University of the Western Cape

Department of Economics

Determinants of output prices formation in local sheep markets – the case of Amathole and Joe Xabi (Ukhahlamba), Eastern Cape

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DECLARATION

I hereby declare that this thesis is my original work, and has not been submitted in part or in its entirety for degree purposes to any other university. All the work that was written by other authors and used in the thesis is fully acknowledged.

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Abstract

Small-scale sheep farmers participate actively in both formal and informal output markets. Formal sheep and wool markets are commonly perceived to function as perfectly free markets. The forces of supply and demand set market prices and all market players are presumed to be price takers. Market information, specifically price information, is freely and readily available. Moreover, buyers and sellers enter and exit the markets without facing onerous obstacles. However, these textbook assumptions rarely if ever hold in real-life local agricultural markets, particularly from the perspective of small-scale farmers. Average sheep prices for small-scale farming households can deviate substantially from prevailing market prices, even if product quality is not lower.

This study identifies the determinants of sheep prices for small-scale sheep farming households in two districts of the Eastern Cape, namely Amathole and Ukhahlamba (Joe Xabe). Output prices that small farm households receive for their sheep affect their incomes from agriculture (knowing that revenue is a product of quantity and price), which, in turn, influence their living standards. The study isolates three sets of determinants of price formation in local agricultural markets - structural drivers, institutional factors and livelihood shocks - to account for the variations in prices that smallholder farmers receive. Data were collected from 134 households that were selected using purpose sampling and preceded by key informant and focus groups interviews with actors along the sheep value chain. A questionnaire consisting of both open-ended and quantitative questions was used. The relationship between output price formation and clusters of determinants is a typical hedonic pricing framework, which is fitted using a backward stepwise econometric technique that is a widely used experimental tool to identify significant determinants.

Estimating the model at both the 5% and 10% levels of significance revealed expected results: structural and institutional factors were identified as price determinants. The variables found significant at the 5% level include: average goat price per household, wool yield per sheep, share of sheep in total livestock held by a household and the purpose of rearing sheep. These findings suggest that an adjustment in each one of the significant variables can significantly influence the average price per household.

In view of the research findings, several policy proposals are suggested. Policy interventions to address the structural and institutional barriers include: create and develop more meat markets for small-scale sheep farmers to sell their sheep and thus reduce losses; and promote the following: pro-poor government support policies in the rural areas; institutional policies aimed at addressing resource management in communes; cooperative wool marketing and sheep meat marketing; better prices in agro-output markets for resource-poor farmers to improve the well-being of rural smallholder farmers.

Key words:
price formation, structural drivers, institutional factors, livelihood shocks, local agricultural markets, smallholder farmers, purposive sampling, hedonic pricing framework, pro-poor, Eastern Cape

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Chapter 1: Introduction

1.1 Introduction

The Eastern Cape has a substantial rural population (60% of its 6.6 million population) and provincial levels of human well-being (poverty, inequality and unemployment) are worse than the national average (BMR 2008). Its headcount poverty rate in 2007 stood at roughly 62% of the population, and recent statistics suggest that inequality, based on the Gini coefficient, has increased from 0.65 in 2000 to 0.67 in 2007. Years of economic expansion preceding the economic downturn in 2008 did not substantially redistribute wealth for sustainable improvements in living standards among the rural poor (Khosa 2002), reopening debates about options for sustainable and appropriate rural development. One of these strategies, for instance, turns on prospects for pro-poor smallholder farmer development strategies and the potential role of agricultural output markets to boost rural development.

Small-scale farming has emerged as crucial livelihood activity for the rural population and some smallholder farmers are producing for the market. This implies that farming can be a potential passage out of poverty for these smallholder farmers. More than half a million farmers had land, ranging in size from 1 to 1.25 ha, in 2008 (GHS 2009).

However, the province still lacks agricultural-led development focused on the support of resource-poor smallholders. Despite an increase in budget allocations for agriculture in South Africa over recent years, the Eastern Cape is still lagging behind the national average. In particular, the share of the budget to support smallholder farmers has not

improved. Yet as Jari and Fraser (2009) suggested, a supportive institutional environment is important if these smallholder farmers are to survive in the markets.

The purpose of this study was to explore the potential of smallholder sheep farming in a broader agricultural-led development strategy in the Eastern Cape. More specifically, it identifies factors that contribute to the average livestock prices that small-scale farm households receive in the local markets of Amathole and Ukhahlamba [Joe Xabi] and the contribution of income from sheep sales to their livelihoods.

Theoretically, the standard neo-classical model of price formation states that market price is the outcome of unimpeded interaction of the forces of supply and demand (Mankiw *et al* 2006; Parkin and Bade 2003). This is based on a number of assumptions, namely many individual small buyers and sellers, homogenous products, information that is perfect and no government intervention (Hirshleifer, Glazer and Hirshleifer 2005).

The assumption of perfect knowledge implies that information is publicly available so that market players can acquire it at no cost (frictionless markets). On the other hand, new institutional and global value chain theorists argue that market information is acquired at a cost. Menard and Shirley (2005), for instance, show that humans incur transaction costs in the process of attaining information in the form of search cost, monitoring cost or cost of information. Market information becomes imperfect in that well-informed market actors are those who have the means to afford information costs. In this case, the market is bound to have some players with the power to set the price.

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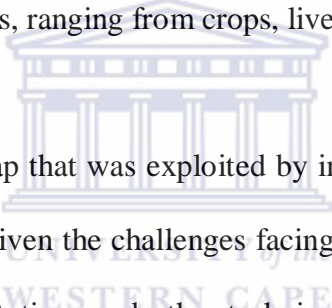
According to Lines (2008), a price is formed through actual or implicit negotiations between market actors. Turner and Williams (2002) suggest that the determinants of livestock prices in local markets include the typical livestock characteristics, but also factors embodied in the social characteristics of the sellers and/or buyers, institutional factors and external shocks. A number of empirical studies show that observed prices for commodities revel contribution from other factors like buyer and seller attributes (Ayele *et al* 2006). Teklewold *et al* (2009) classify price determinants (independent variables) into qualitative (livestock characteristics) and quantitative (buyer and seller characteristics) and with implicit prices as the dependent variable, to employ a hedonic price regression model. Timmer (2009) uses the supply side and demand side classification of price determinants to analyse the determinants of price formation.
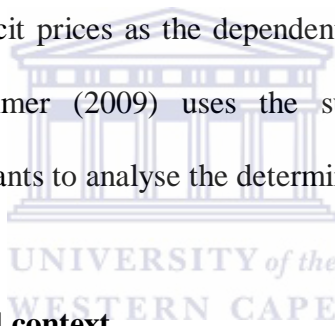
1.2 Research background and context

Prior to the 1980s, the governments of most African countries, particularly the Sub-Saharan countries, used to play a major role in the agricultural markets. In South Africa, under the Marketing Act of 1968, boards were in place to control the marketing of agricultural products. Under this Act, farming groups like smallholder farmers were excluded from participating in the markets. On the other hand, the large commercial farmers benefited greatly from these boards (Kherallah & Kirsten 2001). However, with trade liberalisation becoming a reality, a shift toward an open market-led marketing system was envisaged (Dorward *et al* 2005).

In South Africa, the agricultural marketing system has gone through profound changes (Kherallah & Kirsten 2001, Baiphethi & Jacobs 2009). These have resulted in a significant reduction in government control over the output of agricultural markets. As a way to correct the inequalities created by the Act of 1968, the 1996 Marketing of Agricultural Products Act marked the end of the marketing boards. This subsequently reduced government intervention in the marketing of agricultural products. In other words, the new Act gave resource-poor farmers access to the markets. Presently, there is a great deal of evidence to support the direct participation of smallholder farmers in the agricultural markets (Perret 2002). In that regard, smallholder farmers are directly selling a variety of agricultural products, ranging from crops, livestock and livestock products.

The removal of boards left a gap that was exploited by informal traders, middlemen and agents (Dorward *et al* 2005). Given the challenges facing resource-poor farmers, such as poor road networks, weak institutions and other technical factors, the anticipated results do not materialise (Jari and Fraser 2009). With no state intervention, smallholder farmer survival in these markets becomes questionable under a market-led system. In this situation, smallholder farmers, because of their economically disadvantaged position relative to their large commercial farmer counterparts, are exposed to opportunistic behaviour, leading to loss of income. According to Makhura (2001), some private traders purchase from smallholder farmers, but offer these farmers very low prices.

1.3 Research problem and questions

Small-scale sheep farmers participate actively in both formal and informal markets for sheep and wool. These markets are commonly perceived to function as perfectly

competitive markets. The forces of supply and demand set market prices, and all market players are presumed to be price takers. Market information, specifically price information, is freely and readily available. Moreover, buyers and sellers enter and exit the markets without onerous obstacles. Other assumptions are homogeneity in the products, no collusion and no government intervention in the markets.

However, these textbook assumptions rarely, if ever, hold in real-life local agricultural markets, particularly from the perspective of small-scale farmers. Livestock prices transacted by smaller farmers diverge substantially from prevailing market prices, even in cases where their livestock quality is not lower. Potential determinants of local sheep price differentials are: access to price information, market power of role players (structural imperfections) and precarious livelihoods, which push smaller sheep farmers into distress sales. This paper investigates these determinants in an attempt to improve the economic returns for these smallholder farmers. In other words, the availability of information on these issues could help policymakers to formulate policies that can increase farm-gate prices to being closer to market prices.

This study attempts to answer the following main research questions:

- What are the main factors determining the average price of sheep for households in Eastern Cape Province (Amathole and Ukhahlamba districts)?
- How and to what extent do these factors affect the formation of sheep prices for smallholder farmers in the Amathole and Ukhahlamba districts?

- What policy measures can be employed to improve smallholder farmer income from livestock sales?

