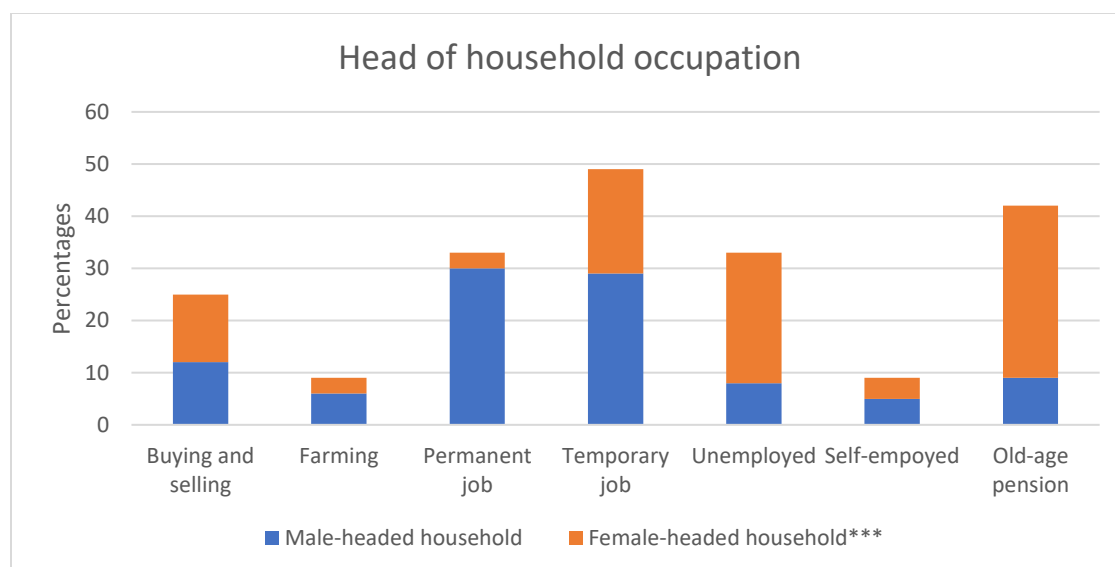
Decision-making was also affected by the education level and occupation of the head of household. Chi-square showed that there was a relationship between education level and decision-making ( $p < 0.05$ ) (Table 3.4). In households where the head had higher education levels, decision making was the role of the head; whilst in households where the head had lower education levels, children also took part in decision-making.

Table 3.4: Education level of household head and role of decision-making as a percentage

Education level	Head	Both head and spouse	Children	Both head and children	Significance level
None	57	5	0	38	**
Primary	77	5	2	16	
Secondary	87	7	0	6	
Tertiary	93	7	0	0	

Significance level: \*\*= $p < 0.05$

The importance of education was seen from the occupation of the different gender (Figure 3.1). Thirty percent of male-headed households had permanent employment as compared to only three percent of female-headed households ( $p < 0.01$ ); with most of the females surviving on old aged pensions (33%). By virtue of men being more educated and earning more income through employment, they were the decision-makers in households.



Significance level: \*\*\*= $p < 0.01$

Figure 3.1: Head of household occupation

### 3.4.3 Income management

Focus group discussions revealed that ownership of goats influenced the decisions made on income from goats. In the study, the owner of goats was responsible for making decisions on how income obtained from goats would be utilized. The owner was also responsible for keeping the money obtained from goat sales. The fact that men earned higher incomes and made decisions on sale of goats, they therefore spent it according to their personal preferences. Focus group discussions also revealed that some spouses did not pool their incomes together but used it differently depending on who earned it and its source, with women spending theirs mostly on household needs and food, whilst men preferred to spend a greater part of their incomes on their personal requirements.



### 3.4.4 Use of income from goat sales

Results from questionnaire surveys and FGDs revealed that income from goat sales was used mostly for funerals and ill-health, and that these were ranked higher in terms of prevalence (Table 3.5). There was a significant difference between the ranking of income from goats for food and education between male and female-headed households. Female-headed households ranked food higher than male-headed households, showing that more females than males considered spending income from goat sales on household food. Focus group discussions revealed that goat ownership patterns affected how the money from goat sales was spent.

Table 3.5: Use of income from goats in ranks of importance

Variable	Female-headed				Significance
	Male-headed household		household		
	Mean	SD	Mean	SD	
Food	3	1.2	2.5	1.2	***
Health	2.2	1.1	2.2	1.2	ns
Household items	5.5	1.2	5.4	1.2	ns
Electricity	5	1.2	4.8	1.1	ns
Debt payment	3.8	1.9	3.8	1.6	ns
Funerals	2.6	1.5	2.7	1.4	ns
Education	5.8	1.8	6.6	1.2	***

Significance level \*\*\*=  $p < 0.01$

ns= not significant

Lower rank is most common use and higher rank is least common use

### 3.5 Discussion

Results from the study showed that the relative resource theory (Webster, 1995) can be applied to the gender participation in decision-making. The theory states that authority that each spouse possesses in decision-making depends on higher education level or better paying job. In the study, males were more educated and contributed more to financial resources in male-headed households; this resulted in them having more authority over women in decision-making. In female-headed households, the head had lower education levels and children (who were adult sons) had the authority to make household decisions and had ownership of goats. Results from the study are in line with previous research which showed that the head of household does not always participate in decision-making (Handa, 1994; Doss, 1996, 2001; McPeak and Doss, 2006) as elder sons made household decisions. These results also showed that marital status influenced decision-making in households since married and widowed women would not make decisions on their own although single women were free to do so. In the study, joint decisions between husband and wife as stated by Oyekale (2013) were not cited, maybe because these were not formally recognised in households for socio-cultural reasons.

The fact that some men were not resident on farms but worked in cities made managing goat flocks challenging for women since they had to call their menfolk for the go-ahead to sell or slaughter a goat or buy medication when goats were sick. In female-headed households, elder sons might have been the rightful owners of goats but did not have enough interest in goats farming and this affected goat production in such households.

Societal laws that govern marriage and inheritance do not allow women to own assets (Olowu, 2013) such as goats. Although, Aganga and Mosimanyana (2001) showed no significant differences between male and female-headed households in small stock ownership and management practices; the results of the study were in line with findings by Njuki *et al.* (2014) that women in male-headed households did not own goats if the husband is still alive but men owned all household assets, goats included; by virtue of them being household heads. For women, the purchase of goats did not automatically indicate ownership (IFAD, 2007) as goats belonged to household heads. In female-headed households, a widowed woman would only inherit goats if she did not have elder sons and only if the family of her deceased husband allows her to. Gendered shocks such as divorce or death of husband affected some women and led to loss of their goats especially if the marriage was under customary law which does not protect women's rights to property (in some instances the siblings of the deceased took ownership of the assets). Similar results were obtained in the study by Peterman (2010).

Ownership of goats also influenced the decisions made such as on income emanating from goats. In line with studies by Waithanji *et al.* (2013), the owner of goats was responsible for making decisions on how income obtained from goats would be utilized. A study by Quisumbing and Maluccio (2003) revealed that married women's rights to land are generally weaker than those for men because traditional land allocations usually go to men. Similar results were observed in the study where land belonged to men and women would only gain ownership through inheritance from the late husband. Quisumbing *et al.* (2014) reported that ownership of assets such as goats is often associated with ownership of land because a woman may not own goats whilst the land she

is using belongs to the husband. Related results were obtained in the study where access to land influenced goat ownership.

Men earned higher incomes and therefore spent it mostly on personal use. The findings were in line with studies by Olowu (2013) which observed that women may receive less incomes than men but spend a substantial amount of it on household needs and food, whilst men preferred to spend theirs mostly on personal needs. Duflo and Udry (2003) also observed similar scenario in which households' different sources of income were used differently depending on who earned it with individuals making decisions with respect to their personal preferences. The study also corresponds with Hamplova *et al.* (2009) relating to the fact that the more educated gender makes decisions on income management.

Obtaining financial independence will assist in increasing bargaining power of women and will enhance their involvement in decision-making. However, increasing women's rights to participate in household decision-making requires a societal change in attitude by both men and women (Kiani, 2012).

### **3.6 Conclusions**

There is need to increase levels of female literacy by providing females with access to basic education. Training women and giving them more power in managing resources will help to strengthen their ability to participate in decision-making. Increasing female literacy will also help to increase females' income which will improve women and children's nutritional levels. Participation of women in goat ownership, production, marketing, as well as decision-making on

goat income is critical in achieving food security. Policy interventions aimed at changing gender inequalities are needed. For women to feel empowered to push for social change in achieving gender equality, however, they need to change perceptions of their own abilities in societies. The development will also require some reflections in the socializing process of boys and girls in households and may entail encouraging men to support women empowerment programmes to address gender inequality. Traditional and cultural values which influence perceptions on societal roles of women need to change in this modern world. In addition, legal obligations for land ownership of women needs to change in order to close the gender gap. Chapter 4 identifies the different roles that men and women play in goat production and detects the challenges faced in increasing flock sizes with the aim of improving household food security.

### 3.7 References

- Aganga A.A. and Mosimanyana N. 2001. Gender impact on sheep and goat production in Botswana. A case of Gaborone region. *Journal of Agriculture in the Tropics and Subtropics*, 102: 15-18
- Babajide A.A.A. 2015. *Livestock ownership by gender and seasonal impact on production: A case study in Msinga Municipality*. Masters thesis. University of KwaZulu-Natal, Pietermaritzburg, South Africa
- Beckford C. 2002. Decision making and innovation among small-scale yam farmers in central Jamaica: a dynamic, pragmatic and adaptive process. *The Geographical Journal*, 168: 248-259
- Bonke J. 2015. Pooling of income and sharing of consumption within households. *Review of Economics of the household*, 13(1): 73-93

- Bordalo K.B. Coffman N. and Gennaioli A.S. 2016. *Beliefs about gender*. Working Paper 22972. National Bureau of Economic Research, Cambridge. <http://www.nber.org/papers/w22972>. Accessed on 13 October 2018
- Cousins B. 2012. *Smallholder irrigation schemes, agrarian reform and accumulation from below: Evidence from Tugela Ferry, KwaZulu-Natal*. Paper for a conference on strategies to overcome poverty and inequality: Towards Carnegie III, 3-7 September 2012. University of Cape Town, South Africa.
- Curry J. 1996. Gender and livestock in African production systems: an introduction. *Human Ecology*, 24: 149-160
- Dearlove P.D. 2007. *Msinga municipality integrated development plan 2005/2006*. Pietermaritzburg: KwaZulu-Natal Department of Local Governance and Traditional Affairs.
- Deere C.D., Alvarado G., Twyman J. 2012. Gender inequality and asset ownership in Latin America: Female owners vs household heads. *Development and Change*, 43(2): 505-530
- Dorward A. 1999. Farm size and productivity in Malawian smallholder agriculture. *Journal of Development Studies*, 35: 141-161
- Doss C. 1996. Testing among models of intrahousehold resource allocation. *World Development*, 24: 1597-1609
- Doss C. 2001. Is risk fully pooled within the household: evidence from Ghana. *Economic Development and Cultural Change*, 50: 101-130
- Duflo E. and Udry 2003. *Intrahousehold resource allocation in Cote d'Ivoire: Social norms, separate accounts and consumption choices*. BREAD Working Paper No. 016. Bureau for Research and Economic Analysis of Development Working paper no. 016, Center for

International Development, Harvard University.

<http://www.cid.harvard.edu/bread/papers/working/016.pdf>. Accessed 21/12/2019

Ferdousi N. 2015. Children as research subjects: The ethical issues. *Bangladesh Journal of Bioethics*, 6 (1): 6-10

GAP Umzinyathi District 2016- 2017 census. 2017. [www.gapkzn.co.za/Umzinyathi.php](http://www.gapkzn.co.za/Umzinyathi.php)-GAP KZN. Accessed on 9 March 2019

Hamplova D., Le Bourdais C. and Le Bourdais C. 2009. One pot or two pot strategies? Income pooling in married and unmarried households in comparative perspectives. *Journal of comparative family studies*, 40 (3): 355-385

Handa S. 1994. Gender, headship and intrahousehold resource allocation. *World Development*, 22: 1535-1547

Ibnouf F.O. 2011. Challenges and possibilities for achieving household food security in the Western Sudan region: The role of female farmers. *Food Security*, 3(2): 215-231

IFAD 2003. *Mainstreaming a gender perspective in IFAD's operations: Plan of action, prerequisites of gender sensitive design*. <http://www.ifad.org/gender/policy/action.htm>  
Accessed on 13 October 2018

Johnson N.L., Kovarik C., Meinzen-Dick R., Njuki J. and Quisumbing A. 2016. Gender, assets and agricultural development: Lessons from eight projects. *World Development*, 83:295-311

Kiani M. 2012. How much are women involved in decision-making in family in Iran? *Sociology Study*, 2(6): 417-427

Martinez E. and Polo Y. 1999. Determining Factors in Family Purchasing Behavior: An Empirical Investigation. *Journal of Consumer Marketing* 16(5):461-481.

- McPeak J. and Doss C. 2006. Are household production decisions cooperative? Evidence on migration and milk sales from northern Kenya. *American Journal of Agricultural Economics*, 88: 525-541
- Msinga, Municipality IDP. 2014. *About Msinga*. <http://www.msinga.org/index.php/about-us>. Accessed on 13 October 2018
- Olowu D. 2013. Gendered aspects of food security in Lesotho: Implications for an integrative rights-based approach. *Gender and Behaviour*, 11(2): 5378-5392
- Osei-Adu J., Ennin S.A., Asante B. O., Adegbidi A., Mendy M., and Kergna A. 2015. Gender issues in crop-small ruminant integration in West Africa. *International Journal of Agricultural Extension*, 3 (2): 137-147
- Oyekale A.S. 2013. Gender role in agriculture, climate change and food security in the Sahel Belt of West Africa: Application of Poisson and Negative Binomial Regression. *Gender and Behaviour* 2013, 11(2): 5499-5511
- Quisumbing A.R., Payongayong E., Aidoo J.B. and Otsuka K. 2001. Women's land rights in the transition to individualized ownership: implications for the management of tree resources in western Ghana. *Economic Development and Cultural Change*, 50: 157-182
- Raosoft. 2004. *Sample Size Calculator Inc.* <http://www.raosoft.com/samplesize.html>. Accessed on 9 March 2019
- Santos F., Fletschner D. and Savath V. 2014. *An intrahousehold analysis of access to and control over land in the Northern Province, Rwanda*. World Bank Conference on land and poverty. The World Bank Washington DC.
- Statistics South Africa, 2016. *Community Survey 2016*. Statistical release P0301 / Statistics South Africa, Pretoria



- Tapela B. 2011. *Msinga smallholder irrigation farmers: Commercially successful smallholders using mixed technologies*. Institute for Poverty, Land and Agrarian Studies, University of the Western Cape
- Udry C. 1996. Gender, agricultural production and the theory of the household. *Journal of Political Economy*, 104: 1010-1046
- Waithanji E., Njuki J. and Nabithu B. 2013. Gendered participation in livestock markets. In: *Women, livestock ownership and markets: Bridging the gender gap in eastern and southern Africa*. Eds. Njuki J and Sanginga P.C. ILRI, Routledge New York
- Webster C. 1995. Determinants of Marital Power in Decision Making. *Advances in Consumer Research*, 22:717-722.

## **CHAPTER 4: GENDER DISAGGREGATED ANALYSIS OF GOAT PRODUCTION IN SEMI-ARID AREAS OF SOUTH AFRICA**

### **Abstract**

Using key informant interviews, focus group discussions and a questionnaire survey of 241 households, the paper provides a detailed analysis of goat management practices in relation to gender in semi-arid areas of Msinga, South Africa. Chi square results showed that household socio-economic factors contributed to different gender roles in goat production, leading to differing capacities in participation in goat management. Male-headed households were generally younger in age, married and more educated. Female-headed households largely belonged to the old age-group, were single or widowed and had little or no formal education ( $p<0.05$ ). Male-headed households had larger goat flock sizes (mean 26.7 goats per household) than female-headed households (mean 16.5 goats per household) ( $p<0.01$ ). The numbers of kid births and goats sold were higher ( $p<0.01$ ) for male-headed households than for female-headed households. Goat annual net gain was significantly higher for male-headed households than for female-headed households ( $p<0.05$ ). Male-headed households had lower goat mortality rates from better health control and higher goat reproduction rates ( $p<0.01$ ). The motivations of male and female-headed households for keeping goats were different ( $p<0.01$ ); with the main reason for rearing goats for female-headed households being for cultural ceremonies and not primarily as an economic activity; whilst for males it was for sales. For a successful goat production, female farmers need to see goat farming as a source of income and be convinced that their standard of living can be improved through goat farming, apart from the cultural benefits derived. Hence there is need to improve the capacity of women to enable them to play better roles in goat production.

*Keywords:* goat management practices, socio-economic factors, goat annual net gain, income

#### **4.1 Introduction**

The importance of goats has been highlighted by many authors (Rahman *et al.*, 2016; Aldosari, 2017; García-Winder and Chavarría, 2017). Goats are generally managed under extensive management systems which require little financial input. However, the level of production is generally low because of several constraints that include underfeeding, parasites and diseases (Lebbie, 2004). Goat-related priorities differ depending on religion, traditional beliefs, values and gender. Priorities vary from main source of capital, income and cultural ceremonies; and traditional beliefs may restrict consumption of goat meat (Bettencourt *et al.*, 2015). Goat ownership may also be used to determine social status. They may be kept as a sign of wealth and prestige without the intention of extracting any net income from them.

Only a few studies have focused on the interaction between gender roles and goat production (Deere, 2012; Johnson *et al.*, 2016). Determining the gender aspect in goat production is important because the perspectives, motives of rearing goats, cultural beliefs, institutional and management practices may depend on the gender of the owner, and this affect goat production (Babajide, 2015). Gender also brings about differences in division of labour in goat production, especially in households where it is their major source of income. Gender differences may make men to focus on the rearing, slaughtering of goats for home consumption or ritual purposes, marketing, management, and control while women may be responsible for feed gathering and providing care (Aldosari, 2017).

The specific objective of the study is to provide a detailed analysis of gender differences in goat production in semi-arid areas of South Africa. Identifying the different roles that men and women play in goat production is important in detecting the challenges they face which assist in developing programmes that address these challenges in access to, control over and management of goats. This also helps in determining the distribution of resources between men and women (FAO, 2010b). Detailing the aspect of gender assists in identifying opportunities and contribute towards making any targeted interventions on women in rural semi-arid areas who keep goats. Increasing goat offtake and exits in female-headed households is an ideal tool to increase their food security and standards of living. The results from the current study also enhance information dissemination among stakeholders in the goat production industry.

## **4.2 Analytical framework**

Gender issues focus on the relationship between men and women, division of labour, roles, and access to and control over resources (IFAD, 2003). Understanding of gender issues is important in goat rearing and activity roles is important in achieving household food security, improved incomes and the wellbeing of the household. The role of gender in ensuring an enhanced goat production system in semi-arid areas cannot be underestimated. Women's roles in goat production is different from region to region and it strongly depends on social, cultural and economic factors. Quisumbing *et al.* (2014) notes that it is often challenging to change gender related issues because gender roles are internalized in young children and this impacts mindsets that are carried later into life.

A description of the physical, economic and social environments of goat farmers is important in order to accurately interpret goat production outcomes (Peacock, 1987). Determining the influence of the physical and socio-economic factors in production by men and women provides an understanding of their capacity to invest in goats. This influences perspectives and motives of rearing goats and goat management practices; and consequently, affect goat production. Access to formal education plays a crucial role in improving productivity and incomes since it has a relationship with the ability to adopt new practices.

The socio-economic role played by goats is important for resource-poor farmers in rural areas in Africa (Mamabolo and Webb, 2005). Gender roles relate to divisions of household labour and gender differences in status and authority (Kray *et al.*, 2017). Any deviations in gender role from traditional one is often met with negative attitudes (Harrison and Lynch, 2005). Women usually have limited resources and participate less in decision-making when compared to men. Despite their involvement in goat management, they are unable to achieve their full potential when compared to men (FAO, 2013). The gender of a farmer has the likelihood to determine adoption of practice for productivity improvement and income generation (Doss and Morris, 2001). Participation of women in goat ownership, production, marketing, access to education for effective technology implementation as well as decision-making on goat income is critical in achieving food security.

### **4.3 Research methods**

#### **4.3.1 Study site, sampling and selection of households and data collection**

The study site, sampling and selection of households and data collection procedure are described in sections 3.3.1, 3.3.2 and 3.3.3.

#### **4.3.2 Statistical analyses**

Qualitative data from the focus group discussions and key informant was analysed by explaining the participants' meanings, experiences and views of the questions discussed. Coding was done and themes were created by identifying keywords which were used to present explanations and interpretations. For quantitative data, the effects of gender and age, marital status and education levels of household was determined using chi-square tests in SPSS. Comparisons of livestock means and of entries and exits between male and female headed households was done using general linear models. Frequencies for the type of housing, breeding, water source and feeding were determined using SPSS (2017).

### **4.4 Results**

#### **4.4.1 Reasons for rearing goats**

There was a significant difference ( $p < 0.01$ ) in reasons for rearing goats between male and female-headed households (Table 4.1). The main reason for rearing goats by male-headed households was for sales whilst for female-headed households it was for cultural ceremonies (*umsebenzi*). According to their beliefs, goats are slaughtered in rituals such as cleansing of the dead, during burials, weddings or to welcome daughters into adulthood (*umemulo*). The purpose of such rituals was to 'contact spirits, to gain favour, to obtain higher standard of living and better health'.

Reasons for rearing such as for household meat consumption, investments, skin and manure followed suit; with milk being the least ranked in terms of importance.

