THE CONTRIBUTION OF GOATS TO HOUSEHOLD FOOD SECURITY IN SELECTED COMMUNITIES OF KWAZULU-NATAL, SOUTH AFRICA

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STUDENT DECLARATION

The contribution of goats to household food security in KwaZulu-Natal, South Africa

I **Anele Aurelia Khowa**, student number: **214519765** declare that:

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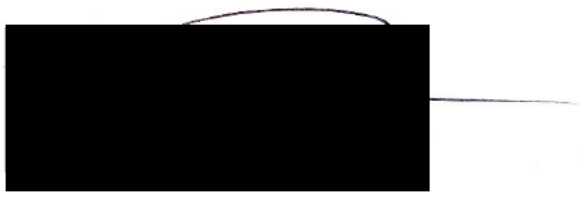

DECLARATION BY SUPERVISORS

We hereby declare that we acted as Supervisors of this MSc student:

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Consultations took place between the student and us throughout the investigation. We advised the student to the best of our ability and approved the final document for submission to the College of Agriculture, Engineering and Science Higher Degrees Office for examination by the University appointed examiners.

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ABSTRACT

The growth of the human population in the world has been occurring at a rapid rate. This presents a challenge of how the world food demands will be met. These challenges are always felt the most in developing countries, and result in a lot of people in developing countries turning to alternative sources of income other than employment to manage their food situation. One of the alternatives includes a reliance on animal husbandry in order to meet and improve their livelihoods particularly with respect to food. Furthermore, small-scale farming of animals such as goats, sheep, pigs and chickens has also been an income source when the animals are sold. In developing countries, pastoralism and agro-pastoralism frequently occur among disadvantaged communities, who are often found in arid or semi-arid regions. As a result, goats have been shown to be an important type of livestock that can be kept in such conditions without financially stressing their owner by requiring constant care of supplementary feeds and medication. Goats are known for their resilience which allows them to cope with stressful conditions while being able to reproduce. This resilience and productivity of goats allows their owners to be able to liquidate them for cash if there is a need and also be able to slaughter them for their household consumption. Here, I investigated the contribution of small-scale goat farming to household food security in rural and peri-urban areas in KwaZulu-Natal (KZN), South Africa.

The study was carried out in rural and peri-urban areas of Msinga, Kokstad, Howick and Pietermaritzburg in KZN. I used structured questionnaire surveys to determine the contribution of goats to household food security from the farmers' responses. The questions asked related to the sale of goats (number, sex, age and sale value of the animal) and how the money generated from goat sales was spent. The study also determined goat sales from 27 households in three villages occurring in Msinga over a 2-year period of 2017 to 2018. I also assessed the participation of small-scale farmers in two livestock auctions, which took place in 2019 and 2020 by recording the age, sex, and coat-colour of the animals taken to auctions.

The results obtained from the study showed that goats played a role in household food security as a source of cash as well as consumption in strenuous times. These findings of the study highlight that small-scale goat farming provides an alternative food source and income source for disadvantaged farmers. These findings were more prevalent in the rural areas, which kept more goats than those found in the peri-urban areas. Goats in rural areas ranged from 5 to 150 goats in a herd, and 5 to 50 goats in a herd while in peri-urban areas. Goats were a source of cash in numerous ways including sale of skins after slaughter that are used to craft household items such as stools that can be sold for cash. Adult goats were sold more at the farmers' homesteads than auctions where buyers opted for younger goats. My results also showed that small-scale farmers use all possible avenues to sell their goats, as they sold a high number of animals from

home and did not depend on infrequent livestock auction events. However, there were benefits derived from participating in auctions in terms of the relatively higher prices obtained there. For example, female and male goats sold for R2 177 and R1 268, respectively at auctions. The price was similar for females (R1 083) and males (R1 065) in homesteads. At auctions, female and male goats sold for R2 177 and R1 268, respectively. From homesteads, female and male goats sold for R1 083 and R1 065, respectively. Colour of goats proved to be an important trait at auctions as light-coloured goats were in higher demand than black goats. Homestead sales also remain a useful practice as farmers generate income to assist in day-to-day household expenses instead of waiting for infrequent auction events. Furthermore, small-scale farmers who plan to participate in auctions should pay attention to the characteristics (age, colour, and sex) of their animals when populating their herds. Sub-adult, light-coloured and female goats were the animals that were highly sought after at auctions.

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Chapter 1

Introduction and Literature Review

1.1 Introduction

Livestock sales are a common practice across the globe. They can take place at an international level and all the way down to trading that takes place in small cities or homesteads (Asegede et al., 2015). The trading of livestock by small-scale farmers, be it formal or informal, is a significant contributor towards what sustains a household (Asegede et al., 2015). Sustaining a household refers to meeting their daily needs that include cash as well as a protein source. Therefore, livestock trading for small-scale farmers can occur in two forms. Musemwa et al. (2010) indicated that farmers can sell livestock to each other informally and privately to other external buyers from their homesteads. Secondly, small-scale livestock farmers have the opportunity to formally participate in livestock auctions where they can sell to butcheries, speculators, abattoirs, and other farmers including commercial (Musemwa et al., 2010). Livestock auctions occur at specific locations and times where farmers and buyers of livestock meet, and livestock is purchased in the form of one buyer outbidding the other for the animal displayed (Uchezuba et al., 2009). For small-scale farmers, participation in auctions is influenced/dependent on the quality of their animals (i.e., health, age, size, colour) and infrastructure such as transport that may be required to move livestock from their homesteads to the auction sites (Barham and Troxel, 2007). Having a constant market to trade livestock like goats allows farmers to have a stable source of additional income that they can use to fight household challenges like food insecurity.

Food security refers to the access to enough food by all individuals in order to achieve a healthy and active lifestyle (Thys et al., 2005; Vaitla et al., 2017). The two crucial minimum requirements of achieving food security include, firstly, the availability of sufficient healthy and nutritious foods (Bickel et al., 2000) and secondly, individuals must be able to acquire such food without stealing, begging or through emergency food supplies (Endale and Tolossa, 2017). In addition, food security is linked to an individual or household's financial capability (Burchi and De Muro, 2016). A food secure household has no financial resource constraint that limits it from obtaining nutritious food (Abu and Soom, 2016) but food insecure individuals or households are different such that they are financially incapable of purchasing food (Zhou et al., 2019). Therefore, food insecure individuals would often turn to informal employment in order to obtain money to purchase food and other household needs. Informal employment could be both short- and long-term but is not formally protected by any form of documentation such as contracts (Kalleberg, 2000)

The full extent of food security is not an entity that can be measured by a single indicator (Cafiero et al., 2014). As a result, a household's level of food security or insecurity is measured by obtaining

information on several conditions that exist for an individual or household (Ogundari, 2017). Labadarios et al. (2011) report that there are indicators, experiences and behaviours that can be used as measures of both food security and food insecurity. The indicators can include the level of education, the income and expenses of a household and also the amount of food intake required by an individual per day. Furthermore, the indicators can be quantified or qualified using questionnaire surveys to obtain information on the level of food security or insecurity that exists within a household (Bickel et al., 2000; Carletto et al., 2013). Questionnaire surveys of households can indicate the conditions within a household as they can show whether or not existing behaviours or conditions are due to financial limitations within the household (Bickel et al., 2000). Therefore, household surveys can serve as indicators of the degree of severity of security or insecurity of food for an individual or a household (Pérez-Escamilla et al., 2017).

Developing countries such as South Africa may appear to be food-secure based on the tonnage and economic value of agricultural exports (Altman et al., 2009). However, this is not necessarily the case with households in rural communities (Klasen, 2000). Altman et al. (2009) indicated that food security status at households can be determined through the resources that a household possesses; this is necessary to determine the levels of food security/insecurity that exists within a household. They further suggested that the issue of food insecurity and poverty can be alleviated through the expansion of employment opportunities, subsequently, employment would elevate household income and allow them better access to food. Although employment opportunities in South Africa increased between the 1990s-2000s, the increase was not enough to address food insecurity in households (Rodrik, 2008). Social grants act as another source of income to qualifying members (e.g. the elderly and children up to 18 years of age) of the South African society (Gray, 2006; Altman et al., 2009). These government services have played a crucial role in ensuring food security for many households in South Africa since the early 2000s (Adekunle, 2013). The lack of employment opportunities due to the declining performance of the national economy of South Africa suggests that there might be a continued reliance on social grants, informal employment and livestock keeping by a lot of households, especially in rural areas (Rodrik, 2008).

1.2 Conditions that cause food insecurity

Food insecurity can be chronic or acute (Hendriks, 2016). Chronic food insecurity refers to a situation where an individual or community lacks the means of living and cannot meet food requirements over a long period of time is thus overwhelmed by poverty (Endalew, 2015). Chronic food insecurity in rural areas is brought about by the lack of resources within a household which on the one hand includes assets such as land for ploughing, crop production and seeds to plant (Baiphethi and Jacobs, 2009; O'Brien et al., 2016). Chronic food insecurity is brought about by a chain of shocking events like droughts with a lack of recovery time in between events for those affected (Freeman et al., 2008). Devastating events such as droughts can

therefore, cause a loss of household assets (e.g. land and livestock) that can be used for production and as a tool to evade poverty (Freeman et al., 2008; Endalew, 2015).

Endalew (2015) showed that acute food insecurity on the other hand occurs because of natural events such as droughts, crop pest outbreaks or earthquakes, floods. Impacted communities may lack the natural environment needed to cultivate and produce their own food and may further lack any form of livestock that they can liquidate for cash during times of distress (Oluoko-Odingo, 2011). Therefore, livestock plays an important role in households, as it can be sold for money, which may be used to buy food and other necessities thereby contributing to curbing poverty (Dovie et al., 2006). The location of small-scale farmers (farmers who use small spaces of land such as home gardens to keep livestock and grow vegetables without needing expensive fertilisers and technologies) puts them at a disadvantage as they tend to occur in places that are prone to drought, which increases their susceptibility to acute food insecurity (Oluoko-Odingo, 2011; Askew et al., 2014). Additionally, undernourishment is persistent in places where people suffer from conflicts, floods and droughts which tends to compromise the food security of individuals in that area (Clover, 2003).

1.3 Increased demand for livestock products

There is a continuous demand for animal products ranging from meat to dairy products in both developed and developing countries (Wright et al., 2012; Herrero et al., 2013). The prevailing demand of livestock products for the increasing human population increases demand of livestock production. This may in turn present an opportunity for small-scale livestock farmers, largely based in rural areas, to contribute to the production of meat, milk and fibre (Peacock 2005; Steinfeld et al., 2006; Jouzi et al., 2017). Small-scale livestock farmers in rural and peri-urban areas participate in agriculture at no significant financial cost to them as they do not use technological tools (Katongole et al. 2012). Also, they do not produce large quantities or regularly buy feeds and medication for livestock, which is especially true of goat farming. Peri-urban areas are places with semi developed buildings, small-scale agricultural practices that are found closer to a city (Walsh and Van Rooyen, 2015). This low financial cost of keeping livestock allows them to direct their earnings towards securing food and other needs for their households (Sansoucy, 1995). This is the case because agricultural production in developing countries is a source of income and can also provide quality food (Zezza and Tasciotti, 2010). Furthermore, the manure from livestock can be used towards improving soil fertility for crop production which can contribute to food and nutrition security (Miller and Photakoun, 2008; Zezza and Tasciotti, 2010).

The increasing rate of urbanisation may result in greater demands for meat related products which allows small-scale farmers in rural and peri-urban areas to increase goat production to meet the increased demand that commercial meat production industries fail to satisfy (Guendel and Richards, 2002). The

evident lack of goat meat and its products on the formal market economy of supermarkets presents an opportunity for rural and peri-urban small-scale farmers to generate income through the sale of goats and their products in the cities (Dubeuf et al., 2004; Omiti et al., 2009; Maganga et al., 2015). For those who practice cultural traditions through ceremonies, a live animal will often be required compared to buying one that is already slaughtered to fulfil certain requirements of the ceremony being performed (Devereux, 1993). As a result, urban residents travel to purchase livestock in the rural and peri-urban areas to perform such ceremonies (Maganga et al., 2015). This is despite there being considerable supplies of meat in the cities, particularly from cattle (*Bos taurus*), sheep (*Ovis aries*), pig (*Sus scrofa domesticus*), and chicken (*Gallus gallus domesticus*), among other livestock. Therefore, there is a potential niche of goat farming near the major towns in order to meet their requirements for live animals such as cattle, goats, sheep, or chicken (Dos Santos Souza et al., 2019).

1.4 Challenges faced by livestock and small-scale farmers

Livestock in rural areas are often faced with a high mortality rate compared to livestock in areas with better facilities and management (Gwaze et al., 2009). This is attributed to threats such as predation (wild dogs, snakes), theft, poor hygiene associated with the cleanliness of kraals and lack of disease prevention measures like vaccination (Kissui, 2008). Webb and Mamabolo (2004) indicated that the high mortality rate in rural areas may be compensated for by the fact that livestock such as indigenous goats are suitable for such areas and reproduce throughout the year, unlike cattle and sheep. However, the reproductive success of indigenous goats depends on the environmental conditions and management of the herds (Webb and Mamabolo, 2004). In particular, livestock management in rural areas is an important aspect because livestock production in such areas is practiced under conditions that are considered unstable (Sebei et al., 2004). These unstable conditions include the constant threats of desertification, extreme of temperature and bush encroachment, all of which may contribute to acute food insecurity (Herrero et al., 2009). Nevertheless, goats in rural areas are productive even in poor body conditions and can achieve and maintain the moderate reproduction levels with little to no input from the farmers (Waters-Bayer and Bayer, 1992; Webb and Mamabolo, 2004). Furthermore, goats mature faster and could be a constant source of income for the farmers (Soni et al., 2011). Goats can be reproductively mature 4 to 5 months after birth (Stankov et al., 2002), whereas sheep and cattle reproductively mature in 6 months and 15 months, respectively (Laster et al., 1976; Yue, 1996). This further increases the value of goats to owners particularly those seeking to increase their herds.