1.4 Research Objectives

The main objective of this study was to identify and assess factors that contribute to the average sheep price per smallholder in the municipal districts of Amathole and Ukhahlamba in the Eastern Cape. The prices that small farm households receive in local sheep markets play a crucial role in shaping the well-being of these households through direct and imputed incomes from farming. This easily be derived from the basic accounting identity, which states that revenue is the product of price and quantity.
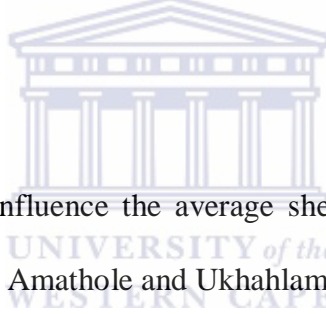
Specific objectives

- To identify factors that influence the average sheep prices for small-scale sheep farming households in the Amathole and Ukhahlamba districts.
- To determine how and to what extent these factors influence average sheep prices per household
- To make recommendations that can be useful for policy formulation and the implementation of agricultural development support programmes.

1.5 Research methodology

In the pre-survey phase, interviews with key informants and focus groups made up of farmers and actors along the sheep value chain were carried out. The main aim was to develop a survey instrument (questionnaire). A questionnaire consisting of both open-ended and closed-ended questions was then used to carry out the survey. A technique known as purposive sampling was used to select the sample.

The collected data was entered into Stata vision 10 for analysis. A backward stepwise regression technique was used to formulate the model. This is a technique where all the variables of concern, based on the theory, are entered into the model and the software eliminates all variables that are not significant. The hedonic price regression model, ordinary least squares, was used to analyse the data.

1.6 Hypotheses

The hypothesis states that structural, institutional determinants and livelihood shocks exert varying influences on output prices for resource-poor small farmers, which in turn affect rural livelihood strategies and living standards. In other words, average sheep prices per smallholder farming household in the Eastern Cape can be determined by factors classified under structural (socio-economic) and institutional factors and exogenous shocks. Thus, where structural and institutional environments are unsupportive of level marketing ground, smallholder farming household are more likely to get lower prices for their livestock. Prices can be affected by factors such as a lack of market price information, distress sales and the buyer's market power in the local agricultural markets. Factors included in the structural environment are deeply embedded socio-economic forces that dictate the development of markets over fairly long periods, such as human settlement (size of demand), infrastructure, age, gender and wealth status.

1.7 Significance of the study

The paper shall include a critical overview that shows that the perfect market situation does not apply in the local markets. It shall review why and how imperfect agricultural

output markets work against the flow of economic returns towards small-scale farmers. Empirical evidence shall be provided to show the determinants of price formation and how these affect the average sheep prices for particular farming households. This kind of information is critical for the farmers because it gives them a different view of the source of their problem. In this case, we seek to show that the problem is partially caused by factors within their socio-economic arena. A solution can be acquired by adopting the conclusion drawn from the theory developed in this paper. For the policy makers, such information will help in addressing issues pertaining to welfare distribution, as is required to fulfil the well-being of small-scale farming households.

1.8 Limitations

There is need to analyse the long-term factors/determinants of price formation, which can be a topic for further study. Furthermore, a bigger sample size and wider study area is required to allow for geographical and seasonal variations. Most importantly, there is a need to study the qualitative aspects of animals (e.g. size, quality, age), because these determine the success of smallholder farmers in penetrating more formal markets.

1.9 Delimitations

This paper only covers the issue of determinants of price formation in local markets in order to improve the economic returns for small-scale sheep farmers for the two identified case study areas. Since this study makes use of cross-sectional data, it does not cover the determinants of price formation over a period of time. Also, since information

on the quality of livestock was not available, structural determinants of prices associated with the quality of animals are not included in this study.

1.10 Outline of study

The study comprises seven chapters. The second chapter discusses the conceptual framework for the determinants of output prices in local agricultural/livestock markets. The third chapter gives an overview of sheep farming: a global and South African perspective. The study area is described in chapter four, which includes economic development pathways, driving factors and agricultural support. In the fifth chapter, the methodology is presented and the sampling and data collection procedures are discussed. Furthermore, this chapter presents the model for data analysis. In chapter six the research findings and discussion are presented, with the first part in the chapter presenting and discussing the descriptive results, while the second part gives our original empirical results. Finally, chapter seven presents the conclusion.

Chapter 2: Determinants of Output Prices in Local Agricultural/Livestock Markets – a Conceptual Framework

2.1 Introduction

This chapter develops a conceptual framework to understand how prices are formed in local markets for small livestock. Economists commonly hypothesise that market prices are determined by market forces – which means a random list of demand-and-supply factors. What this implies is that market prices convey information about conditions in markets and it is crucial to understand the determinants of price formation, because they can shed light on how output markets operate. This study seeks to better understand how observed transacting prices are formed in localised rural sheep markets. Two specific dimensions are discussed: Why are these prices important to small-scale farmers? What is the underlying logic of each determinant according to different schools of thinking in economics?
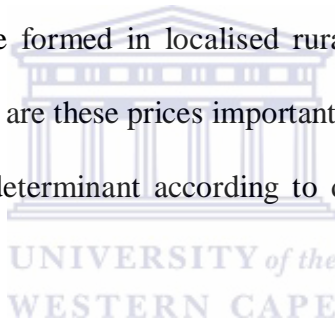
2.2 Price formation and small-scale farmers

The dominant feature of the modern agricultural sector in developing countries is that it is based on the monetary exchange of goods and services rather than on barter. Agricultural outputs, labour and other services are exchanged for money, which has evidently displaced virtually all in-kind transactions (Bailey *et al* 1999; Pingali 2007). This implies that the monetary value of farm outputs, or simply market prices, plays a fundamental role in the well-being of rural buyers and sellers linked to agricultural markets. In other words, market prices affect the incomes and expenditures of market participants, which ultimately manifests in their individual or household well-being.
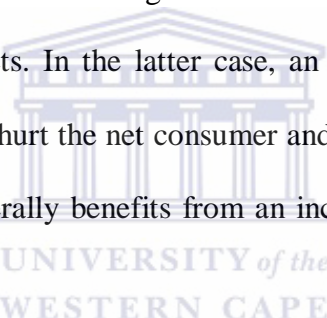
Surplus-producing small-scale farmers usually rely on farm output sales to generate income (Fafchamps and Gavian 1995; Jari and Fraser 2009). Fluctuations in output prices thus affect their incomes (sales revenue) through the basic accounting identity that revenue is a product of price and quantity.

The evaluation of the contribution of income from livestock to a household gives rise to complex issues of measurement and imputation. In the rural areas of most African countries, livestock is primarily considered a productive asset (Fafchamps 2004). Livestock can be used to produce food and non-food products, for example wool, milk, calves, meat, manure, and traction power (FAO 2009). Firstly, these livestock products can either be sold or consumed, but there is a need to capture the value of the livestock consumed. The second issue is the change in stock (purchase and sales) and herd growth (reproduction and maturation). While sale of livestock can provide immediate income for the household to spend, it is also regarded as disinvestment, because livestock are an asset. On the other hand, purchases of livestock represent the primary means of investment for most poor rural households, especially in contexts where credit markets are imperfect and systematically discriminate against borrowers with inadequate collateral. Rural households thus keep livestock as a store of wealth, which can be used as insurance against bad times (Fafchamps and Gavian 1995).

Both purchases and sales of livestock are decisions on how to spend incomes. Herd growth (reproduction and maturation), for instance, is simply perceived as income. However, measuring herd growth is very complex, for instance the value of the livestock that presently are in the possession of a household (not sold/died) has to be imputed. Livestock price plays a crucial role in this process. That is, an average price is assigned to

fully grown/adult livestock, while young livestock are assigned half the price. This same calculation can be employed for livestock consumed or donated (Adams 1996).

Agricultural output prices in general form a fundamental element in studies of agricultural production and consumption. They form the basis of how markets work and arise in a large number of contexts. For example, consider how food price changes affect rural household well-being: it depends on whether the rural household is a net producer (smallholder with a marketable surplus) or a net consumer. A household is said to be a net producer if the gross farm income exceeds expenditure on farm products (Goetz 1992). On the other hand, a net consuming farm household has farm income less than what it spends on farm products. In the latter case, an uncompensated increase in the agro-food output price tends to hurt the net consumer and could reduce its welfare. A net producing farm household generally benefits from an increase in the price of its output, *ceteris paribus* (Timmer 2009).

Resource-poor farm households in developing countries have to deal with large income fluctuations without being able to rely on formal insurance or credit markets, as they lack security (Hoogeveen 2002). Income from sales of agricultural commodities can assist these farmers with smoothing consumption over time when exposed to unpredictable livelihood shocks.

Small-scale farmers also employ labourers (farm workers) to assist the family labour. Demand for labour is derived from the goods markets (Mohr and Fourie 2008). This implies that the demand for labour is based on the market performance of the respective product, and this includes the price it fetches. Therefore, agricultural output prices play a

crucial role in that they provide the employers of farm labour with incomes to remunerate the workers. To the extent that output market prices signal the prevailing market conditions and revenue prospects to farmers, they act as critical determinants of farmers' 'supply response' (Aadland and Bailey 2001; Mankiw *et al* 2006).

2.3 The underlying logic of each determinant according to different schools of thinking in economics

The standard neo-classical model of price formation states that the forces of supply and demand determine market prices (Mankiw *et al* 2006; Parkin and Bade 2003). Key assumptions of this model include the following: many individual small buyers and sellers, homogenous products, information is perfect and there is no government intervention (Hirshleifer *et al* 2005).
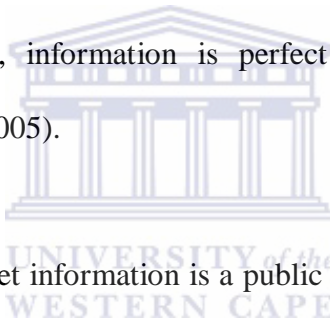
In the neo-classical view, market information is a public good that is equally available to all market players at no cost (frictionless markets)[1]. But the realism of the perfect market information assumption has been questioned. Market information, especially about price, is acquired at a cost (e.g. search cost, time), as recent literature on asymmetric information, new institutional economists and global value chains underscore. Menard and Shirley (2005), for example, show that humans incur transaction costs in the process of attaining information, in the form of search, monitoring cost or cost of information. Well-informed market players who are able to afford the cost of market information might be able to exploit their superior knowledge to influence the market price. This

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[1] Information about the price of a good plays a vital role in the process of price formation (Hirshleifer *et al*, 2005). This can be traced back to the seminal work of Stigler (1961).

leaves poorly informed actors in the same market at a disadvantage, implying that costly market information could drive market imperfections.