Table 4.1: Reasons for goat rearing in ranks of importance

Variable	Male-headed household		Female-headed household		Significance
	Mean	SD	Mean	SD	
Meat	3.6	1.3	3.3	1.3	ns
Milk	7.8	0.5	7.7	1	ns
Manure	5.9	1.5	6.3	1.6	ns
Skin	5.6	1.4	5.6	1.3	ns
Sales	1.7	1.2	2.7	1.4	***
Investment	4.5	1.7	4.5	1.6	ns
Dowry	4.5	1.7	4.3	1.6	ns
Ceremonies	2.5	1.7	1.6	1.3	***

Significance level \*\*\* =  $p < 0.01$

ns= not significant

Lower rank is most important reason and higher rank is least importance reason

During FGDs, farmers indicated that they keep goats as a ‘bank’ to sell only when there is an emergency such as illnesses or funerals. Questionnaire survey results indicate that this reason mostly applies to male-headed households whilst it is only the second most popular reason for rearing goats by female-headed households. These results show that the priorities of male and female-headed households for keeping goats are different. Reasons for rearing affect goat

production in that production may not increase if farmers cannot see tangible benefits of keeping goats in their day to day living.

#### **4.4.2 Provision of goat housing and breeding**

Results from both FGDs and questionnaire surveys showed that all goat farmers (both male and female-headed households) used kraal made up of untreated wood material as the basic housing for goats. Goats are kept under extensive production system and so housing is mainly for overnight protection against theft and predation. Goats are housed in kraals at night and let out to graze during the day. Goats are therefore exposed to extreme weather conditions. Children or females in male-headed households and in female-headed households are responsible for opening and closing of the kraal as well as cleaning inside the kraal. Focus group discussions revealed that culturally, women are not allowed to enter a kraal until a ritual ceremony is conducted to cleanse them. Rituals are performed for mature girls and new brides in the household before they can enter the kraal. The reason given was that before rituals are performed the women's presence in the kraal upsets the ancestors. This cultural issue affects goat production in that women may not be available to take care of goats during the time of their 'impurity'.

Focus group discussions and questionnaire survey results showed that communal area bucks are the source of bucks used for breeding by all farmers. Farmers do not choose which bucks or which characteristics of bucks are to be used for mating because mating occurs during free range grazing away from the homestead. Hence mating is uncontrolled by both male and female-headed households.



#### **4.4.3 Goat castration and culling**

Questionnaire survey results for castration showed that most of the goat farmers castrate their goats - about 93% of male-headed households and 95% of female-headed households (with no significant difference). The task of goat castration was mostly performed by males. Females who were single or widowed had to ask neighbours or elder sons to assist with performing the task. The reasons for the castration of goats are stated in Table 4.2. The most common reason for goat castration by both males and females was to control breeding, whilst males also considered improvement in meat taste as equally important. Where breeding is controlled, it is to the benefit of the farmers because uncastrated goats get lost as they wander around looking for mates. Single and widowed females in FGDs mentioned that the problem of lost goats is more concerning to them than it would be in male-headed households because the later are able to go out and look for lost goats which they may recover. The pattern of culling goats is significantly different ( $p < 0.01$ ) between male and female-headed households. Eighty-eight percent of male-headed households cull the goats as compared to 72 % of female-headed households. The reasons for culling for male-headed households cull was mostly for size and old age, whilst in female-headed households it was mostly for performance and old age. (Table 4.2). The reason for these differences between males and females is linked to the reasons for rearing goats. Males prefer larger sized goats which are ideal and fetch higher prices when selling.

Table 4.2: Reasons for castration and culling of goats

	Male-headed	Female-headed	
Category	households	households	Significance level
Reasons for castration (%)			
Control breeding	41	67	
Improvement in taste	40	13	**
Better temperament	8	11	
Fast growth	4	4	
Reasons for culling (%)			
Size	25	7	
Conformation	2	0	
Colour	1	0	**
Performance	19	11	
Old age	35	51	

Significance level: \*\*=  $p < 0.05$

#### 4.4.4 Goat watering, feeding and feed supplements

Both questionnaire survey and FGDs results indicated that herding of goats was not practiced by farmers and goats grazed in nearby hills during the day and returned to the homesteads in the evening. The goats were able to self-herd, being led by alpha females where they wandered in bushes. Due to the semi-arid nature of the study area; little growing of crops is practiced rendering it unnecessary to herd goats since they would not pose any threat to crop farming. With most farmers providing little or no supplementary feeding in winter; kids often die during this period.

There was no significant difference of goats feed supplementation between male and female-headed households. There was however a significant difference ( $p < 0.01$ ) of supplementary feeding between Mchunu and Mthembu traditional authority areas. Majority of Mchunu residents did not supplement their goats because they had no crop residues to use as supplements due to little or no cropping being performed because of the semi- arid nature of the area. On the other hand, majority of Mthembu residents supplemented their goats using crop residues because they were involved in gardening due to their proximity to the irrigation scheme near the Tugela River.

Both the questionnaire survey and FGDs showed that goats look for water on their own in rainy seasons when dams are full, and rivers are flowing but in winter water is provided for them. Main sources of water were rivers, dams and taps (Table 4.3).

Table 4.3: Source of water for goats

Water source	Frequencies	Percent
Dam	100	41.5
River	96	39.8
Water well	37	15.4
Borehole	7	2.9
Tap	1	0.4
Total	241	100

During the dry season, goats returned to the homesteads during the day to be provided with water. Women in households, as caregivers; had the responsibility of providing water to goats in homesteads. Although girls did not take part in FGDs due to ethical considerations, views from FGDs were that girls also assisted their mothers in providing water for the goats as they learned to take part in some of the caregiving roles as females.

#### 4.4.5 Goat health

A considerable number of male-headed households vaccinated their goats (76%), as compared to female-headed households (62%) ( $p < 0.05$ ). During FGDs, some female-headed households did not vaccinate their goats because they could not afford it. They reported that they may be forced to sell a single goat just so they can have enough money to buy vaccines for the newly born kids. Others revealed that they do not vaccinate goats as they do not see the benefit of doing so because even when vaccinated, goats may still succumb to heartwater disease. On the other hand, males

indicated that they made use of traditional medicines if modern vaccines proved too costly for them.

Seventy-three percent of male-headed households were between the ages of 35 to 64 and only 18% belonged to the old age-group (above 65 years of age). In comparison, 52% of female-headed households belonged to the adults age-group, and as much as 42% were old aged. There was a relationship between age of household head and goat vaccination; with the youth (82%) and adults (70%) vaccinating their goats, whilst only 48% of the aged vaccinated goats ( $p < 0.01$ ). FGDs results revealed that the younger farmers were more proactive in gathering resources required in goat management practices (as shown by goat health management), while those in the old-aged category had challenges to physically and mentally run a goat farming project.

There was a significance difference ( $p < 0.01$ ) of the role of health management between household members (Table 4.4). In male-headed households and in female-headed households owned by single women, the heads of the households were responsible for goat health management. In widowed households, however, children, and mostly elder sons were responsible for goat health. The reason as obtained from FGDs was that veterinary drug stores were located further from the villages and required a long commute. With men being more mobile than females it was ideal for them to be responsible for goat health. Mature boys also assisted in buying medical supplies from veterinary.

Table 4.4: Role of goat health management as a percentage

Household	Head	Spouse	Head and spouse	Children	Hired labour	Significance level
Male-headed household	55	25	14	4	1	
Female-headed (single)	91	0	0	9	0	***
Female-headed (widowed)	42	2	0	55	1	

Significance level: \*\*\*= $p < 0.01$

There was a significance difference ( $p < 0.05$ ) between the ranks of endemic diseases by both male and female-headed households. Males ranked poisonous plants and worms higher whilst females ranked heartwater (*umqazelo*) and coccidiosis (*uhudo*) as being more problematic. Control of heartwater require vaccination and as reported earlier in the study; a considerable number of female-headed households did not vaccinate their goats resulting in goats succumbing to the disease. Questionnaire survey results showed that female-headed households ranked diseases as the highest cause of death for goats, whilst males considered poor diet as the main cause. This shows that males were better at controlling diseases than females because they were able to commute to buy medicines or also made use of traditional medicines.

Table 4.5 shows that most farmers seek health advice for their goats but there was a significance difference between male and female-headed households in terms of where advice is sought from. More male-headed households sought health advice from private veterinary services ( $p < 0.01$ ) than female-headed households. Some female headed households opted to seek health from Community CAHWs because their services were more affordable than private veterinaries and drug stores.

Most of the CAHWs were females; single and widowed farmers found it easier to engage with these female CAHWs than they would with male veterinary officers. Interviews conducted to gain more insight on CAHWs revealed that an NGO called Mdukatshani trained the CAHWs and provided them with vaccinations and treatments which they sold to communities at a small price. Their focus was on goat and chicken farmers because they believed that the government's Department of Agriculture only focused on cattle and neglected goat and chicken farming. Community members contacted CAHWs when they had health issues with goats and chickens because they did not get much assistance from extension services of the Department of Agriculture. During an interview conducted with an extension officer from the study site, he admitted that they offered their services mostly to cattle farmers because they did not have the capacity to assist all the livestock farmers in the area, goat farmers included.

Table 4.5: Sources of advice on goat health

Household head	None	Government veterinary	Private		Extension service	CAHWs	Significance level
			veterinary	Veterinary store			
Male-headed	7	5	62	9	0	17	***
Female-headed	11	1	41	17	1	30	

Significance level: \*\*\*= $p < 0.01$

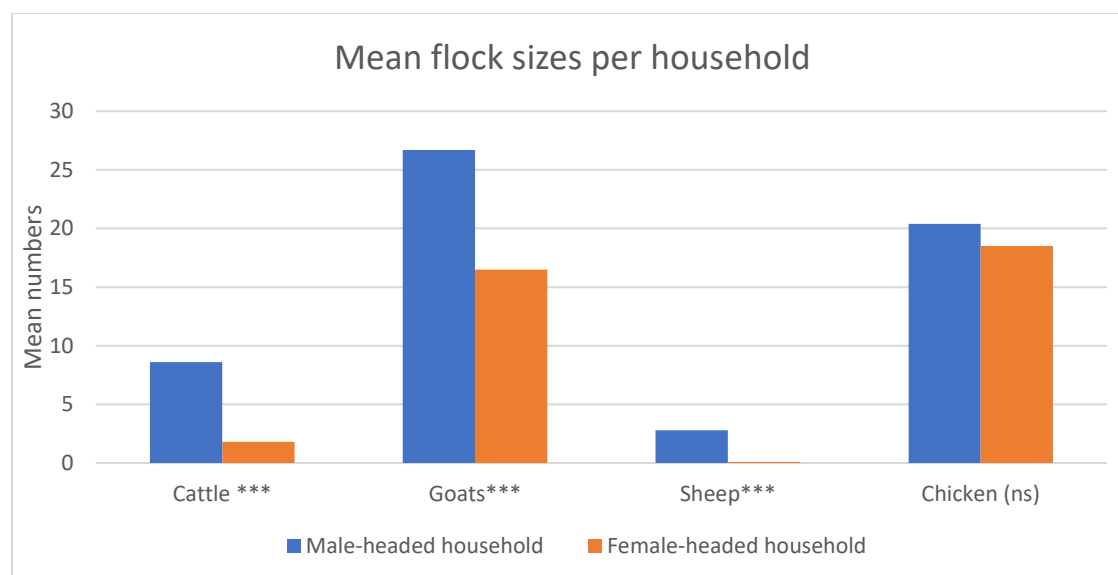
Single and widowed women faced challenges in attending and participating in group training activities such as Livestock Association meetings meant to assist farmers. Access to information

for women goat farmers was a challenge as meetings were mostly attended by men and this limited their ability to improve production.

#### **4.4.6 Flock sizes**

Goat flock sizes were significantly higher ( $p < 0.01$ ) for male-headed households (mean 26.7 goats per household) than for female-headed households (mean 16.5 goats per household) (Figure 4.1). There was also a significant difference ( $p < 0.01$ ) between male and female-headed households in terms of cattle herd sizes with male-headed households owning more cattle than female-headed households (means 8.6 and 1.8 respectively). Male-headed households also owned statistically significant more sheep ( $p < 0.01$ ) than female-headed households (means 2.8 and 0.1 respectively). Similar results were reported in Chapter 3. However, there was no significant difference between the numbers of chickens of male and female-headed households. Farmers kept more goats than cattle or sheep because they found it easier to manage goats particularly in dry season since cattle and sheep suffer from more environmental and nutritional stress.





Significance level: \*\*\* =  $p < 0.01$

ns= not significant

Figure 4.1: Mean flock sizes per household

Male-headed households had lower goat mortality rates from improved health control and higher goat reproductive rates than female-headed households. In addition, males had better access to information than women. This may infer that goat flock sizes were influenced by goat management practices.

#### 4.4.7 Goat entries and exits

There were significant differences ( $p < 0.01$ ) between male and female-headed households in terms of goats born, sold and died (Table 4.6). Male-headed households had more goats being born and sold and fewer deaths. The fact that more male-headed households owned larger goat flock sizes ( $p < 0.01$ ) than females could translate to more kid births and sales. The fewer goat deaths were as a result of better flock health programmes. However, there were no significance differences

between goats bought, donated, slaughtered, exchanged and stolen of the male and female headed households. Goat net gain was therefore significantly higher for male-headed households than for female-headed households ( $p < 0.05$ ).

Table 4.6: Average goat entries and exits and goat net gain

	Female-headed				Significance
Variable	Male-headed household		household		level
	Mean	SD	Mean	SD	
Entries:					
Bought	0.6	1.1	0.4	0.9	ns
Born	6.1	3.6	4.5	3.6	***
Donated	0.1	0.4	0.1	0.3	ns
Exchanged	0.4	1.3	0.1	0.6	ns
Exits:					
Died	1.0	0.9	1.7	1.3	***
Sold	2.1	1.8	1.0	1.2	***
Slaughtered	1.4	1.2	1.1	1.1	ns
Stolen	0.5	0.7	0.5	1.1	ns
Net gain	2.2	3.9	0.8	3	**

Significance levels: \*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$ , ns = not significant

Education level of household head plays a role in goat rearing. Thirty-two percent of male-headed households had secondary schooling as compared to only 15% of female-headed households who

had secondary education. Sixteen percent of male-headed households had no formal schooling at all as compared to 49% of female-headed households. Males, with their higher education levels showed greater goat production levels than female-headed households with lower education levels. The more years spent in school increased the chances of being more exposed to better management options, being more understanding of what needs to be done and therefore make informed decisions such as rearing goats for sales rather than merely for cultural reasons. Males owners, by virtue of being more educated than their female counterparts, would be in a better financial position to acquire inputs needed in a goat project and to make better decisions on management practices. An interview with a Mdukatshani NGO revealed that when working with farmers, men showed better understanding in management practices than women who often had difficulties in understanding goat management.

#### **4.5 Discussion**

Household socio-economic factors contributed to goat production. Male household heads were generally younger, married and more educated; compared to female household heads. The latter mostly belonged to the old age age-group, were widowed and had no or little formal education. Although some authors have alluded to the fact that women play major roles in goat production (DeVries, 2008; Hulela, 2010; Oyekale, 2013), which often involve low skill activities (such as feeding); others mentioned that men play occasional but more important roles that require mobility such as purchase of medicines and interaction with the market (Bravo-Baumann, 2000; FAO, 2000). The younger age group and higher education levels of male household heads realized better goat production when compared to the female-headed households. The results were in line with studies conducted by Aldosari (2017) which revealed that when compared to females, males show

more interest in discussing matters relating to goat farming and goat rearing proved more beneficial to them. Tedonkeng (2007) reported that understanding the nature of the goat enterprise by recognising the significant contribution they make in households is central to addressing goat management practices, nutrition and reproduction. Women's mobility and freedom to leave a homestead is often limited by customary traditions (IFAD, 2003) and this led to women facing challenges in attending and participating in group training activities for livestock farmers in the current study. As a result, women were unable to obtain access to information and this limited their ability to improve goat production.

Most farmers mentioned that goat numbers do not increase appreciably due to insufficient nutrition and prevalent diseases. Male-headed households had greater goat production in terms of number of goats born and sold (entries and exits) than female-headed households. In female-headed households, where the heads were mostly widowed, goats were owned by various people, including adult sons. Laws that govern inheritance and marriage discriminate women from owning and playing important roles in the ownership and management of assets that are considered as belonging to men (Olowu, 2013). Males dominated the roles in goat production, which agreed with Osei-Adu *et al.* (2015). Although women played the goat care roles such as providing water; they were not involved in more important roles which affect goat production such as supplementary feeding and health management. The fact that in the current study girls and not boys assisted their mothers in providing water for the goats agrees with Quisumbing *et al.* (2014) who reported that gender roles in children are internalised at young ages, with girls being socialized to play roles traditionally performed by women.

Lower inputs and the use of the veld as feed characterize smallholder farmers' goat production systems (Capote, 2016). Insufficient feed and lack of feed supplements particularly during the drier months adversely lower goat production (Pollott and Wilson, 2009). The current study showed that kids die in drier months due to lack of feed led to flock numbers increasing slowly. Insufficient feed led to does being unable to meet the nutritional requirements for milk production (Capote, 2016). As a result, the reason for goats' milk to be ranked the lowest is because goats do not produce enough milk adequate for human consumption let alone for their kids. Since the nutritional requirements for milk production could not be met in those extreme environments, goats were therefore used for meat production. Perceptions and preferences also led to unwillingness to consume goat milk. The unusual taste, cultural bias, general dislike and strong odour were some of the additional reasons for non-consumption of goat milk (Idamokoro *et al.*, 2019).

Prevalent diseases such as heartwater and coccidiosis were additional constraints to goat production by female-headed households. With indigenous goat breeds being largely neglected by veterinarians and extension officers (FGDs; Visser and van Marle-Köster, 2016), in- affordability of female farmers to consult private health practitioners led to poor management of goats and this affected production. The assistance being provided by stakeholders to dairy cattle and chicken farmers should also be given to goat farming to improve its ability to survive and be profitable.

Poor housing structures exposes goats to extreme weather conditions (Rumosa Gwaze *et al.*, 2009), hence there is need for innovation in housing in the study area. The absence of a structured breeding season entails that goats flocked together throughout the year often resulting in mating of closely related individuals leading to inbreeding (Rumosa-Gwaze, 2009). Inbreeding depression

may thus lead to poor growth rates (Marete *et al.*, 2011). Buck exchanges between homesteads is needed to reduce inbreeding depression.

The motives of rearing goats also had a bearing on production. In comparison with male-headed households, female-headed households kept goats mainly for cultural ceremonies and not primarily as an economic activity. Goat production may not increase if farmers cannot see tangible benefits of keeping goats in their day to day living. The productivity and hence profitability of goat farming tend to be higher with increasing flock sizes (Dubeuf, 2014). Lower mortality through better healthcare and disease management and higher number of births led to increased flock sizes by male headed households. Studies by Mayberry and Herrero (2018) also alluded to the fact that lower mortality and higher reproduction rates increase goat flock sizes. Male-headed households with larger flock sizes had more kid births and sold more goats than female headed households with smaller flock sizes. Male-headed households therefore showed better goat production efficiency than female-headed households because they had a higher goat net gain.

#### **4.6 Conclusions**

Socio-economic factors of households contributed to differing gender roles in goat production. It is apparent from the information provided in the study that male-headed households showed greater efficiency of goat production than female-headed households. Male-headed households had larger goat flock sizes than female-headed households and had greater goat entries and exits. Male-headed households were more proactive in terms of their roles in goat management than the females in both male and female-headed households. There was uncontrolled goat breeding, complemented with deaths due to nutritional constraints and prevalent diseases, and this led to

reduced fertility in does in female-headed households. Females in male and in female-headed households were responsible for the care giving roles in households such as providing goats with water; but when it came to important roles which affect goat production such as supplementary feeding and health care; they fell short. The priorities of male and female-headed households for keeping goats were different; with the main reason for rearing goats by female-headed households being for cultural ceremonies and not primarily as an economic activity.

Policy makers need to ensure that the young, especially females, spend more time in school. This will assist them to be more empowered and proactive in gathering resources required in goat management practices. It will also increase the chances of them being more exposed to better management options, being more understanding of what needs to be done and therefore make informed decisions. There is need to close the gender gap in access to resources, information, education and goat productivity. Empowering women socially and economically will improve their decision-making skills which can lead to gains in goat production. For a successful goat production, farmers need to see goat farming as a source of income and be convinced that their standard of living can be improved through goat farming, apart from the cultural benefits derived. Improved production is best sustained by an efficient marketing structure which helps to build a sustainable food security. Hence, Chapter 5 analyses the effect of gender on commercialisation of goat production.

#### **4.7 References**

Aldosari F.O. 2017. Gender participation in sheep and goat farming in Najran, southern Saudi Arabia. *Saudi Journal of Biological Sciences*, 25: 144-148

- Babajide A.A.A.2015. *Livestock ownership by gender and seasonal impact on production: A case study in Msinga Municipality*. Masters thesis. University of KwaZulu-Natal, Pietermaritzburg, South Africa
- Bettencourt E.M.V., Tilman M., Narciso V., da Silva Carvalho M.L. and de Sousa Henriques P.D. 2015. The Livestock Roles in the Wellbeing of Rural Communities of Timor-Leste. *Revista de Economia e Sociologia Rural*, 53 (1): 63-80
- Bester J., Ramsay K.A., and Scholtz M.M. 2009. Goat farming in South Africa: Findings of a national livestock survey. *Applied Animal Husbandry and Rural Development*, 2: 9-13
- Bravo-Bauman H. 2000. Gender aspects in livestock production. In: *Livestock and gender: A winning pair*. Working Document. Swiss Agency for Development and Cooperation. Bern. [www.fao.org/WAIRDOCS/LEAD/X6106E00.HTM](http://www.fao.org/WAIRDOCS/LEAD/X6106E00.HTM). Accessed on 26/08/2018
- Capote J. 2016. Environments and goats around the world: Importance of genetic and management factors. In: *Sustainable goat breeding and goat farming in Central and Eastern European countries*. Food and Agriculture Organization of the United Nations, Rome
- City Population, 2012. *Msinga local municipality*. Available at <http://www.citypopulation.de/php/southafrica-admin.php?adm2id=KZN244> . Accessed 04 March 2018
- Coates J., Swindale A. and Bilinsky P. 2007. *Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide* (v. 3). Food and Nutrition Technical Assistance Project (FANTA), Academy for Educational Development, Washington, D.C.