In both rural and peri-urban areas, livestock are kept overnight in kraals (corrals) constructed of wood, zinc sheets, stones and barb wire fences (Bester et al., 2009). These kraals serve to protect livestock from predation and theft (Dzimba and Matooane, 2005). However, during the day, livestock are left to

browse and graze freely on the rangelands on their own or under the stewardship of a herdsman (Pfister and Malechek, 1986; Hirpa and Abebe, 2008). Yet, in peri-urban areas, because of limited rangeland, livestock may need to be herded to specific locations such as the mountains in order to avoid conflict with neighbours and vehicular traffic (Thornton, 2008), or farmers may need to spend on supplemental feeds (Katongole et al., 2012).

1.5 The experience required when managing livestock

People in peri-urban areas may not possess much knowledge and experience about keeping livestock compared to those in the rural areas (Thornton, 2008). However, the elderly and the young people in rural areas may share a lot of indigenous knowledge that has been passed on from one generation to another on how livestock is kept and managed. As a result, peri-urban small-scale farmers find themselves facing challenges in terms of getting maximum production from their herds (Chenyambuga et al., 2010). Goats are however less challenging to manage even for less experienced persons because they require less guidance and herding compared to sheep and cattle (Casey and Webb, 2010). Mkwambisi et al. (2011) found that people in peri-urban areas often do not have enough time to devote to their livestock because of employment and cannot properly manage their herds. As a result, this lack of time prompts them to employ herders from nearby villages to look after their livestock. Hiring help adds to financial commitments of the farmer. Additionally, lack of education about the value of goats, management strategies of goats, and the management of natural resources in the target environments that goats are kept in may also be a constraint for those with little animal farming experience (Webb and Mamabolo, 2004). Furthermore, peri-urban farmers face the ever-present threat posed by the presence of national roads near the rangelands, which may result in high mortalities when their livestock forage near and cross the roads (Losada et al., 1998). The rate of mortalities may be decreased by the presence of a herder. Road use by animals is not a big issue in the rural areas because the distance between the road and homesteads is usually greater than the one that exists in urban areas (Losada et al., 1998). Roads in rural areas are also not as busy as the ones in cities and that may decrease the likelihood of animal hits.

Livestock or herd management is an important aspect that contributes towards the overall productivity of domestic animals (Rust and Rust, 2013). However, herd management differs between the small family operated subsistence-based farms to the large commercial farms. In small-scale farming, herd management relies heavily on the indigenous knowledge of the farmer (Kunene and Fossey, 2006; Banhazi et al., 2012). On the other hand, large-scale commercial farms herd management is aided by the technological advancements and formal employees who have been formally trained to do the job (Banhazi et al., 2012). One way to increase production in herds is to manipulate/manage the sex ratio of the herd as it has a lot of influence on the overall productivity of the herd (Foote and Miller, 1971). For example, a

herd of animals populated with more females than males has a high possibility of attaining greater reproductive output than a herd with a larger number of males to females (Glander, 1980; Dziuk and Bellows, 1983). As a result, most herds are largely dominated by females than males (Foote and Miller, 1971). Furthermore, farmers can also pay attention to goats that have a tendency of producing twins in order to rapidly increase their herd sizes (Akpa et al., 2010). With colour being a factor in goat sales, some farmers can pay particular attention to goats that produce offspring of preferred colours (Mahanjana and Cronje, 2000).

1.6 The South African agricultural sector and the grazing systems used

In South Africa there is a total of 40 122 farms recognised in the commercial agricultural industry and are white-dominated (Kirsten and Van Zyl, 1998; Statistics South Africa, 2017). Nompozolo and Igodan (2000) indicated that the majority (34%) of the commercial farms are mainly focused on livestock farming. Furthermore, livestock commercial farms are the major contributors in the total income generated for the agricultural industry, at R120 billion ($8 588 640), which makes up 36% of the total income generated by the sector (Mellor and Malik, 2017). The province which is home to the highest number of commercial farms is the Free State with 20% of the farms situated there (Olubode-Awosola, 2006). However, the Free State ranks second to the Western Cape in total income generated from the commercial farming sector with R47 billion compared to R64 billion in the Western Cape commercial farms (Statistics South Africa, 2017). KwaZulu-Natal generates the least income at R34 billion which is 10% of the total income generated (Statistics South Africa, 2016). Consequently, the Western Cape employs the greater number of people in the commercial agricultural sector with 186 997 (25%) employees and KwaZulu-Natal only has an employment proportion of 96 206 (13%) in the commercial farming industry (Statistics South Africa, 2017).

Some 2.3 million homesteads in South Africa are involved in rural small-scale farming activities (Statistics South Africa, 2016). Small-scale farming is dominated by black people in the lower rural areas of the country (Kirsten and Van Zyl, 1998). There has been a decrease in household small-scale farming from 2011 due to a major drought event that took place in 2014/15 which saw majority of homesteads involved in small-scale farming decrease by a margin of 19% (Statistics South Africa, 2016). The decrease in small-scale farming was a resultant of the loss of livestock as a consequence of the drought (Rao et al, 2015). In South Africa, a bulk of homesteads that practice small-scale farming are situated in KwaZulu-Natal (23%), while Northern Cape had the lowest number of homesteads engaged in farming at 2% total (Statistics South Africa, 2016). The challenges faced by South African small-scale farmers is the lack of infrastructure as well as lack of schooling for most of them (Musemwa et al., 2008). Mpumalanga province

has the highest number of uneducated farmers at 26% and KwaZulu-Natal has 23% uneducated small-scale farmers which is the lowest (Maponya et al., 2013; Statistics South Africa, 2016).

The social and economic structure of the agricultural farming industry in South Africa consists of two entities, which are the small-scale subsistence farmers and the large commercial farmers (Kirsten and Van Zyl, 1998). The two farming entities rely heavily on the intensive and extensive livestock farming systems (Tilman et al., 2002; Steinfeld et al., 2006). Most of the small-scale farmers are comprised of people located in rural areas, who receive little to no financial or infrastructural support from the government or the private sector (Murphy, 2011; Aliber and Hall, 2012). Hence, small-scale farmers rely on extensive farming systems where livestock range freely and graze on the natural vegetation. With extensive farming systems, livestock are at lower risk of contracting diseases when interacting with other livestock (Reeder and Kramer, 2005; Uzun, 2005). This puts less strain on the rural livestock farmers because they do not have to provide their livestock with a lot of supplements, if any (Peacock, 2005; Peacock and Sherman, 2010).

Commercial farms are mainly focused on large scale production, including exportation of agricultural goods because they can access financial assistance from government and the private sector to acquire appropriate infrastructure and logistical support for their enterprises (Khapayi and Celliers, 2016). This financial support to commercial farmers is usually linked to their involvement in the global markets (Hall et al., 2017). In this light, large-scale commercial farming systems may be viewed as important compared to the small-scale farming (Guendel and Richards, 2002). Small-scale farmers cannot produce in large quantities and are only appropriate for demands related to household food production and security (Guendel and Richards, 2002; Wright et al., 2012). Yet, commercial farms employ intensive methods of livestock husbandry in that livestock are kept in pens and food is provided for them instead of having them go out into the rangelands and look for their own food (Banhazi et al. (2012). This puts pressure on the intensive farming system to have a higher reproductive output than the extensive system because livestock are kept and monitored closely which may prevent them from contracting diseases when released to roam freely in the rangelands (Zhang et al., 2007; Steinfeld et al., 2013).

1.7 Statistics on goat production

Goats are approximated to be at about 1 billion worldwide and a large number of them being located in Asia and Africa (Capote, 2014). In the African continent, goats make up 30% of the domestic ruminants that are presently found within the continent (Lebbie, 2004). The dominance of goats in the African continent, which houses majority of the developing countries and is also characterised by high temperatures is due to their adaptability to unfavourable conditions such as arid and semi-arid environments (Muller and Shackleton, 2014). Goat farming is a common practice in the arid and semi-arid rural areas of southern

Africa. As such, an approximated 64% of indigenous goats are found in these arid and semi-arid rural areas (Gwaze et al., 2009). Southern Africa is home to more than 223 million goats which are either owned by commercial farmers or informal small-scale farmers (Simela and Merkel, 2008). A significant portion (90%) of goats in Sub-Saharan Africa are owned by small-scale farmers due to their sacrificial values and also being used as a means for sustenance (Gwaze et al., 2009; Livingston et al., 2011). In South Africa, goats have a higher importance in people's livelihoods than other parts of the world that keep goats after livestock like cattle (Devendra, 1999). As a result, the large portion of goats falls to small-scale farmers. Therefore, the potential for goat farming in Africa is massive.

1.8 Importance of the study

Livestock farming for family sustenance or commercial purposes has always been a widely practiced and important agricultural activity worldwide (Steinfeld et al., 2006; Thornton, 2010). Goat farming is common in many parts of the world, this popularity can be due to several reasons (Hadjigeorgiou et al., 2002). One other important reason as indicated in this study is that goats can act as a source of protein for families, rather than having to purchase from formal markets all the time. Supermarkets in the "nearest" towns may be located far from communal areas and add costs of travelling and time to access resources. Slaughtering chickens or goats may make more sense for convenience of the farmers and their families than travelling to town to buy meat. In poor rural communities, the contribution of goats to human livelihoods can be divided into three categories which are economic, social and cultural (Nkosi and Kirsten, 1993). Upon realising the benefits and amounts of money that can be generated from selling livestock in the commercial markets, livestock owners in rural communities may in turn lean towards keeping livestock and selling them for profit at a later stage. This study explores the notion that the sale of livestock for profit is important for disadvantaged households in order to fight food insecurity. Additionally, the study uncovers the potential that selling livestock does not only refer to selling the actual animal only, but also other products (i.e., skin, meat) could also be sold for a profit. As such, the objective of livestock owners in rural areas has changed from keeping livestock only for family sustenance to also include trading for financial gain (Singwane and Salam, 2007). Similar to cattle and sheep, goats too can be used as a source of income through their products (Singwane and Salam, 2007). The popularity of goat farming in rural communities can also be due to their significance in socio-cultural practices. For example, goats can be used when performing ancestral ceremonies and this is significant in many parts of the African continent (Coetzee et al., 2005). The study is relevant as it will inform people, especially those located in rural areas about the values of livestock beyond only using them for traditional ceremonies and as a source of food only.

1.9 Aims and objectives

The study aimed (1) to investigate the contribution of small-scale goat farming to household food security in rural and peri-urban areas, and (2) to determine the role of auctions and homestead-based sales in facilitating the trading of goats by small-scale farmers in KwaZulu-Natal Province, South Africa. The study had the following objectives:

(1) To quantify the use of goats for meat and milk.

(2) To identify and quantify additional uses of goats or their products aside from meat and milk.

(3) To establish the amount of money obtained through the sale of goats and its use at household level. (4) To assess the contribution of other household activities and income streams to improving the livelihoods of families.

(5) To quantify goat sales at homesteads and auctions.

(6) To determine the influence of colour, sex, and age on the prices at which the goats were sold.

1.10 Thesis structure

This thesis is written using the format manuscripts formatted for submission to a journal for publication. However, this is not the case for chapters 1 and 4 which are the introductory and concluding chapters, respectively. Chapters 2 and 3 are experimental chapters and are therefore made up of an introduction, methods, results, and discussion section. The chapters have been written as journal manuscripts and as a result, repetition is unavoidable in some instances. I followed the South African Journal of Botany's referencing protocol in all chapters.

Chapter 1 is the general introduction and literature review on food security in the developing countries. The chapter also explore types of food securities in developing countries. It also covers the effects of urbanisation on the demand for food. Finally, I explain the importance of the study as well as its aims and objectives.

Chapter 2 investigates the contribution of small-scale goat farming to household food security in rural and peri-urban areas of KwaZulu-Natal Province of South Africa. Objectives 1, 2, 3 and 4 are covered in this chapter.

Chapter 3 investigates the role of livestock auctions and sales from homesteads in facilitating the trading of goats by rural and peri-urban area small-scale farmers in order to achieve household needs and food security. It focuses on objectives 5 and 6.

Chapter 4 is comprised of the main findings of the study and general conclusions that were drawn from the overall study. Recommendations for future studies are also included.

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Chapter 2

The Contribution of Small-Scale Goat Farming to Household Food Security in Selected Rural and Peri-Urban Areas of KwaZulu-Natal, South Africa

Abstract

The need for food is significant to all human life. However, accessibility to food varies from one household to another. For disadvantaged low earning rural and peri-urban households, this need for food can be met through keeping cheaper livestock at a small-scale such as goats, sheep and chicken. In rural and peri-urban areas of South Africa, income sources could include social grants, work (formal/informal), vegetable sales/consumption, and livestock keeping. Goats (*Capra hircus*) are suitable livestock to address issues of food and income generation because they can contribute towards a household as food or money for other essential needs. In this study, I investigated the contribution of small-scale livestock farming such as goats to household food security in rural and peri-urban areas. The use of structured questionnaires was employed to determine the contribution of goats to household food security. The questionnaire survey interviews were carried out in four locations in the KwaZulu-Natal province in South Africa: Howick, Kokstad, Msinga (Tugela Ferry) and Pietermaritzburg. The questions asked related to the sale of goats (number, sex, age and sale value of the animal) and how the money generated from goat sales was spent. The data were then analysed using Pearson's Chi-square on Statistical Package for Social Sciences (SPSS). The results obtained from the study showed that goats played a role in household food security as a source of cash as well as consumption in strenuous times. These findings were more prevalent in the rural areas, which kept more (5-150 in a herd) goats than those found in the peri-urban areas (5-50 goats in a herd). Goats were a source of cash in numerous ways including sale of skin after slaughter and use to craft household items such as stools that can be sold for cash. The amount of money generated from goat sales ranged from R900 to over R1 300 across rural and peri-urban areas. Social grants and sale of goats were the leading contributor of other household income streams also contributed substantially to households. The conclusion drawn from the study was that households in both rural and peri-urban areas should keep cheaper livestock which are not only limited to goats but other smaller livestock to increase their family food security, incomes and consumption.