The argument above implies a breakdown in the perfect markets encountered in textbooks. As Stigliz (1997) puts it, "When information is imperfect – markets will essentially always be imperfectly competitive". Under imperfect market conditions, opportunistic behaviour is a common phenomenon, as the well-informed players tend to use the information at hand to their advantage. Global value chain (GVC) theorists concur that even when prices change in so-called 'perfect' markets there are some market players with sufficient power to influence market outcomes (Gereffi, Humphrey, and Sturgeon 2005; Coe, Dicken and Hess 2008)

As Lines (2008) argues that price is formed through actual or implicit negotiations between market actors. It is an outcome of the complex interplay of economic interests and negotiating strengths – relative market power – of suppliers and buyers. Factors mentioned by Coase that drive market participants to settle for a particular price need to be taken into consideration[2]. In real-world markets, unobservable social relations and exogenous shocks help to determine market prices. After all, buyers and sellers are far from passive market players, but astute activists set on withstanding the pressures of tough competition. Institutional and socio-cultural factors affect how prices are formed in decentralised livestock markets (Turner and Williams 2002), for example, although these might be invisible to the casual observer of market transactions. Turner and Williams

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[2] Market participants are influenced by market power and cost (Coase 2000).

(2002) suggest that the determinants of livestock prices in local markets include the typical livestock characteristics, but also factors embodied in the social characteristics of the sellers and/or buyers, institutional factors and external shocks.

The crucial process and factors that determine the observed output prices per transaction seem to be bypassed or ignored. Hence the meaning of price formation from the neo-classical view deviates from the other schools of thought, such as the new institutional economists. This deviation of prices in agricultural output markets from neo-classical scenarios and perspectives requires more nuanced thinking about how prices are formed (their determinants) for more realistic marketing and pricing policies. Erratic and unpredictable agricultural prices, particularly from the standpoint of smallholder farmers, translate into enormous uncertain fluctuations in real agricultural incomes (Garcia 1991). This issue goes to the heart of addressing the fundamental challenges that confront rural areas in most developing countries: rural poverty and inequality (Valentinov and Baum 2008). Hence, there is a need for closer investigation of how prices are formed and determined in context-specific rural markets. The following section further investigates the economic logic that underpins the determinants of transacting prices in local agricultural output markets.

2.4 Price determinants and Price formation

The determinants covered in this paper fall into three sets of factors: (i) structural, (ii) institutional and (iii) exogenous shocks. This classification enables us to highlight the varied nature of output price determinants. Structural factors incorporate deeply embedded socio-economic forces that dictate the development of markets over fairly long

periods – such as human settlement (size of demand) and social infrastructure that need huge investment and time to construct. Institutional factors cover both arrangements to capture power relations among market actors and policy reforms that set the 'rules of market exchanges'. To make our conceptual framework even more realistic and insightful, we include exogenous shocks to track unpredictable events that result in sudden deviations of output prices from longer-term trends. Figure 2.1 below summarises the determinants of price formation.
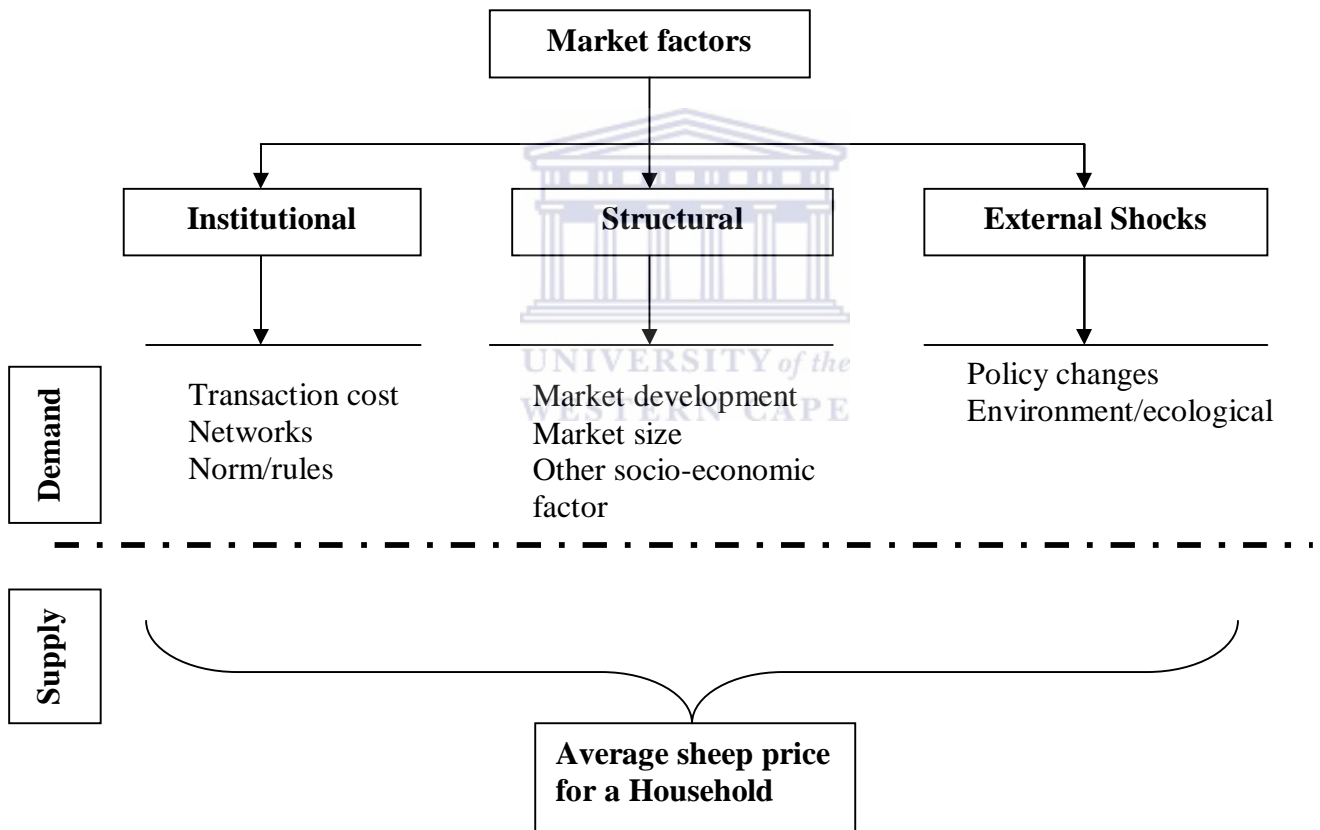
Figure 2.1*: Conceptual framework*

Source: Author's own framework

2.4.1 Structural factors

Under structural factors, the concern turns around three aspects: market development, market size and infrastructural development. Market development basically deals with the existence of markets for small-scale farmers. If markets exist, it is crucial to know how well they function or work – this is often influenced by the institutional forces elaborated on in the next section. The market size refers to the extent and characteristics of potential and actual buyers of the market output on sale.

Evidence shows that small-scale rural farmers participate in different agricultural output markets, ranging from formal to informal (Jari and Fraser 2009). This implies that there are output markets for smallholder farmers. Certainly, there are problems that can cause these local agricultural output markets to be poorly developed and not function properly. According to Dorward *et al* (2005), the most important physical infrastructural weaknesses for the livestock marketing system in developing countries relate to transport and storage facilities. De Janvry, Fafchamps and Sadoulet (1991) state that markets do exist in rural areas, but that they tend to selectively fail for particular households. Strictly speaking, markets tend to fail when the cost of exchange creates disutility greater than gains.

The lack of physical infrastructure, such as good quality roads, can influence price formation from the supply side as well as the demand side. In the former, poor roads or communication systems impede the flow of livestock to the formal markets (Ayele *et al* 2006). In other words, with poor infrastructural development it is costly and makes it

difficult for a resource-poor farmer to access profitable markets. On the demand side, poor infrastructure development makes it difficult for distant buyers to reach resource-poor farms (disadvantage for farmers located far from urban areas). In this case, demand might be confined to a local area (e.g. community buyers).

Furthermore, poor communication infrastructure can give rise to imperfect information (asymmetric information) amongst market participants. Well-informed market actors usually possess more market power to set the price when dealing with participant(s) who are not well informed. In this case, a lack of price information, among other factors, can hinder price transmission (Babiker and Mabdalla 2009). This has the effect of preventing smallholders from fully benefiting from an increase in the prices of their products. According to Pica-Ciamarra (2005), imperfection in the markets can result in low-level income equilibrium.
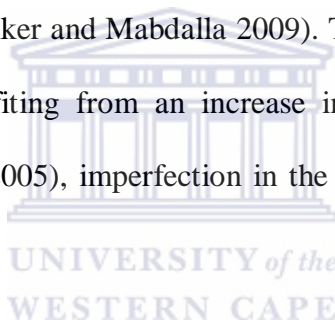
Distance from the nearest town also plays a vital role in the process of price formation. Increasing urbanisation has been associated with increases in the demand for meat (FAO 2009). This implies that the demand for meat is increasingly becoming more concentrated in urban areas. Farms located close to towns are faced with an ever-increasing demand for meat. Hence, the closer a farming household is located to town, the higher the price for its products, *ceteris paribus* (Turner and Williams 2002).

Market size can be explained in terms of the size of demand. In rural areas where road networks are poor, distant buyers find it difficult to reach the areas. This implies limited

demand as, with few buyers, competition amongst buyers is reduced as well. Under such a situation, the basic law of demand states that few buyers (reduced demand) against increased supply creates surplus in the market, hence forcing prices downward, *ceteris paribus* (Mankiw 2006). Moreover, a situation in which there is sole buyer (monopsony) can also arise. This also has the tendency to push prices down, as a monopolist certainly has the power to determine price in the market.