- De Cock N., D'Haese M., Vink N., van Rooyen C.J., Staelens L., Schönfeldt H.C. and D'Haese L. 2013. Food security in rural areas of Limpopo province, South Africa. *Food Security*, 5: 269-282
- Deere C.D., Alvarado G., Twyman J. 2012. Gender inequality and asset ownership in Latin America: Female owners vs household heads. *Development and Change*, 43(2): 505-530
- De Vries J. 2008. Goats for the poor: Some keys to successful promotion of goat production among the poor. *Small Ruminant Research*, 77: 221-224
- Doss C.R. and Morris M.L. 2001. How does gender affect the adoption of agricultural innovations? The case of improved maize technology in Ghana. *Journal of Agricultural Economics*, 25: 27-39
- Dubeuf J. 2016. Organization and shifts in the genetic and breeding of goats to address current environmental issues in livestock activities. In: *Sustainable goat breeding and goat farming in Central and Eastern European countries*. Food and Agriculture Organization of the United Nations, Rome
- FAO 2010b. *Roles of women in agriculture*. <http://www.fao.org/docrep/013/am307e/am307e00>. Accessed on 13 October 2018
- FAO 2013. *Understanding and integrating gender issues into livestock projects and programmes: A checklist for practitioners*. [www.fao.org/a-i3216e.pdf](http://www.fao.org/a-i3216e.pdf)
- García-Winder M. and Chavarría H. 2017. *The Outlook for Agriculture and Rural Development in the Americas: A Perspective on Latin America and the Caribbean 2017-2018*/ ECLAC, FAO, IICA. San Jose, Costa Rica
- Hulela K. 2010. The role of women in sheep and goat production. *International Journal of Scientific Research in Education*, 3 (3): 177-187

- Idamokoro M., Gunya B., and Aliber M. 2019. Farmers' perception and willingness to consume goat milk and goat milk products: A case study of central Eastern Cape, South Africa. *Research, Policy and Practice*, 9:3
- IFAD 2007. *Gender and livestock tools for design*. [www.ifad.org>documents](http://www.ifad.org/documents). Accessed on 13 October 2018
- Johnson N.L., Kovarik C., Meinzen-Dick R., Njuki J. and Quisumbing A. 2016. Gender, assets and agricultural development: Lessons from eight projects. *World Development*, 83: 295-311
- Lebbie S.H.B. 2004. Goats under household conditions. *Small Ruminant Research*, 51 (2): 131–136.
- Mamabolo M.J., Webb E.C. 2005. *Goat production survey- Fundamental aspects to model goat production systems in Southern Africa*. Case study- Agricultural Commission- Witfor
- Marete A G., Jung'a J. O. and Mosi R. O. 2011. An analysis of inbreeding levels and factors affecting growth and reproductive traits in the Kenya Alpine dairy goat. *Livestock Research for Rural Development*, 23 (12):1-8
- Mayberry D. and Herrero M 2018. Closing yield gaps in smallholder goat production systems in Ethiopia and India. *Livestock Science*, 214: 238-244
- National Agricultural Marketing Council (NAMC), 2005. Report on the investigation into the potential for the South African goat industry, Pretoria
- Njuki J., Waithanji E., Sakwa B., Kariuki J., Mukewa E., and Ngige J. 2014. A qualitative assessment of gender and irrigation technology in Kenya and Tanzania. *Gender and Technology Development*, 18(3): 303-340.

- Olowu D. 2013. Gendered Aspects of Food Security in Lesotho: Implications for an Integrative Rights-Based Approach. *Gender and Behaviour*, 11(2): 5378-5392
- Oyekale A.S. 2013. Gender Role in Agriculture, Climate Change and Food Security in the Sahel Belt of West Africa: Application of Poisson and Negative Binomial Regression. *Gender and Behaviour*, 11(2): 5499-5511
- Peacock C.P. 1987. Measures for assessing the productivity of sheep and goats. *Agricultural Systems*, 23(3): 197-210
- Pérez-Escamilla R., Gubert M.B., Rogers B. and Hromi-Fiedler A. 2017. Food security measurement and governance: Assessment of the usefulness of diverse food insecurity indicators for policy makers. *Global Food Security*, 14: 96-104
- Peterman A. 2010. *Widowhood and asset inheritance in Sub-Saharan Africa: empirical evidence from 15 countries*. Presented at the Chronic Poverty Research Centre/Overseas Development Institute Roundtable on Inheritance and the Intergenerational Transmission of Poverty, ODI
- Pollott G. and Wilson R.T. 2009. *Sheep and goats for diverse products and profits*. Diversification booklet No. 9. Rural Infrastructure and Agro-Industries Division, Food and Agriculture Organization of the United Nations, Rome
- Quisumbing A.R and Maluccio J. 2003. Resources at marriage and intrahousehold allocation: Evidence from Bangladesh, Ethiopia, Indonesia, and South Africa. *Oxford Bulletin of Economics and Statistics*, 65(3): 283–328
- Quisumbing A.R., Meinzen- Dick R., Raney, T.L., Croppenstedt A., Behrman J.A. and Peterman A. 2014. *Gender in Agriculture: Closing the Knowledge Gap*. FAO, Dordrecht

- Rahman M., Hossain M. and Miah M. 2016. Poverty reduction and livelihood improvement of women through goat rearing. *Asian Journal for Poverty Studies*, 3(1): 59 - 66
- Rumosa Gwaze F., Chimonyo M. and Dzama K. 2009. Communal goat production in South Africa: A review. *Tropical Animal Health Production*, 41(7): 1157–1168.
- Statistics South Africa, 2016. *Community Survey 2016*. Statistical release P0301 / Statistics South Africa, Pretoria
- Tedonkeng E.P. 2007. Goat production research in Africa: A signpost review for research in the new millennium. *International Journal of Biological and Chemical Sciences*, 1(1): 76-89
- Urban-Econ Development Economists, 2012. Msinga Local Municipality: Local Economic Development Strategy, Durban
- Visser C. and van Marle-Köster E. 2016. Challenges to the development of a rural goat industry in South Africa. In: *Sustainable goat breeding and goat farming in Central and Eastern European countries*. Food and Agriculture Organization of the United Nations, Rome

## **CHAPTER 5: EFFECT OF GENDER ON COMMERCIALISATION OF GOAT PRODUCTION IN THE SEMI-ARID AREA OF MSINGA, SOUTH AFRICA**

### **Abstract**

Using focus group discussions, key informant interviews and a questionnaire survey of 241 households, the study analysed sales and marketing of goats by male and female-headed households and the challenges they faced towards goat commercialization in semi-arid Msinga area of South Africa. Goat sales were generally low, with mean of 2.1 for male-headed households and even lower for female-headed households with mean of 1.0 ( $p < 0.05$ ) in 12 months. The Tobit analysis showed that the determinants of goat commercialization were gender, education level and occupation of household head, household income, location, number of goats a household owns, goat marketing price and goat losses through mortality and theft. The main constraints towards goat commercialisation were poor condition of goats and mortality, high illiteracy rates of women, cultural settings biased against women which discouraged them from owning and selling goats, shortage of transport to take goats to the market, poor confidence in the newly set up auction system aimed at modernizing the goat market and limited access to information. Farmers did not see goats in monetary terms but there were sporadic sales only when there were household emergencies. Commercially oriented goat production goals of a household are prerequisites for the commercialization of goats.

*Keywords:* illiteracy, goat sales, determinants of goat commercialisation

## 5.1 Introduction

Small-scale goat farming is an important source of livelihoods in many African countries and has an ability to contribute to household food security, yet little effort has been made to investigate its full potential through commercialisation (Yesefu *et al.*, 2017). Regardless of the benefits of goat keeping (Koluman and Silanikove, 2018), their productivity and offtake remain low (van Rooyen and Moyo, 2007) and hinder attempts of commercialisation. Several studies have focused on the technical and biological efficiency, and adaptability to harsh conditions, yet commercialisation is equally important in increasing goat production (Endeshaw, 2007). Improved production is best sustained by an efficient marketing structure which helps to eradicate poverty and build a sustainable food security option for communities (Dube, 2015). Benefits from goat production can be improved if opportunities and challenges that farmers face in the commercialisation of goats are understood. Martey *et al.* (2013) pointed out that in an imperfect market where conditions are risky, households compare the utility derived from making the decision to market or not. Commercialisation is therefore a function of market transaction costs as explained by a set of variables which are the determinants of commercialisation.

For commercial farmers in South Africa, marketing of chevon and mohair is well organized with capital resources, institutions, and markets. However, for non-commercialised goat farmers, historical institutional and market factors have been major constraints in their transformation into a formal mainstream industry (Roets and Kirsten, 2005). Goats have a potential for commercialization as their prices on a per unit body weight basis are higher than for other ruminants (Glimp, 1995; DAFF, 2018). Goat projects in some parts of the country such as Umzimvubu, Laphum'ilanga and Kalahari Kid have been developed with the aim of

commercialising the goat sector from rural farmers (DAFF, 2012); but such projects need to be widespread. One aspect that limits the commercialisation of goats in rural areas is that they are mainly kept as financial security (NAMC, 2005) and not as a commercial commodity (DAFF, 2018). Promoting the financial value of goats assist in changing perceptions. The main objective of the study was to determine the effect of gender on commercialisation of goat farming enterprises in the semi-arid area of Msinga, South Africa.

## **5.2 Conceptual framework**

According to Oakley (1972), gender is a notion that humans create socially although it relies upon biological disparities between males and females. Socially, the understanding of gender issues is demonstrated by the fact that individuals and societies across cultures attribute certain traits to individuals based on their sex creating gender roles. The gender roles are often based on stereotypes which include flawed or embellished assertions about the nature of males and females. Gender is sustained by doing tasks associated with a specific gender and this perpetuates meanings of what is defined as being a man or a woman (Carter, 2014).

It is important to consider gender in the marketing of goats because there are constraints which are disaggregated by gender which influence the decision-making process in goat commercialization. Women and children are often responsible for many goat related activities, but they own fewer goats than men and are less involved in decision-making (Webb and Mamabolo, 2004) as a result of the cultural settings biased against them (Chukwuka *et al.*, 2010). The involvement of women in the provision of labour highlights the importance of focusing on them in the improvement of household incomes.

A few studies on goat marketing have focused on the limits to its commercialization and the challenges resulting from unorganized marketing of goats (Togarepi *et al.*, 2018; Miller and Lu, 2019). However, little is known about the effect of gender on commercialization of goat farming enterprises. Addressing this issue could play a paramount role in reducing food insecurity (Homann *et al.*, 2007; Ngambi *et al.*, 2013), especially in semi-arid areas where rainfall is erratic and crop farming is too risky. Gender specific market possibilities and control of the income need to be considered. Women tend to lose control to men when marketing and income from livestock is high (Bravo-Baumann, 2000). The men may use the income as they wish, and in some cases not to the benefit of the household *per se*.

Male-headed and literate households often own and sell more goats compared to female-headed and illiterate households (Byaruhanga *et al.*, 2014) implying that male literate households are better able to commercialise goats. Byaruhanga *et al.* (2014) also showed that households with large flocks sold more goats than those with smaller flocks. Households, therefore, limit sales to maintain the potential to increase their flock size. Interventions aimed at improving the commercialization of goats should pay attention to enhancing and having a good understanding of the characteristics of goat production as this increases the supply of goats to the market (Kosgey *et al.*, 2008).

Reasons for rearing goats should be understood to enhance the success of commercialising goats. They have an impact on whether farmers see the need to sell goats. Hassen and Tesfaye (2014) mentioned that cash income is the most important factor in goat farming enterprises followed by



other benefits. The income obtained from goats can thus be used to sustain human nutrition for the farmers. On the other hand, where goats are being kept mainly for cultural ceremonies and not primarily as an economic activity, only in times of dire economic pressures do households resort to the selling of goats (DAFF, 2012). The goats may be kept for multiple functions and sales may be sporadic based on immediate cash needs.

Efforts directed at improving marketing opportunities and strengthening of goat marketing systems such as information and infrastructure contribute towards sustainable food security (Olowu, 2013). In South Africa, there are low off-take rates of goats but with a higher demand for purchases. As a result, goats are imported from Namibia to meet market demands (Togarepi *et al.*, 2018). Small-scale farmers do not provide regular and adequate market supply of quality live animals, hence there is need to increase local production (Negassa and Jabbar, 2014). Reasons include low goat fertility, high mortality rates, poorly conditioned marketed goats and ownership patterns that discourage goat sales. For commercialization of goats to be more effective, farmers need to be encouraged to farm with goats rather than just to keep them (Ramsay and Donkin, 2000).

The factors that affect a household's choice to participate in the market need to be determined. More importantly, the factors should be disaggregated by gender by taking into consideration the various constraints which may influence their decision-making process in goat commercialisation.

### **5.3 Research methods**

#### **5.3.1 Study site, sampling and selection of households and data collection**

The study site, sampling and selection of households and data collection procedure are described in sections 3.3.1, 3.3.2 and 3.3.3.

#### **5.3.2 Statistical analyses**

Qualitative data from the focus group discussions and key informant was analysed by explaining the participants' meanings, experiences and views of the questions discussed. Coding was done and themes were created by identifying keywords which were used to present explanations and interpretations. For quantitative data, general linear models were used to compare means of goat sales between gender and between traditional authority areas. The gender effect was tested by comparisons of differences between pairs of gender categories (male-headed households and female-headed households) in the marketing of goats and other socio-economic factors and these were compared to assess statistical significance using Chi-square test of SPSS (2017). Comparisons of means for reasons of rearing goats between male and female-headed households was done using general linear models. The determinants of goat commercialisation were analysed using the Tobit regression model.

The Tobit regression model was used to estimate the influence of livelihood factors on goat farmers' market participation. The Tobit model is appropriate for analysing where independent variables are censored (McDonald and Moffitt, 1980). In this study, the dependant variable, number of goats sold was lower censored at zero. Households considered to be more involved in

commercialisation had a higher number of goat sales and those less involved in commercialisation had a lower number of goat sales. The model was analysed in STATA Version 15 software.

The empirical model for quantifying the determinants of market participation was given as:  $Y_i^* = \beta_0 + \beta X_i + e_i$

Where

$Y_i^*$  = is the latent variable of the dependent variable (goats sold)

$\beta$  = is the vector of parameters to be estimated

$X_i$  = is the set of explanatory variables (Table 5.1)

$e_i$  = is the disturbance term

The model errors  $e_i$  are assumed to be independent,  $N(0, \sigma^2)$  distributed, conditional on the  $X_i$ .

The observed  $Y_i^*$  is defined as 1 if  $Y_i^* > 0$  and 0 if  $Y_i^* \leq 0$ .

The independent variables were the household characteristics and resources. Table 5.1 gives the independent variables used in the Tobit model which were hypothesised to affect number of goats sold.

The logic behind the gender variable having a negative sign is that male-headed households are expected to be more involved in goat marketing than the female-headed households. The reason is embedded in the cultural settings biased against women and ownership patterns of assets that discourage women from decision-making and from owning major assets in households (Webb and Mamabolo, 2004; Chukwuka *et al.*, 2010).

Byaruhanga *et al.* (2014) stated that the more literate households are, the more goats they sell because more educated heads of households can understand the market structure better. Therefore, such households are expected to be more involved in goat marketing as represented by a positive sign. Households whose heads are unemployed and those that receive less income are likely to more involved in goat marketing to obtain income to buy food (Hassen and Tesfaye, 2014).

Table 5.1: Description of independent variables used in the Tobit model

Variables	Measures	Expected effect	Rationale
Gender of household head	0=Male headed household, 1=Female-headed household	-	Male-headed households tend to sell more goats than females; men usually own the means of production
Marital status of household head	0=Not married, 1=Married	+	Married household heads tend to be more involved in goat marketing because of ownership patterns and cultural reasons
Occupation of household head	0=Employed, 1=Unemployed	+	Households whose heads are unemployed are likely to be more involved in goat marketing to obtain income to buy food
Goat feed supplement	0=No, 1=Yes	+	Households which provide goat supplementation tend to be more involved in goat marketing in anticipation of higher sale prices
Educational level	Years in school	+	Households with an educated head tend to be more involved in goat marketing since they understand the market structure
Total household income	ZAR	-	Households whose heads receive less income are likely to more involved in goat marketing to obtain income to buy food
No. of goats	Numbers	+	Higher goat ownership is potential income as they can be sold to buy food
Age of household head	0=old aged, 1= young	-/+	Household heads older in age tend to be more involved in goat marketing since

				they are more experienced and have more market information or they may be more risk averse and not willing to venture into goat marketing
Location	0=Mchunu authority, 1=Mthembu authority area	traditional area, traditional	+	Mthembu due to its proximity to the market tend to be more involved in goat marketing than Mchunu
Household size	Numbers		+	Households with bigger sizes will be more involved in goat marketing due to increased labour supply and to obtain income to buy food
Receive remittance	0=No, 1=Yes		-	Households which do not receive remittance will be more involved in goat marketing to get income
Goat price	ZAR		+	When goat prices are high households tend to be more involved in goat marketing
Goat losses	Numbers		-	Households which lose more goats through poor nutrition, diseases, predation, and theft prefer not to sell

The expectation was that household size would influence the chances of a household's involvement in commercialisation positively due to increased supply of labour required for goat production and marketing (Dube and Guveya 2016). The age of household head was expected to have either a positive or negative effect. The age of the farmer may be related to more farming experience. When farmers become more experienced, they may have more access to marketing information. Hence, age can be positively related to commercialisation decisions (Kabiti *et al.* 2016). Conversely, the elderly may be more risk averse and may not be willing to venture into goat marketing leading to a negative relationship between commercialisation and age (Kamoyo *et al.* 2015). Accessibility of markets is expected to positively influence commercialisation (Goshu *et al.* 2012). As such, Mthembu traditional area which is closer to the market and auction facilities is expected to have a positive relationship with marketing.

Byaruhanga *et al.* (2014) also showed that households with large flocks sold more goats than those with smaller flocks. Therefore, households with more goat numbers are expected to be more involved in marketing and therefore are represented by a positive sign. Conversely, households which lose more goats through deaths as a result of poor nutrition, diseases, predation, and theft will limit sales to maintain the potential to increase their flock size. Therefore, such households are expected to be less involved in goat marketing and are represented by a negative sign. Households which provide goat supplementation tend to be more involved in goat marketing in anticipation of higher sale prices due to increased market weight (Megersa *et al.*, 2013; Terefe *et al.*, 2013). Thus, goat supplementation can be positively related to commercialisation decisions. When goat prices are high, households tend to be more involved in goat marketing because farmers

will experience an increase in income (Huka *et al.*, 2014). Therefore, such households are expected to be more involved in goat marketing, as represented by a positive sign.

## 5.4 Results

### 5.4.1 Socio-economic factors affecting sale of goats

Goat sales were generally low, although male headed-household sold more goats (mean of 2.1) than female headed-households (mean of 1.0) in 12 months ( $p < 0.05$ ). More households in Mthembu traditional authority area sold goats than in Mchunu traditional authority area, with mean sales of 2.1 and 1.4 respectively ( $p < 0.05$ ) (Table 5.2).

Table 5.2: Mean goat sales in male and female-headed households

Variable	Category	Mean goat		Significance
		sales	SD	
Gender	Male	2.1	1.79	**
	Female	1	1.22	
Traditional authority	Mchunu	1.4	1.36	**
	Mthembu	2.1	1.95	

Significance level: \*\* =  $p < 0.05$

Education levels and marital status of the head of household affected the sale of goats. Thirty-two percent of male-headed households had secondary schooling as compared to only 15% of female-



headed households ( $p < 0.01$ ). Sixteen percent of male-headed households had no formal schooling at all as compared to 49% of female-headed households ( $p < 0.01$ ).

When comparing traditional authority areas, 24% of Mchunu households had secondary schooling as compared to only 31% of Mthembu households ( $p < 0.05$ ). Thirty-four percent of Mchunu households had no formal schooling at all as compared to 19% of Mthembu households ( $p < 0.01$ ). The results show that female-headed households had lower education levels when compared to male-headed households, and Mchunu residents had lower education levels when compared to Mthembu residents.

There was a relationship between goat sales and the education level of the household head. More male-headed households with higher education levels sold goats when compared to female-headed households with lower education levels (Table 5.3). The more years spent in school increased the chances of understanding market requirements and making informed decisions.

Table 5.3: Education levels of household heads and goats sold as a percentage

Education level	Not sold any goats	Sold goats at auctions	Sold goats privately	Sold goats at both auction and privately		Significance level
None	63	2	33	2		
Primary	65	2	29	4		***
Secondary	33	6	57	8		
Tertiary	20	0	55	33		

Significance level: \*\*\*=  $p < 0.01$

There was also a relationship between goat sales and marital status (Table 5.4). A higher percentage of married farmers sold goats when compared to single, widowed and cohabiting farmers. These results are in line with the studies by Togarepi *et al.*, (2018) who found that goat sales are more inclined to take place in married farmers than in single and in widowed farmers as this is credited to joint decision-making and increased household needs for income by married farmers.