Keywords: Consumption, homesteads, livelihoods, livestock, sales.

2.1 Introduction

The ever-present need to meet the demand for food for the growing human population is a global challenge (Tito et al., 2018). This demand for food is more apparent in developing countries of Sub-Saharan Africa and Asian countries like Afghanistan (Mbow et al., 2019). Food is an ever-present requirement by the body. The ability to obtain this requirement may vary with social status (Quandt et al., 2001; Baipheti and Jacobs, 2009). Food security refers to an individual or a households' ability to access good quality and adequate food to achieve an active and healthy life (Frayne et al., 2010; Muzah, 2015). Food insecurity is a problem in many developing countries, including South Africa (Mjonono et al., 2009). This does not manifest in urban areas but is prevalent in rural and peri-urban areas, peri-urban areas being places with semi-developed buildings, small-scale agricultural practices that are found closer to a city (Jacobs, 2009; Muzah, 2015; Walsh and van Rooyen, 2015). For peri-urban households, living in peri-urban areas means that the household budget allocation to the purchase of food is preceded by other fixed expenses in the household like water, rent, and electricity (Tawodzera, 2012). Therefore, the budget allocated to purchasing food may subsequently affect the overall nutritional quality and quantity of food that ends up being consumed by the residents in the household (Tawodzera, 2012).

Rural areas are identified by a low human density and little infrastructural development such as buildings and roads (Hoggart, 1988; Peen et al., 2010). In rural areas, there are no fixed monthly expenses like municipal rates as is in the peri-urban areas, allowing the residents to allocate most of their income towards attaining the desired quality and amount of food. Food insecurity may be associated with rural settlements because that is where most of the poor are located (Bohle et al., 1994; Baipheti and Jacobs, 2009). Poor households face a high risk of being food insecure due to a lack of essential resources ranging from money, land, and livestock (Zeller et al., 1997). Poor households also cannot create alternative ways to generate income to secure enough food for themselves (Godfray et al., 2010; Faber et al., 2011; D'Haese et al., 2013). As a result, access to preferred food for a vast majority of rural and peri-urban households remains a challenge and food insecurity remains at its highest levels in these communities (Mjonono et al., 2009; D'Haese et al., 2013). Food insecurity in peri-urban areas may be worsened as there is a high competition for employment, even in the informal sector, which can then cause the wages to be low for those employed due to the demand for employment resulting from high population numbers (Puspadjuita, 2018).

Small-scale or subsistence farming of various crops and livestock such as goats (*Capra hircus*), sheep (*Ovis aries*), cattle (*Bos taurus*), and chicken (*Gallus gallus domesticus*) is associated with rural communities. This kind of farming may contribute to household running costs, including food, and act as a source of income for families (Aliber and Hart, 2009; Baipheti and Jacobs, 2009). Other rural and peri-urban households are sustained through government social grants in South Africa (Labadarios et al., 2011;

D'Haese et al., 2013). The South African government offers social grants to the unemployed, disabled, foster care children and children (<18 years of age) of the unemployed parents as well as the elderly (>60 years of age) under the social security programme for South African citizens (Thejane, 2020). The social grant is R1 860 for adults, R450 for child support, and R1 040 for foster child grant per month (South African Government, 2020).

Livestock farming by small-scale communal farmers is subsistence or traditionally oriented and does not contribute significantly to the major meat markets of a country (Musemwa et al., 2008; Aliber and Hart, 2009). However, such livestock farming may help meet household food needs in rural and peri-urban communities by slaughtering for family consumption and sales that may be done informally at households or formally at auctions (Mosisi, 2009). Small-scale livestock farmers need to produce animal products at low personal cost by, for example, relying on natural vegetation for animal feed, which in turn results in greater profits (Lebbie, 2004). Animals that are relatively inexpensive and versatile to keep for small-scale farmers are preferred, and goats seem to meet these criteria (Lebbie, 2004; Peacock, 2005). Small-scale farmers favour goats due to their mixed feeding abilities, high reproduction potential, and ability to survive without supplemental feeds (Peacock, 2005; Peacock and Sherman, 2010). One reason contributing to goats' good performance without supplementation may be that the rural areas have greater amounts of natural vegetation that livestock can feed on, which sustains them even during times of drought (Reeder and Kramer, 2005; Uzun, 2005). Goats are tolerant to droughts, diseases and pests (Baker, 1998; Darcan and Silanikove, 2018). As such, the range within which goats occur is extensive. For example, goats occur in all nine provinces in South Africa (Mogala, 2012). During the aftermath of a drought, goat herds can recover quickly at low costs to farmers due to their quick reproductive rates, allowing herds to increase in numbers quickly (Fatet et al., 2011). Specifically, goats have inter-kidding intervals of less than a year (0.75 years) while cattle and sheep have inter-calving intervals of >1 year (Odubote, 1996; Hare et al., 2006). Goats reproductive behaviour is also not limited by season, for goats reproduce in both the wet and dry seasons (Fatet et al., 2011).

Poverty in rural and peri-urban households is a persistent challenge (Farrigan and Parker, 2012), which is primarily caused by a combination of low income from employment that can be deemed as being informal and a significant proportion of the residents being faced with unemployment (Bickel et al., 2000). Food insecurity and poverty in most rural households are heavily influenced by employment limited only to farming, meaning that people only work on farms (Parker et al., 2016). Additionally, Derman and Poultney (1987) reported that farm-based employment tends to be temporary or seasonal for many. In turn, this likely contributes to money linked shortages in households for the periods of unemployment in a year. The rural areas are dominated mainly by less educated and/or illiterate individuals, limiting their options

for employment outside the farming sector, and consequently affects their savings and ability to purchase food (Mkwambisi et al., 2011; Parker et al., 2016).

Livestock is used to boost rural household income and contribute towards food security in many African countries (Owen et al., 2004; Baiphethi and Jacobs, 2009). In response to this high reliance on livestock for household needs, non-governmental organisations (NGOs), donors, and government officials have since directed many resources towards improving the livestock sector because of its importance in the livelihoods of the poor (Owen et al., 2004). Goats are culturally significant to African communities. They can be used when performing traditional ceremonies and can play a unique role in lifting poor households out of poverty and lead them towards improved welfare (Peacock, 2005; Van Rooyen and Tui, 2009). Goats and chickens are the most common assets that are possessed by poor households (Lebbie, 2004). As a result, poor households can use goats as a viable, sustainable, and long-lasting cash option as they yield more money than chickens during tough times (Van Rooyen and Tui, 2009). This money can go a long way and may be used to purchase household necessities like food and medicines and contribute towards education (Devereux, 1993; Badenhorst, 2002; Dovie et al., 2006).

The study aimed to investigate the contribution of small-scale goat farming to household food security in rural and peri-urban areas of KwaZulu-Natal Province of South Africa. The objectives were to: (1) quantify the use of goats for meat and milk, (2) identify and quantify additional uses of goats or their products aside from meat, (3) establish the amount of money obtained through the sale of goats and its use at household level, and (4) assess the contribution of other household activities and income streams to food security. I predicted (1) that goats would contribute significantly through sales and household consumption to food security in rural areas compared to peri-urban areas, (2) that there will be a high contribution of other sources of income such as social grants and vegetable sales to food in rural areas than there will be in peri-urban areas, and lastly, (3) that there would be greater use of secondary products of goat farming in rural than in peri-urban areas.

2.2 Materials and Methods

2.2.1 Study sites

The study was carried out at several sites near the towns of Howick (29.4893° S, 30.2167° E), Kokstad (30.5096° S, 29.4063° E), Pietermaritzburg (29.6006° S, 30.3794° E) and Tugela Ferry (28.7416° S, 30.4617° E), all in KwaZulu-Natal Province, South Africa. In Howick, the study site was at Mpophomeni, which is a peri-urban area. Parkies Farm, which lies in a rural area, was the study site in Kokstad. The two sites in Pietermaritzburg were Elandskorp and Imbali, which are both peri-urban. Tugela Ferry had several sites: Ncunjane, Gujini, Mathinta Romeni, and Ngubo, all of which, are rural areas. The peri-urban areas in

Tugela Ferry were esiNqumeni and eziBomvini. The selection criteria for the sampling sites were influenced by the presence of goats and whether the area was rural or peri-urban. Consequently, the sites were spread out such that a wide area of KZN was covered, as Kokstad is on the border of the province and would have provided a broader scope on goat farming throughout the selected areas.

Pietermaritzburg, Howick, and Kokstad occur in the grassland biome (Table 2.1). The biome comprises of *Themeda triandra* grasslands that have been transformed by overutilisation so that the native grass *Aristida junciformis* now dominate at several places (Mucina and Rutherford, 2006). Some of the important grasses include *T. triandra, Tristachya leucothrix, Panicum eckloni, Sporobolus africanus,* and herbs such as *Acalypha glandulifolia* and *Commelina africana* (Mucina and Rutherford, 2006). The Kokstad, Pietermaritzburg, and Howick areas have one of the most conserved endemic taxa, including geophytic herbs like *Asclepias woodii, Kniphofia latifolia,* and low shrubs, such as *Helichrysum citricephalum* and *Syncolostemon latidens* (Low and Rebelo, 1996). The geology of Pietermaritzburg, Howick, and Kokstad is dominated by apedal and plinthic soil forms, which are suitable for dry land crop production (Mucina and Rutherford, 2006). The climate varies with high summer (November-April) rainfall and mist that provides extra moisture, which is good for agricultural activities (Rutherford and Westfall, 1994; World Weather Online, 2016).

Msinga, where Tugela Ferry is located, is a rural area in the uMzinyathi District in KwaZulu-Natal. Msinga lies in semi-arid to mesic savanna largely made up of Thukela Valley bushveld vegetation type (Mucina and Rutherford, 2006). This vegetation is characterised by short (1.5-10 m) deciduous trees such as *Vachellia tortilis, V. natalitia, Searsia dentata,* and *Vitex rehmannii*, including evergreen trees (e.g., *Olea europaea* subsp. *africana*, *Euclea crispa,* and *Boscia albitrunca*) and many succulent plants such as *Aloe* spp. and *Euphorbia* spp. (Mucina and Rurtherford, 2006).

The social and economic dynamics of Msunduzi District Municipality and uMngeni Local Municipality, where Pietermaritzburg and Howick towns are located, comprises of rural, peri-urban and urban areas with varying rates of unemployment. The unemployment rate for Msunduzi Municipality accounted for 33% of individuals who were not seeking jobs at the time (Zimu, 2014). Msinga comprises of peri-urban and rural areas with an employment rate that was 38%. Here, jobs are mainly in the informal sector with earnings that are usually less than R800 per month (Msinga Municipality, 2012). However, there are many people who are not actively job seeking due to their age or are unable to participate economically due to disability and sickness who are also classified as unemployed (Msinga Municipality, 2012). The majority (82%) of the residents of rural Pietermaritzburg and Howick earn R1 600.00 per month from employment in the informal sector, which is less than what is required to maintain a household (Zimu, 2014). In South Africa, the minimum wage for informal or domestic workers is R15 per hour, which puts the monthly minimum wage at R2 400 (South African Government, 2020). Similarly, the social and

economic status of Msinga Municipality indicated that most of the population was unemployed, and those who were employed in the informal sector earned less than what is required to maintain a household.

Table 2.1: Biophysical features of the study sites in KwaZulu-Natal.

Study site	Msinga	Kokstad	Pietermaritzburg	Howick
Mean annual precipitation (mm)	682	747	897	861
Mean minimum temperature (°C)	6	9.3	12.9	10
Mean maximum temperature (°C)	25	19.4	22.2	20
Altitude (m.a.s.l)	777	1 302	596	1 050
Location	Rural	Rural	Peri-urban	Peri-urban
Type of vegetation	Thukela Valley Bushveld	East Griqualand Grassland	Midlands Mistbelt Grassland	Southern KwaZulu-Natal Moist Grassland
Disturbance to vegetation	Droughts, grazing, and browsing	Grazing, fire	City development, grazing, fire, floods	Fire, herbivory, grazing, floods
Small-scale crop cultivation	High	High	Medium	Medium
Level of communal livestock husbandry	High	High	Medium	Medium
Human population density (km^2)	16	52	127	30

2.2.2 Sampling

Data collection took place between May and December 2020, using a structured questionnaire survey. The number of respondents from each site was influenced by the number of goat farmers, which was greater in Msinga than in Kokstad and Pietermaritzburg. Multi-staged sampling approach was used as areas were selected first and then subsequently villages and households. I conducted personal interviews with farmers from different households. The households whereby survey interviews were carried out were selected randomly. I asked questions relating to the sale of goats and the prices at which they were sold in order to determine a representation of the amount of money farmers obtained through sales. Once this was determined, I went further to ask how the monies were spent. To determine whether farmers had other sources of income that contribute to meeting household food needs, I asked questions on other livelihood activities such as crop production and keeping of other livestock i.e., cattle, sheep, and chickens, as well as quantify other livelihood sources such as social grants. The questionnaire also included questions that aimed to assess people's socio-economic dynamics and demography from the study sites. These questions ranged from the age, sex, and educational level of respondents through employment status to the level at which livestock contributed to household food. Questions regarding other uses of animal parts such as the hide and horns and manure products were included.