The effect of distance on the supply side operates through the fact that farmers incur sunk costs before the buyers commit funds if they are to access distant markets (towns). However, economic contract theory states that if one party to a contract incurs sunk costs before the other party has committed funds, the tendency is that the latter party can use its position to bargain/renegotiate contractual terms (Scott and Triantis 2005). Generally, the former party is placed in a relatively lower bargaining position. In other words, distance has the effect of transferring market power to the latter party.[3] The high cost of transporting/trekking the livestock back to the farm (i.e. cost of exiting from the contract) can force the farmer to accept the price, even if it is below the reservation price[4]. Thus, it is highly possible that such farmers can get lower prices for their livestock.

Other socio-economic factors include differences is asset endowments among rural households, gender, and livestock-related characteristics. Under asset endowment, some households have access to assets that can broadly be categorised into immovable (land),

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[3] Trekking livestock back to the farm can result in even higher costs to the farmer, specifically when we take into consideration high animal mortality, potential weight loss and stock theft.
[4] Reservation price is the minimum price/least expected price below which the producer/farmer will not be willing to supply/sell any of his livestock or products.

movable (tractor, radios, television), livestock (livestock wealthy), and financial (pension). The better the asset position of household, the wealthier and more stable is the household to resist opportunistic buyers and get better prices for their products. That is, some assets owned can be used to generate additional income so that the farmers who own them are under less pressure to sell their livestock.

According to Bailey *et al* (1999), income from livestock required by the farmers is in the products (e.g. wool), rather than in the sale of the livestock. Therefore, according to Turner and Williams (2002), capital assets are held until the income-generating value falls below the salvage value. This implies that the higher the yield from the producing asset, the harder it is for the household to dispose of it and therefore its price tends to be higher.

2.4.2 *Institutional factors*

Under institutional factors we have the institutional environment and the institutional arrangements, defined as the rules of the game and the play of the game respectively (North 1990). These issues are important because they govern the way people generally behave in a society. Jari and Fraser (2009) concluded that decision making by smallholder farmers can be influenced by institutional factors. Decision making by smallholder farmers includes the decision on whether or not to participate in markets, to participate in formal or informal markets, to accept or reject certain prices, and when and how to sell their products. In this subsection the idea is to show how rules and norms of exchange affect the yields of a smallholder farmer participating in agricultural output

markets. Specifically, we show how institutional factors affect the formation of prices in livestock markets.

In the view of neo-classical economics, perfect markets exist and exchange is effectively costless (Williamson 2000). By contrast, new institutional economics acknowledges that costs, known as transaction costs, are always involved in every transaction (Dorward *et al* 2005; North 1990). A transaction is regarded as the fundamental unit of analysis (D'Haese *et al* 2005), and arranging a transaction requires time and money. According to Jari and Fraser (2009), transaction costs (cost of exchange) and market information flows are institutional factors. Under new institutional economics, market participants accumulate transaction costs in the process of attaining information in the form of search costs, monitoring costs or the cost of information (Menard and Shirley 2005).

Kherallah and Kirsten (2001) state that typical resource-poor farmers in the rural areas of developing countries face problems such as poor/lack of contractual arrangements and a lack of adequate market information. Such factors are associated with high transaction costs. When farmers confront prohibitively high transaction costs, the tendency is either to exit the market or resort to spot markets (Makhura 2001). From the supply side, wealthier farmers might be able to afford additional private information to reduce transaction costs and get better prices. Resource-poor farmers, who might have to resort to the spot market, are likely to fetch very low prices. This is because spot markets are characterised by uncoordinated exchange, players that seek self-interest, limited information sharing, opportunism and short-term relationships (Jordaan and Kirsten 2008).

Coordination is one way of reducing the transaction costs advocated by the new institutional economists, which work from both the demand side and supply side. Two forms of coordination exist: horizontal and vertical (D'Haese *et al* 2005). According to Dorward *et al* (2007), the former refers to a situation where farmers organise themselves into groups (e.g. associations, clubs). Horizontal coordination enables farmers with different levels of information to support and empower each other with market information, thus improving their bargaining power (D'Haese *et al* 2005; Khan 2000). Horizontal coordination works from the supply side.

In the rural areas, the main source of information about price-related issues is through social networks. According to Fafchamps (2004), information is shared amongst members of a group/society through social gatherings/meetings (e.g. cultural ceremonies). Hence, social capital plays a crucial role as a source of information. Weak public information systems and the absence of a credible means to enforce contracts in the spot markets contribute to the importance of informal networks in the local markets. These networks often are defined by ethnicity, clan, or some other social affinity that encourages cooperation. In addition, the networks enable individuals to monitor and build trust effectively amongst members. Other researchers seem to argue that such networks can create barriers to entry for outside/once-off buyers. However, the costs of information and enforcement are substantially reduced for those who are included in the networks (Fafchamps 2004).

Agricultural markets, specifically in rural areas, are subject to the problem of low level equilibrium trap (Poulton 2006). According to Kydd and Dorward (2004), this is a situation that involves low economic activity, thin markets, high transaction costs, risks, and unit cost and market price locked at lower levels. This is mainly because of factors such as a weak institution, in addition to weak infrastructural environment, inhibited market access and development and the high cost of information. Therefore, it is argued that the identified factors can cause lower level equilibrium price trap problem, even if cooperatives are in place. More specifically, this calls for improvements in the institutional environment and institutional arrangements.

According to Dorward *et al* (2005), changes in the institutional arrangement have an impact on the price obtained by the farmer. Such changes can be improvements in markets information to support competitiveness, and government/civil society action to improve communications and property rights (Svensson and Yanagizawa 2009). Neilson (2008) calls for the involvement of third-sector organisations (such as cooperatives and associations), rather than profit- market driven firms, which can result in imperfect markets.[5]

Vertical coordination involves the interlinking of farmers and the buyers of their products (e.g. contract farming). According to Van der Meer (2006), there is a mix of empirical evidence that shows the inclusion or exclusion of small-scale farmers from the coordinated supply chain. Vertical coordination allows farmers to reduce other forms of

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[5] Imperfect market, in this case, refers to situations where some market players have the market power to set the price. Global value chain theory follows such power relationships.

transaction cost, like search costs. Furthermore, the high price risk associated with the marketing of agricultural commodities can be reduced (Birthal, Joshi and Gulati 2005). Some researchers believe that contract farming can expose farmers to exploitation by traders/buyers who may exercise their monopsony power to exploit resource-poor farmers.[6] However, Birthal *et al* (2005) argue that there are mutual gains for parties to such contracts, based on a study in India, where contract farming is still practiced. It is therefore argued that, through vertical integration, farmers are guaranteed the prices for their products, thus reducing the chances of price risks.

Fafchamps (2004) argues that transaction and commodity prices can be affected by trust and social relationship. Trust and relationship help to strengthen the social capital aspect, and thus reduces the need for contracts or the chances of cheating. On the contrary, livestock prices can be suppressed because of the need to maintain social relations or due to the loyalty aspect (Jari and Fraser, 2009). For instance, a farmer is likely to charge a lower price when selling to neighbours or relatives than when dealing with first-time, once-off buyers. Furthermore, local buyers have a tendency to hide their true willingness and ability to pay (Hirshleifer *el al* 2005). Obare, Shiferaw and Muricho (2006) argue that the rural buyers/traders do not pay any premium for superior quality. Yet the importance of price on quality prevails when the rural buyers (traders) sell the same products to larger urban traders or processors (secondary/tertiary market). Here, vertical coordination works from the demand side to have an impact on price formation.

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[6] Three types of opportunism are identified: monopolistic opportunism, specification opportunism, and strategic default (Poulton *et al* 2005)

Lack of land ownership, as in communal areas, poses problems for land management (Dorward *et al* 2007). In most cases, communal areas are faced with the problem of overgrazing. This can put pressure on the farmers to sell their livestock. On the other hand, authorities are forced to put regulations on the size of the livestock herd per household to protect land from overgrazing (Fafchamps and Udry 1998). Such measures can force the farmers in these areas to sell their livestock whenever the required maximum size/limit is exceeded. Again, farmers who are faced with such situations are more likely to be under pressure to sell, which can lead to lower prices for their livestock (supply side factor).

The current situation in agricultural markets tends to favour commercial farmers relative to small-scale farmers. For example, the international health standards requirements tend to exclude smallholder farmers from participating internationally, where they can fetch better prices and thus increase farm income (Minten, Randrianarison and Swinnen 2009). The policy makers are faced with the dilemma of where to provide funding, between improving the smallholder farmers to meet the health standards at farm level or developing certificates to meet the required standards. The perspective here is to reduce the possibility of marginalising small-scale livestock farmers in developing countries who view livestock as a way out of poverty (Hall, Ehui and Delgado 2004).

Power relations on the basis of gender also play a role when livestock prices are determined. The literature has pointed to the superiority of male farmers when it comes to bargaining power in the markets. In some case, women do send representatives to the market (Turner and Williams 2002). This can also influence the price the owner would get for the livestock.

2.4.3 Exogenous factors

Sudden shocks and crises also determine output prices in local rural markets. Droughts, for example, expose uninsured resource-poor farmers to enormous ecological risks and often reduce livestock productivity and quality. Livestock systems in developing countries rely more heavily on extensive grazing than on feedlot operations (Coppock 1994). This implies that animal husbandry is more closely tied to climatic and ecological shocks than industrial livestock systems.

Research documented by Fafchamps and Udry (1998) suggests that farmers tend to build up their stock during the good (wet) periods and reduce the numbers in bad (hot/dry) periods. In the context of natural disasters, farmers resort to rational coping strategies by reducing the size of their livestock herds to avoid losses. This surge in market supply, in theory, should depress commodity prices as uninsured sellers try to rapidly offload their stock to curb their losses, *ceteris paribus* (Mankiw *et al* 2006). When livestock are kept as a store of wealth rather than as income-generating capital, and income comes from animal products (e.g. wool), rather than the sale of the livestock, farmers can be found holding on to their stock as long as prices for livestock products exceed those for livestock (Bailey *et al* 1999). Economic theory states that such capital assets are held until income-generating value falls below the salvage value (Turner and Williams 2002).