Table 5.4: Marital status and goats sold as a percentage

Marital status	Sold goats				Significance level
	Not sold any goats	Sold goats at auctions	Sold goats privately	Sold goats at both auction and privately	
Single	36	9	55	0	**
Married	24	2	67	7	
Widowed	57	5	38	0	
Cohabiting	32	0	59	9	

Significance level: \*\*= $p < 0.05$

Goat ownership was higher (mean 26.7 goats per household) for male-headed households than for female-headed households (mean 16.5 goats per household) ( $p < 0.01$ ). The low goat flock sizes that female-headed households have may have translated to them selling less than the male-headed households who owned more goats. This is in line with Byaruhanga *et al.* (2014) who showed that households with larger flock sizes sold significantly more goats than those with smaller ones.

Goat mortality was one of the constraints affecting sale of goats. Both male and female farmers claimed that their goat flock numbers did not grow sufficiently due to mortality caused by poor nutrition in the dry seasons, diseases (such as heartwater and coccidiosis), inadequate housing and predation caused mainly by dogs which attacked vulnerable kids. Feed shortages caused low carcass weight which reduced the selling price of goats as reported by Musara *et al.* (2013). Goat numbers were also affected by theft of goats. With flock size being positively associated with

household's decision to participate in goat sales, goat sales were limited where flock size was low (Negassa and Jabbar, 2014), as was the case with female-headed households.

#### **5.4.2 Goat selling options available**

Focus group discussions revealed that although a non-governmental organisation called Mdukatshani has been encouraging farmers to sell goats at auctions, most farmers did not use this system because they did not 'trust' it. Community members preferred to buy or sell to people from the same area whom they were most likely familiar with rather than to traders who acted as middlemen at auctions. Trusted neighbours could even pay in interest free instalments. Most goat sales (67% and 43%, respectively) were conducted privately within the communities and they considered the auction systems as immaterial to the traditional marketing systems they are used to.

Both FGDs and questionnaire survey revealed that a considerable number (50%) of female-headed households did not sell their goats in the past 12 months when compared to male-headed households (25%) ( $p < 0.05$ ) (Table 5.5). The reason for this is that traditionally, married and widowed women were not allowed to sell goats in the community as it was the role of men to announce the sale of goats, which they usually did at social events. Laws that govern marriage and inheritance disallow women from owning assets (Olowu, 2013) such as goats. FGDs revealed that women in male-headed households may not own goats if the husband is still alive. In female-headed households, a widowed woman may only inherit goats if she does not have elder sons and only if the family of her deceased husband allows her to (in some instances the siblings of the deceased take ownership of the assets). However, single women (who never married) in female-

headed households, may have ownership of goats and may ask assistance from neighbours or male siblings when selling goats. Similar results were reported in Chapter 3.

Table 5.5: Sale of goats in the previous 12 months and easiness of sales

	Male-headed	Female-headed	
Category	household	household	Significance level
Sale of goats in the previous 12months (%)			
No goats	25	50	
Goats sold at auctions	2	5	**
Goats sold privately	67	43	
Goats sold	6	2	
Easiness to sell goats (%)			
No goats	18	61	***
Yes	82	39	

Significance level: \*\*=  $p < 0.05$ , \*\*\*=  $p < 0.01$

Ownership patterns affected sale of goats because it was the role of the owner to make decisions about the sale of goats when the need arises. Elder sons in female-headed households, may be the rightful owners of goats but may not have the enthusiasm of goats farming or see the need for selling. However, these results do not concur with the findings by Togarepi *et al.* (2018) and Musemwa *et al.*, (2010) who found that the sale of cattle and goats was predominantly by pensioners and females who sold livestock to complement their income from remittances and government grants. The results, however, corresponds with findings by Homann *et al.* (2007) and

Tchale (2009) that heads of households in the productive age group (considered adults) and literate households were inclined to sell more goats than older and illiterate households.

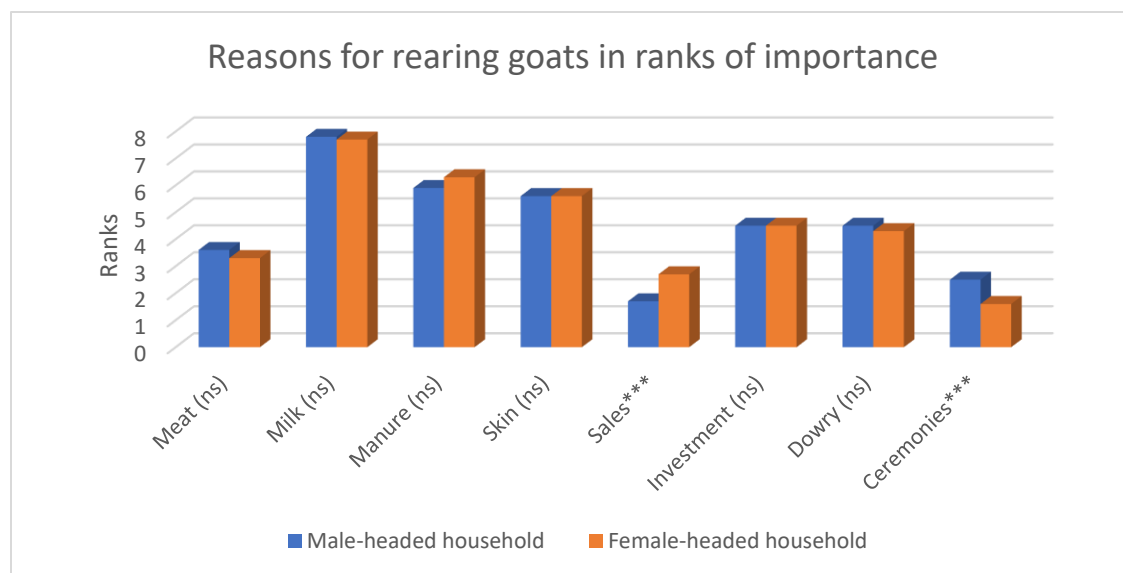
Focus group discussions and questionnaire survey results revealed that female-headed households found it challenging to sell their goats ( $p < 0.01$ ) (Table 5.5). The reasons provided were that traditionally it was unacceptable for women to sell goats and so potential buyers would shy away from buying from women sellers. Women in female-headed households would not be the rightful owners of the goats and would need permission from the owner (who maybe elder sons or deceased husband's male siblings) to sell when the need arises. More residents of Mchunu traditional authority area revealed that they face challenged when selling their goats in comparison to residents of Mthembu traditional authority area ( $p < 0.05$ ). Focus group discussions explained that there were more households in Mchunu traditional authority area which owned goats and so the market was occasionally inundated with more sellers than buyers. In contrast to Mchunu traditional authority area, Mthembu is closer to Tugela River and has most households working in garden plots and the irrigation scheme; with Mchunu being a semi-arid, the only farming activity residents resorted to was goat farming.

Apart from high illiteracy rates of women, poor mobility also strongly impacted marketing possibilities, leaving men to take part in marketing (de Cardona *et al.*, 2017). The NGO organized mini goat auctions once monthly and big auctions twice a year in order to assist farmers to sell their goats. Farmers however, mentioned that often they were forced to sell in between auction dates for urgent money requirements and were therefore forced to sell privately. The NGO mentioned that it assisted farmers with free transport for goats to the auction, but some farmers

claimed that this was not reliable because occasionally the transport was unavailable, and it would be uneconomic for them to take small number of goats to the market. As a result, farmers would be forced to sell privately.

Most farmers mentioned that the amount of money they obtained from goat sales was adequate for them ( $p>0.05$ ); with 92% of male and 82% of female-headed households sharing the same views. NAMC (2005) also stated that farmers generally realize good prices through out of hand sales of goats. The few who expressed unhappiness about the goat sale price explained that goats were difficult to look after when compared to other livestock and so they preferred that they were pegged at higher prices. Goat selling prices ranged from ZAR800 or US\$42 (at exchange rate of ZAR19 = US\$1) to ZAR1500 (US\$79) per goat, with the average price being ZAR1000 (US\$53). There were no significant differences of goat prices obtained between male and female-headed households. The differences in price ranges were due to the size and sex of the goat. Goats with larger body frames and castrated male goats fetched higher prices. Traits such as sex, live weight and body condition are known to determine goat prices (Yitayew *et al.*, 2019). Goat prices for Mchunu traditional authority area were lower than for Mthembu traditional authority area. The reason is because there would usually be more goat sellers than buyers in Mchunu and so sellers were forced to drop prices to get quicker sales.

The understanding of some households' rearing of goats did not go further than the social attachments associated with their goats. The main reason for female-headed households for the rearing of goats was for cultural ceremonies (which was an important aspect of their livelihoods) and not primarily as an economic activity ( $p<0.01$ ) (Figure 5.1).



Significance level: \*\*\* =  $p < 0.01$

ns= not significant

Lower rank is most important reason and higher rank is least importance reason

Figure 5.1: Reasons for rearing goats in ranks of importance

The fact that farmers sold goats in the villages or occasionally at the auction did not turn their goat farming into a commercialized production enterprise as they sold only when there was a real need. Goat selling was usually done in cases of family emergency such as illnesses or funerals. Farmers mentioned that their flock sizes did not increase adequately due to diseases, starvation and predation; and so, they did not sell frequently or else they would be 'left with none'. Farmers were unwilling to sell their goats for cash and then not have enough goats for their ritual ceremonies. Others even preferred to 'keep' goats as a sign of wealth as selling was looked down upon by others as it showed a sign of poverty and desperation.



### 5.4.3 Type of goats sold

Focus group discussions results showed that castrated goats were generally sold for cultural ceremonies purposes and often fetched higher prices. These were mostly sold privately in the communities. The middlemen at auctions preferred younger female goats and uncastrated males which could be used for breeding purposes. However, the NGO revealed that some farmers brought in poorly conditioned and much older goats than required at auctions and these were therefore downgraded and fetched lower prices. Lack of understanding of the auction marketing system made farmers to market surplus animals such as those culled due to old age, unproductive or diseased and those not well prepared as per requirements of the market.

### 5.4.4 Determinants of goat commercialisation

Table 5.6 provides the results obtained from the Tobit model on the variables which affected goat commercialisation levels. In the Tobit model, the reciprocal of the tolerance value which measures the impact of collinearity among variables (VIF), was below the cutoff for tolerance value of 10 (Hair *et al.*, 2014). This means that there was low correlation among variables as the VIFs were in acceptable ranges.

Nine estimated coefficients were statistically significant. Results showed that location, gender, and goat losses were significantly associated with goat commercialization. Education level, household head occupation, receiving remittances, number of goats per household, goat price and total household income were significantly associated with goat commercialization. The negative coefficients point to the fact that female-headed households tend to commercialize less than males,

whilst households which receive more income tend to commercialize less than those who receive less.

Table 5.6: Tobit estimates on influence of livelihood factors affecting number of goats sold

Variable	Coefficient	Standard Error	P> t	VIF
Location	0.7816772	0.20	0.000***	1.36
Gender	-0.9506804	0.23	0.000***	1.52
Household head age	0.2051938	0.18	0.245	1.37
Marital status	0.0935413	0.84	0.267	1.21
Education level	0.2604368	0.11	0.021*	1.48
Goat feed supplement	0.0969806	0.12	0.431	1.22
Head occupation	0.1414299	0.06	0.017*	1.55
Receive remittance	0.2494268	0.12	0.043*	1.13
Total household size	0.0293201	0.02	0.187	1.46
No. of goats	0.0207724	0.01	0.011*	2.00
Goat price	0.0019191	0.00	0.064*	1.21
Total household income	-0.512237	0.22	0.020*	1.43
Goat losses	0.5146804	0.04	0.000***	1.75
_cons	-5.201208	1.19	0.000	
var (e. Goats sold)	1.339824	0.15		
Log likelihood= -293.66509				
Pseudo R <sup>2</sup> = 0.3349				
Significant at * = 0.05 ** = 0.01 and *** = 0.001				

## 5.5 Discussion

Goat sales of mean 2.1 and 1.0 for male and female-headed households, respectively in 12 months is too low. The reason for the generally low goat sales in the study could be based on the fact that farmers found it more difficult to build up suitable flock sizes (for reasons emanating from losses

through poor nutrition, diseases, predation and theft), and this made it more unlikely that they would sell goats. However, goat sales and marketing were higher in male-headed households with higher education levels than in female-headed households with lower education levels. The more years spent in school increased the chances of understanding market requirements (Musemwa, *et al*, 2010). According to Adesina (2016), formal education increases chances of participating in modern agricultural technologies and innovations aimed at improving productivity. The difference in goat flock sizes between male and female-headed households may also reflect the way these households are in different stages of the household life cycle (with female-headed households being older, uneducated, and having fewer resources).

Goat numbers were also affected by theft of goats. Dube *et al.* (2017) found that theft of goats, diseases and predation were some of the challenges in goat production. The authors attributed this to a lack of information and limited support given to goat farmers by government extension services (Kumar, 2007). Flock size is positively associated with household's choice to participate in goat sales which is likely to be limited if the size is low (Negassa and Jabbar, 2014), as was the case with female-headed households in the current study. Rios *et al.* (2009) also pointed out to the fact that participation in agricultural markets is associated with its productivity. Hence, increasing flock size through dissemination of appropriate technologies for better nutrition and health management practices can go a long way in increasing market participation.

Marital status affected goat commercialization. Female-headed households faced challenges in selling their goats because traditionally, married, and widowed women were not allowed to sell goats in the community as it was the role of men to announce the sale of goats. Women were not

actively engaged in goat marketing because buyers were less willing to purchase from women since women were not socially sanctioned to be goat sellers. Ownership patterns also affected commercialisation of goats because it was the role of the owner to make decisions about the sale of goats when the need arose. Cultural imbalance biased against women as stated by Chukwuka *et al.* (2010) discriminate them from owning and playing important roles on assets that are considered as belonging to men. However, these results do not concur with the findings by Togarepi *et al.* (2018) and Musemwa *et al.*, (2010) who found that the sale of cattle and goats was predominantly by pensioners and females who sold livestock to complement their income from remittances and government grants. The results, however, corresponds with findings by Homann *et al.* (2007) and Tchale (2009) that heads of households in the productive age group (considered adults) and literate households were inclined to sell more goats than older and illiterate households.

With only 2% of male-headed households and 5% of female-headed households using the auction system when marketing goats, it showed that there was poor confidence in the system. Farmers mentioned that the auction trading system lacked transparency and they did not understand it. Similar to observations by Togarepi *et al.* (2018), the farmers obtained lower prices at auctions because they did not understand the market requirements as they would bring in goats that were not well prepared as per requirements of the market (such as the old and diseased). The farmers' low education levels and exposure worsened the situation as they were not able to use available information in making the correct marketing decisions. The NGO explained that some farmers brought in poorly conditioned and much older goats than required by the auction system and these were therefore downgraded and fetched lower prices. When there was a family emergency; farmers usually marketed surplus animals such as those culled due to old age, unproductive or diseased

and those not well prepared as per requirements of the market. Farmers therefore need to be trained through workshops, on the market trends and understand the importance of body conformation scoring, age and accurate keeping of records (Marume *et al.*, 2013). Such interventions may assist in resolving the issue of lack of transparency in the auction trading system of goats.

For female-headed households, the main reason for rearing goats was for cultural ceremonies and not primarily as an economic activity. This was also reported in Msinga Municipality IDP (2014). Goat selling was usually done in cases of family emergency such as illnesses or to fund funerals. Their understanding of goat rearing did not go further than the social attachments they had with their goats. Selling of goats was done out of necessity and not because the farmers had turned into commercial goat farmers. The NGO admitted that despite the introduction of the goat auction system in the area, the cultural and social meanings attached to goats have only transformed marginally despite the supposed advantages of the auction system.

In the current study, the fact that prices realized by male and female goat sellers were similar and that farmers expressed that the amount obtained was adequate for them may be interpreted from findings by Bellemare and Barrett (2006); Alene *et al.* (2008). Their reports mentioned that communal farmers do not necessarily consider prevailing pricing when deciding to sell their livestock. In addition, traditional system of goat sales is often based on trust, forming a mutually beneficial safety net with favours given and later returned within the community.

The Tobit analysis showed that the determinants of goat commercialization were gender of household head, location, education level of household head, occupation of household head, total

household income, number of goats a household owns, goat marketing price, goat losses through death from diseases and theft, and whether a household receives remittances. Current results were in line with findings by Osman and Hassain (2015) and Chukwuka *et al.* (2010) that male-headed households are more market oriented compared to the female-headed households due to the cultural settings biased against women which affect decision-making process in goat commercialization. Results also corresponded with findings by Byaruhanga *et al.* (2014) that more literate households are better able to commercialise their goats due to better understanding of market requirements. Ele *et al.* (2013) documented that in Nigeria, off-farm income was positively associated with commercialization. Rubhara and Mudhara (2019) also found that households receiving more non-farm income were less likely to be involved in commercialization. Similar results were obtained in the current study, with households earning more off-farm income participating in goat marketing to a lesser extent than those who received little off-farm income. Ndoro *et al.* (2014) also indicated that farmers who obtain more and regular unearned incomes such as remittances from their relatives and government grants are unlikely to participate in the livestock market. In the current study, households receiving remittances were less involved in goat marketing.

Byaruhanga *et al.* (2014) showed that households with larger flock sizes sold more goats than those with smaller flocks as households limit sales to maintain the potential to increase their flock size. Hence, a household's choice of participation in goat sales is limited if the flock size is low (Negassa and Jabbar, 2014). Mogues (2006) reported that in rural Ethiopia, smallholder farmers chose not to sell their livestock for fear of slow or costly reacquisition and because selling livestock

would mean reducing the stream of expected future income. Similar results were obtained in the study as households' goat flock sizes significantly influenced market participation.

Jacoby (2000) stated that the cheaper the cost of transport costs, the more farmers are willing to sell their produce at the markets. Mthembu traditional authority residents were more likely to sell at the auction than Mchunu residents as the latter were located further from the market. For the Mchunu residents, transport unavailability was a major constraint. This affirms findings by Justus *et al.* (2015) in Rwanda that market access is positively associated with commercialization.

Generally, the results of this study concur with Ainslie (2005) and Vetter (2013), that commercialization requires livelihood specialization because households need access to adequate capital, large flock sizes, low interest loans, and access to markets and information. Since most communal farmers do not have access to these, they only view their livestock as a risk aversion livelihood strategy and not as an economic activity. The results also showed that goat keepers prefer the traditional system of selling goats. Reasons for this stem from distrust of middlemen; poor understanding of the auction rules; lack of transparency of the system and infrequency of sales events. A proposal to change the farmers' livelihood strategy to a commercially oriented approach may not be suitable for the risk-averse farmers. Kirsten (2005) stated that goat farmers need to be taught about the importance of commercialisation of goat farming so that they can see the shortcomings of their traditional farming methods. Although a configuration of the sector by developing a marketing orientated goat production sector and investment into commercial for indigenous goats in the area may be required; Long (2001) however, argued that for any development project, there is need to get behind the ramifications on local culture and knowledge



in order to understand their beliefs. Any attempt to commercialise goats in the study area will continue to cause a huge gap between attempts to achieve economic development and current practices.

## **5.6 Conclusions**

The study highlighted the effect of gender on commercialisation of goat farming enterprises. The main constraints towards goat commercialisation were poor condition of goats and mortality, high illiteracy rates of women, cultural settings biased against women which discouraged them from owning and selling goats, transport shortage to the market, poor confidence in the newly set up auction system of marketing and limited access to information. In addition, the main reason for rearing goats in female-headed households was for cultural ceremonies and not primarily as an economic activity. Goat sales were found to be low, especially in female-headed households with lower education levels. High illiteracy rates of women, household goat ownership patterns and poor mobility strongly impacted and influenced goat marketing possibilities, leaving men to participate in marketing.

The success of commercialization of goat production in general is based on the accessibility of the knowledge and market and the household's production goals. Understanding the importance of the socio-cultural context of goat farming is imperative so that any recommendations may not face resistance but complement existing practices. An auction system that was introduced to modernize the goat market was not well understood or commonly used by goat keepers. There was a challenge between aiming to make the goat market more efficient and recognizing the cultural factors that push farmers to regard their goat flocks as a business, not a safety net. Risk reduction needs to be

part of a strategy to encourage farmers to become more commercialized. The fact that farmers, with most of them being male-headed households; sold goats in the villages or occasionally at the auction did not turn their goat farming into commercialized production enterprises as they sold only when there was a family emergency. Household commercially oriented goat production goals are prerequisites for the commercialization of goats. Understanding the knowledge base of local farmers is critical because rural livelihoods goes beyond monetary gain but social satisfaction; and to them goats keeping is not solely attached to monetary reasons but for social and cultural satisfaction through taking part in ritual ceremonies. Chapter 6 analyses gendered-differentiated contribution of goat farming to household income and food security. Income from goat sales can be used to buy food and this contribute in addressing household food insecurity.

## 5.7 References

- Adesina T. K. 2016. Determinants of participation in youth-in-agriculture Programme in Ondo State, Nigeria. *Journal of Agricultural Extension*, 20 (2): 104-117.
- Ainslie A. 2005. Farming cattle, cultivating relationships: Cattle ownership and cultural politics in Peddie District, Eastern Cape. *Social Dynamics*, 31: 129–156.
- Alene A.D., Manyong V.M., Omany G., Mignouna H.D., Bokanga M. and Odhiambo G. 2008. Smallholder market participation under transactions costs: Maize supply and fertilizer demand in Kenya. *Food Policy*, 33: 318–328.
- Bellemare M.F. and Barrett C.B. 2006. An ordered Tobit model of market participation: Evidence from Kenya and Ethiopia. *American Journal of Agricultural Economics*, 88: 324–337.