I carried out the household questionnaire interviews at each homestead. The questions were asked in isiZulu if the respondent could not read as per the questionnaire handed out to them. However, those who were literate, read and responded to the questions themselves without any need for me to recite the questions to them. Most of the respondents were of Zulu background, which meant no interpreter was required in most cases. However, there was one case where an interpreter was required, this was when an interview of a Sotho speaking individual took place. The initial target for the survey questions at each homestead was the head of the household as one would expect that they are well informed about the aspects of the household pertaining to livestock, if that was not possible, the person who was well informed about livestock provided the answers to the questions. In some instances, where livestock was shared among the family, questions were answered in a collaborative effort with only the herd owner or elder's demographic details in the household being taken.

2.2.3 Data analysis

The questionnaire survey data were prepared and analysed using IBM Statistical Package for Social Sciences (SPSS v. 27). The data were prepared by coding the interviews to represent them as a dataset before analysis took place. The coding of questionnaires was guided by the responses of the interviewees to the questions. The data were then analysed using Pearson’s Chi-square test with the area (rural/peri-urban) as the independent variable and price of adult and subadult goats, the aim of keeping livestock,

source of income, and the level of education of the farmers as the dependent variables. Specifically, I used the Chi-square analysis to determine the cost of goats between rural and peri-urban areas for adult and subadult goats. I determined the main reasons farmers keep livestock in the rural and peri-urban areas. I also used it to determine the main sources of income between households in rural and peri-urban areas. I used a *t*-test to determine the difference between herd sizes in rural and peri-urban area homesteads.

Descriptive statistics were run to determine means, frequencies, and percentages on the interviewed farmers' demographic information. The descriptive statistics further provided information on the social and economic characteristics of the farmers.

2.3 Results

A total of 115 respondents were interviewed from the three sites. Rural areas accounted for 55 respondents, while the rest were from peri-urban areas. There were 36 female and 19 male respondents in the rural areas. Peri-urban areas had 23 female 37 male respondents. Overall, most respondents (51%) were females. Fifty-one percent of the respondents were the elderly (between 50 and 70 years), with the lowest (11%) representation coming from the youth (25-34 years). The majority (66%) of households had a male head. Overall, there was an employment rate of 39% across rural and peri-urban areas, with 17% rural employment and 22% peri-urban employment.

Table 2.2: The level of education and gender of livestock farmers in rural and peri-urban areas.

Level of education		Gender		
		Male (%)	Female (%)	Total (%)
	None	8	21	29
	Primary	17	11	28
	High School	12	10	22
	Matric	9	8	17
	Tertiary	3	1	4
Total		49	51	100

Most (57%) of the respondents had little to no form of formal education. The level of education was similar between male and female respondents ($\chi^2 = 10.218$, df = 5, $P = 0.069$). None of the female respondents had tertiary level education, while slightly more males attained primary level education (Table 2.2).

Table 2.3: The aim of keeping livestock by farmers in rural and peri-urban areas.

Aim of livestock ownership	Rural (%)	Peri-urban (%)	Total (%)
Subsistence use	2	3	5
Sales	5	4	9
Traditional ceremonies	8	17	25
Subsistence use and sales	33	27	60
Total	48	52	100

The aim of keeping livestock was similar ($\chi^2 = 5.833$, df = 3, $P = 0.212$) between rural and peri-urban areas. Respondents in both rural and peri-urban areas primarily owned goats for a combination of subsistence use and sales (Table 2.3). Ownership for traditional uses was also important in both areas. This tended to be greater by 9% in peri-urban than rural areas.

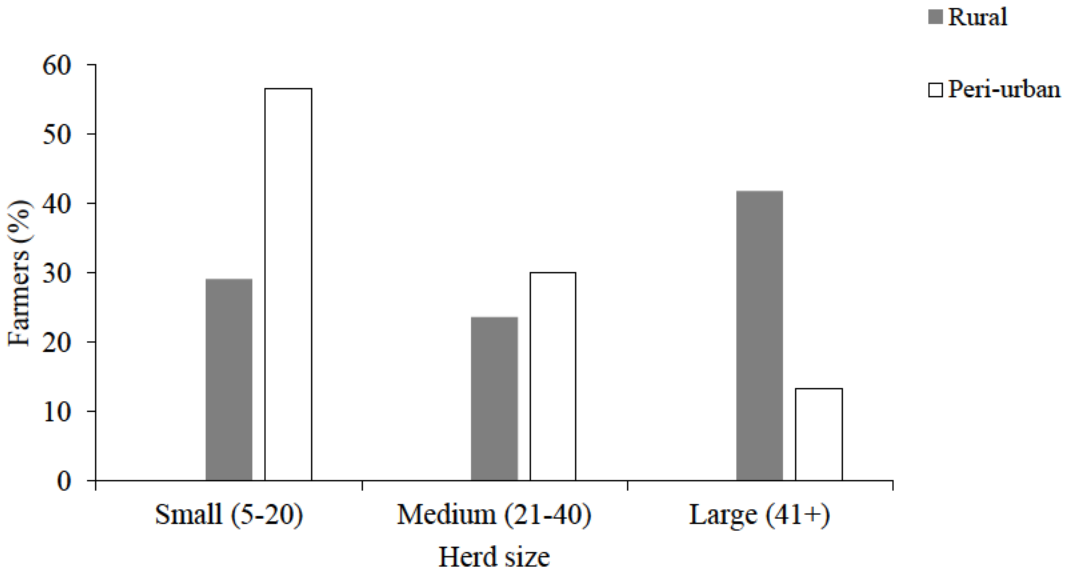

Figure 2.1: Livestock herd sizes in rural and peri-urban area homesteads.

The sizes of the herds of animals differed across the rural and peri-urban areas. Peri-urban areas had the highest number of small herd sizes (57%), while the majority (42%) of the large herd sizes were in the rural areas (Figure 2.1). The herd sizes between the two areas showed a significant difference (t = 2.038, df =

114, $P = 0.044$). Rural areas had homesteads with a higher number of large herds than the peri-urban area homesteads.

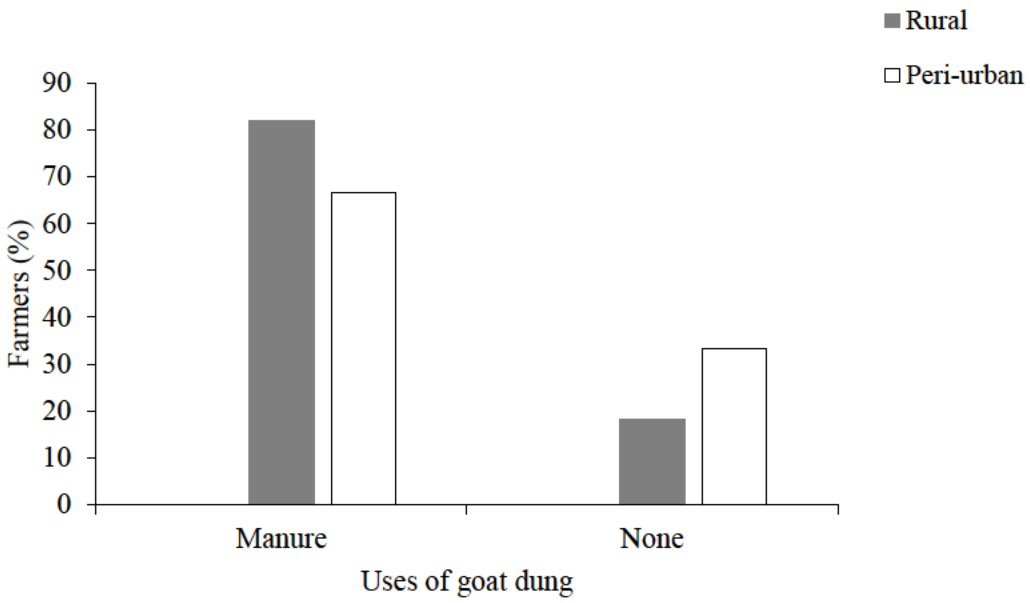

Figure 2.2: Uses of goat manure by rural and peri-urban goat farmers.

Goat manure was used by 82% of respondents in rural areas and 67% in peri-urban areas (Figure 2.2). None of the respondents indicated using goat milk.

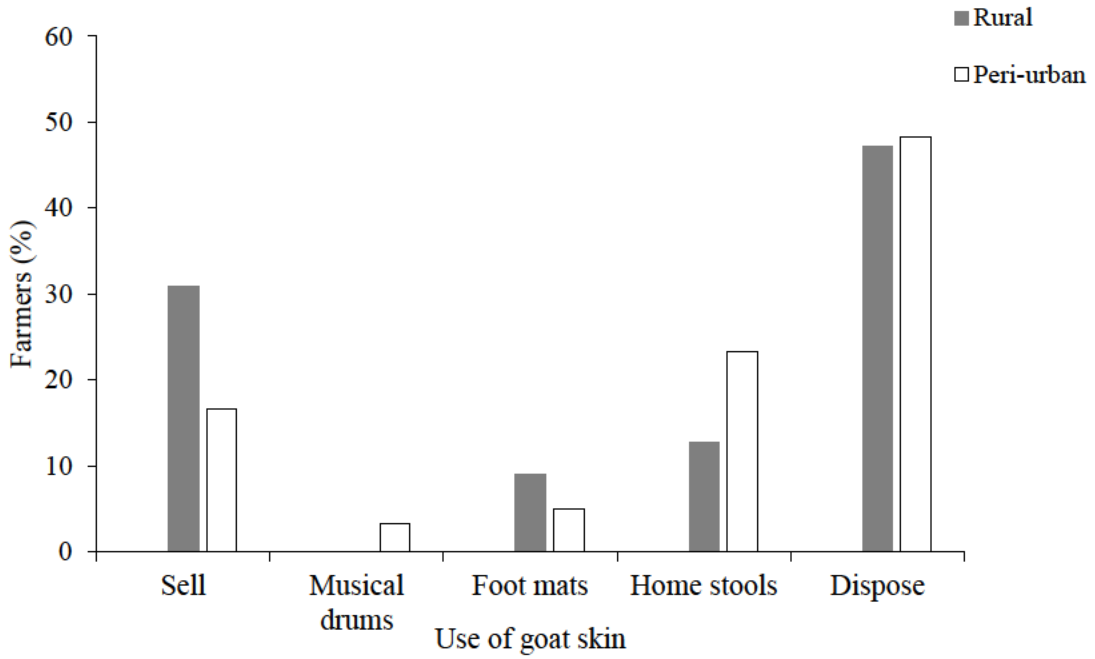

Figure 2.3: Use of goat skin in rural and peri-urban areas in KwaZulu-Natal.

Goat skin was used for several reasons. Rural areas had the highest number (31%) of farmers who sold goat skin after slaughtering, while only 16% in peri-urban areas sold goat skin. There was a higher crafting of home stools by farmers in peri-urban areas using goat skin (23%) than in rural areas (13%). Goat skin was also used to produce musical drums in peri-urban areas (3%), while this did not occur in rural areas. Goat skin was disposed of in both areas after slaughter (Figure 2.3).

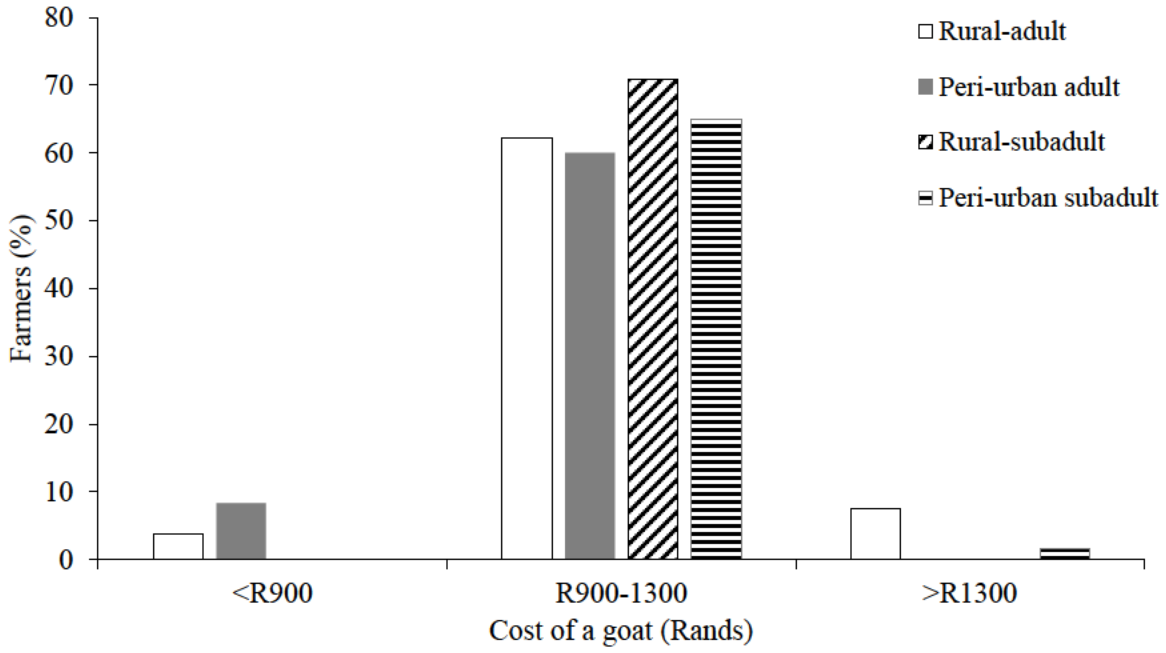

Figure 2.4: The costs of different aged goats across rural and peri-urban areas.

The average price of an adult and subadult goat in rural and peri-urban areas was R900-1300 (Figure 2.4). In rural areas, adult goats could be sold for >R1300, while subadults were sold for the same amount in peri-urban areas. There were rare instances where farmers in both areas would sell adult goats for a price less than R900.