This surge in livestock sales in the context of adverse uninsured risks and shocks is called distress sales. Resource-poor farmers who sell livestock only in times of exogenous shocks tend to get a lower price than those who can afford to wait (Fafchamps and

Gavian 1995). It is worth noting that small ruminants (sheep and goats) might be more adaptable and resilient to drier climatic conditions than large livestock (Morris 2009).

Festivities and other event-based shocks, such as Christian or Moslem holidays, also determine local livestock prices (Ayele *et al* 2006). This contributes to the seasonality of local markets, with price spikes during peak sales period, *ceteris paribus*.

There are also supply side factors emanating from the farmer's livelihood or welfare position. The degree of economic distress for the farmer can force the farmer to sell some of the livestock. In this case, smallholder farmers might not be able to bargain for a higher price, especially when facing opportunistic buyers (Lines 2008). Chaudhuri (1996) showed that distress sales flow from indebtedness in the households. Indebted farm households are forced to sell their livestock to repay their debt. Similarly, food price inflation, high dependency ratios and family crises (Dawe and Maltsoglou 2009) could lead to distress sales. Montshwe (2006), for instance, found that small-scale livestock farmers often liquidate their stock to invest in the education of their children and to cover emergencies.

2.5 Model/conceptual framework

The general hypothesis states that the price for any commodity depends on its qualitative aspects (product characteristics), as purchasers tend to evaluate the quality of the product to satisfy their utility. A number of empirical studies show that the observed prices for commodities relieve contribution from other factors, such as buyer and seller attributes (Ayele *et al* 2006). Teklewold *et al* (2009) classify price determinants (independent variables) into qualitative (livestock characteristics) and quantitative (buyer and seller

characteristics), with implicit prices as the dependent variable, to employ a hedonic price regression model. Timmer (2009) uses the supply side and demand side classification of price determinants to analyse determinants of price formation.

This study combines the two approaches in the classification of price formation determinants. Thus, the price formation determinants are classified as structural, institutional and exogenous (shock). This type of classification captures the qualitative and quantitative factors from both the demand and the supply side. Furthermore, this approach/classification can give policy makers the ability to identify/recognise the factors that can be controlled and those that cannot, leading to the formulation of more effective policies.

The basic assumption is that farmers are engaging in the selling of the full grown sheep from which the average price of sheep is derived. Therefore, the visible physical features of the sheep/animal do not matter much, and we rather focus on the other, unobservable factors that play a role in the formation of that price.

The general functional form is:

$$P_i = X_i\beta + \varepsilon_i \quad \text{..} \quad (1)$$

i = 1, 2…………N

where P_i is the average sheep price per household, X_i is made up of a range of factors that play a role in the formation of the average price per household, β is the array of the parameters to be estimated (parameters indicating their effect on the observed average

prices of sheep per household) + ε$_i$ is a residual. Therefore, the mathematical expression of the relationship between the dependent variable and the independent variables can be presented as follows:

$$linP_i = \alpha + \sum \beta_{si}X_{si} + \sum \beta_{ki}X_{ki} + \sum \beta_{zi}X_{zi} + \sum \beta_{li}d_{li} + \varepsilon_i \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(2)$$

lnPi – log of average price of sheep for household iX$_s$ – explanatory structural (demand-supply side) variables without any transformations

X$_{ki}$ – explanatory institutional (demand-supply side) variables without any transformations

X$_{zi}$ – explanatory exogenous (demand-supply side) variables without any transformations

dli – dummy variables

β$_{si}$; β$_{ki}$ & β$_{zi}$ – parameters that, after multiplying by 100%, indicate how much in percentage points the average price of a product for a household i will increase if we increase the amount of the characteristic by one unit,
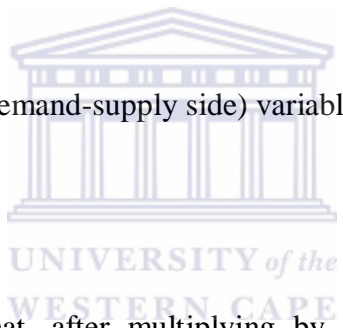
2.6 Conclusion

This chapter has developed a theoretical framework that isolates three sets of determinants of price formation in the local livestock output markets in which resource-poor farmers sell. It has been demonstrated that the prices of agricultural outputs are important to small-scale farmers because they affect the well-being of rural households through income and expenditure components. As rural farm households rely on monetary exchange rather than barter trade, income from livestock sales becomes very important
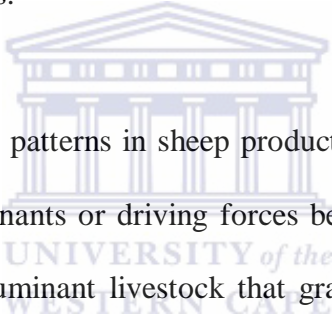
for the well-being of resource-poor farmers. Farm incomes (and by extension the determinants of prices) enable these households to smooth consumption, remunerate workers, invest in the education of their children and cover a host of other household expenses. This implies that agricultural output price in general is a crucial component in shaping the well-being of rural dwellers.

Factors that influence price formation in output markets have been categorised into three groups: structural, institutional and exogenous factors. Each set of price determinants could arise from both the demand and supply sides of the market. Structural factors include factors such as market development, demand size and other characteristics of the market participants. Generally, these factors dictate the long-run development of output markets. Institutional factors include rules that govern market exchange (transactions) and cover the power relations amongst market actors, and the policy reforms that set the rules of exchange. Exogenous shocks capture the unpredictable events (e.g. natural disasters) that might cause deviations in the output prices over time. Usually these unpredictable fluctuations are difficult to influence through policy changes.

Chapter 3: Sheep farming: Global and South African perspective

3.1 Introduction

The purpose of this chapter is to place small-scale sheep farming in the Eastern Cape province into a larger South African and international context. We want to show where small, resource-poor sheep farmers fit into the broader and complex sheep value chain, and compare sheep production, income and marketing strategies and opportunities to relevant global and national evidence. There is a widespread perception that small-scale sheep farmers, where they do partake in sheep output markets, tend to sell in local informal meat and wool markets.

This chapter demarcates salient patterns in sheep production and trade on a global scale and sheds light on key determinants or driving forces behind these patterns. Sheep and goats form part of the small ruminant livestock that graze on natural shrub vegetation common to arid agro-ecological zones.

Livestock such as sheep contribute to the livelihood of smallholder farmers by generating income sales. However, such income is affected by the prices the farmers receive as a result of certain factors identified and discussed in Chapter 2. The aim of this chapter is to present/explore information about the sheep. This is important because it gives more insight about the characteristics (e.g. value/importance, market performance, etc.) of the product (sheep) from a global and South African perspective. The section therefore begins with an overview of the global sheep value chain, where sheep are compared to other livestock in terms of production and export, market demand and imports. Then a

South African sheep value chain is presented, including production and exports, and market demand and imports.

3.2 Global sheep value chain

This subsection gives the global picture of the sheep and wool value chain, focusing on production and exports, and market demand and imports. Trends in these aspects are presented and possible explanations are provided.

3.2.1 Production and exports

Before examining recent trends in sheep production and trade (in domestic and external markets), some historical background on sheep farming might be insightful. Historically, the domestication of sheep can be traced back to 9000 BC in areas known today as Iran and Iraq (Zygoyiannis 2006). According to Aitken (2007), sheep domestication originated from south-west Asia and then spread to areas such as Europe, Asia and Africa. The natural social structures were based on social hierarchy, with a dominant leader (Aitken 2007). According to Chessa *et al* (2009), sheep and goats were the first livestock to be domesticated in areas around Southwest Asia – initially mainly for meat. Later, wool as the main derived product from sheep came into practice to satisfy the needs for warmer clothing and this expanded the rearing of wool breeds (Zygoyiannis 2006). In the Middle East, sheep had gained popularity as a source of cooking fat.

At present, over 650 breeds of sheep exist around the world, kept for various purposes including meat, wool and milk. Of all the global breeds, about 35 to 40% comprise the

Merino and British breeds that were introduced to South America, Australia, New Zealand and South Africa (Zygoyiannis 2006).

The vast majority of sheep around the world are managed under extensive grazing conditions, either for subsistence or commercial purpose. Of over 650 sheep breeds across the world, only a few (10% to 25%) are exploited for commercial purposes (sheep meat, wool and milk). The rest are local, indigenous breeds characterised by their ability to adapt to the respective climatic conditions (Morris 2009).

Over the last four decades, the geographic distribution of major sheep farming regions has changed, marked by two key turning points in the late 1960s and early 1990s respectively. Even though the largest sheep population was in Europe by the early 1960s, with the smallest being in Africa, a major transition could be observed in the 1960s/1970s. From the mid-1960s onwards, Asia experienced a remarkable rise in its sheep population, displacing Europe as the leading sheep farming location. By the early 1970s, Asia had increasingly higher numbers of sheep, while sheep numbers were decreasing in Europe. The Asian sheep population trend could have been the result of an increase in sheep numbers in India, Pakistan and Turkey. In these countries, rising sheep meat prices as a result of increasing demand for meat by the urban population could have been the driver. In Europe, the general policy in the region was aimed at increasing meat output, but the lower priority given to sheep meat could be linked to the decreasing population. Furthermore, bad climatic conditions are said to have continuously limited sheep numbers (Blyth 1981).

During the same period (1960s/1970s), the sheep population in Africa increased slightly, while sheep numbers fell dramatically in the Americas. The latter could have been the result of a decline in sheep numbers in North America. According to Blyth (1981), sheep populations have been on the decline since 1946 due to factors such as reduced breeding flocks in open range and mountainous regions, combined with rising input costs, the availability of profitable alternatives (cereal, beef, etc.), and losses as a result of predators. Furthermore, in South America (e.g. Argentina), the main producers of sheep experienced a decline in sheep populations at about the same time. This decline was driven by many factors, including political instability and economic uncertainty in the region. For Africa the increase in these early days could be as a result of improvements in counting methods. Even though sheep numbers in Asia decreased slightly around the mid-1980s while increasing in Europe, those in Asia remained with highest. At this time, sheep export prices for all the regions took a downward trend, but for Europe the decline was relatively less (FAO 2009).