- Bravo-Bauman H. 2000. Gender aspects in livestock production. In: *Livestock and gender: A winning pair*. Working Document. Swiss Agency for Development and Cooperation. Bern.  
www.fao.org/WAIRDOCS/LEAD/X6106E00.HTM. Accessed on 26/08/2018
- Byaruhanga C. Oluca J. and Olinga S. 2014. Socio-economic aspects of goat farming enterprise in Teso region, Uganda. *Uganda Journal of Agricultural Sciences*, 15(1): 87-100
- Carter M. J. 2014. Gender socialization and identity theory. *Social Sciences*, 3: 242-263
- Chukwuka O.K., Okoli I.C., Okkeudo N.J., Opara M.N., Hebert U., Ogbuewu I.P. and Ekenyem B.U. 2010. Reproductive potentials of West African Dwarf sheep and goats: A review. *Research Journal of Veterinary Sciences*, 3: 86-100
- Classens A. 2005. *The communal land rights Act and women, does the Act remedy or entrench discrimination and the distortion of the customary?* PLAAS, University of the Western Cape, Cape Town.
- Department of Agriculture, Forestry and Fisheries (DAFF)2018. *A profile of the South African goat market value chain*, Pretoria
- de Cardona K.L., De Gracia Scanapieco A., Braun P.G. 2017. Goat Production in El Salvador: A Focus on Animal Health, Milking Hygiene, and Raw Milk Quality. *Journal of Food Quality*, (2): 1-7
- Dube K. 2015. *Characterisation of goat production systems in selected coastal areas of the Eastern Cape Province, South Africa*. Masters degree Thesis. University of Fort Hare, Alice
- Dube L. and Guveya E. 2016. Determinants of agriculture commercialization among smallholder farmers in Manicaland and Masvingo Provinces of Zimbabwe. *Agricultural Science Research Journal*, 6(8): 182-190

- Dube S., Chakoma I., and Bahta S. 2017. Analysis of the goat value chain in Beitbridge district of Zimbabwe. *International Livestock Research Institute*, Nairobi.
- Ele I., Omini G. and Adinya B. 2013. Assessing the extent of commercialization of smallholding farming households in Cross River State, Nigeria. *Journal of Agriculture and Veterinary Science*, 4(2): 49-55.
- Endeshaw A. 2007. *Assessment of production and marketing system of goats in Dale District, Sidama Zone*, Masters degree thesis, University of Hawssa, Awassa
- Glimp H.A. 1995. Meat goat production and marketing. *Journal of Animal Science*, 73 (1): 291-295
- Goshu D., Kassa B. and Ketema M. 2012. Measuring smallholder commercialization decision and interaction in Ethiopia. *Journal of Economics and Sustainable Development*, 3(13): 150-160
- Hair J.F., Black W.C., Babin B.J. and Anderson R.E. 2014. *Multivariate Data Analysis*. 7<sup>th</sup> Edition. Pearson New International Edition, Essex
- Hassen A.S. and Tesfaye Y. 2014. Sheep and goat production objectives in pastoral and agro-pastoral production systems in Chifra district of Afar, Ethiopia. *Tropical Animal Health and Production*, 46: 1467-1474
- Homann S., van Rooyen A., Moyo T and Nengomasha Z. 2007. *Goat production and marketing: Baseline information for semi-arid Zimbabwe*. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Bulawayo
- Huka H., Ruoja C. and Mchopa A. 2014. Price fluctuation of agricultural products and its impact on small scale farmers development: Case analysis from Kilimanjaro Tanzania. *European Journal of Business and Management*, 6(36): 155-161

- Jacoby H. 2000. Access to markets and the benefits of rural roads. *Economic Journal*, 110 (465): 713-737
- Justus O., Knerr B., Owuor G. and Ouma E. 2016. Commercialisation of food crops and farm productivity: Evidence from smallholders in Central Africa. *Agrekon*, 55(4): 458-482
- Kirsten F. 2005 *Commercialisation of goat production in South Africa*. Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, Pretoria.
- Kabiti H. M., Raidimi N. E., Pfumayaramba T. K. and Chauke P. K. 2016. Determinants of agricultural commercialization among smallholder farmers in Munyati Resettlement Area, Chikomba District, Zimbabwe. *Journal of Human Ecology*, 53(1): 10-19.
- Kamoyo M., Muranda Z. and Chikuya T. 2015. Agricultural export crop participation, contract farming and rural livelihood in Zimbabwe: The case of cotton farming in Rushinga district. *Journal of Economics and Finance*, 6(6): 110-115.
- Koluman D. N., and Silanikove N. 2018. The advantages of goats for future adaptation to climate change: A conceptual overview. *Small Ruminant Research*, 163: 34-38.
- Kosgey I.S., Rowlands G.L., van Arendok J.A.M. and Baker R.L. 2008. Small ruminant production in smallholder and pastoral/extensive farming systems in Kenya. *Small Ruminant Research*, 77(1): 11-24
- Kumar S. 2007. *Commercialisation of goat farming and marketing of goats in India*. International Crops Research Institute for Semi-Arid Tropics, New Delhi
- Lebbie S.H.B. 2004. Goats under household conditions. *Small Ruminant Research*, 51 (2): 131–136.
- Long N. 2001. *Development sociology*. Actor perspective. Routledge. London

- Martey E., Wiredu A.N., Asante B.O. Annin K., Dogbe W., Atttoh C. and Al-Hassan R.M. 2013. Factors influencing participation in rice development projects: The case of smallholder rice farmers in Northern Ghana. *International Journal of Development and Economic Sustainability*, 1(2):13-27
- Marume U., Chimonyo M., and Dzama K. 2013. Some insights into the reproductive performance, selection criteria, production and market constraints in communal goat production systems of South Africa. *Scientific Research and Essays*, 3 (30): 1448-1458
- McDonald J.F. and Moffitt R. A. 1980. The Uses of Tobit Analysis. *The Review of Economics and Statistics*, 62(2): 318-321
- Megersa T., Urge M. and Nurfeta A. 2013. Effects of feeding sweet potato (*Ipomoea batatas*) vines as a supplement on feed intake, growth performance, digestibility and carcass characteristics of Sidama. *Tropical Animal Health and Production*, 45(2): 593-601
- Miller B.A. and Lu C.D. 2019. Current status of global dairy goat production: an overview. *Asian-Australasian Journal of Animal Sciences*. <https://www.ajas.info>. Accessed on 13 October 2018
- Mogues T. 2006. *Shocks, livestock asset dynamics and social capital in Ethiopia* (Discussion Paper No. 38). International Food Policy Research Institute, Washington DC, VA.
- Musara J. P., Chimvurahwe J., Muyati V., Chivheya R., and Mwadzingeni L. 2013. Why not commercial goat production? Exploring rural communities' preference for livestock enterprises. Case of Matsai communal area, Zimbabwe. *Journal of Agricultural Research and Development*, 3(3): 30-31. [http://www.e3journals.org/cms/articles/1369753850\\_Musara%20et%20al.pdf](http://www.e3journals.org/cms/articles/1369753850_Musara%20et%20al.pdf) Accessed on 12\_November 2019

- Musemwa L., Mushunje A., Chimonyo M., and Mapiye C. 2010. Low cattle market off-take rates in communal production systems of South Africa: Causes and mitigation strategies. *Journal of Sustainable Development in Africa*, 12 (5): 209-226
- National Agricultural Marketing Council (NAMC). 2005; Report on the investigation into the potential for South African Goat industry. [www.namc.co.za](http://www.namc.co.za) Accessed on 12 November 2019
- Ndoro J.T., Mudhara M. and Chimonyo M. 2014. Cattle commercialisation in rural South Africa: Livelihood drivers and implications for livestock marketing and extension. *Journal of Human Ecology*, 45(3): 207-221
- Negassa A., and Jabbar M. 2014. *Livestock ownership, commercial off-take rates and their determinants in Ethiopia*. ILRI, Addis Ababa
- Ngambi J.W., Alabi O.J., Norris D. 2013. Role of goats in food security, poverty alleviation and prosperity with special reference to Sub-Saharan Africa: A review. *Indian Journal of Animal Research*, 47:1–9.
- Oakley A. 1972. *Sex, Gender, and Society*. New York: Harper and Row.
- Olowu D. 2013. Gendered Aspects of Food Security in Lesotho: Implications for an Integrative Rights-Based Approach. *Gender and Behaviour*, 11(2): 5378-5392
- Osmani A. G. and Hossain E. 2015. Market participation decision of smallholder farmers and its determinants in Bangladesh. *Journal of Economics of Agriculture*, 62(1): 163-179
- Ramsay K.A and Donkin E.F. 2000. *A review of the current status of goat research and development in South Africa*. Paper presented at the Regional Workshop on Goat Development in Southern Africa, Malawi

- Rios A.R., Shively G.E. and Masters W.A. 2009. *Farm productivity and household market participation: Evidence from LSMS data*. Presented at the International Association of Agricultural Economists Conference, Beijing.
- Roets M. and Kirsten J.F. 2005. Commercialisation of goat production in South Africa. *Small Ruminant Research*. 60(1): 187-196
- Rubhara T. and Mudhara M. 2019. Commercialisation and its determinants among smallholder farmers in Zimbabwe. A case of Shamva district, Mashonaland Central Province. *African Journal of Science, Technology, Innovation & Development (AJSTID)*, 11 (6):711-718
- Statistics South Africa, 2016. *Community Survey 2016*. Statistical release P0301 / Statistics South Africa, Pretoria
- Tchale H. 2009. The efficiency of smallholder agriculture in Malawi. *African Journal of Agricultural and Resource Economics*, 139: 101-121.
- Terefe E., Yaqob Y., Dessalean K., Tafa A. and Kifle A. 2013. Market weight and carcass characteristics of intact yearling afar goats under semi-intensive feeding management. *International Journal*, 4 (6): 95-101
- Togarepi C., Thomas B. and Mika N. H. 2018. Why goat farming in northern communal areas of Namibia is not commercialized: The case of Ogongo Constituency. *Journal of Sustainable Development*, 11 (6): 236-245
- Van Rooyen A. F., and Moyo T. 2007. *Goat production and marketing: Baseline information for semi-arid Zimbabwe*. Technical Report. South African Land Observatory, International Crop Research institute for the Semi-Arid Tropics Bulawayo.



- Vetter S. 2013. Development and sustainable management of rangeland commons- aligning policy with the realities of South Africa's rural landscape. *African Journal of Range and Forage Science*, 30(1-2): 1-9
- Webb E.C. and Mamabolo M.J. 2004. Production and reproduction characteristics of South African indigenous goats in communal farming systems. *South African Journal of Animal Sciences*, 34 (supplement 1): 236-239
- Yesufu O. A., Kassali R., Aremu F. J., and Ojo M. O. 2017. Market Analysis of smallholder goat enterprise under tropical conditions. *Agricultura Tropica Et Sutropica*, 50(3): 121-127.
- Yitayew A., Yigezu Y.A., Kassie G.T., Deneke T.T., Haile A., Hassen H. and Rischkowsky B. 2019. Identification of strategies to improve goat marketing in the lowlands of Ethiopia: A hedonic price analysis. *Applied Economics*, 51(1): 61-75

## **CHAPTER 6: GENDER-DIFFERENTIATED CONTRIBUTION OF GOAT FARMING TO HOUSEHOLD INCOME AND FOOD SECURITY IN SEMI-ARID AREAS OF MSINGA, SOUTH AFRICA**

### **Abstract**

Using focus group discussions, key informant interviews and a questionnaire survey of 241 households, the study analysed gendered-differentiated contribution of goat farming to food income and food security in the semi-arid area of Msinga in South Africa. Using the Household Food Insecurity and Access Scale to measure household food security for goat farming households, descriptive statistics and the Chi-square statistic showed a significant relationship between food security and household socio-economic parameters such as education level of household head ( $p<0.05$ ), gender of household head ( $p<0.05$ ) and the total household income ( $p<0.01$ ). The Tobit regression model showed that the main factors that determine food security at the household level were education levels, gender and the total household income. Female-headed households were less food secure than male-headed households because they did not have reliable employment to allow them to provide adequate and nutritious food for their households. Goats did not contribute to household food security. Little income was obtained from goats because goat flock numbers for most households did not increase due to poor nutrition, diseases, predation, and theft. Where goat flock sizes were low, households limited goat sales to maintain the potential to increase their flock size. Empowering women by promoting rural education can contribute to improvement of food security. Enhancing goat production is important if flock numbers are to be increased which enables farmers to make more sales thereby assisting in improving food security. Extension workers, therefore, need to assist farmers to better manage and utilize goats to their full potential.

*Keywords:* determinants, goat flock numbers, Tobit regression model

## 6.1 Introduction

Small-scale goat farming in most rural areas is an important source of livelihoods and has potential to eradicate poverty and build a sustainable food security option for communities (Ngambi *et al.*, 2013; Dube, 2015). Several studies have examined the importance of goats in diversifying income of the rural poor (Njuki and Sanginga 2013; Aldosari, 2017). Gendered analysis on factors such as the role and potential of goats to improve income and food security in semi-arid areas, however, have not been properly studied. Benefits from goat production can be improved if opportunities and challenges faced by farmers are understood in gendered lenses. It is important to consider gender because constraints disaggregated by gender affect the decision-making process and the contribution of goats towards household food security.

Food security is defined as a condition when all people have social, physical, and economic access to adequate, safe, and nutritious food continuously which meets the needs of their diet and preferences for healthy living (FAO, 2008). To ensure food security within households; availability, stability, accessibility, and utilization needs to be met. Food security can be used as a measure of household welfare because its absence is related to both the cause and effect of poverty in households (FAO, 1996). Households become food insecure when they fail to alleviate negative shocks to food availability, access or utilization (Webb *et al.*, 2006). Altman *et al.* (2009) classified food insecurity into transitory, temporary and chronic. Transitory food insecurity was defined as sudden in onset, temporary food insecurity as short periods of scarcity of access and availability

whilst chronic food insecurity as long periods of food shortages. Although a country may be food secure at national level, at household level, predominantly in rural areas; this may not be the case (De Cock *et al.*, 2013). Manyamba *et al.* (2012) thus referred to food insecurity as not an inability to produce food at national level but as a failure by households to have adequate income to buy food and purchasing of food. Food security cannot be understood in isolation from rural and urban development, access to land and other assets, water, education, sources of income and nutritional knowledge (Altman *et al.*, 2009).

De Cock *et al.* (2013) revealed that the main determinants of household food security status in the Limpopo Province of South Africa were human capital (education and household size) and household income; with income being considered as one of the most significant determinants (Lêl, 2015). Mango *et al.* (2014) found age and education level of household head, livestock ownership, remittances, household labour size, and access to market information to positively influence household food security. Zhou *et al.* (2017) revealed that gender, education and age of household head, assets, unemployment, remittances, and inflation were the factors that determine household food insecurity. However, these determinants of food security may differ depending on social norms of an area or at household level because food security is a multidimensional phenomenon. Oyekale (2013) highlighted that large household size can increase agricultural production due to the provision of labour; but where production means are constrained, large household sizes can lead to food shortages. Schwabe (2004) indicated that households with many dependents are likely to be poor because they need substantial income to keep household members out of poverty, and higher dependency ratios are more frequent among the poor.

Deciphering the complexities of the gender and food security link assist in understanding how to increase household food security. Inequalities in women's access to assets such as livestock and land and other livelihood opportunities makes them vulnerable to malnutrition and food insecurity. Although government social grants may assist women in caring and looking after households, they do not transform gender relations (Patel and Hochfeld, 2011), and do not stimulate women's participation in developmental activities (Patel *et al.*, 2015). With fewer assets and heavier burdens associated with additional household obligations, women are more vulnerable to shocks of household food insecurity.

Women and children are often responsible for the provision of labour in many goat related activities (Hulela, 2010). Despite this, they generally own less goats than men and participate less in decision-making (Webb and Mamabolo, 2004) as a result of the cultural settings which are biased against women (Chukwuka *et al.*, 2010). Despite several studies having reviewed aspects of women and food security, this has failed to translate into the expected outcomes in addressing food insecurity in much of Southern Africa (Olowu, 2013). Obtaining financial independence assist in increasing negotiating ability of women and enhance their rights to participate in decision-making and therefore increase household food security.

Household food security requires adequate food supply to meet specific dietary needs, either through production, purchase or gifts (Banwat *et al.*, 2012). Poverty leads to households consuming diets which lack diversity, and this can lead to micronutrient deficiencies and ailments. It may also lead to households consuming poor quality and quantity and less nutritious foods, a decrease in the number of meals and or size of the portion, and in malnutrition, especially in

children (Brinkman *et al.*, 2010). Baiphethi and Jacobs (2009) alluded to the fact that incidences of food insecurity are high in South Africa due to an increase in the dependence on market purchases of food supply. Households, therefore, should have direct access to cash but with unemployment being rife particularly in rural areas, the income to purchase food is scarce. Relying on cash to buy food makes households vulnerable to food insecurity (Manyamba *et al.*, 2012). The use of assets such as goats can be used to generate income for rural households. The study, therefore, is aimed at involving goats as an asset which can be used to contribute towards sustainable household food security in semi-arid areas.

## **6.2 Conceptual framework**

Most rural dwellers in South Africa depend on social grants. A social grant is money the government gives the country's citizens on a monthly basis to increase the standard of living of people vulnerable to poverty and in need of state support. The recipients include the elderly people, people with disabilities and those with young children. The need for social grants particularly in rural areas is due to lack of economic activities and the fact that rural people often do not have the necessary skills required to be involved in economic activities to improve their standard of living (Adams-Kane and Lim, 2016). Most women access social grants as they are caregivers of children (Patel, 2012). According to the 'development as freedom' theory (Sen, 1999: 87); although social grants have a positive role to play in most households of reducing poverty, they are inadequate to fully end poverty (Selepe *et al.*, 2015; Mokwena, 2016; Devereux and Waidler, 2017). Social grants are regarded as safety nets to prevent acute poverty in households but are inadequate to meet all household needs. Trefry *et al.* (2014) found that social grants are a disincentive to farming and gardening. Another concern with social grants is that since cash is fungible, it can easily be

allocated to non-essentials such as alcohol and drugs. In some households the grant is the only source of income which the whole household shares (Mokwena, 2016). Therefore, households need to diversify livelihoods to other on-farm and off-farm activities (Barret *et al.*, 2001; Mathebula *et al.*, 2017), thereby reducing dependency on social grants.

Amartya Sen's theory of freedom of development gave rise to the capability approach (Sen, 1999). According to the capability approach, humans vary in their ability to translate means into opportunities or outcomes or transform a resource into opportunities. It is based on the view that the development of human skills is essential for poverty reduction as it gives people freedom through the development of their capabilities. Although health, adequate nutrition and freedom of speech are some of the important capabilities; human capital development, such as education, is one of the most effective tools for poverty alleviation (Nussbaum, 2011). Education increases the capacity of rural households to investigate technological advances and market opportunities. There is a correlation between poverty and low education level and unemployment (Baiyegunhi and Fraser, 2010). Gubbles (2013) noted that increasing levels of education, particularly of female literacy, is important as it increases family incomes and leads to better nutrition and, hence, it is related to increased food and nutritional security.

Although women play an important role in providing food for their households, social and cultural inequalities lead to them having less access to education, household decision-making power, productive resources, and markets, (Olowu, 2013; Trefry *et al.*, 2014; and Sharaunga *et al.*, 2015). Baiyegunhi and Fraser (2014) observed a positive relationship between being a female-headed household and poverty. When compared to male-headed households, female-headed households

are more likely to be poor. Felker-Kantor and Wood (2012); Kassie *et al.* (2014) and Zakari *et al.* (2014) studied the relationship between the gender of a household head and food security. They observed that female-headed households were less food secure than the male-headed ones. However, Ibnouf (2011) showed that women contribute more to food security than men. Most men migrate seasonally or even permanently due to unfavourable climatic conditions and conflicts, leaving women to produce and provide food for their households.

Ansah *et al.* (2019) argued on the importance of resilience (that is, the capacity of socio-economic systems to withstand shocks) to household food security. Resilience of a household is often acquired from capitals/ income, assets, and opportunities such as social safety nets and access to public services such as government social grants. A theoretical model by Vaitla *et al.* (2012) linked household assets to income; that assets can be employed to generate income for household consumption. The objective of the study was therefore, to investigate the gender-differentiated contribution of goat farming to food security in semi-arid areas. Semi-arid areas have a huge potential for goat production due to suitable rangelands. Despite the abundance of goat numbers and rangelands, most rural communities in semi-arid areas experience poverty and malnutrition. Thus, to address food insecurity, assets such as goats, can be used as living savings and be converted into cash to buy food for the household whenever it is needed (Bettencourt *et al.*, 2015).

## **6.3 Research methods**

### **6.3.1 Study site, sampling and selection of households and data collection**

The study site, sampling and selection of households and data collection procedure are described in sections 3.3.1, 3.3.2 and 3.3.3.



### 6.3.2 Statistical analyses

Using SPSS (2019), different statistical tools were used in the analysis and interpretation of results. These included descriptive statistics and chi-square tests (Crosstabs). The Tobit regression model were used to estimate the determinants of food security. Qualitative data from the focus group discussions and key informant was analysed by explaining the participants' meanings, experiences and views of the questions discussed. Coding was done and themes were created by identifying keywords which were used to present explanations and interpretations.