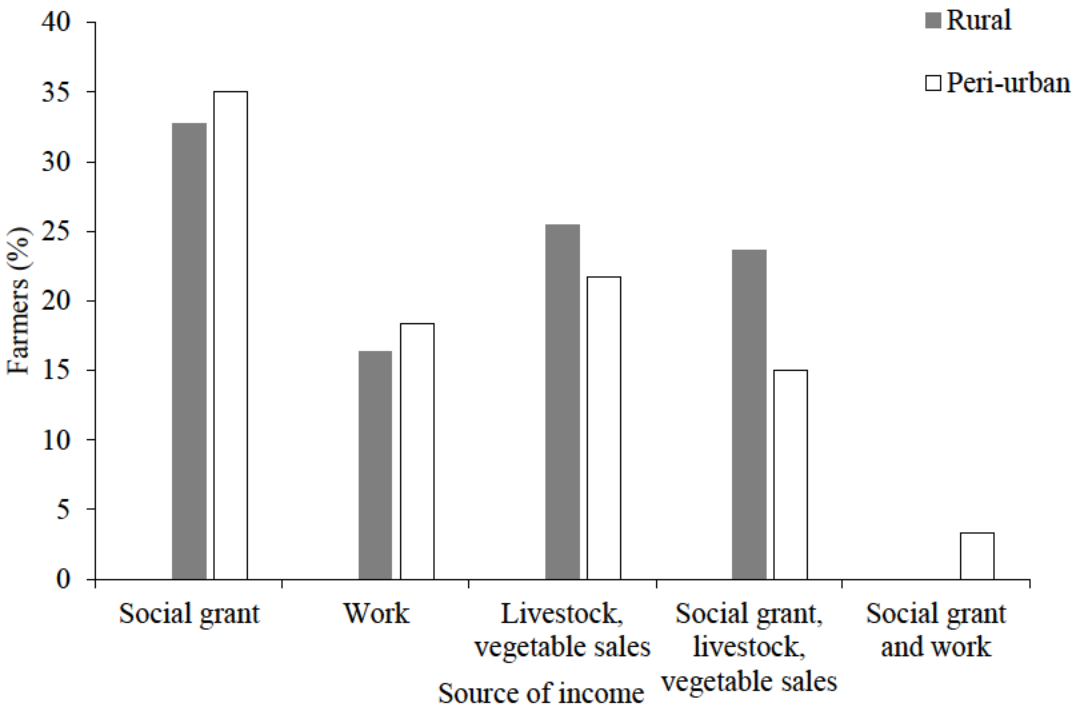

Figure 2.5: Sources of income in rural and peri-urban areas in KwaZulu-Natal.

The major contributors to household income were similar between rural and peri-urban areas ($\chi^2 = 7.781$, df = 6, $P = 0.352$). However, the government social grants seemed to contribute more than the income from selling vegetables, employment, and other livestock in rural and peri-urban. Social grants and employment were an unlikely combination in rural areas, while only 3% relied on both to contribute to household income in peri-urban areas (Figure 2.5).

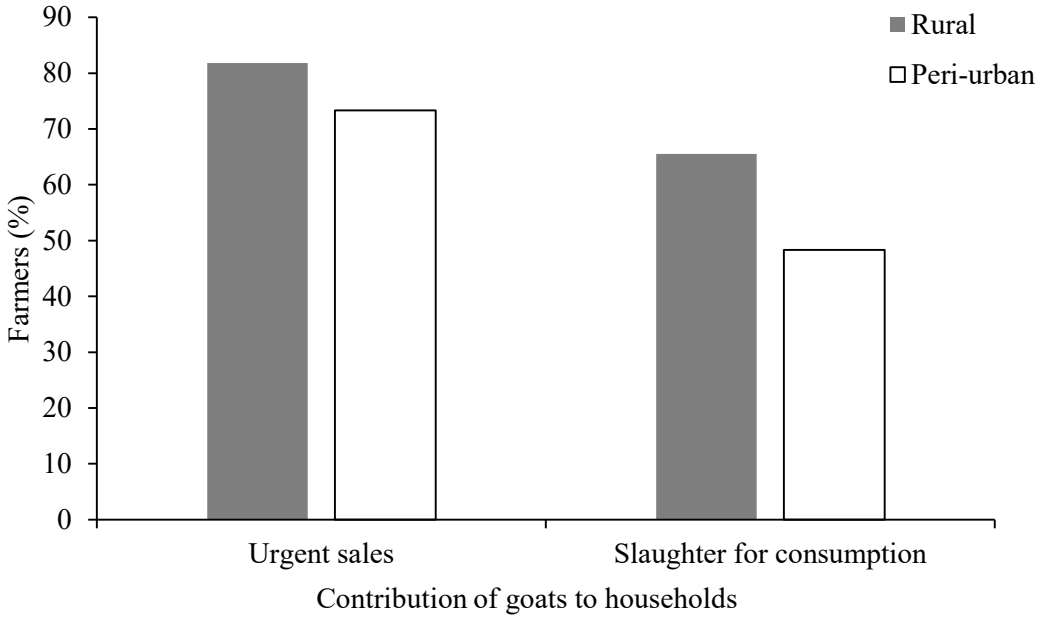

Figure 2.6: The contribution of goats to household needs through urgent cash sales and meat for household consumption.

Urgent sales of goats were high in both rural (82%) and peri-urban areas (73%) (Figure 2.6). Rural farmers slaughtered more for household consumption (66%) than peri-urban areas (48%).

2.4 Discussion

There were greater animal numbers found in rural areas than peri-urban areas; this subsequently led to homesteads having large herd sizes in rural areas than peri-urban areas. Spatial constraints in the peri-urban could explain the lower livestock numbers (Peacock, 2005). In peri-urban areas, there may also be laws in existence that regulate the presence of livestock closer to the big cities. Also, agricultural practices such as livestock keeping in peri-urban areas were identified as a constraint by city authorities towards achieving their aims of providing city residents with clean water and sanitation (Ngure et al., 2019). There is likely more freedom to keep livestock in rural areas. This might also be supported by the availability of natural feed and water in the rural areas compared to peri-urban areas (Omiti et al., 2009; Grace et al., 2015). However, there is a presence of small livestock in peri-urban areas like chicken, goats, and sheep because keeping livestock is a common practice in South African cities (Grace et al., 2015). Low numbers of livestock in the peri-urban areas may be affected by the attitude that exists towards owning them, which is that they are “impure, pollutive, disruptive and discomforting occupants of city spaces” (Philo, 1995). This

negative attitude towards livestock presence in cities may lead to the eradication of livestock from the cities and, to some extent, the peri-urban areas.

Farmers in rural areas had higher usage of goat manure than in the peri-urban areas. This may suggest that crop farming takes place at a greater extent in rural areas than peri-urban areas. Peri-urban areas are likely limited by spaces, as the size of homesteads and backyard for gardens and farming is smaller (Galhena et al., 2013). Space allocated to corrals and gardens would thus also be small, which may discourage crop farming. In addition, the limitations in space may also negatively influence the size of the herds of domestic livestock in peri-urban areas and the amount of manure production. An increased number of animals likely results in greater production of manure. Goat skin does not seem to have value in both areas, although some used it for cash, musical drums, foot mats and home stools.

The value of rural-adult goats was likely higher because rural farmers sold some of their subadult goats for over R1300. Yet, adult goats in rural areas cost the same. This may indicate different buyer intentions. For example, buyers in peri-urban areas may be interested in goats to keep for farming reasons (reproduction), while buyers in rural areas may be doing so to slaughter. Goat prices are determined by several factors like physical appearance, especially body condition in male goats and the reproductive potential in female goats (Barham and Troxel, 2007). High value is placed on younger animals due to the reproductive potential that younger livestock possess (Mellado et al., 2006). This may be caused by the fact that adult goats are mostly past or at the end of their reproductive window (Côté and Festa-Bianchet, 2001). As a result, subadult goats had the highest sales with over 65% in both areas. Goat prices may be higher in peri-urban than the rural areas due to the presence of buyers who buy to resell, these buyers include commercial farmers who would participate in purchasing livestock from rural and peri-urban areas to grow their enterprises (Musemwa et al., 2008; Marandure et al., 2016).

Social grants generated large proportions of income in both areas. This was similar to Thornton (2008) who found that there was an explicit reliance on the government's social grants by poor households to sustain livelihoods in South Africa. Government social grants have played a crucial role in contributing to food security for many South African households since 2001 (Adekunle, 2013). Therefore, the lack of employment opportunities resulting from a declining economic state in South Africa suggests that there may be a continued reliance on social grants and livestock by many households, especially in rural areas (Rodrik, 2008). This can be linked to the high unemployment rate that exists in both areas. The unemployed farmers received social grants for themselves and in some cases, for their children (<18 years of age) too. A few farmers (16-18%) had employment as a primary source of income in both areas. The regular and urgent sales of goats and vegetables contributed more to the income generation of rural households. The regular and urgent sales of goats for cash may contribute towards unbudgeted household needs such as food, medicines, and school fees for children (Russell, 1996). The higher earnings from goat sales may be

more apparent in rural than peri-urban areas because they have the natural resources to keep livestock and cultivate crops, unlike the highly populated and industrialized peri-urban areas that require additional investments, e.g., feeds (Guendel and Richards, 2002; Peacock, 2005). The importance of income generation by a household was noted by Loopstra and Tarasuk (2013), who indicated that the relationship between income source and food security was positive, and an improvement in the level of income meant an improvement would be observed in the state of food security. In rural and peri-urban areas, livestock like goats remain a viable alternative source of boosting household income level through cash sales and other additional products that come from goats. Leete and Bania (2010) indicated that having resources such as assets that could be liquidated in times of financial distress can help prevent households from feeling the full extent of food insecurity and avoid starvation.

Slaughtering goats for consumption in households was more frequent in rural areas than in peri-urban areas. Grace et al. (2015) indicated that there is increased reliance on modern foods from supermarkets in urban cities and peri-urban areas, which leads to the abandonment of small-scale agriculture and leads to agriculture becoming more industrialized and a lesser need of keeping livestock by peri-urban residences. Furthermore, rural farmers slaughter a higher number of goats to provide food for their household consumption (Andersson and Gabrielsson, 2012), and a higher number of animals are slaughtered during the festive season. This is when most relatives have gathered for festivities like Christmas. Contrary to this, peri-urban farmers slaughtered less for household consumption because most peri-urban households kept livestock for commercial reasons rather than sustenance mostly due to the fact that they were closer to markets that sell meat. Blecha (2015) found that there is an existing regulation about the backyard slaughtering of animals in peri-urban areas which may affect the number of animals they slaughter compared to rural areas, where no such conflicts or regulations exist. Rural and peri-urban farmers also slaughter animals for traditional purposes (Thornton, 2008), which would subsequently end up being consumed in the household or neighbours. The combination of sustenance and sale of livestock was the leading reason for goat farming in the current study. Surprisingly, more peri-urban farmers (17%) kept livestock solely for traditional ceremonies than in rural areas (8%). Thornton (2008) also found that few small-scale farmers kept livestock solely for traditional ceremonies.

Goats are viewed as a safety net or a cash deposit for most, which explains why high consumption is not favoured. Only 9% of farmers kept their goats for commercial reasons in both areas (Guendel and Richards, 2002). This can be explained by that small-scale farmers have not yet realised the potential returns they stand to receive by participating in livestock trading markets (Guendel and Richards, 2002). The level of education was generally low in the current study. Therefore, small-scale farmers are not well educated in a formal manner aside from indigenous knowledge about how they can use their livestock to better their livelihoods. Therefore, food insecurity tends to be more prevalent in households with low income and low

education levels (Muzah, 2015). A negative relationship between the head of household's level of education and food insecurity may be the reason why households with less educated heads are most likely to face food insecurity (Melgar-Quinonez and Hackett, 2008). As indicated by Babatunde et al. (2008), female-headed households suffer from increased levels of food insecurity because they rely on small agricultural activities like cultivating crops as their only means of income source. This was mostly the case in rural areas where most (51%) of the respondents were female heads of households.

2.5 Conclusion

Small-scale livestock farming of goats is a common practice for sustenance and sales in rural and peri-urban areas of KwaZulu-Natal. This contributes to household needs such as food availability for the families. Goats thus contribute as a long-lasting source of protein to families but also as cash that can be used for various purposes including unbudgeted family emergencies (buying food, paying school fees, buying uniforms, covering travel costs to school or work, etc). Contrary to chickens, goats yield more money from sales but they also go a long way as a protein source to families in relation to chicken, which may only feed small families. Cattle on the other hand may be difficult to sell because they are expensive. They do not work well in cases of emergencies as a source of money. However, this small-scale farming does not come without any challenges whether in rural or peri-urban areas. In this study, rural areas appeared to be more favourable for farming, owing to their natural vegetation and space that has not undergone significant development. As a result, high animal numbers were a characteristic of rural areas. Goats are thus important to food-insecure households in both rural and peri-urban areas as they can contribute towards feeding more mouths in a household than the case with meat brought from a supermarket. However, opportunities to sell were far greater in peri-urban areas because of their close proximity to the major markets as well as being able to easily participate in events such as auctions. The study found that goats play an important role in improving livelihoods, as they provide families with a cheaper alternative to income generation as they are cheaper to farm and provide various benefits to those who keep them. Therefore, a conclusion can be drawn from this study that financially disadvantaged households in rural and peri-urban areas should keep cheaper livestock, not only confined to goats but could include sheep and chickens in order to boost their household income, as well as the protein intake of the family's diet.