The early 1990s marked the second turning point, when sheep numbers in Asia increase sharply, while there was a sharp decrease in Europe. The growing demand for meat in countries like China could be linked to the increase in Asia. New policies and production method were implemented to increase meat for the growing urban demand. Furthermore, according to Heilig (1993), there had been an increase in permanent pasture land in the Asian countries. In the European region the decline in the sheep population could be a result of human population pressure on land, hence a decline in pasture land (FAO 1993). Changing land use in areas of Europe, with more intensive use of land, has put pressure

on rangelands. Evidence from FAO statistics shows that the numbers of all livestock declined in Europe in this period.

In the early 1990s, the African sheep population trend got steeper, meaning sheep numbers began to increase at a faster rate. This could be explained by the increasing grazing area (Heilig 1993). However, sheep numbers in the Americas continued to decline even more in the early 1990s. This could have been driven by the shift to beef, as it is evident from FAO statistics that there was a trade-off between beef and other livestock. The point is that the sheep population in Europe and the Americas has been on a declining trend, while the trend has been a gradual increase in Africa and Asia.
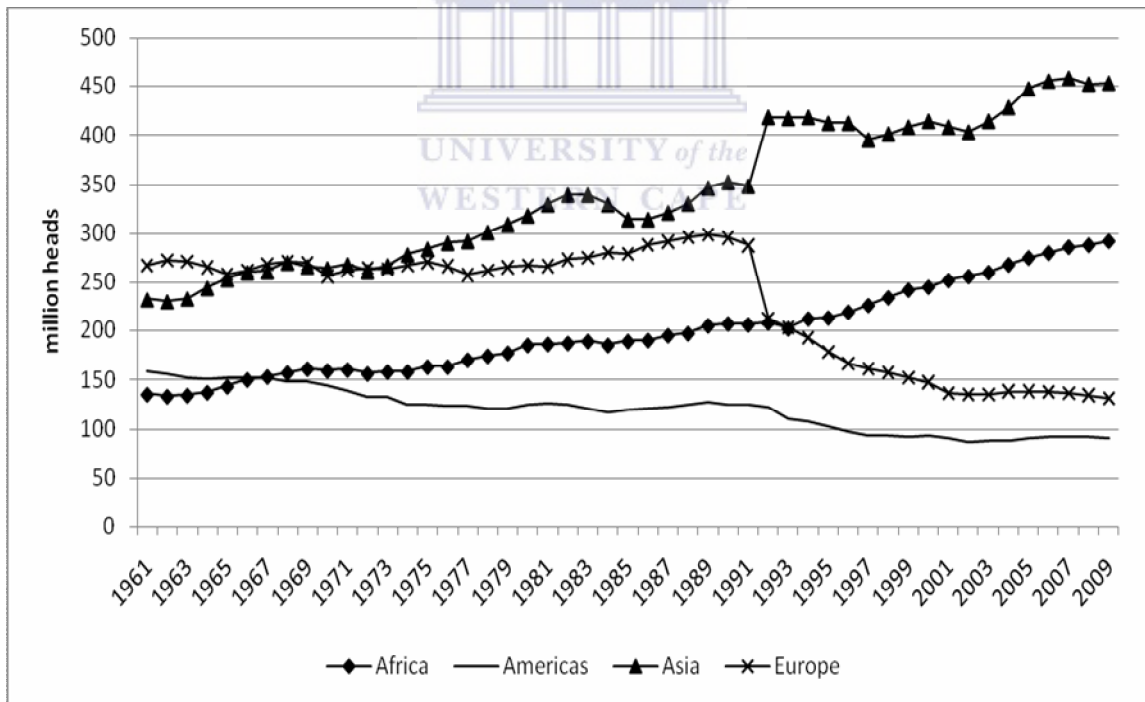
Figure 3.1: Sheep production in million heads by continent from 1961 to 2008

Source: FAOSTAT(2010)

What is illustrated by the snapshot above is that the key location of sheep farming has shifted from Europe to Asia and Africa, whilst sheep numbers continue to dwindle in the Americas. Generally, the implication is that there has been a transformation in sheep production towards the Asian and African countries from Europe. Furthermore, this picture helps to show the growing importance of sheep in Asian and African countries. This could be explained by environmental factors that are suitable for these livestock, in addition to the fact that the small ruminants, sheep in particular, provide a livelihood. Sheep and goats are more likely than cattle to survive on minimum land and low nutritional levels. Furthermore, sheep have the ability to withstand harsh conditions and can be produced at lower cost, as they graze on natural vegetation (shrub bush), making it convenient for the resource-poor household (Nefzaoui, Salman and El-Mourid 2008).

A comparison of sheep to other common livestock such as goats, cattle and pigs shows that, globally, sheep are second after cattle in terms of population. The sheep population increased gradually in the 1960s, leading other livestock and reaching approximately 1 060 million by 1970. Since then, the sheep population has declined to below that of cattle. This is probably explained by the price of beef, which is relatively higher than that of mutton. According to Blyth (1981), the decline in sheep numbers in the early 1970s was caused by poor wool prices, combined with higher beef prices relative to the mutton price. According to FAO data, cattle have the highest numbers world-wide for the period from the early 1970s up to 2008. However, sheep stocks have gradually been increasing over the years, although they are unstable. The highest ever recorded sheep numbers was in 1990, when global sheep numbers reached approximately 1 200 million. Thereafter,

global sheep numbers remained relatively stable, even though the trend has been gradually falling. This could be explained by the fact that regional decreases and increases in sheep numbers were almost of the same magnitude. Common in the trends for cattle and sheep numbers is that both dropped slightly in 2008.

Generally, it is clear from the trend in the Figure 3.2 below that, for the last 15 years or so we have not seen any major change in global sheep stock numbers around the world. This could be explained by the fact that, as sheep numbers increase in other regions by a certain margin, a decrease in sheep numbers of approximately the same margin is observed elsewhere. The massive increase in beef seems to suggest some substitution, and this has been due to the price of beef relative to the price of mutton. The rate of increase in goats started levelling off during the 1990s, while pigs expanded due to the shift in consumption towards pork. The ecological and nutritional health implications are huge.
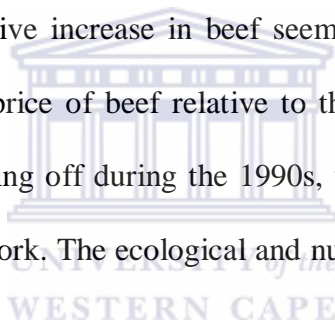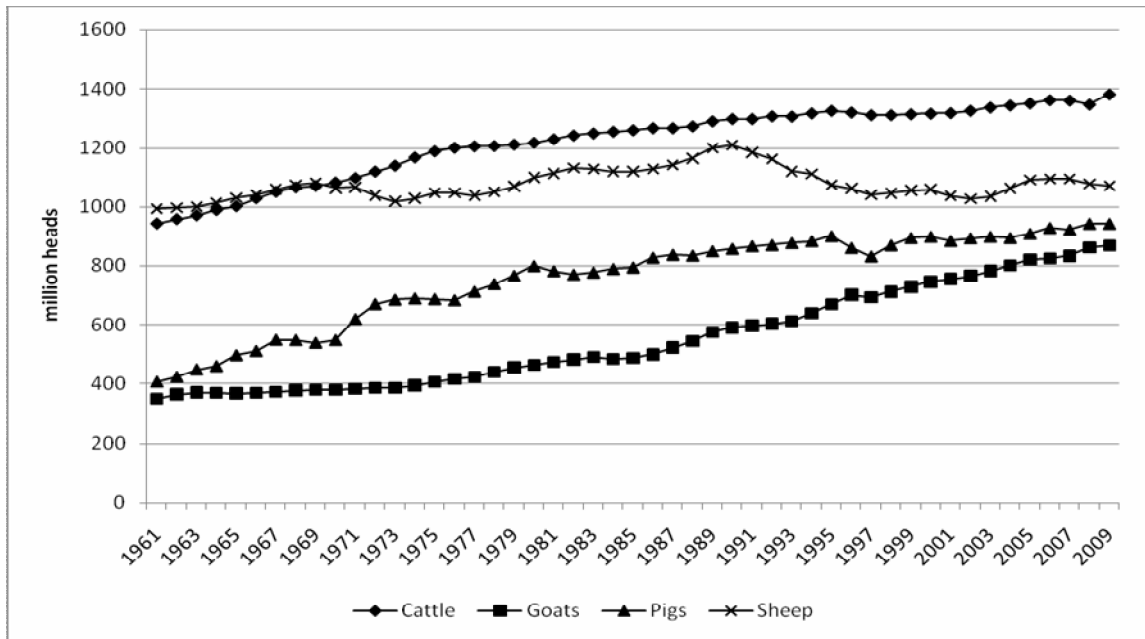
Figure 3.2*: Global comparison of sheep, cattle, goats and pigs in million heads from 1961 to 2009
Source: FAOSTAT (2010)