Descriptive analysis of all the variables was carried out by looking at frequencies of the variables to examine the socio-economic characteristics of the selected households. Chi-square tests were computed to determine the association between categorical variables such as food security and different socio-economic parameters (such as gender of household head, education level of household head, marital status of head of household, total household size, land ownership, location, total household income, source of regular food, number of meals eaten per day, occupation of household head and number of goats owned).

Food security was measured using the Household Food Insecurity Access Scale (HFAIS). Although there are other indicators which measure food security such as the Household Dietary Diversity Scale (HDDS) which capture food quality and diversity; this study focused on the element of food quantity eaten or sufficiency, which is what the HFIAS captures (Daniel *et al.*, 2013).

The Household Food Insecurity Access Scale (HFIAS) was used to assess food security status of households (Appendix 2, Section 2B of questionnaire). Nine questions probed whether the household experienced one form of insufficient access to food in the past 30 days and if yes, with what frequency (Pérez-Escamilla *et al.*, 2017; De Cock *et al.*, 2013). Households had three possible answers to each of the nine questions, which ranges from zero to 27; the higher the score, the greater the food (access) insecurity the household experienced (De Cock *et al.*, 2013). Therefore, in the study, households that were food secure had lower HFIAS scores; whilst those which were food insecure had higher HFIAS scores.

Frequencies of experience of each question were summed to create a continuous variable which became the HFAIS score (Swindale and Bilinsky, 2006). The dependent variable was household food security, grouped into four categories which had cut off points on the scale, which enabled a household to be categorized as food secure or not depending on its socio-economic condition. The categories were 1 (food secure: household did not experience any of the food insecurity conditions, or experienced anxiety, but rarely), 2 (mildly food insecure: household was worried about not having sufficient food at times or often, and/or was unable to consume preferred foods, and/or consumed repetitive diet, but only rarely), 3 (moderately food insecure: household consumed poor quality food more frequently, consumed monotonous diet at times or often, and/or started to cut back on quantity of meal size or number of meals, rarely or sometimes) and 4 (severely food insecure: household reduced meal size or number of meals often, and rarely or frequently ran out of food, went to bed hungry or spent whole day without eating). Classification for the four HFAIS categories were done following Coates *et al.* (2007). Chi-square statistic was used to determine

whether there was an association between these four categories of food security and household socio-economic parameters.

To analyse the determinants of food security, the Tobit regression model was used with the HFAIS score as the dependent variable. The dependent variable was lower and upper censored at zero and 27, respectively. The Tobit model is appropriate for analysing variables with lower and upper censoring (McDonald and Moffitt, 1980). Households considered food secure had lower HFAIS scores whilst those considered food insecure had higher HFAIS scores. The model was analysed in STATA Version 15 software.

The empirical model for quantifying the determinants of HFAIS was given as:  $Y_i^* = \beta_0 + \beta X_i + e_i$

Where:

$Y_i^*$  = is the latent variable of the dependent variable (HFAIS)

$\beta$  = is the vector of parameters to be estimated

$X_i$  = is the set of explanatory variables (Table 6.1)

$e_i$  = is the disturbance term

The model errors  $e_i$  are assumed to be independent,  $N(0, \sigma^2)$  distributed, conditional on the  $X_i$ .

The observed  $Y_i^*$  is defined as 1 if  $Y_i^* > 0$  and 0 if  $Y_i^* \leq 0$ .

The independent variables were household characteristics such as gender, education level of household head, location, age of household head, sale of goats in the past 12 months, save money, food storage to last a month, number of goats per household and the total household income. Table

6.1 gives the variables which were in the model and their expected effect on the dependent variable (food security).

Table 6.1: Description of independent variables used in the Tobit model

<b>Variables</b>	<b>Measures</b>	<b>Expected effect</b>	<b>Rationale</b>
Gender	0=Male headed household, 1=Female-headed household	+	Male-headed households tend to be food secure as men usually own the means of production
Goats sold in past 12 months	0=Sold, 1=Did not sell	+	Households which sold goats had income to buy food items, and therefore more food secure
Save money	0=Yes, 1=No	+	Money saved can be used to cope with food shortages
Food stored for a month	0=Yes, 1=No	+	Food stored to alleviate future shocks such as increase in food prices. Those who store food are likely to be food secure
Educational level	Years in school	-	Households with an educated head are more likely to be food secure since they have more access to opportunities
Total household income	ZAR	-	The more the income, the more food a household can buy
Goat flock sizes	Numbers	-	Higher goat ownership is potential income. Goats can be sold to buy food and achieve food security
Age of household head	0=young, 1= old aged	+	Younger household heads can fend for themselves and be more food secure than the aged
Location	0=Mthembu traditional authority area, 1=Mchunu traditional authority area	-	Mthembu area has access to irrigation to sustain gardens will be more food secure than Mchunu which does not have

The logic behind the gender having a positive sign is that male-headed households were expected to be more food secure than the female-headed households. Males often earn more income than female because of socio-cultural factors that prohibit women from participating in the labour force (Mallick and Rafi, 2010). In addition, lack of access to production resources also limit women's contribution to the household income (Muhoyi *et al.*, 2014). Faridi and Wadood (2010), Nyako (2013) and Muche *et al.*, (2014) stated that education levels are directly related to food security. Households become more food secure with increasing education levels of the household head. Therefore, education levels of household heads had a negative sign indicating that the educated are expected to be more food secure than those with fewer years of schooling. Hoddinot and Yohannes (2002) indicated that higher educational attainment by heads of households is likely to be associated with higher incomes. Higher household income is linked with more expenditure on food.

Households that saved money to cope with food shortages were expected to be more food secure than those which did not save money (Shariff and Khor, 2008), hence the positive sign. Thamaga-Chitja *et al.* (2004) stated that effective food storage plays a significant role in making food supply to become stable at household level. Longer food storage minimises expenses incurred when buying regularly enduring price increases of goods and increased transport costs. Food storage had a positive sign indicating that households that store food are expected to be more food secure than those which do not. Rose (2008) noted that the more assets a household owns, the better it will be able to face difficult situations in the future. Hassen and Tesfaye (2014) reported that income from goats can be used to sustain human nutrition for the farmers. Byaruhanga *et al.* (2014) also showed that households with large flocks sold more goats than those with smaller flocks resulting in more

income to use for household expenses. Therefore, goat flock sizes had a negative sign as those with larger goat flocks were expected to be more food secure.

Baiyegunhi and Fraser (2010) reported that households headed by old age people tend to be more vulnerable because they cannot fend for themselves due to their old age. Therefore, young household heads can fend for themselves and be more food secure, and the variable had a positive sign. Shisanya and Hendriks (2011) mentioned that home gardens have a positive influence towards reducing the effect of food insecurity by decreasing micro-nutrient deficiencies. Location had a negative sign as Mthembu households were more likely to be food secure because most of them own gardens, compared to those in Mchunu area.

## **6.4 Results**

### **6.4.1 Descriptive statistics and socio-economic characteristics of households**

Table 6.2 shows descriptive statistics for household socio-economic characteristics. Most of the households were male-headed. The heads belonged to the adult age-group (67%), were married (56%) and only had up to primary school education level (42%). Most of land owned was allocated by the traditional authority (97%). The most prevalent occupation was temporary (26%) or permanent employment (22%) whilst some were old age pensioners (17%). Although most households did not save money (67%), they were able to store food for at least a month (61%). Most households did not grow any crops and so they relied on buying food from supermarkets (51%). Coping strategies for emergencies by households included mostly selling livestock (36%) or borrowing money from relatives and friends (28%).

Table 6.2: Descriptive statistics for socio-economic characteristics of households

Variable	Categorical	Frequency	Percentage
Location	Mchunu	118	49
	Mthembu	123	51
Gender	Male	165	68.5
	Female	76	31.5
Head of household age	Youth	17	7.1
	Adult	161	66.8
	Old age	63	26.1
Marital status	Single	11	4.6
	Married	134	55.6
	Widowed	62	25.7
	Cohabiting	34	14.1
Education level	None	63	26.1
	Primary	100	41.5
	Secondary	63	26.1
	Tertiary	15	6.2
Land ownership	Allocated	234	97.1
	Inherited	3	1.2
	Bought	4	1.7
Head occupation	Buying and selling	30	12.4



	Farming	12	5.0
	Permanent job	52	21.6
	Temporary job	63	26.1
	Unemployed	32	13.3
	Self employed	12	5.0
	Old age pension	40	16.6
Save money	No	161	66.8
	Yes	80	33.2
Source of regular meal	Supermarkets	122	50.6
	Own production and supermarkets	119	49.4
Coping strategy	Sell livestock	86	35.7
	Sell other assets	2	0.8
	Use cash savings	38	15.8
	Borrow	67	27.8
	Reduce spending	48	19.9
Receive remittances	No	131	54.4
	Yes	110	45.5
Food storage for a month	No	94	39
	Yes	147	61

### 6.4.2 Household food production

A few households (39%) in Mchunu traditional authority had gardens due to lack of water when compared to Mthembu traditional authority (73%) ( $p < 0.01$ ) (Table 6.3). Residents of Mthembu traditional authority were involved in gardening due to their proximity to the Tugela River and most had plots in the irrigation schemes. The garden produce contributed to food security by providing food and diversity in diets. Although questionnaire survey results showed that there was no significant relationship between gender and growing of crops; during FGDs, the women mentioned that men were generally not interested in gardening as it was considered a women's job. FGDs also revealed that although males managed the income from goats, the females managed income from the sale of garden produce. The amount of money received from the sale of garden produce, although small and irregular in its flow due to poor marketing, assisted them to purchase other goods required in the household.

Table 6.3: Relationship between growing of crops in traditional areas and gender as a percentage

Category	Traditional authority area		Significance level	Gender		Significance level
	Mchunu	Mthembu		Male	Female	
Did not grow crops	61	27		41	50	
Grew crops but did not sell	36	6		18	26	
Sold crops for <ZAR500	3	22	***	17	4	ns
Sold crops for ZAR501-1000	0	8		5	3	
Sold crops for >ZAR1000	0	37		19	17	

Significance level: \*\*\* =  $p < 0.01$ ; ns= not significant

#### **6.4.3 Household income level**

Male-headed households earned more income than female-headed households ( $p < 0.01$ ) (Table 6.4). Similar results were observed in Chapter 3. The results can be explained by the main occupation of the household head. More male-headed households had permanent employment (30%) than female-headed households who mostly survived on the government old age pension funds (33%). Higher education levels of males enabled them to obtain permanent employment which translated to higher incomes. On the other hand, female-headed households were mostly unemployed or depended on government old age pensions due to lower education levels. Some unemployed household-heads relied on children's social grants. FGDs revealed that the government social grant money was not adequate to buy food to last households a month and so households tended to struggle towards month end. Social grant money had many uses besides buying food; it paid for funeral covers, micro lenders, stokvels and was used to buy pre-paid electricity. School-going children were assisted by school feeding schemes where they were fed one meal per day during school days. There was, however, no significant difference between the total income spent on food between male and female-headed households.

Table 6.4: Household head occupation, total household monthly income and household income spent on food monthly, as a percentage

Category	Male-headed household	Female-headed household	Significance level
Household head occupation	%	%	
Buying and selling	12	13	
Farming	6	3	
Permanent job	30	3	***
Temporary job	29	20	
Unemployed	8	25	
Self-employed	5	4	
Retired	9	33	
Total household monthly income	%	%	
<ZAR1000	2	1	
ZAR1001-5000	65	93	***
>ZAR5000	33	5	
Household income spent on food monthly	%	%	
<ZAR1000	35	45	
ZAR1001-1500	39	67	ns
ZAR1500-2000	21	7	
>ZAR2000	5	1	

Significance level: \*\*\*=p<0.01, ns= not significant

#### **6.4.4 Use of income from goat sales**

Focus group discussions showed that goat keeping did not aid household food security because little income was obtained from them. Most farmers claimed that their goat flock sizes did not grow adequately due to mortality caused by poor nutrition in the dry seasons, diseases (such as heartwater and coccidiosis), inadequate housing and predation caused mainly by dogs which attacked vulnerable kids and also theft. Farmers limited goat sales when flock sizes were low and so there were sporadic sales only during emergencies such as funerals and ill-health. Selling of a goat to buy food for a household was usually done only when there was a ‘crisis’ such as extreme cases of hunger when the household could not make use of neighbours, friends or micro-lenders to borrow money. Farmers revealed that goats were not their main source of income and a year could pass without a single goat being sold. According to them, selling goats too frequently with such ‘small numbers’ of 20 or 30 would result in them being left with nothing to fall back on when a ‘real crisis’ arises. Only those with larger goat flock sizes (above 50) could sell more often. Having smaller flock sizes was also seen as reflecting poverty and so most households would rather keep their goats than sell each time there is inadequate food in the household. As such, farmers revealed that some households would rather go to bed hungry than sell their goats.

#### **6.4.5 Association between HFAIS and socio-economic characteristics**

Table 6.5 categorized HFAIS into four: food secure, mildly food insecure, moderately food insecure and severely food insecure to analyse the association between food security and household socio-economic characteristics. There was a significant difference between male and female-headed households in terms of food security with more males than females belonging to the food secure category ( $p < 0.05$ ). There were also significance differences between food security

and size of the household ( $p<0.05$ ), marital status ( $p<0.05$ ), household head education level ( $p<0.05$ ), household head occupation ( $p<0.01$ ), total household income ( $p<0.01$ ), source of regular food ( $p<0.01$ ), number of meals per day ( $p<0.01$ ) and location ( $p<0.01$ ).

The larger the household size, the more they become food insecure. The higher the education level of the household head, the more food secure they were whilst households with little or no education levels were less food secure. However, there were no significant differences between food security and land ownership and number of goats owned by a household. Although FGDs revealed that only farmers with higher goat flock sizes sold more goats than those with fewer, this did not translate to food security because this only applied to a few of the farmers and so the questionnaire survey results did not show significant differences between those with many or fewer goat flock sizes.

Household head occupation which is often related to education level and total income, showed that household heads with permanent employment were more food secure than those who were unemployed, self-employed or those who dependent on old age pensions and earned less income. An interview with a social worker in the study area indicated that households where the head was unemployed often dependent on the government social child grant. The social grant was aimed at assisting children but ended up feeding the entire household making it inadequate to meet its intended beneficiaries. As a result, meals eaten were unbalanced, inadequate or not nutritious. Households who owned gardens and produced some of their household food were more food secure when compared to those who dependent on having income to purchase food from the supermarkets. The number of meals eaten per day also affected food security as the fewer the

number of meals eaten; the less households were food secure. Mthembu traditional authority area were more food secure when compared to Mchunu. Focus group discussions in Mchunu mentioned that in contrast to Mthembu, their area did not have water to allow them to have gardens and so they were forced to buy all the food they require which is a challenge due to lack of purchasing power.

#### **6.4.6 Determinants of food security**

Table 6.6 indicates that seven estimated coefficients were statistically significant. The relationship between gender and food security was a statistically significant. The positive coefficient indicates that female-headed households were worse off than males in terms of food security. There was a statistically significant negative coefficient for saving money indicating that households which save money were more food secure than those which did not. There was a statistically significant negative coefficient for location which indicates that Mthembu traditional authority area was more food secure than Mchunu traditional authority area. The results were attributed to Mthembu farmers having access to gardens. There was a statistically significant negative coefficient for total household income indicating that households with more income are more food secure.

Table 6.5: Food security and household parameters

Variable	Category	Food security				Significance level
		Food secure	Mildly insecure	Moderately insecure	Severely insecure	
Household head gender	Male	18	120	9	18	**
	Female	8	38	12	18	
Location	Mchunu	13	57	16	32	***
	Mthembu	13	101	5	4	
Household head marital status	Single	2	4	2	3	**
	Married	15	96	7	16	
	Widowed	6	31	9	16	
	Cohabiting	3	27	3	1	
Household head education level	None	4	34	10	15	**
	Primary	9	67	9	15	
	Secondary	8	48	2	5	
	Tertiary	5	9	0	1	
Land ownership	Allocated	24	156	19	35	ns
	Inherited	1	1	1	0	
	Bought	1	1	1	1	
Household head occupation	Buying & selling	3	19	6	2	***



	Farming	0	11	1	0	
	Permanent job	11	38	0	3	
	Temporary job	1	49	5	8	
	Unemployed	2	13	7	10	
	Self employed	1	9	0	2	
	Retired	8	19	2	11	
Source of regular meal	Supermarkets	19	60	13	30	***
	Own production & supermarkets	7	98	8	6	
Total household size	<5	10	31	5	16	**
	6-10	10	76	11	15	
	>10	6	51	5	5	
No. of goats per household	<25	21	90	14	30	ns
	26-50	5	61	7	4	
	>50	0	7	0	2	
No. of meals per day	3	25	113	8	13	***
	2	1	43	13	21	
	1	0	2	0	2	
Total household income	<ZAR1000	0	0	0	5	***
	ZAR1001-5000	14	115	20	29	
	>ZAR5000	12	43	1	2	

Note: \*\*\* is significant at  $p < 0.01$ ; \*\* is significant at  $p < 0.05$ ; ns is not significant

Although there was a statistically significant coefficient for food storage, the positive coefficient indicates that households that store food are less food secure than their counterparts. A possible reason could be that households that store food might not have a continuous flow of income and therefore are less food insecure. There was a statistically significant negative coefficient for goat sales in the past 12 months indicating that households which sold goats had income to buy food making them more food secure. Goat flock size had a statistically significant positive coefficient indicating that goat ownership meant food insecurity. The results were contrary to expectations. A plausible explanation for this could be that higher goats flock sizes distracted households' economic activities making households end up being food insecure than their counterparts. Households with larger flock sizes might be more attached to them and not willing to convert them to food to make them food secure.

In the Tobit model, the reciprocal of the tolerance value which measures the impact of collinearity among variables (VIF), was below the cutoff for tolerance value of 10 (Hair *et al.*, 2014). There was low correlation among variables as the VIFs were in acceptable ranges.

Table 6.6: Tobit estimates of the determinants of food security

Variable	Coefficient	Standard Error	P> t	VIF
Gender	2.219643	0.67	0.001**	1.39
Education level	-0.5092766	0.37	0.172	1.49
Location	-1.367428	0.64	0.035*	1.46
Sold goats in 12months	-0.5138926	0.31	0.099*	1.30
Saved money	-1.178934	0.55	0.034*	1.59
Household head age	0.458961	0.54	0.392	1.18
Food storage	1.121422	0.57	0.051*	1.11
Number of goats	0.0513205	0.02	0.032*	1.47
Total household income	-1940761	0.70	0.006**	1.46
_cons	9.846895	1.90	0.000	
Var (HFAIS)	16.53438	1.63		
Wald chi <sup>2</sup> (9) = 77.91				
Prob > chi <sup>2</sup> = 0.0000				
Log likelihood = -632.22857				
Pseudo R <sup>2</sup> = 0.0580				
Significant at * = 0.05, ** = 0.01 and *** = 0.001				

## 6.5 Discussion

The socio-economic factors that had an influence on food security were location, marital status, source of regular meal, total household size, gender, education level, occupation, total household income and number of meals per day. In their studies Baiphethi and Jacobs (2009); Shisanya and Hendriks (2011) and Selepe *et al.* (2015) reported that home gardens have a positive contribution towards reducing the impact of food insecurity by decreasing micro-nutrient deficiencies and

giving allowance to households to only buy the foods that they do not produce thereby increasing financial savings on food bills. Similarly, this was observed in Mthembu traditional area where residents were involved in gardening and were therefore more food secure than Mchunu residents. Water is a basic need and key to household food security as it is required for food production (Selepe *et al.*, 2015). Mchunu residents had underutilized land which could not be used for crop production or gardening due to lack of water; and this contributed to them being food insecure as they only relied on supermarkets to obtain food. Obtaining food from supermarkets require purchasing power which often households do not have and so households which grew own crops had more likelihood of attaining food security. Mrema and Chitiyo (2011) stated that vegetable home gardening is one of the agri-based safety nets that can be used to deal with food shortages and nutritional needs. Patel and Hochfeld (2011) and Murugani *et al.* (2014) in their studies mentioned that women in agriculture need to be supported by government authorities to curb food insecurity in households.

Meyer and Nishimwe-Niyimbanira (2016) and Oyekale (2013) indicated that there is an unclear relationship between poverty and household size. Households with more children may have more labour to work on the land with the hope of increasing income. On the contrary, large households with many dependents are likely to be poor and hence food insecure because they require large income to keep the family members out of poverty and to provide daily meals. The latter was observed in the study where larger household sizes were more food insecure than those with smaller sizes.

Results showed that number of meals consumed per day affected food security. Food insecurity was a result of an insufficient number of meals eaten per day, whilst food security was seen in households which could afford more meals per day. Manjengwa (2012) mentioned that poor households may eat food of poor nutritional quality or fewer meals per day because they cannot afford more meals. Such households may be food insecure as a result of insufficient number of meals eaten per day. The more meals eaten per day means more quantity of food is eaten, and so households which can afford more meals per day tend to be more food secure.

Marital status of household had a significant relationship with food security, with the single and widowed being less food secure. In their study Selepe *et al.* (2015) found that single headed households led by women were food insecure because they often did not have reliable employment to afford adequate and nutritious food for their household. Coping strategies mentioned in the study were in line with those stated by D'Souza and Jolliffe (2012) and Mkhawani *et al.* (2016) that households may resort to selling livestock, borrow money to buy food and reduce spending on food in face of emergencies.