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Chapter 3

Sale of Goats by Small-Scale Rural Farmers of Selected Communities in KwaZulu-Natal, South Africa

Abstract

Pastoralism plays an important role in the livelihoods of disadvantaged African communities. Small-scale farmers keep various livestock such as cattle, sheep, goats and chickens for additional income for their household needs. I quantified goat sales that took place during auctions and those that took place in homesteads, and determined the number, colour, sex, age, and the prices at which the goats were sold in auctions and homesteads. I did this by collecting data on the sex, age and colour of the animals that were sold including the price of each animal at two goat auctions that took place at Weenen in 2019 and Pietermaritzburg in 2020. I also collected data on sales from 2017 to 2018 from 27 homesteads in Msinga on the number, price, sex, and age of the goats sold. The datasets were then analysed using an independent samples *t*-test. My results showed that adult goats were sold more at homesteads compared to auctions, where buyers opted for younger goats. Female goats were bought more than males and at a higher mean price at both auctions and homesteads. The price of a female goat was R2 177 at auctions and R1 083 from home sales, while males sold for R1 268 at auctions and R1 065 at home. Colour of goats proved to be an important trait at auctions as light-coloured goats were in higher demand than black goats. Auctions were a viable alternative for small-scale farmers to sell their goats at a price that is higher than they would normally obtain from selling at their homesteads. Homestead sales also remain a useful practice as farmers generate income to assist in day-to-day household expenses instead of waiting for infrequent auction events. In conclusion, participation of small-scale farmers in bigger livestock markets is important for them to generate income by selling animals in bulk. Furthermore, small-scale farmers need to populate their herds with light-coloured sub-adult male and female goats as they are in demand in auctions.

Keywords: Goat colour, home sales, livestock buyers, peri-urban, rural.

3.1 Introduction

Keeping livestock like cattle (*Bos taurus*), sheep (*Ovis aries*), goats (*Capra hircus*) and chickens (*Gallus gallus domesticus*) play a significant role in improving the livelihoods of people living in financially disadvantaged households (Herrero et al., 2013). This is because the farmers derive income in addition to keeping the animals for other uses including slaughtering for traditional ceremonies (Groenewald and Jooste, 2012; Rust and Rust, 2013). Small animals such as goats require low initial capital investment and

reproduce rapidly compared to bigger and expensive livestock such as cattle. Smaller animals also have low operational costs such as reduced supplemental feeds and transportation costs if there is a need. These low operational costs reduce financial strain to those who keep them. Additionally, when they must be sold, they are relatively easier to transport to or from markets (Montshwe, 2006; Aziz, 2010).

Rural areas are characterised by low population densities and fewer opportunities for employment in formal jobs. They are associated with greater amounts of natural vegetation that can support communal livestock husbandry compared to urban areas (Coleman et al., 1985; Caraviello et al., 2006). In contrast, peri-urban areas are characterised by smaller but mainly commercial rangelands (Snep et al., 2006). The characteristics of peri-urban areas make them transitional areas between urban and rural areas (Otieno et al., 2009). As a result, people living in rural and peri-urban areas may undertake different activities contributing to their livelihoods. Rural and peri-urban farmers comprise of a large portion of small-scale farmers in sub-Saharan Africa (Groenewald and Jooste, 2012).

Livestock auctions refer to established business places whereby farmers can buy and sell livestock by offering them to the highest bidder (Buttimer, 1970; Uchezuba et al., 2009). The process involves livestock being assembled in lots and showcased one after another with potential buyers making bids until the animal is sold. Auctions are a public gathering that allows access to any individual who wishes to participate. Bidders may be buying for their households for food or ceremonies, or they may be butchers, or may be businessmen seeking to resell, or are farmers (Musemwa et al., 2008; Marandure et al., 2016). One of the major benefits of an auction is that it presents small-scale farmers with good opportunities to sell their livestock and there is no waiting period for payments as the livestock is bought and paid for onsite (Teshirogi, 2014). The platform for trading livestock such as auctions provides rural and peri-urban dwellers with a way of sustaining their livelihoods through the sale of livestock for cash (Baiphethi and Jacobs, 2009) without having to wait for buyers to approach them from their homes.

Livestock sales may also occur at the homesteads, and such sales do not result in transport costs for the seller, whereas at auctions, both the seller and the buyer incur transportation costs (Musemwa et al., 2007; Groenewald and Jooste, 2012; Rust and Rust, 2013). As a result, there are minimal costs incurred by the seller through such sales. The seller may thus make more money from one animal through sales from home because unlike auctions, home sales allow the owner to negotiate prices directly with the buyer (Musemwa et al., 2007). However, auctions offer opportunities of selling many animals at one time (Troxel et al., 2002). Often, auctions take place in urban areas and may thus present challenges for rural farmers of transporting the animals to the auction. This is largely because small-scale farmers' are in isolated geographic location with limited exposure to big commercial livestock trading markets (Montshwe, 2006; Musemwa et al., 2008). Generally, small-scale farmers do not have access to infrastructure or institutions that can better facilitate their participation in markets to the level they would require (Omiti et al., 2009).

Participating in auctions could encourage small-scale farmers to increase their livestock production. Popular animals auctioned by small-scale farmers include goats, sheep, pigs and poultry because these animals have potential for high financial returns aside from bigger livestock such as cattle (Pica-Ciamarra et al., 2011). Animal care during auctions is not optimal as livestock may be crowded in lots where animals may suffer from dehydration and in some worst cases livestock may suffer fatalities from such instances. Additionally, animals risk contracting diseases from other livestock under such conditions (Porter, 1996).

Small-scale farmers participating in auctions should consider certain factors that affect a buyer's perception about the livestock. Characteristics of the animal (e.g. colour, sex, age, overall impression) are important considerations at the market (Lange et al., 2010). For example, ethnic buyers put less value on goats that are plain white as opposed to goats with dark or brown heads which are considered good for breeding (Malan, 2000). Additionally, black goats are of value to people who practice traditional ceremonies (Lohani, 2011), but are not favoured by buyers who seek to resell or build their herds. The perception regarding black goats within buyers is that they are not good for breeding because their colour could spread within a herd of animal and overtime become dominant (Getachew et al., 2020). Furthermore, black goats are very difficult to sell whether it is from the seller's homestead or at auctions because buyers are often looking to purchase light-coloured goats (Mahanjana and Cronje, 2000). As auctions are public places, persons there consist of various individuals such as butchers, agricultural extension staff, the NGO sector or commercial farmers and other small-scale local buyers intending to enlarge their herds, and this differentially influences the marketability of male versus female and young versus old animals (McHugh et al., 2010; Mohammed et al., 2015). Furthermore, the presentation of the animal can affect its perceived value by potential buyers. Therefore, it becomes imperative that the animals are in good body condition and are clean as dirty animals may be perceived as unhealthy and diseased (Troxel et al., 2002).

The aim of the study was to investigate the role of livestock auctions and sales from homesteads in facilitating the trading of goats by rural and peri-urban small-scale farmers in order to achieve household needs and food security in KZN, South Africa. The objectives were (1) to quantify goat sales that took place during auctions and those that took place in homesteads, (2) to determine the number, colour, sex, age, and the prices at which the goats were sold in auctions and homesteads. I predicted that there would be greater sales of younger female goats than older goats. I also predicted that light-coloured goats would be preferred by buyers more than black or dark-coloured goats.

3.2 Materials and Methods

3.2.1 Study site

The study was carried out in a rural area of Msinga (28° 33' 38.88" S, 30° 26' 8.88" E), which falls under the uMzinyathi District in KwaZulu-Natal (KZN) Province of South Africa. Three villages (Ncunjane, Jolwayo and Ngubo) were selected for sampling herds of goats because of their close relationship with Mdukatshani Rural Development Trust, a rural developmental NGO, which facilitates research in Msinga.

Msinga is characterised as a semi-arid to mesic savanna which is dominated by the type of vegetation called the Thukela Valley Bushveld (Mucina and Rutherford, 2006), which consists of short to medium sized evergreen and deciduous trees. The deciduous trees include *Vachellia tortilis, V. natalitia, Searsia dentata* and *Vitex rehmannii.* Evergreen trees include *Olea europaea* subsp. *africana, Euclea crispa* and *Boscia albitrunca* (Mucina and Rutherford, 2006). Additionally, there are several succulent plants present such as *Aloe* spp. and *Euphorbia* spp. (Low and Rebelo, 1996). The landscape features of Msinga comprises of steep slopes and rocky surfaces. The mean annual precipitation (MAP) experienced in Msinga is 682 mm with a mean annual temperature of 27°C (Mucina and Rutherford, 2006). The mean maximum and minimum temperatures are 25°C and 6°C, respectively.

Msinga is a communal area where livelihood activities are dominated by small-scale farming of livestock and limited rain-fed crop production. A few irrigation schemes augment crop production on the banks of the Tugela River. Most (625) of the population of Msinga municipality is unemployed. At less than R1600 per month, the population's level of income is insufficient to sustain household needs (Zimu, 2014).

3.2.2 Sampling

I used 27 herds of goats from homesteads in three villages in Msinga to collect the data. I counted the number of goats that were sold in each homestead over a period of 2 years in 2017 and 2018 covering the wet (October – March) and dry (April – September) seasons. I recorded the sex, age and colour of the animals that were sold. The age categories of the goats included uncastrated adult males (AM), subadult males (SAM), adult females (AF), subadult females (SAF), and castrated adult male (CAM). Subadult males and subadult females were the young goats that had reached sexual maturity but had not yet mated or given birth, respectively. This was undertaken by visiting households once per season and recording all the information about livestock that had been sold and the prices of the sales. The amount for which the animals were sold was recorded while paying attention to whether the price was affected by sex and age of the animal. I also enquired and recorded each homestead's reasons for the sales.

At goat auctions, I recorded the sex, age and colour of the animals that were sold including the price of each animal. I also recorded the same information about individual goats that did not sell as well as the maximum bids that were rejected, and any explanations of why this was the case. The information was collected from two auctions that took place in KZN. The first occurred at Weenen, a rural to peri-urban centre in uThukela District and neighbouring to uMzinyathi District where Msinga is located, and the second at Pietermaritzburg, a large urban centre in Msunduzi District to the south of Msinga. At both auctions, the source of the goats was Msinga. Farmers were organised by Mdukatshani Development Trust. The auctions took place in November 2019 and the second in November 2020. The second auction was delayed by lockdown restrictions imposed in response to the outbreak of Covid-19 in South Africa.

3.2.3 Data analysis

The auction and homestead sales data were prepared and analysed with the use of IBM Statistical Package for Social Sciences (SPSS v. 27). The datasets for the auctions and homestead sales were coded in preparation for analysis. The coding included representing age, sex, colour and other characteristics as numbers. The datasets were then analysed using an independent samples *t*-test with the price being the dependent factor and location of sales (auctions/homesteads) as the independent factor. I used the independent samples *t*-test to determine whether price of goats was affected by the location of sales or the sex of the goats. I also used an independent samples *t*-test to determine whether there was a difference in the number of goats sold in the wet and dry season.

3.3 Results

During the period of 2017 and 2018, some 236 goats were sold from the 27 homesteads in Msinga while 119 were sold at the two auctions. A total of 355 goats were recorded between auctions and homesteads altogether. From the 355 goats recorded, 335 were sold while 20 were returned from the auctions. Specifically, thirty-five percent of the goats brought to the Weenen auction were not sold and thus returned home while only 2% were returned at the Pietermaritzburg auction. In Weenen, 57 goats were sold while 62 goats were sold at the Pietermaritzburg auction. From the animals that were recorded and sold at auctions and homesteads, 24% were female goats and 76% were male goats. The animals that were actually sold from both auctions and homesteads comprised of 162 (46%) male goats and 173 (49%) female goats and the other 20 (5%) animals were not sold and returned to owners. There were two reasons why some goats were rejected by buyers, which included the price of the animal being too high for buyers with the seller not willing to accept a lower offer for their animal. Additionally, some goats were rejected because of their poor appearance which may have had them appear as diseased and deter buyers.

Table 3.1: The number of goats sold and returned at auctions, and number of goats sold at homesteads.

Age class and sex	Location	Goats sold	Goats returned	Average price (Rands)
AM	Weenen	7	4	1 382
	Pietermaritzburg	0	1	N/A
	Home	34	-	1 118
SAF	Weenen	14	1	1 138
	Pietermaritzburg	39	0	2 586
	Home	71	-	1 000
AF	Weenen	7	3	1 375
	Pietermaritzburg	22	0	2 614
	Home	20	-	N/A
CAM	Weenen	1	2	1 750
	Pietermaritzburg	0	0	N/A
	Home	45	-	1 038
SAM	Weenen	9	9	1 126
	Pietermaritzburg	0	0	N/A
	Home	66	-	1 000
TOTAL		335	20	16 127

Most (124) subadult female goats were sold across all auctions and homesteads (Table 1). Subadult females also had the lowest number of animals returned with one animal returned (Table 1). Adult males were the least (7) sold at both auctions combined. Adult females were the least (20) sold from homesteads (Table 1).