Despite the fact that cattle have the highest number on a global scale, sheep have the highest number in Africa (see Figure 3.3). This shows the importance of sheep in the lives of African in general. Generally, small ruminants have dominated the African continent, specifically in the early 1990s. Sheep and goats have the highest numbers, even though goats have the lowest numbers at the global level. This implies that goats are as important as sheep in Africa. Goat volumes increased significantly in the period 1993 to 2008 – much faster than any other livestock – such that goats had a slightly higher population than sheep in Africa by 2008.
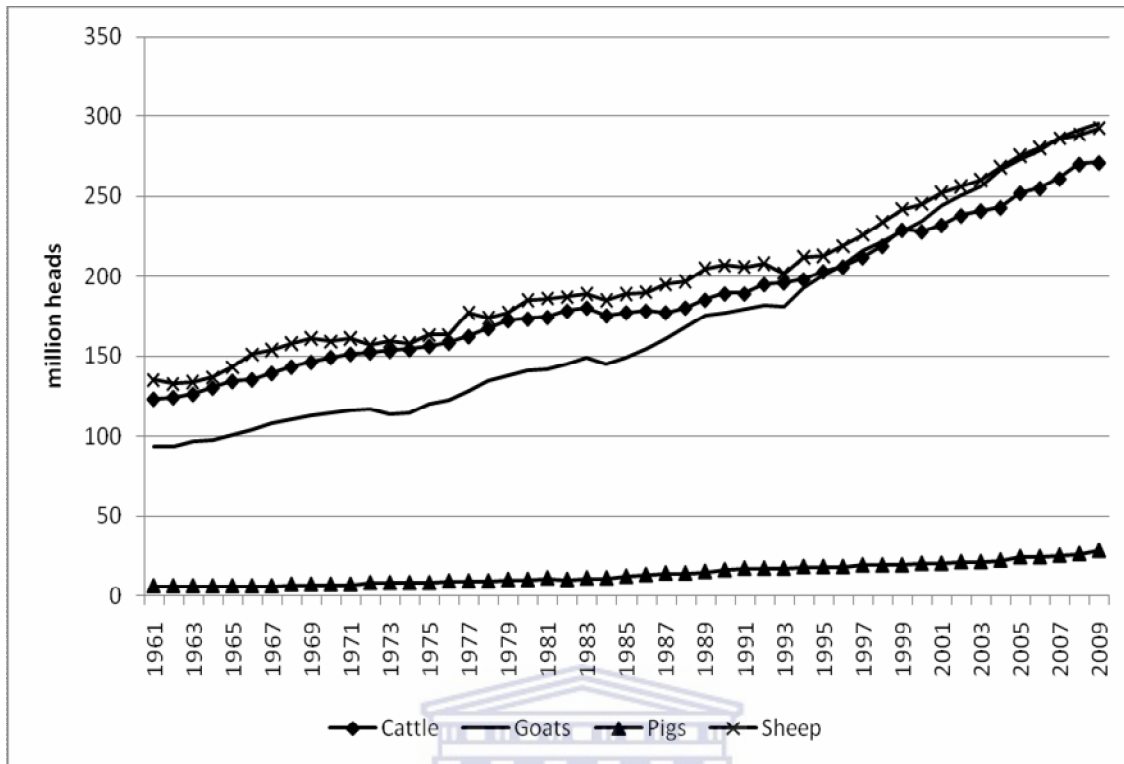
Figure 3.3: A comparison of livestock production in Africa in million heads from 1961 to 2009

Source: FAOSTAT (2010)
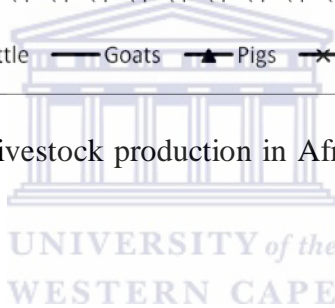
In Africa, the Sub-Saharan countries (e.g. South Africa, Botswana) have considerable sheep volumes (Morris 2009). According to the FAO (2008), Sudan is one of the countries with a significant proportion of the sheep population in Africa. Other examples include countries such as Kenya, with approximately eighty percent of land arid and semi arid, best sheep production (Barret *et al* 2003). A significant number of sheep are produced in countries like Nigeria and Ethiopia (Jabbar and Ayele 2003).

Despite significant increases in sheep numbers in Africa, there has been low productivity in terms of meat, wool and milk, specifically in the West African and North African countries (WANA). Meat output per ewe is much lower and less efficient per unit of

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body weight in Africa and Asia than in North America or Europe (FAO 2008). Nefzaoui *et al* (2008) point to the deterioration of the rangelands as one of the main reasons for the low productivity of sheep in Africa. This implies that the majority of sheep in African countries could be in the hands of resource-poor farmers, whose sheep depend solely on the rangelands.

According to data extracted from the FAO, the Americas had the highest quantities of sheep meat exports in the 1960s, despite many fluctuations. However, in the early 1970s, Europe took over following a sharp fall in exports from the Americas. This could be explained by the export price of sheep meat, which increased significantly in the former, but declined in the latter case (see Figure 3.5). Exports from European countries used to be significant, particularly in the form of live sheep exported to the European Union and to South-West Asia. Since 1990, when the industry collapsed, it has never recovered (Boutonnet 1999). Latin American countries (Argentina, Uruguay and Paraguay) were also competitive around the same time. A significant contribution to the world sheep market is seen in the exports of live sheep from Asia.

Africa has the highest fluctuations in the price of sheep exports. This could have been driven by the unstable export prices of sheep. A comparison of Figures 3.4 and 3.5 below shows that, due to the increase in the price of exports from Africa in the mid-1990s and late 2000, slight increases in the quantity of sheep exports were recorded for the respective periods. Thus, the continent recorded the smallest quantities of sheep exports since 1961 (FAO 2008).

Generally, four phases can be observed from the trends for sheep export prices: in the 1960s to 1970, a harmonious, gradual increase; in the early 1970s to 1980, a sharp increase; from early 1980 to the mid-1980s, a decline; from the late 1980s to 2000, a gradual increase at a different rate; and from early 2000 to 2008, a sharp increase. Global trade has gone through profound changes over this period of time, with the increasing popularity of trade liberalisation a possible driving factor.
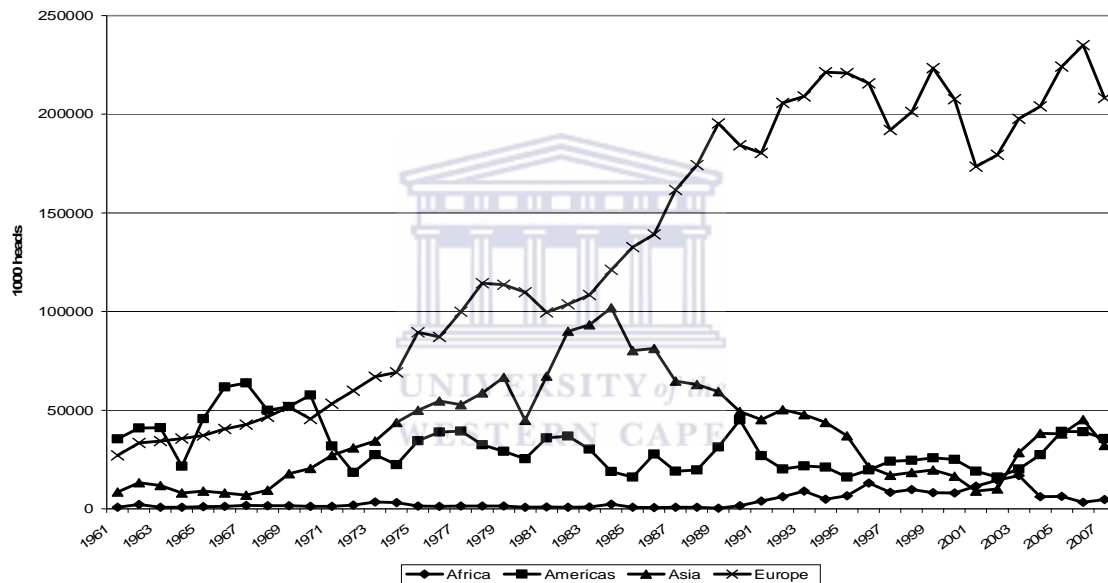
Figure 3.4: Global sheep exports quantities per 1 000 head from 1961 to 2007
Source: FAOSTAT(2010)
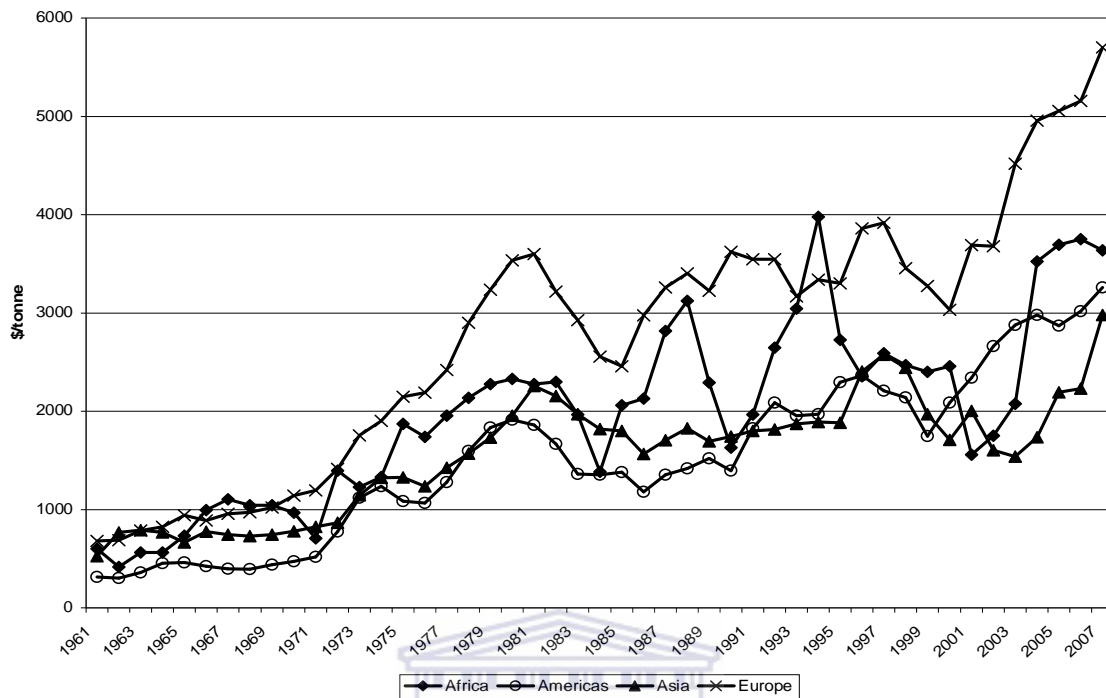
Figure 3.5: Sheep export prices in $/tonne for the period 1961 to 2007

Source: FAOSTAT (2010)
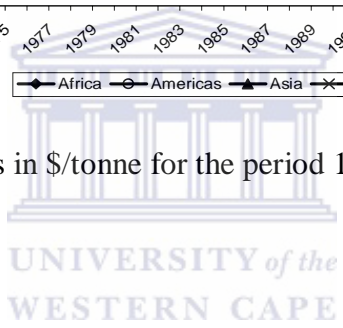
As for the wool industry on a global scale, an expansion has been observed for the last two centuries. However, this industry is currently deteriorating (FAO 2008). This could be due partly to the fact that the product (wool) has lost its monopoly as a provider of clothing material to other fibres. The quantity of wool used by the global textile industry decreased by 0.2 million (1.7 million tons to 1.5 million tons) in the period from 1990 to 1996 (Sherman 2002). The collapse of the USSR wool industries, which could not be balanced by the wool industries developing in China, exacerbated the problem. In addition, the improvements in quality, price and diversity from the artificial fibre industry has added to the pressure on wool. With the sheep meat industry being boosted, this

could be the driving force behind the global wool decline, as most sheep producers are turning to the sheep meat industry.