The determinants of food security at the household level were education levels, gender, saving money, location with access to irrigation to sustain gardens, sale of goats in the past 12 months and total household income. The food security situation was lower for households with little or no education, the unemployed and those who received little household income because more income enables a household to secure food through purchasing. Obi and Tafa, (2016) alluded to the fact that there is a significant correlation between poverty and unemployment. Whilst Baiyegunhi and Fraser (2010) stated that households may become more vulnerable to poverty and hence food

insecurity when the education level of the household head is low because the more years spent in school increases the chances of finding a better paying job which increases food security of households. Higher education levels may lead to better knowledge on nutrition and access to food due to higher incomes as stated by De Cock *et al.* (2013). Similarly, Gebre, (2012) noted that education is significantly correlated with food security.

Some authors presented arguments on the head of household's age and stated that food insecurity and poverty were prevalent in households whose heads are younger in age due to the youth's reliance on adults for food provision as argued by Obi and Tafa (2016). On the contrary, Baiyegunhi and Fraser (2010) stated that households headed by the aged could be more vulnerable because they cannot fend for themselves due to their old age. In the current study, age of household head had no influence on food security.

Saving money was also a determinant of food security in the study. Where households had money kept for future use it could easily lessen shocks such as income uncertainty, increasing food prices and drought. Although Gitonga *et al.* (2013) mentioned that food storage is vital to food security because it bridges the gap between two harvests and stabilizes prices by taking the produce off the market during the peak season; in the current study, storing food did not contribute to food security. A possible reason is that households which store food might not have a continuous flow of income and therefore are less food insecure. In the study, the quantity and type of food stored was not measured or assessed and so the quantity or type of food stored by households might not have contributed to food security. In addition, the period of storage, of 30 days, might not have been long enough to adequately have any impact on food security of households.

There was a significant relationship between food security and gender of household head. Female-headed households were less food secure than male-headed households. Baiyegunhi and Fraser (2010) obtained similar results that food insecurity and poverty is more likely to be higher in female-headed households when compared to male-headed households. This is because females often did not have sustained income to provide adequate and nutritious food for their household.

Results from FGDs are in line with those from questionnaire survey that goats did not contribute towards household food security. Although FGDs revealed that farmers with higher goat flock sizes sold more goats than those with fewer, and used the income to buy food for the households; this may not conclude that the food security situation could be increased because only few farmers had high flock sizes. Focus group discussions results indicated that for most farmers, there was little income obtained from goat sales. This is because for most household, goat flock numbers did not grow effectively due to poor nutrition, diseases, predation and theft. Where goat flock sizes were low, households, therefore, limited goat sales to maintain the potential to increase their flock size and so there were only sporadic sales mostly when there were household emergencies such as funerals and ill-health. This is in line with Byaruhanga *et al.* (2014) who showed that households with large herds sold significantly more goats than those with smaller herds. Negassa and Jabbar (2014) also mentioned that flock size was positively associated with household's choice of participation in goat sales, with goat sales being limited where flock size was low.

## 6.6 Conclusions

In the study, information relating to household composition, food consumption, household income, and ownership of goats; and how they relate to food security was collected. The results showed that the determinants of food security at the household level were education levels, gender, saving money, location with access to irrigation to sustain gardens, sale of goats in the previous 12 months and the total household income. Female-headed households were found to be less food secure than male headed households. Empowering women is therefore crucial to ensuring food security. Unstable employment opportunities lead to households to be unable to adequately cope with food insecurity. Hence, promoting rural education may largely contribute to improvement of food security levels, as education is significantly correlated with food security. Enhancing goat production is important if flock numbers are to be increased. Increasing goat flock numbers will enable farmers to make more sales which can assist in improving food security. Policies should focus on the promotion of education, especially of women and provision of appropriate policies which can raise household incomes and improve rural economies are needed. This may entail mobilizing households through training to create their own opportunities as entrepreneurs is important since employment prospects are scarce. Agricultural development programmes need to integrate gender and goats, in the design and implementation of interventions programmes on improving food security. Extension workers in the study area of Msinga also need to assist farmers to better manage and utilize goats to their full potential. This may be done by assisting goat farmers to improve goat nutrition, health and management; thereby increasing production efficiency of goats.



## 6.7 References

- Adams-Kane J. and Lim J.J. 2016. Institutional quality mediates the effect of human capital on economic performance. *Review of Development Economics*, 20: 426-442.
- Aldosari F.O. 2017. Gender participation in sheep and goat farming in Najran, southern Saudi Arabia. *Saudi Journal of Biological Sciences*, 25: 144-148
- Altman M., Hart T. and Jacobs P. 2009. *Food security in South Africa*. Centre for poverty employment and growth, HSRC, Pretoria
- Ansah I.G.K., Gardebroek C. and Ihle R. 2019. Resilience and household food security: A review of concepts, methodological approaches and empirical evidence. *Food Security*, 11:1187-1203
- Baiyegunhi L.J.S. and Fraser G.C. 2010. *Determinants of household poverty dynamics in rural regions of the Eastern Cape Province, South Africa*. In poster presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa. <http://ageconsearch.umn.edu/bitstream/97078/2/63.%20Poverty%20dynamics%20in%20South%20Africa.pdf>. Accessed on 9 March 2019
- Banwat M.E., Lar L.A., Dakum L.B., Igoh C.S., Daboer J.C. and Ogbonna C. 2012. Factors affecting household food security in a rural community in North-Central Nigeria. *International Journal of Community Research*, 1 (1): 23-29
- Barrett C.B., Reardon T. and Webb P. 2001. Nonfarm income diversification and household livelihood strategies in rural Africa: Concepts, dynamics, and policy implications. *Food Policy*, 26(4): 315–331

- Bettencourt E. M. V., Tilman M., Narciso V., da Silva Carvalho M.L. and de Sousa Henriques P.D. 2015. The Livestock Roles in the Wellbeing of Rural Communities of Timor-Leste. *Revista de Economia e Sociologia Rural*, 53(1): 63-80
- Brinkman H.J., Saskia D.P., Ludovic S. and Martin W. 2010. High food prices and the global financial crisis have reduced access to nutritious food and worsened nutritional status and health. *The Journal of Nutrition*, 140: 153–161.
- Baiphethi M. and Jacobs P.J. 2009. The contribution of subsistence farming to food security in South Africa. *Agrekon*, 4(48): 459-482
- Byaruhanga C., Oluka J. and Olinga S. 2014. Socio-economic aspects of goat farming enterprise in Teso region, Uganda. *Uganda Journal of Agricultural Sciences*, 15(1): 87-100
- Chukwuka O.K., Okoli I.C., Okkeudo N.J., Opara M.N., Hebert U., Ogbuewu I.P. and Ekenyem B.U. 2010. Reproductive potentials of West African Dwarf sheep and goats: A review. *Research Journal of Veterinary Sciences*, 3: 86-100
- Coates J., Swindale A. and Bilinsky P. 2007. *Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide* (v. 3). Food and Nutrition Technical Assistance Project (FANTA), Academy for Educational Development, Washington, D.C.
- Daniel M., Coates J and Vaitla B. 2013. *How Do Different Indicators of Household Food Security Compare? Empirical Evidence from Tigray*. Feinstein International Center, Tufts University: Medford, USA.
- De Cock N., D’Haese M., Vink N., van Rooyen C.J., Staelens L., Schönfeldt H.C. and D’Haese L. 2013. Food security in rural areas of Limpopo province, South Africa. *Food Security*, 5: 269-282

- D'Souza A. and Jolliffe D. 2012. Rising Food Prices and Coping Strategies: Household-level Evidence from Afghanistan. *Journal of Development Studies*, 48(2): 282-299
- Dube K. 2015. *Characterisation of goat production systems in selected coastal areas of the Eastern Cape Province, South Africa*. Masters degree Thesis. University of Fort Hare, Alice
- Food and Agriculture Organization (FAO) 2008. *Deriving Food Security Information from National Household Budget Surveys: Experiences, Achievements, Challenges*. Food and Agricultural Organization of the United Nations, Rome
- FAO. 2016. *Report on World Food Summit*. World Food Summit, WFS 96/REP Part One, Rome
- Faridi R. and Wadood S. 2010. An econometric assessment of household food security in Bangladesh. *Bangladesh Development Studies*, 33 (3): 97-111
- Felker-Kantor E. and Wood C.H. 2012. Female headed households and food insecurity in Brazil. *Food Security*, 4(4): 607-617
- Gitonga Z. M., Groote H. D., Kassie M. and Tefera T. 2013. Impact of metal silos on households' maize storage, storage losses and food security. *Journal of Food Policy*, 43: 44-55.
- Gubbels P. 2013. *Changing the Development Paradigm: Key to Managing Drought Risk in areas of Chronic Food Insecurity in Africa*. Background Paper prepared for the Global Assessment Report on Disaster Risk Reduction.
- [www.preventionweb.net/english/hyogo/gar/.../Gubbels,%202012.pdf](http://www.preventionweb.net/english/hyogo/gar/.../Gubbels,%202012.pdf) Accessed on 9 March 2019
- Hair J.F., Black W.C., Babin B.J. and Anderson R.E. 2014. *Multivariate Data Analysis*. 7<sup>th</sup> Edition. Pearson New International Edition, Essex

- Hassen A.S. and Tesfaye Y. 2014. Sheep and goat production objectives in pastoral and agro-pastoral production systems in Chifra district of Afar, Ethiopia. *Tropical Animal Health and Production*, 46: 1467-1474
- Hoddinot J.F. and Yohannes Y. 2002. *Dietary diversity as a food security indicator*. Food Consumption and Nutrition Division of the IFPRI. Discussion Paper 136
- Hulela K. 2010. The role of women in sheep and goats production. *International Journal of Scientific Research in Education*, 3(3): 177-187
- Kassie M., Ndiritu S.W. and Stage J. 2014. What determines gender inequality in household food security in Kenya? Application of exogenous switching treatment regression. *World Development*, 56: 153-171
- Ibnouf F.O. 2011. Challenges and possibilities for achieving household food security in the Western Sudan region: The role of female farmers. *Food Security*, 3(2): 215-231
- Lê1 Q., Auckland S., Nguyen H.B., Murray S., Long G., and Terry D.R. 2015. The Socio-Economic and Physical Contributors to Food Insecurity in a Rural Community. SAGE Open: 1–21
- Mallick D. and Rafi M. 2010. Are female-headed households more food secure? Evidence from Bangladesh. *Journal of World Development*, 38(4): 593-605.
- Mango N., Zamasiya B., Makate C., Nyikahadzoi K. and Siziba S. 2014. Factors influencing household food security among smallholder farmers in the Mudzi district of Zimbabwe. *Development Southern Africa*, 31(4): 625-640
- Manjengwa J., Feresu S. and Chimhowu A. 2012. *Understanding poverty, promoting wellbeing and sustainable development*. A sample survey of 16 districts of Zimbabwe Institute of Environmental Studies, Computer Science Building, University of Zimbabwe, Harare.

- Manyamba C., Hendriks S.L., Chilonda P. and Musaba E. 2012. *Factors Contributing to Inequalities in Food Security in South Africa: Implications for Agricultural Policy*. Strategies to overcome poverty and inequality. 'Towards Carnegie 111' Conference University of Cape Town 3-7 Sept 2012
- Mathebula J., Molokomme M., Jonas S., and Nhemachena C. 2017. Estimation of household income diversification in South Africa: A case study of three provinces. *South African Journal of Science*, 113(1/2): 1-9
- McDonald J.F. and Moffitt R. A. 1980. The Uses of Tobit Analysis. *The Review of Economics and Statistics*, 62(2): 318-321
- Meyer D.F. and Nishimwe-Niyimbanira, R. 2016. The impact of household size on poverty: An analysis of various low-income townships in the Northern Free State region, South Africa. *African Population Studies*, 30(2): 2283-2295
- Mkhawani K., Motadi S.A., Mabapa N.S., Mbhenyane X.G. and Blaauw R. 2016. Effects of rising food prices on household food security on female headed households in Runnymede Village, Mopani District, South Africa. *South African Journal of Clinical Nutrition*, 29 (2): 69-74
- Mokwena M. N. A.P. 2016. *Impact of social grant on food security: Evidence from neighbourhoods in the Gauteng Province of South Africa*. PhD Thesis, North-West University, Vaal Triangle Campus
- Mrema M. and Chitiyo F. 2011. *Home Gardening as a Coping Strategy for Urban and Peri-Urban Households: The Case of Mutare City, Manicaland Province, Zimbabwe, during the 2008 Hyperinflation Period*, Department of Agribusiness, Faculty of Agriculture and Natural Resources, Africa University, Zimbabwe.

- Muche M., Endalew B. and Koricho T. 2014. The determinants of household food security among south west Ethiopian rural households. *Asian Journal of Agricultural Research*, 8: 248-258.
- Muhoyi E., Mukura T. J., Ndedzu D., Makova T. and Munamati O. 2014. Determinants of household food security in Murehwa district. *Journal of Economics and Sustainable Development*, 5(3): 84-92.
- Murugani V.G., Thamaga-Chitja J.M., Kolanisi U. and Shimelis H. 2014. The Role of Property Rights on Rural Women's Land Use Security and Household Food Security for Improved Livelihood in Limpopo Province. *Journal of Human Ecology*, 46(2): 205-221.
- Ngambi J.W., Alabi O.J., Norris D. 2013. Role of goats in food security, poverty alleviation and prosperity with special reference to Sub-Saharan Africa: A review. *Indian Journal of Animal Research*, 47:1–9.
- Njuki J. and Sanginga P. (eds.). 2013. *Women, livestock ownership and markets: bridging the gender gap in Eastern and Southern Africa*. Abingdon, United Kingdom, Routledge.
- Nussbaum M.C. 2011. *Creating capabilities: The human development approach*. MA: Harvard University Press, Cambridge
- Nyako A. M. 2013. *The relationship between educational attainment and food security in Nigeria*. Unpublished thesis. Faculty of the Graduate School of Arts and Sciences. Georgetown University, Washington DC.
- Obi A. and Tafa S. 2016. *The determinants of household poverty in South Africa*. South Africa's public service delivery and performance review, 4 (4): 516-538
- Olowu D. 2013. Gendered Aspects of Food Security in Lesotho: Implications for an Integrative Rights-Based Approach. *Gender and Behaviour*, 11(2): 5378-5392

- Oyekale A.S. 2013. Gender Role in Agriculture, Climate Change and Food Security in the Sahel Belt of West Africa: Application of Poisson and Negative Binomial Regression. *Gender and Behaviour*, 11(2): 5499-5511
- Patel L. and Hochfeld T. 2011. It buys food but does it change gender relations? Child Support Grants in Soweto, South Africa. *Gender and Development*, 19(2): 229-240. <https://doi.org/10.1080/13552074.2011.592633> PMID: 62823270. Accessed on 9 March 2019
- Patel L. 2012. Poverty, gender and social grants in Soweto, South Africa. *Policy, Design and Practice*, 1-2: 106-120
- Patel L., Knijn T. and Van Wel F. 2015. Child support grants in South Africa: A pathway to women's empowerment and child well-being? *Journal of Social Policy*, 44 (2): 377-397
- Pérez-Escamilla R., Gubert M.B., Rogers B. and Hromi-Fiedler A. 2017. Food security measurement and governance: Assessment of the usefulness of diverse food insecurity indicators for policy makers. *Global Food Security*, 14 :96-104
- Rose D. D. 2008. *Interventions to reduce household food insecurity: A synthesis of current concepts and approaches for Latin America*. School of Public Health and Tropical Medicine, Department of Community Health Sciences, Tulane University. New Orleans.
- Ruel M.T. 2002. *Is dietary diversity an indicator of food security or dietary quality? A review of measurement issues and research needs*. Food Consumption and Nutrition Division, International Food Policy Research Institute, Washington
- Schwabe C. 2004. Fact sheet: poverty in South Africa. Human Sciences Research Council, 26.

- Selepe B.M., Mtyingizane S.S. and Masuku M.M. 2015. Factors contributing to household food insecurity in Mhlontlo area, Eastern Cape, South Africa. *African Journal of Hospitality, Tourism and Leisure*, 4 (1)
- Sen A. 1999. *Development as freedom*. Oxford University Press. New York
- Sharaunga S., Mudhara M. and Bogale A. 2015. The Impact of 'Women's Empowerment in Agriculture' on Household Vulnerability to Food Insecurity in the KwaZulu-Natal Province. *Forum for Development Studies*, 42(2): 195-223.
- Shariff Z.M. and Khor G.L. 2008. Household food insecurity and coping strategies in a poor rural community in Malaysia. *Nutrition Research and Practice*, 2(1): 26-34
- Shisanya S.O. and Hendriks S.L. 2011. The contribution of community gardens to food security in the Maphephetheni uplands. *Development Southern Africa*, 28(4): 509-526.
- Statistics South Africa, 2016. *Community Survey 2016*. Statistical release P0301 / Statistics South Africa, Pretoria
- Swindale A. and Bilinsky P. 2006. Household Dietary Diversity Score (HDDS) for Measurement of Household. Food Access Indicator Guide V 2. FANTA
- Thamaga-Chitja J. M., Hendriks S. L., Ortmann G. F. and Green M. 2004. Impact of maize storage on rural household food security in Northern KwaZulu-Natal. *Journal of Family Ecology and Consumer Sciences*, 32: 8-15.
- Trefry A., Parkins J. and Cundill G. 2014. Culture and food security: a case study of homestead food production in South Africa. *Food Security*, 6: 555-565
- Vaitla B., Tesfay G., Rounseville M. and Maxwell D. 2012. *Resilience and livelihood change in Tigray, Ethiopia*, Somerville: Tufts University, Feinstein International Centre
- Verbeek M. 2014. A Guide to Modern Econometrics. *Applied Econometrics*, 8: 125-132



- Webb E.C. and Mamabolo M.J. 2004. Production and reproduction characteristics of South African indigenous goats in communal farming systems. *South African Journal of Animal Sciences*, 34 (supplement 1): 236-239
- Webb P., Coates J., Frongillo E.A., Rogers B.L., Swindale A. and Bilinsky P. 2006. Measuring household food security: Why it's so important and yet so difficult to do. *The Journal of Nutrition*, 136(5): 1404S-1408S
- Zakari S., Ying L. and Song B. 2014. Factors Influencing Household Food Security in West Africa: The Case of Southern Niger. *Sustainability*, 6: 1191-1202
- Zhou D., Shah T., Ali S., Ahmad W., UdDin I. and Ilyas A. 2017. Factors affecting household food security in rural northern hinterland of Pakistan. *Journal of the Saudi Society of Agricultural Sciences*, 18(2): 201-210

## **CHAPTER 7: GENERAL DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS**

### **7.1 Recap of the research objectives and methodology**

The general objective of the study was to conduct a gendered analysis on the role and potential of goats to improve income and food security in semi-arid areas of South Africa. Firstly, the study sought to investigate gender-differentiated ownership and participation in decision-making and income management of goats at household level. Secondly, the study investigated gender disaggregated analysis of goat production in semi-arid areas. Thirdly, the effect of gender on the commercialisation of goat production in the semi-arid areas was investigated. Lastly, an investigation into the gender-differentiated contribution of goat farming to household income and food security was done. The study used focus group discussions, key informant interviews and a questionnaire survey of 241 households for data collection. Descriptive statistics, general linear models, Chi square tests and the Tobit regression model were used for data analyses. The gender aspects which the study focused on were the married (both males and females), the divorced, the single and the widowed. Young boys and girls did not participate in the study due to ethical considerations, but their views were brought up during interviews and focus group discussions. This chapter presents the main conclusions of the study based on the empirical results. The chapter draws several policy recommendations. Lastly, the remaining knowledge gaps and areas of future research are presented.

### **7.2 General discussion and conclusions**

Chapter 1 investigated gender-differentiated ownership and participation in decision-making and income management of goats at household level. It found gender disparities in goat ownership and

decision-making process between male and female-headed households. This was attributed to the cultural set-up and low literacy levels of females which resulted in females being less empowered to achieve gender equality within households. The results correspond with those from several studies which have investigated gendered ownership of assets and decision-making in households.

The study which conducted gender disaggregated analysis of goat production in semi-arid areas found that household socio-economic factors contributed to differing gender roles in goat production; with male-headed households showing greater efficiency of goat production than female-headed households. The male-headed households were more proactive in goat management than the females, in both male and female-headed households. Females in male and female-headed households were responsible for the care-giving roles in households such as providing goats with water; but they fell short when it came to important roles which affect goat production such as supplementary feeding and health care. Increasing literacy levels of females will increase their chances of being more exposed to better management options, acquiring better understanding of goat management practices and therefore making informed decisions. These results concur with those from other authors which stated that access to formal education plays a crucial role in improving productivity and incomes since it has a relationship with the ability to adopt new practices. Therefore, when compared to men, women do not reach their full potential in the agriculture sector due to low illiteracy levels, limited resources and participation in decision-making.

An investigation of the effect of gender on the commercialisation of goat production in the semi-arid areas found that farmers sold goats in the villages or occasionally at the auction, and did not

turn their goat farming into commercialized production enterprises as they sold only when there was a family emergency. The access to knowledge of the market and commercially oriented production goals will lead to the success of commercialization of goat production. An auction system that was introduced to modernize the goat market was not well understood or commonly used by goat keepers. There was a challenge between aiming to make the goat market more efficient and recognizing the cultural factors that push farmers to regard their goat flocks as a business, and not as a safety net. The results showed that goat keepers prefer the traditional system of selling goats due to their distrust of middlemen, poor understanding of the auction rules, lack of transparency of the system and infrequency of sales events. A proposal to change the farmers' livelihood strategy to a commercially oriented approach may not be suitable for the risk-averse farmers. Risk reduction needs to be part of a strategy to encourage farmers to become more commercialized.