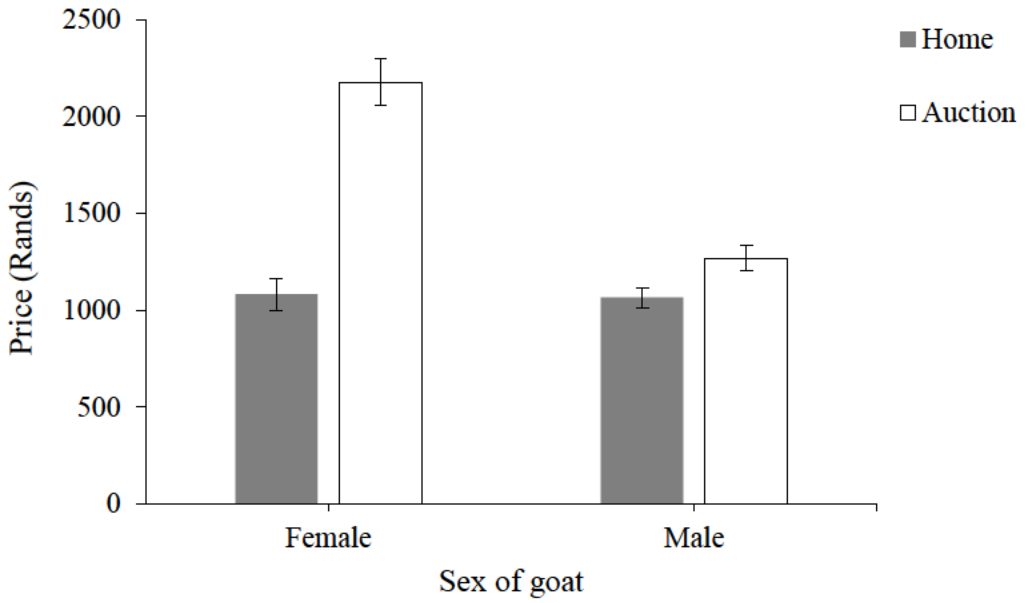

Figure 3.1: The mean (±SE) price of goats sold at home and in district level auctions in Msinga in 2019 and Pietermaritzburg in 2020.

The mean price of goats differed between sales from home and auction sales (Figure 3.1). Female goats sold at a significantly higher price in auctions than in homestead sales (t = -5.748, $P < 0.001$). The mean price of male goats was similar in home and auction sales (Figure 3.1).

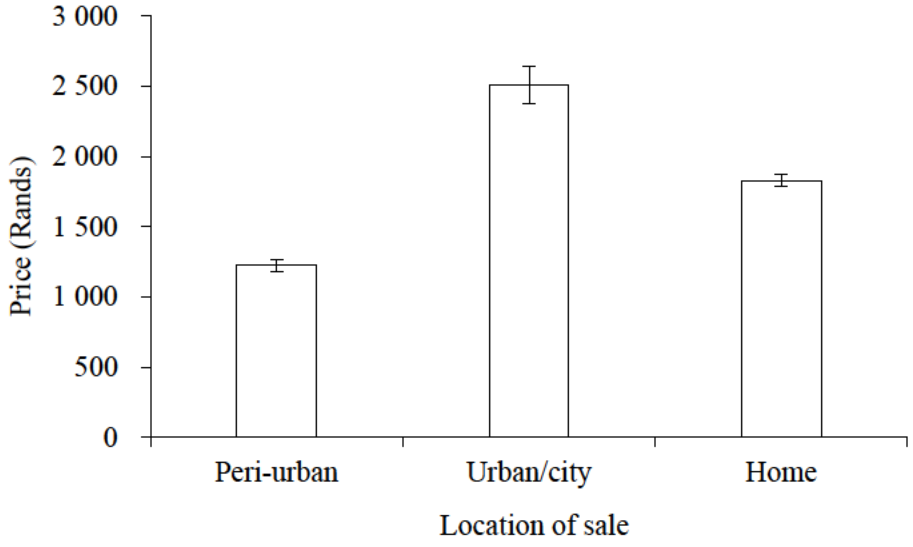

Figure 3.2: The mean (±SE) price of goats sold at homesteads and auctions in KwaZulu-Natal, South Africa.

The mean price of a goat was significantly different between auction and homestead sales ($t = 6.602$, df = 148, $P < 0.001$). Sales at the urban auction obtained a higher mean price for a goat than the mean price at the peri-urban auction and home sales (Figure 3.2).

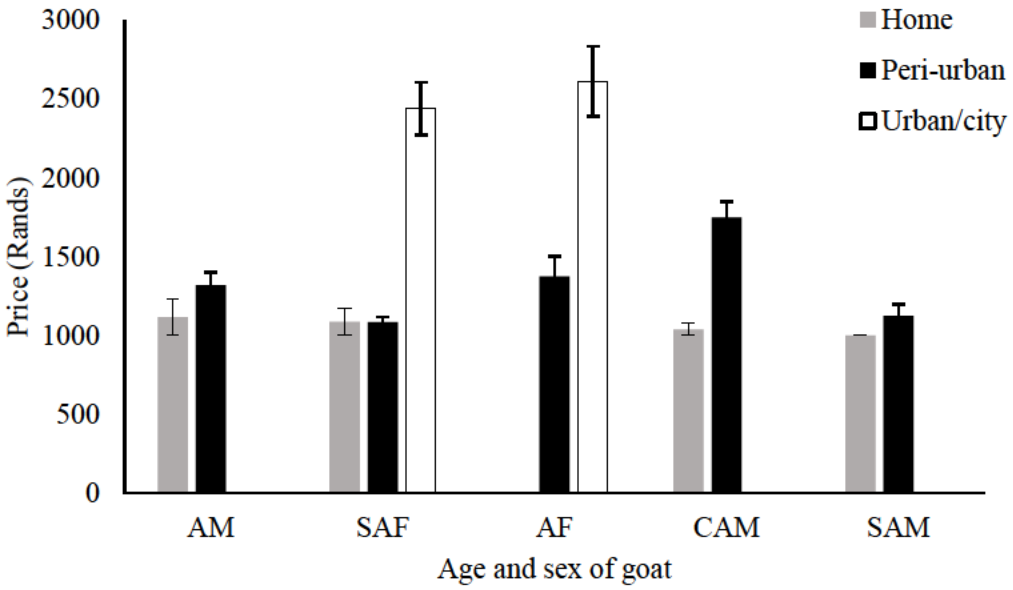

Figure 3.3: The mean (±SE) price of different aged and sexed goats in auctions and homesteads.

The value of goats differed with sex and age between auctions and homesteads. Adult female goats fetched the highest price at urban auctions (R2 613 ± 220) whereas no male (adult, castrates and subadults) goats were purchased in urban auctions (Figure 3.3). Castrates had the highest (R1 750 ± 100) price from peri-urban area auction sales (Figure 3.3). Adult males fetched a high price of R1 118 ± 118 from homesteads.

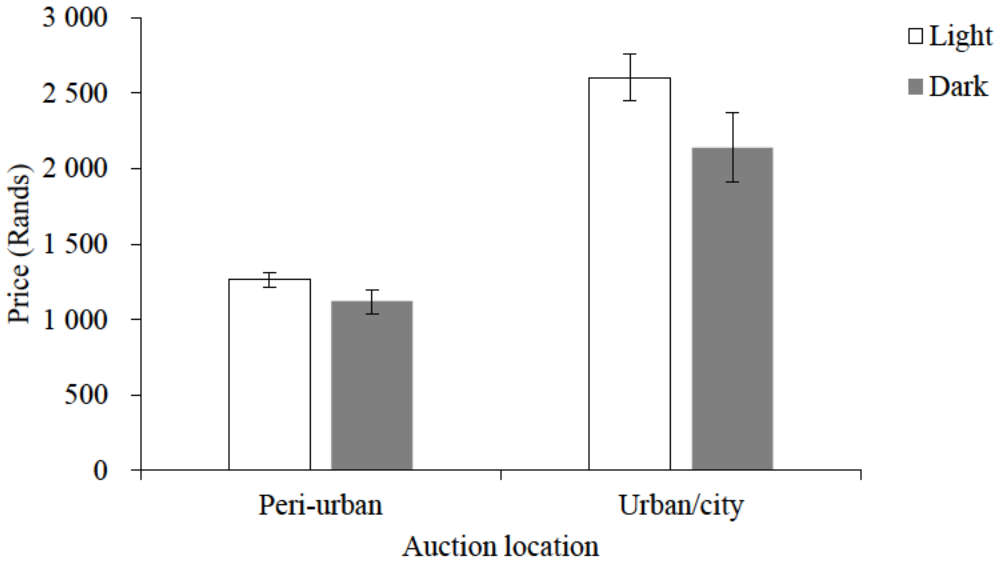

Figure 3.4: The mean (±SE) price of different coloured goats at peri-urban and urban auctions.

Mean goat prices varied with location and colour. Light-coloured (white, white and brown, and brown) goats at the urban auction fetched a greater price than at peri-urban (Figure 3.4). Dark-coloured (black and white, black, and black and brown) goats were cheaper at Weenen than at the Pietermaritzburg auction. There was a significant difference in the pricing of different coloured goats between the auctions (t = -7.624, df = 93, $P < 0.001$).

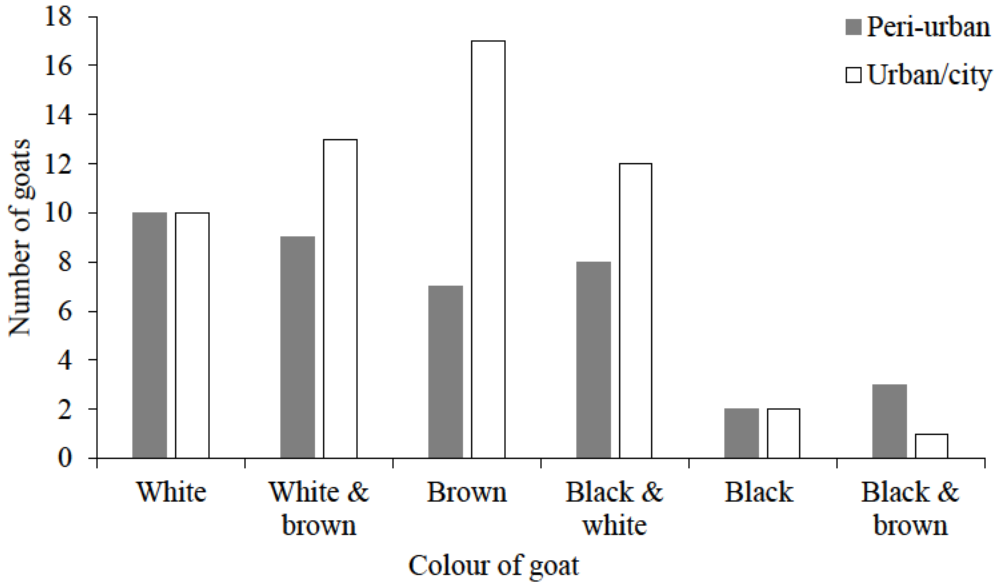

Figure 3.5: The total number of different coloured goats sold at auctions in KwaZulu-Natal, South Africa.

Goat sales differed with colour at auctions. Most of the goats sold were light-coloured brown while black goats were the least sold colour (Figure 3.5).

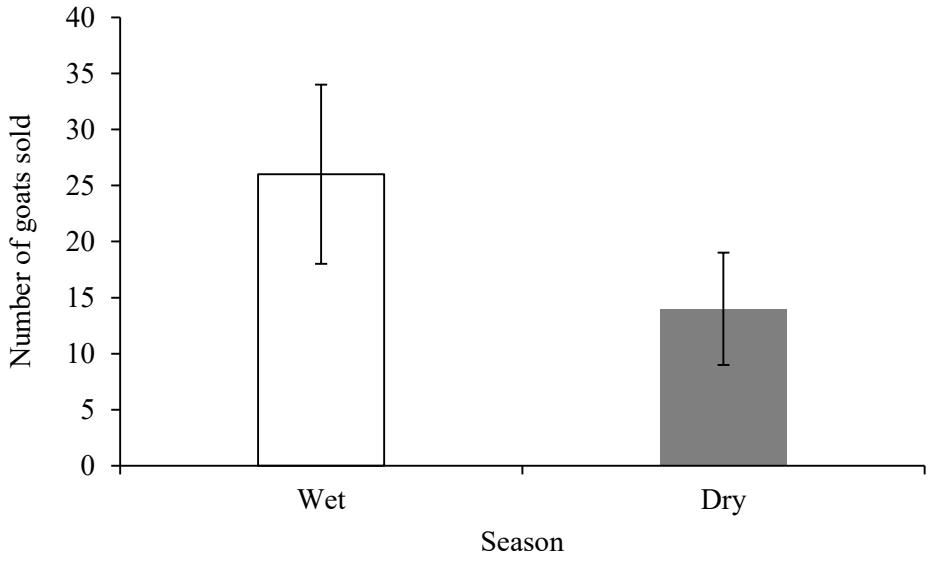

Figure 3.6: The mean (±SE) number of goats sold from homesteads per season at Msinga in 2017 and 2018.

Goat sales taking place from homesteads differed with season (t = -0.144, df = 227, P = 0.036) (Figure 3.6). The wet season had a higher (26±8) number of goats sold than the dry season (14±4).

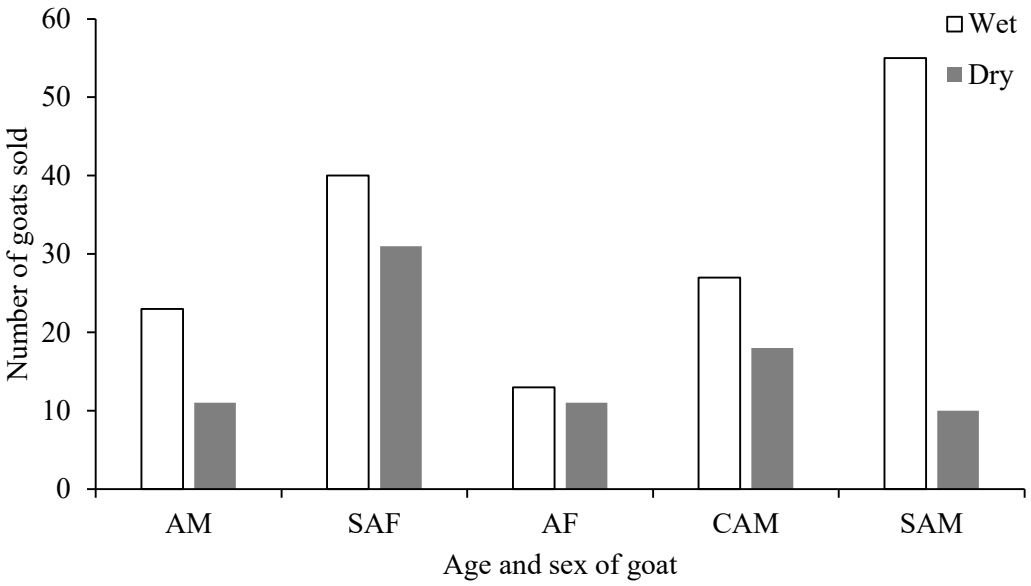

Figure 3.7: The age and sex of animals sold during the wet and dry season from homesteads at Msinga in 2017 and 2018.