For the production of goats to be more successful, farmers, particularly female-headed, need to see goat farming as a source of income and be convinced that their standard of living can be improved through goat farming, apart from the cultural benefits derived. The determinants of goat commercialization were gender of household head, location, education level of household head, occupation of household head, total household income, number of goats a household owns, goat marketing price, goat losses through death from diseases and theft, and whether a household receives remittances. The reason for the generally low goat sales could be due to farmers finding it more difficult to build up suitable flock sizes (for reasons emanating from losses through poor nutrition, diseases and theft), and this made it more unlikely that they would sell goats. These results concur with previous studies which showed that households with large flocks will sell more

goats than those with smaller flocks. Previous findings have also stated that male literate households are in a better position to commercialise the goat enterprise. Similar results were also obtained in the current study. The current study also pointed to the other reason for women not to be actively engaged in goat marketing as arising from the fact that buyers were less willing to purchase from women because they are not socially sanctioned to sell goats. This is due to cultural settings which allows men to own goats in households and make decisions to sell.

The investigation into the gender-differentiated contribution of goat farming to household income and food security found that female-headed households were less food secure than male-headed households. The reason was partly because they were less likely to have reliable employment to provide adequate and nutritious food for their households. Goats did not emerge as one of the main determinants of food security as their contribution to household income was limited. This is because goat flock numbers for most households did not grow effectively due to poor nutrition, diseases, predation, and theft. Where goat flock sizes were low, households limited goat sales to maintain their flock sizes and only sold goats when there were household emergencies such as funerals and ill-health.

Although several studies point to the economic, social, and cultural importance of goat farming in poor households; the current study concluded that in gendered analysis, goats do not contribute significantly to the improved income and food security in semi-arid areas of South Africa. The main reason for this was low flock sizes which did not adequately increase for households to sell for income. Amongst other reasons mentioned were the poor condition of goats and mortality, high illiteracy rates particularly of women, shortage of transport to take goats to the market, limited

access to market information and perceptions by goat farmers which are biased towards cultural purposes as the main reasons for goat rearing apart from economic reasons which can be derived. Hence, the hypothesis which stated that in gendered lenses, goats can be used to improve income and food security in semi-arid areas is rejected because this was not observed in the study.

### **7.3 Policy recommendations**

Increasing levels of female literacy for women will assist in strengthening their role in household decision-making processes so that they become empowered to achieve gender equality within society. Providing women and girls with access to primary education as well as training on goat production is of paramount importance. Increasing female literacy will also help to increase females' income which will improve women and children's nutritional levels. Participation of women in goat ownership, production, marketing, as well as decision-making on goat income is critical in achieving food security. For goat production and commercialisation to be successful, female farmers need to regard goat farming as a source of income and be convinced that their standard of living can be improved through goat farming, apart from the cultural benefits derived. There is need to provide rural women with greater mobility and market information by facilitating access to transport to the market.

Future policies should make the extension service delivery more demand-driven and provide for strategies to ensure the accountability of extension workers at local level. Livestock extension programmes should facilitate the emergence of an effective reputation mechanism among auctioneers through transaction information recording and sharing. As part of a strategy to encourage farmers to become more commercialized, transaction costs associated with the auction

market system such as market uncertainty, higher negotiation costs and transport costs need be considered. Enhanced efforts to improve the goat body condition, using approaches such as communal feedlots in order to reduce the gap between farmers' expected prices and bid prices are required. Farmers will need to be trained through workshops, on the market trends and understand the importance of preparing goats for the market as this will resolve the issue of perceived lack of transparency in the auction trading system of goats. Enhancing goat production is also important if flock numbers are to be increased. Increasing goat flock numbers will enable farmers to make more sales which can assist in improving household income. Therefore, extension workers need to assist farmers to manage and utilize goats to their full potential. Extension workers also need to understand and consider the needs and constraints of female goat farmers when providing training. The veld conditions need to be considered in making these decisions.

In the study area, the livestock association which acts as a cooperative for livestock farmers mostly focuses on cattle farmers, putting those who do not own cattle but are goat owners at a disadvantage as they do not attend such meetings. There is need for a cooperative focusing solely on goat farmers. Such a cooperative will focus on increasing the ease with which extension workers reach out to goat farmers. Co-operative leaders could play a vital role in encouraging goat farmers to maximize productivity and increase marketing. By setting up information management systems, they could also play a vital role in the design and implementation of strategies to reduce the higher negotiation costs associated with goat auctioneering.

Promoting more attractive investment opportunities and reducing the attractiveness of goats as a store of wealth can have a positive effect on goat production and commercialization in the semi-

arid areas. Policies need to create gender specific monitoring and evaluation indicators in food security programmes. Lastly, central to the arguments that underscore this thesis is the recommendation that agricultural development programmes need to incorporate gender and goats, in the design, implementation and evaluation of interventions programmes on improving food security.

#### **7.4 Areas for future research**

The empirical basis of the given recommendations needs to be furthered and reassessed in different spatial and time circumstances. Methodologically, comparison of findings at different times and spaces is desirable for providing credibility to the results and giving additional insights into policy.

Cultural functions were reported to be one of the most important reasons for rearing goats. Social and cultural functions of goats are difficult to value in monetary terms. Specific research needs to be done to quantify the economic value of social and cultural functions of goats in order to better assess their contribution towards household food security considering the institutional and socio-cultural environment of the farmers. Female-headed households were less efficient in goat production and less food secure than male-headed households. Future research needs to assess to what extent female-headed households are receiving assistance from extension officers and from agricultural development programmes in the quest to improve their food security situation. The current study revealed that the food insecurity problem in semi-arid areas cannot be solved by promoting agriculture alone. Research on future practical programmes aimed at reducing food insecurity particularly in semi-arid areas is therefore required.



## APPENDICES

### APPENDIX 1

#### Ethics Approval Letter



UNIVERSITY OF <sup>TM</sup>  
**KWAZULU-NATAL**  


---

 INYUVESI  
**YAKWAZULU-NATALI**

30 May 2019

**Mrs Susan Tsvuura (206513515)**

**School of Agricultural, Earth & Environmental  
 Sciences Pietermaritzburg Campus**

**Dear Mrs Tsvuura,**

**Protocol reference number:** HSS/0286/019D

Project title: Gendered analysis on the role and potential of goats to improve income and food security in semi-arid areas of South Africa

Approval    Notification    —

Expedited Application In response to your application received on 03 April 2019, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted FULL APPROVAL.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 1 year from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully



.....  
**Dr Rosemary Sibanda (Chair)**

/ms

Cc Supervisor: Professor Maxwell  
Mudhara cc Academic Leader Research:  
Professor Hussein Shimelis cc School  
Administrator: Ms Marsha Manjoo

---

Humanities & Social Sciences Research

Ethics Committee Dr

Rosemary Sibanda (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001 , Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: [ximbap@ukzn.ac.za](mailto:ximbap@ukzn.ac.za)

I [snyrnanm@ukzn.ac.za](mailto:snyrnanm@ukzn.ac.za) I [mohunp@ukzn.ac.za](mailto:mohunp@ukzn.ac.za) Website:

[M%/ukzn.ac.za](http://M%/ukzn.ac.za)

1910 ,

YEARS OF ACADEMIC EXCELLENCE

Founding Campuses Edgewood Howard College Medial Sdwol Pietermaritzburg Westville

## APPENDIX 2

### Questionnaire



#### School of Agricultural, Earth and Environmental Science

The purpose of this questionnaire is to determine gendered analysis on the role and potential of goats to improve income and food security in Msinga. The information captured in this questionnaire is strictly confidential and will be used for research purposes by staff and students at the University of KwaZulu-Natal only. Respondents can choose not to answer questions – answers are voluntary.

Date of survey.....

Enumerator Number.....

Tribal Authority Name.....

Dip tank Name.....

Household Number.....

### SECTION 1

#### Section 1A: Household demographics

1. Gender of household head

Male (0)	Female (1)
----------	------------

2. Marital status of household head

Single (0)	Married (1)	Widowed (2)	Divorced (3)	Cohabiting (4)
------------	-------------	-------------	--------------	----------------

## 3. Household structure

Gender	Total	<12	12-17	18-35 youth	36-65 adult	>65 old age
Male						
Females						
<b>Total</b>						

## 4. Is the head of the household resident on the farm

No (0)	Yes (1)
--------	---------

## 5. What is the educational level of head of household?

None (0)	Primary (1)	Secondary (2)	Tertiary (3)
----------	-------------	---------------	--------------

## 6. Means of agricultural land ownership and size.

Means of ownership	Allocated (1)	Inherited (2)	Borrowed (3)	Rental (4)	Bought (5)

**Section 1B: Ownership patterns of livestock within households**

## 1. Numbers and livestock species kept

Cattle	Goats	Sheep	Chicken	Others (specify)

## 2. Why do you keep goats? (The second column is for purpose and the third is for rank)

Meat		
Milk		
Manure		
Skin		
Sales		
Investment		
Dowry		

Ceremonies		
------------	--	--

3. Who own(s) the goats? (Can tick more than one)

Head =0	Spouse =1	Head/spouse together =2	Child/ =3 children	Various people(name them) =4
---------	-----------	----------------------------	-----------------------	------------------------------------

4. What role(s) does each family member play in goat production? (Tick as appropriate)

	Head	Spouse	Both head& spouse	Children	Hired labour
Purchasing goats					
Selling/slaughtering goats					
Feeding					
Animal health					

5. What is the income from goats usually spent on? (Tick second column as appropriate, more than one may be ticked; and the third is for rank)

Food		
Health		
Education		
Household items		
Electricity		
Debts payment		
Funerals		

6. Who makes the decisions on how the income is to be spent?

Head =0	Spouse =1	Both head & spouse =2	Child/Children =3	Head & children =4
---------	-----------	-----------------------	-------------------	--------------------

### Section 1C: Marketing opportunities and constraints of goats

1. Did you sell any goats in the last 12 months? Yes/No

If yes, where were the animals sold?

No = 0	At an auction =1	Privately =2	Auction and Privately =3	Others (specify).....2
--------	------------------	--------------	--------------------------	------------------------

2. Is it easy to find a market for goats? Yes/No

If yes, do you get approached or you look for a market?

If no, state the possible reasons?.....

3. What is the average price for a goat? ZAR.....

Is this amount fair?.....

If yes, tick this box ☐

If no, state your reasons?.....

4. When selling your goats, which traits do you consider as of economic importance in goats (Tick second column as appropriate and rank levels of importance in the third column)

Size		
Conformation		
Colour		
Health		
Performance		
.....		

5. Do you cull your goats? Yes/No

If yes, what are your reasons for culling?

No =0	Size =1	Conformation =2	Colour =3	Health =4	Performance =5	Body condition =6	Old age =7
-------	---------	--------------------	-----------	--------------	-------------------	-------------------------	------------------

## Section 1D: Goat productivity

### Goat production system

1.How are the goats fed/grazed?

Paddock =1	Tethered =2	Yard =3	Free grazing =4	Herded = 5	Free grazing &yard = 6	Others (specify)..... =7
---------------	-------------	---------	--------------------	---------------	------------------------------	--------------------------------

2. What form of housing do you have for your goats?

Kraaling =1	Stall/shed =2	Yard =3	None =4
-------------	---------------	---------	---------

3. If animals are housed, what materials have been used?

Untreated wood/bush=1	Treated wood=2	Iron sheets=3	Bricks=4	Mud=5	Wire=6	Others (specify)...7
--------------------------	-------------------	------------------	----------	-------	--------	-------------------------

4.Do you supplement feeds for your goats? Yes/No

If yes, what supplementary feeds do you give your goats?

None = 0	Roughage/crop residues=1	Minerals/Vitamins =2	Bought feed/concentrates=3	in
----------	-----------------------------	----------------------	-------------------------------	----

5. How do your goats have access to drinking water?

Animals go to water =1	Water is provided =2	Both =3
------------------------	----------------------	---------

6. What are the sources of water for goats?

Borehole =1	Dam/pond =2	River=3	Water well =4	Tap =5
-------------	-------------	---------	---------------	--------

### Goats health

1. If your goats are sick whose advice do you seek?

None =0	Government veterinary =1	Private veterinary =2	Veterinary drug suppliers=3	Extension service =4	CAHWs = 5
------------	-----------------------------	--------------------------	--------------------------------	-------------------------	--------------

2. What are the major causes of mortality of your goats? Rank

Old age	Poor diet	Predators	Diseases
---------	-----------	-----------	----------

4. What are the prevalent diseases that occur? Rank.

Coccidiosis	
Heartwater	
Worms	
Poisonous plants	
Mange	
Ticks	

4. Do you vaccinate your goats? Yes/No



No =0	Heartwater = 1	Kids at birth =2
-------	----------------	------------------

### Goat breeding objectives and selection criteria

1. What goat breeds do you keep?

Indigenous = 1	Improved = 2	Unknown =3
----------------	--------------	------------

2. What are your sources of buck(s) used in the herd

Own buck (bred) =1	Own buck (bought) =2	Buck donated =3	Communal area buck =4
--------------------	----------------------	-----------------	-----------------------

2. What is your reason for the choice when choosing a buck?

Availability =1	Size =2	Conformation =3	Colour =4	Performance = 5
-----------------	---------	-----------------	-----------	-----------------

4. Do you ever exchange your bucks with other farmers within your village? Yes/No

No = 0	Yes = 1
--------	---------

5. How do you mate your goats?

Uncontrolled =1	Hand mating =2	Group mating =3
-----------------	----------------	-----------------

6. Do you castrate your male goats? Yes/No

If yes, state reason for castration

No =0	To control breeding =1	To improve meat quality =2	For better temperament =3	To grow fast = 4
-------	------------------------	----------------------------	---------------------------	------------------

## Entries and exits of goats

1. How many goats joined your flock (within the last six months) by the following categories?

	Total
Born	
Bought	
Donated/Gift	
Exchange	

2. How many goats exited your flock (within the last six months) by the following categories?

	Total
Died	
Sold	
Donated/Gift	
Exchange	
Slaughtered	
Stolen	

## Section 2

### Section 2A: Household Income and Food

1. What is the main occupation of head of household?

Buying& selling=1	Farming/ UA = 2	Permanent job=3	Temporary job=4	Unemploye d =5	Self- employe d =7	Old age grant =7	Other (specify )=8
----------------------	--------------------	--------------------	--------------------	-------------------	--------------------------	---------------------	--------------------------

2. How much income does the household receive from the following main sources of income?

Income range	Farming	Buying &selling	Pension &grants	Remittances	Salary/ wages	Micro- enterprise	Others specify
ZAR0=0							
ZAR0- 1000=1							
ZAR1001- 5000=2							
>ZAR5000=3							

3. What type of expenses do you pay for? Rank.

Type of expense	Rank
Food	
Clothing	
Health	
Transport	
Household items	
Electricity	
Stokvel	
Education	
Other items	

4. Total household monthly income, excluding gifts, donations or money sent by friends, relatives and other family members (ZAR).

<ZAR500=0	ZAR600-1000=1	ZAR1001-5000=2	>ZAR5000=3
-----------	---------------	----------------	------------

5. How much does your household normally spend on food per month? ZAR\_\_\_\_\_

6. Do you save money? Yes/No

No =0	>R1000 =1	R1000-2000 =2	<3000 =3
-------	-----------	---------------	----------

7. Do you grow any crops on the farm? If yes, how much money did you make in the past year?

No =0	Yes, but do not sell =1	Sold for less R1000 =2	Sold for R1001 to R2000=3	Sold for more than R4000
-------	----------------------------	---------------------------	------------------------------	-----------------------------

8. Do you sell any of your livestock? Yes/No

If yes, in the past year, how much did you earn from sales of:

Livestock	ZAR
Cattle	
Goats	
Sheep	
Chicken	
Other	

## 9. Physical household assets owned

Does the household own:	No (0)	Yes (1)
<b>Farm implement</b>		
Tractor		
Plough		
Truck		
Wheelbarrow		
<b>Household assets</b>		
Car		
Bicycle		
Television		
Refrigerator		

## 10. What is the main source of the regular meal?

Own production (1)	Supermarkets (2)	Own production and supermarkets (3)	Barter trade (3)	Food aid (4)
-----------------------	---------------------	--	------------------	--------------

**Section 2B: The extent of household food insecurity**

## Household Food Insecurity Access Scale (HFIAS)

1. In the past four weeks.....

No = 0 Yes = 1

How often did this happen?

1 = rarely (once or twice in the past four weeks)

2 = sometimes (three to ten times in the past four weeks)

3 = often (more than ten times in the past four weeks)

Occurrence Questions	No	Yes	1	2	3
----------------------	----	-----	---	---	---

In the past four weeks, did you worry that your household would not have enough food?					
In the past four weeks, were you or any household member not able to eat the kind of foods you prefer because of lack of resources?					
In the past four weeks, did you or any household member have to eat a limited variety of foods due to lack of resources?					
In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?					
In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?					
In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?					
In the past four weeks, was there ever no food to eat or of any kind in your household because of lack of resources to get food?					
In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?					
In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?					

## 2. Number of meals per day under normal circumstances

Breakfast, lunch and supper =0	Breakfast and supper only =1	Lunch and supper only =2	Only one meal per day =3
--------------------------------	------------------------------	--------------------------	--------------------------

3. How does your household cope/ deal with income shortage?

Sell livestock =0	Sell other assets =1	Use cash savings =2	Borrow money from friends & relatives =3	Reduce spending =4
-------------------	-------------------------	------------------------	--	-----------------------

4. Can you rank the quality of the food on consumption?

Very good (0)	Good (1)	Poor (2)	Very poor (3)
---------------	----------	----------	---------------

5. Does the household have any family members or relatives working and sending money to them?

Yes/No

If yes approximately how much per year? ZAR\_\_\_\_\_

6. Do you have any food in storage?

No (0)	Yes (1)
--------	---------

**Thank you for your responses.**

### APPENDIX 3

#### Tobit regression on factors affecting no. of goats sold

```

Limits: lower = 0
        upper = +inf

Number of obs      =          241
Uncensored         =          162
Left-censored      =           79
Right-censored     =           0

LR chi2(13)        =       295.77
Prob > chi2         =       0.0000
Pseudo R2          =       0.3349

Log likelihood = -293.66509

```

Goatssold	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
TrAuth	.7816772	.1960548	3.99	0.000	.3953663	1.167988
Gender	-.9506804	.2272303	-4.18	0.000	-1.39842	-.5029407
HeadAge	.2051938	.176113	1.17	0.245	-.1418234	.552211
MarStat	.0935413	.0841518	1.11	0.267	-.0722732	.2593559
EdctnLev	.2604368	.11233	2.32	0.021	.0390992	.4817745
Goatfeedsupplemnt	.0969806	.1229004	0.79	0.431	-.1451851	.3391463
Headoccupatn	.1414299	.0586137	2.41	0.017	.0259361	.2569237
ReceiveRemittances	.2494268	.1225051	2.04	0.043	.0080399	.4908137
Tothhsize	.0293201	.0221421	1.32	0.187	-.0143092	.0729494
No_Goats	.0207724	.0081449	2.55	0.011	.0047235	.0368212
Goatprice	.0019191	.001032	1.86	0.064	-.0001143	.0039525
TotHhIncome	-.512237	.2193373	-2.34	0.020	-.9444244	-.0800497
Goatlosses	.5146804	.0380046	13.54	0.000	.4397952	.5895655
_cons	-5.201208	1.189754	-4.37	0.000	-7.545527	-2.856888
var(e.Goatssold)	1.339824	.1536337			1.068863	1.679475

```
. vif
```

Variable	VIF	1/VIF
EdctnLev	1.48	0.675474
No_Goats	2.00	0.501050
TotHhIncome	1.43	0.697109
Locatn	1.36	0.734277
Goatfeedsuppl	1.22	0.822862
Headocuptn	1.55	0.645229
Gender	1.52	0.656657
Receiveremit	1.13	0.888438
HeadAge	1.37	0.731487
Tothhsize	1.46	0.683506
Marstat	1.21	0.825627
Goatloss	1.75	0.571745



Goatprice	1.21	0.825627
-----+-----		
Mean VIF	1.44	

## APPENDIX 4

### Tobit regression analysis for the extent of household food insecurity

```

Tobit regression                                Number of obs   =      241
                                                Uncensored     =      230

Limits: lower = 0                               Left-censored  =       11
                                                Right-censored =       0
        upper = 27

                                                LR chi2(9)     =      77.91
                                                Prob > chi2    =      0.0000
Log likelihood = -632.22857                     Pseudo R2      =      0.0580

```

HFAIS	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Locatn	-1.367428	.6441368	-2.12	0.035	-2.636533	-.0983222
Gender	2.219643	.6720635	3.30	0.001	.8955148	3.54377
HeadAge	.458961	.5355595	0.86	0.392	-.5962207	1.514143
EdctnLev	-.5092766	.3716504	-1.37	0.172	-1.241518	.2229646
Soldgoatsin12mnth	-.5138926	.3105781	-1.65	0.099	-1.125807	.0980214
SaveMoney	-1.178934	.5536892	-2.13	0.034	-2.269836	-.0880325
FoodStorage	1.121422	.5721064	1.96	0.051	-.0057659	2.24861
No_Goats	.0513205	.0237405	2.16	0.032	.0045459	.098095
TotHhIncome	-1.940761	.6977643	-2.78	0.006	-3.315525	-.5659964
_cons	9.846895	1.902413	5.18	0.000	6.098682	13.59511
var(e.HFAIS)	16.53438	1.628784			13.6175	20.07607

```
. vif
```

Variable	VIF	1/VIF
EdctnLev	1.49	0.672188
No_Goats	1.47	0.678966
TotHhIncome	1.46	0.685359
Locatn	1.46	0.684864
Soldgoatsi~h	1.30	0.772014
SaveMoney	1.59	0.627869
Gender	1.39	0.720481
FoodStorage	1.11	0.902177
HeadAge	1.18	0.843921
Mean VIF	1.38	