Sales of different sexed and aged goats were higher in the wet than the dry season with subadult male goats sold most (n = 55) (Figure 3.7). Adult females sold the least (13) number of animals during the wet season. Most of the sales taking place in the dry season were of subadult females (n = 40) (Figure 3.7). In contrast to the wet season, subadult males were the least (n = 10) sold during the dry season.

3.4 Discussion

My study showed that small-scale goat farmers participate in regional auctions but rely much more on homestead sales, which took place throughout the year and varied with season. This may have been influenced by the fact that auctions are rare. Yet, household needs are likely continuous (day to day). These may peak with seasons such as schools opening thus the need for uniform, school fees, stationery, and transport (Thompson, 2014). In my study, sales from homesteads peaked (65%) during the wet season period between October and March. Increased sales in the wet season may be explained by the fact that the festive holidays wherein various ceremonies are performed as well as the beginning of the year when children return to school which would most likely mean increased household expenses during this period. Therefore, a high number of goats will likely be sold heading into the festive season for celebrations like Christmas as relatives will be coming together for the celebrations that will often require that they slaughter livestock in order to increase meat supply for all family members (Togarepi et al., 2018). In contrast to the wet season, the dry season (April and September) resulted in fewer (35%) goat sales from the homesteads. Food sources are poor and few for goats which can consequently affect their overall health and marketability

in the dry season (Salem, 2010). As a result, it is not easy for goat owners to sell their animals during this period because buyers also do not want to purchase animals that appear malnutritioned and diseased. Furthermore, goat owners themselves may be reluctant to sell during this dry period because animals die due to the lack of water and suitable vegetation (Hulme, 2005). Therefore, goats sold in the dry season may be used to attend to emergency or household needs or to buy medicine required for diseased animals in the herd (Campbell et al., 2019).

I also showed that the prices goats fetched were different between auctions and homesteads. Homestead sales tended to be cheaper for buyers, these cheap prices may have been influenced by that sellers incurred no costs but only the buyers had additional costs. Communities sell amongst each other, which constitutes reduced transaction costs by both parties. Specifically, buyers can buy and walk the animal home, while the seller incurs no costs of transportation (Hobbs 1997; Musemwa et al., 2008). Therefore, the contributing factors that influence livestock owners' decision not to participate in livestock auctions can be linked to logistical requirements for transporting livestock to and from the auction site (Musemwa et al., 2008). In most instances, a livestock farmer stands to generate more money by selling from home because there are no extra costs incurred, such as transportation if selling from home. The buyer arranges their own transportation of the livestock. This then indicates that if a goat owner can generate a mean price of R1 828 from selling a goat from home compared to the R1 224 at an auction then they can do away with participating in auctions all together as more money may likely be generated without incurring any additional costs.

At auctions, sales were also influenced by colour, sex and age of the animal. For example, livestock owners tended to sell older animals irrespective of sex from their homesteads. The likely reason for this is to offload the older livestock in both sexes because their reproductive potential has already lapsed (Côté and Festa-Bianchet, 2001). Buyers may purchase older animals because they may require them for slaughtering during celebratory or traditional ceremonies. As a result, older animals would sell more in rural areas than the young animals because of their meat.

There was a preference amongst buyers of purchasing younger reproductive goats as opposed to purchasing their adult counterparts which may indicate that the buyers may be looking to grow their herds and resell (e.g. commercial farmers) at a later stage. Furthermore, Côté and Festa-Bianchet (2001) said that auction buyers may largely be seeking to buy younger animals, irrespective of sex. Subadult male goats were also sold at a high number. A total of 66 goats, making up 28% of the goats sold from homesteads were subadult males. However, in auctions, only 9 (8%) subadult males were sold and another 8% were returned. The purchase of all types of male goats in auctions was not very popular but were sold in homesteads. Small-scale farmers grow male goats to sell for profit during the festive season (Dey, 2007). The purchase of uncastrated males may be because of the buyers who are buying for breeding purposes and

they purchase the subadult males that have the traits they require for breeding. From homesteads, there were 19% castrates sold compared to only 0.8% sold from auctions and 1.6% were returned. Castrates may be bought by buyers largely for their meat as they no longer possess the ability to mate and reproduce.

The benefit of auctions is that they offer farmers an opportunity to sell in bulk even though it may be at a lower price in auctions taking place in peri-urban areas such as Weenen than at homesteads, but it may be better than a few intermittent sales from home. But, auctions also increase the likelihood of contracting diseases, which may spread to other herd members from animals returned home from auctions (Porter, 1996). As a result, auctions may present farmers with additional costs because they may have to purchase medicine to treat the returned animals from auctions to prevent the spread of the disease to other livestock they may have at home. Porter (1996) further indicated that fatalities of livestock in auctions are a possibility due to a number of factors which include the mishandling of animals, excessive heat or cold. Therefore, if a fatality occurs at an auction, the livestock trader may end up returning home only at a loss rather than profiting from the auction. All the aforementioned challenges and costs to participating in auctions by small-scale farmers may play a role in dissuading owners from participating in auctions.

The pricing of goats was strongly affected by the sex of the animal. Buyers at auctions, both in peri-urban and urban areas favoured buying subadult female goats. At both auctions and homesteads, more value was placed on female goats as opposed to their male counterparts. Mellado et al. (2006) indicated that a high value is placed on female and younger animals because of their reproductive potential. The mean price of all male goats, castrated, uncastrated, old and young was similar at both auctions and homesteads. At the urban area auction in Pietermaritzburg, goats were valued higher than it was the case in the peri-urban auction in Weenen and at homesteads. The higher livestock prices at the Pietermaritzburg auction may have been influenced by the location of the auction being in an urban city. Sales from home can be influenced by a variety of reasons which can be selling to save money or pay debts. Furthermore, other small-scale farmers do not participate in livestock auctions at all which means that home sales are their only option for selling their livestock. Only 3 small-scale farmers from the 27 homesteads indicated that they have participated in an auction to sell their animals.

Higher preference and value were placed on light-coloured goats by the buyers than it was the case for dark-coloured goats. Light-coloured goats fetched a greater price than the solely black goats and those that were dark owing to the presence of black shades in their colour. The mean price of light-coloured goats at auctions was R2 601, while dark-coloured goats had a mean price of R2 138. Both the prices were higher than that of the goats that were completely black. A total of 4 (3.3%) black goats were sold from both auctions at a mean price of R1 156. Mahanjana and Cronje (2000) showed that the reason why such high value was placed on light-coloured goats was because of their sacrificial purposes in addition to their breeding purposes. This was the case in both the urban and peri-urban area auctions. Regardless of the

price, light-coloured goats were highly sought after by buyers (despite being expensive) because more light-coloured goats were sold than dark-coloured goats. These findings are similar to that of Mahanjana and Cronje (2000) who found that light-coloured goats were in high demand in livestock markets and fetch higher prices from buyers in the Eastern Cape province of South Africa. Black goats may be purchased by individuals who require them for traditional ceremonies due to their colour. Livestock owners and buyers have perceptions about black goats that cause them to be disfavoured. As a result, few black goats end up being sold and at a lower price. The sex of the black goats that were sold were a subadult female, subadult male, and an adult female. This may suggest that buyers may overlook colour for sex of the animal during auction sales.

3.5 Conclusion

Small-scale farmers in rural areas and peri-urban areas can use their domestic livestock to meet their household needs. Goats thus acted as income generators in the Msinga region of KwaZulu-Natal, South Africa. Goats were sold in homesteads and auctions. However, the income generated from home sales was not very different from the mean price in the peri-urban area but not as much as the income that they can obtain from auctions like the one in urban areas. Auctions in the city resulted in greater animal prices than sales at home and in peri-urban areas. As a result, auctions are another viable avenue to trading livestock in bulk. A conclusion that can be drawn from this study is that small-scale farmers have steady markets in their communities, which may only be influenced negatively by the dry season (affects the quality and health of the animals). However, one or fewer animals are bought at a time and the pricing is low compared to auctions. Auctions offer an opportunity to sell several animals at once. Urban auctions may be a profitable option for rural farmers. Small-scale farmers populating their herds with subadult female and male goats that are light-coloured may boost their animal sales during auctions because they were the ones that were the most in demand. Furthermore, small-scale farmers in rural and peri-urban areas have an economically feasible system of producing livestock like goats that can be further improved. The improvements could be through the provision of infrastructure like animal transportation systems for small-scale farmers. This improvement would then lead to a wider improvement in the livelihood of farmers which can include a constant financial income and a sustainable source of protein. Farmers should be strategic about sales and target market. Sales from homes can take place over an extended time although the number of animals sold is few and price is less.

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Chapter 4

General Conclusions and Recommendations

4.1 General conclusions

Small-scale farming of various forms of livestock has played a role in sustaining the livelihoods of many disadvantaged families. Farming of livestock at a small-scale to boost family income is more common in developing countries and has been practiced for a relatively long period of time. Limited unemployment opportunities may increase the importance of small-scale farming practices in developing countries. Small-scale farmers in developing countries often turn to small livestock to boost household income. Goats are a popular choice for small-scale farmers, especially those in arid to semi-arid rural, and peri-urban areas because of the prevalence of droughts in these areas. Goats are resilient and can survive adverse conditions (e.g. extreme colds and heat) while being able to reproduce and requiring little to no financial injection from the farmers. Livestock play a vital role in mitigating the effects of unemployment by providing an alternate source of income. In a developing country such as South Africa, there is high reliance on livestock as a means of food and cash. Small-scale farmers achieve food and income from goats through slaughtering for household consumption and selling either from their own homesteads or participating in livestock trading markets like auctions.

This study investigated the contribution of small-scale goat farming to household food security in rural and peri-urban areas and to determine the role of auctions and homestead-based sales in facilitating the trading of goats by small-scale farmers in KwaZulu-Natal Province, South Africa. I found that goats are important to households in both rural and peri-urban areas, which may be food insecure. Goats offered disadvantaged families with an alternative income source through sales. I also found that small-scale farmers in peri-urban areas had greater opportunities to participate in livestock trading markets owing to their proximity to urban areas. Additionally, I found that many households also keep other forms of livestock (e.g. sheep, chicken and pigs) to increase income as well as for consumption to increase the protein intake of their families. I also found that other activities such as crop production contributed substantially towards improving livelihoods for small-scale farmers.

The results obtained from the study showed that goats play a significant role in alleviating hunger for many households and may contribute to food security in many rural families in KwaZulu-Natal. Goats achieved this by being a source of cash and meat for consumption for families. However, there was under-utilisation of other protein sources such as milk, which all the families indicated that they do not use. A large part of the community in Msinga, Parkies farm and Mpophomeni seemed to be against the idea of obtaining and

using milk from goats but rather bought it from the shops. My results further indicated that small-scale farmers participate in livestock auctions while also privately selling their goats from their homesteads. I found that auctions offered small-scale farmers an opportunity to sell their livestock in bulk and at a price that is higher than they normally obtain from homestead sales. However, there were numerous challenges that prevented small-scale farmers in participating in auctions and the main one was the distance from their homesteads to the auction sites, which are often located in peri-urban and urban areas. Subsequently, these challenges led to more livestock being sold directly to buyers from homesteads when the sellers incurred no transportation costs. Furthermore, results showed that animal traits are an important aspect to consider if small-scale farmers are planning to participate in auctions. The price of goats at auctions was affected by traits such as colour, sex and age of the animal being sold. Therefore, small-scale farmers needed to have young light coloured female goats when they plan to participate in livestock auctions. This is because young and light-coloured goats fetched more at auctions and were in greater demand from buyers who were willing to pay high prices for them compared to dark-coloured goats. Goats that were completely black-coloured were not in high demand, which highlights that small-scale farmers need not populate their herds with a lot of them if they plan to participate in auctions.

Goat farming appeared to be a feasible approach to improving the livelihoods of resource constrained communities such as Msinga, Mpophomeni and Parkies farm. These communities are faced with challenges of limited water for rain-fed crop production in Msinga and the lack of employment opportunities in Mpophomeni and Parkies. I conclude that small-scale farming of goats and sales whether from auctions or homesteads plays a significant role in contributing to food security of most households and can meet other household requirements using proceeds from goat sales. Furthermore, government policies aiming to improve livelihoods in rural and peri-urban can be linked to activities that are already in motion such as livestock farming and trading by small-scale farmers in rural and peri-urban areas.

4.2 Limitation of the study

It would have been more descriptive if explicit information was collected on expenditure to highlight how income is distributed within the household (e.g. how much is spent on food, electricity or school fees).

4.3 Recommendations

1) I would recommend for future research the quantification of how much money is spent on the well-being of goats through disease control and supplemental feeds to compare with the amount of money they make in return for their owners.

2) The collection of more data on auction sales that would occur in different settings in order to provide a more detailed contrast on the differences between auctions that take place in different locations.
3) Homestead sales would sometimes include animal exchanges. More information on how these decisions are taken could be collected and what qualifies one animal to be traded for the other especially if it is the same kind of animal. It would also be interesting how pricing of goats affects an exchange that involves bigger livestock like cows and how many goats would be required for that trade.
4) Exploration of other forms of obtaining proteinaceous food such as hunting and fishing could be explored, especially in Msinga. These could be implemented in questionnaires.