According to FAO data, Australia and New Zealand (Oceanic region) are regarded as the leading wool producers in the world. However, Figure 3.6 below shows a significant decline in wool from the Oceania region from the early 1990s, even though Asian wool production, which took over at about the same time, did not match the gap. This could explain the global decline in wool production. Interestingly, the trend for sheep numbers by region (see Figure 3.1 above) and that for wool (see Figure 3.6 below) shows closely similar patterns for Asia, Europe and the Americas. This can be evidence for the argument against the trade-off between sheep meat and wool production.
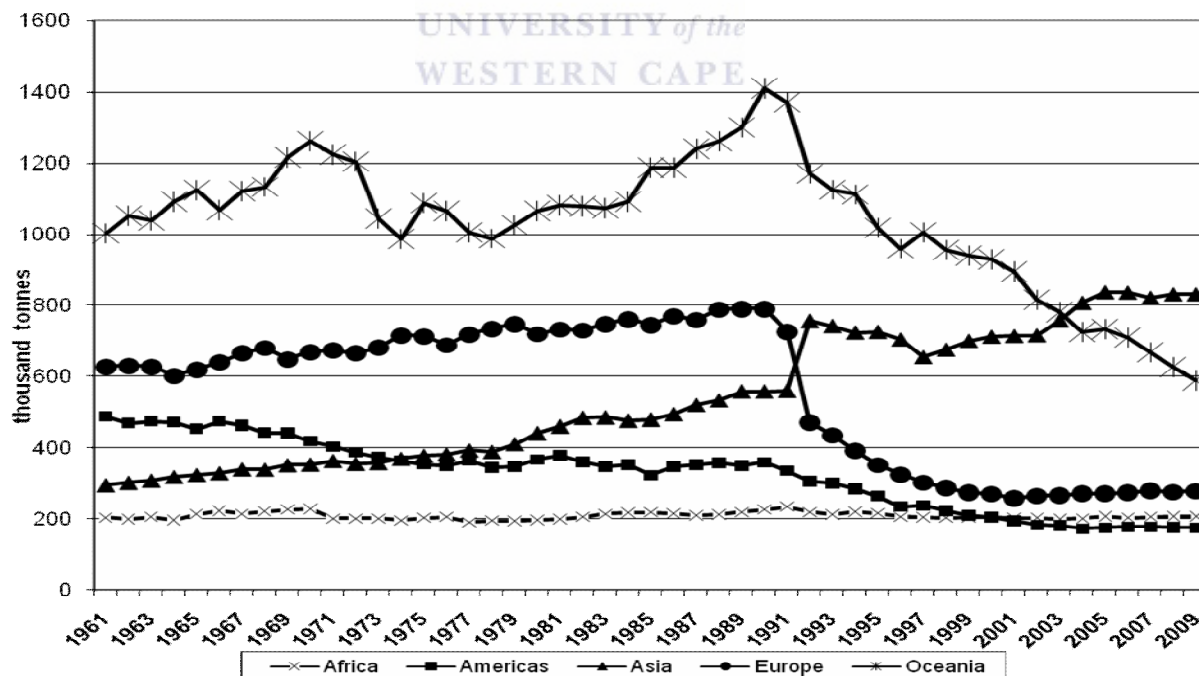
Figure 3.6: Greasy wool production by region in 1000 tonnes from 1961 to 2009
Source: FAOSTAT 2010

Even though it is not known how much/the exact proportion of these sheep product exports comes from small-scale farmers, different researchers have acknowledged the participation of small sheep producers. According to Nefzaoui *et al* (2008), in most developing countries small-scale farmers tend to sell their sheep in local markets. Teklewold *et al* (2009) identified the involvement of small-scale farmers in the Kenyan sheep industry. In Indonesia, small-scale sheep and goat farmers sell live animals through different marketing channels, which involve formal (supermarkets, butcheries) and informal traders.

A study carried out in east Macedonia and Thrace in Greece on sheep and goat farmers identified two types of farmers, namely commercial and resource poor. The latter group consists of the farmers who obtain more than 50% of their income from their sheep and goat enterprise (Tsourgiannis, Eddison and Warren 2008). The factors affecting the selection of marketing channels by these farmers include size of flock, volume of milk and debt (Nefzaoui *et al* 2008; Tsourgiannis *et al* 2008). Other significant factors were found to include sales price, speed of payment and loyalty (Teklewold *et al* 2009). Most importantly, the conclusion drawn by Tsourgiannis *et al* (2008) is that the prices obtained by the farmers across the marketing channels were different. Farmers who chose the local market obtained the lowest prices and were identified as the small-scale/resource-poor and medium producers.

According to Hoppe, MacDonald and Korb (2010), about 91% of farms in the United States are classified as small, with gross cash farm income less than $250 000 annually.

Of these farms, about 60% are very small farms, not commercial farms, generating less than $10 000 and depending heavily on off-farm income. However, the large commercial farms enjoy the highest profits. The reason seems to point to the economies of scale, which allows the larger farms access to finance and the ability to produce higher value products. Household income and wealth are also contributing factors.

3.2.2 Market demand and imports

In terms of sheep global imports, the largest portion is imported by Europe, while 30% goes to South-East Asia and North Africa. The demand for mutton in these areas has been increasing because of the status of the meat among the Moslem community and the increase in the income of the growing population. Also, Northern Asian countries (Japan and Korea) import a significant quantity of cheap mutton for processing. The majority of the international sheep meat trade is as a result of the demand from the Mediterranean and Moslem countries (Boutonnet 1999).

Data from the FAO shows that the highest quantities of sheep meat imports are realised in Europe, despite having the highest exports. Imports of sheep meat to Asia generally rose from the early 1960s up to the early 1980s. Since then the trend has been declining, up to about 2000/01, when it began to pick up again. The least imports are realised in Africa (see Figure 3.7 below). This could be associated with the impact of trade restrictions, which allow free trade amongst European countries.
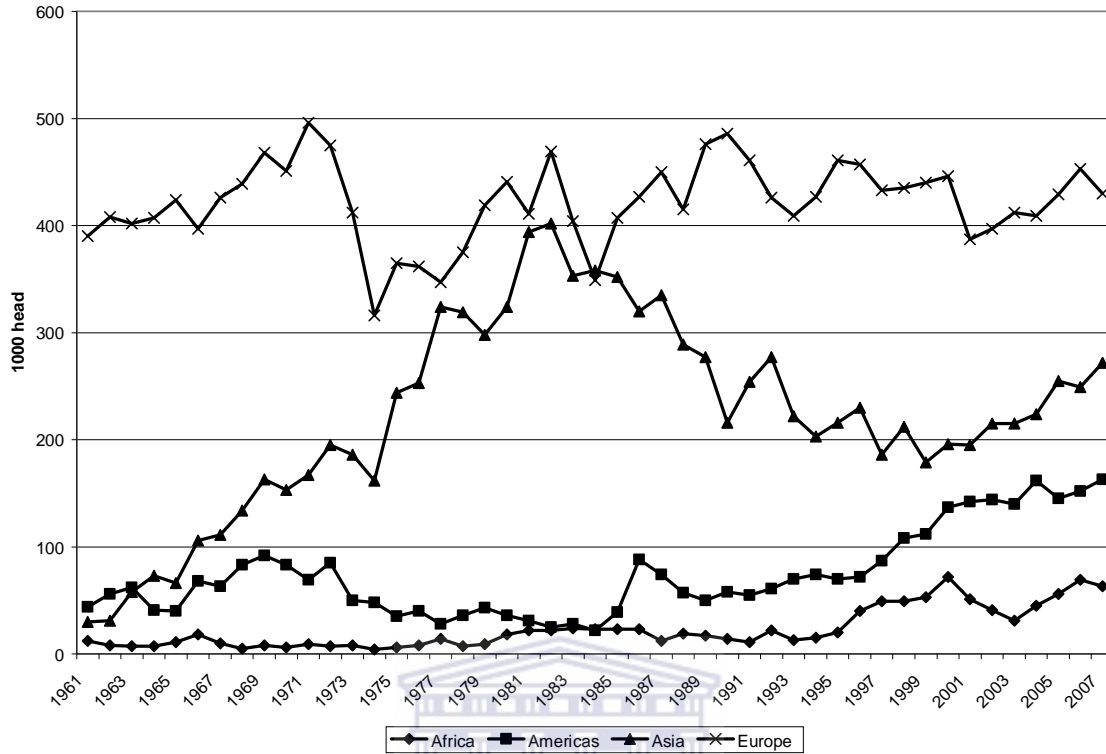
Figure 3.7: Global trend of sheep meat imports in 1000 heads

Source: FAOSTAT (2010)

When the import value is expressed in terms of $/tonne, it is interesting to note that, from 1961 to around the end of the 1980s, the values were moving harmoniously across the regions. After that period, prices moved in different directions, with Africa recording the least, followed by Asia, while Europe had the highest, followed by the Americas. This can be explained by the effect of the increasing demand for sheep meat in areas where sheep were no longer common.
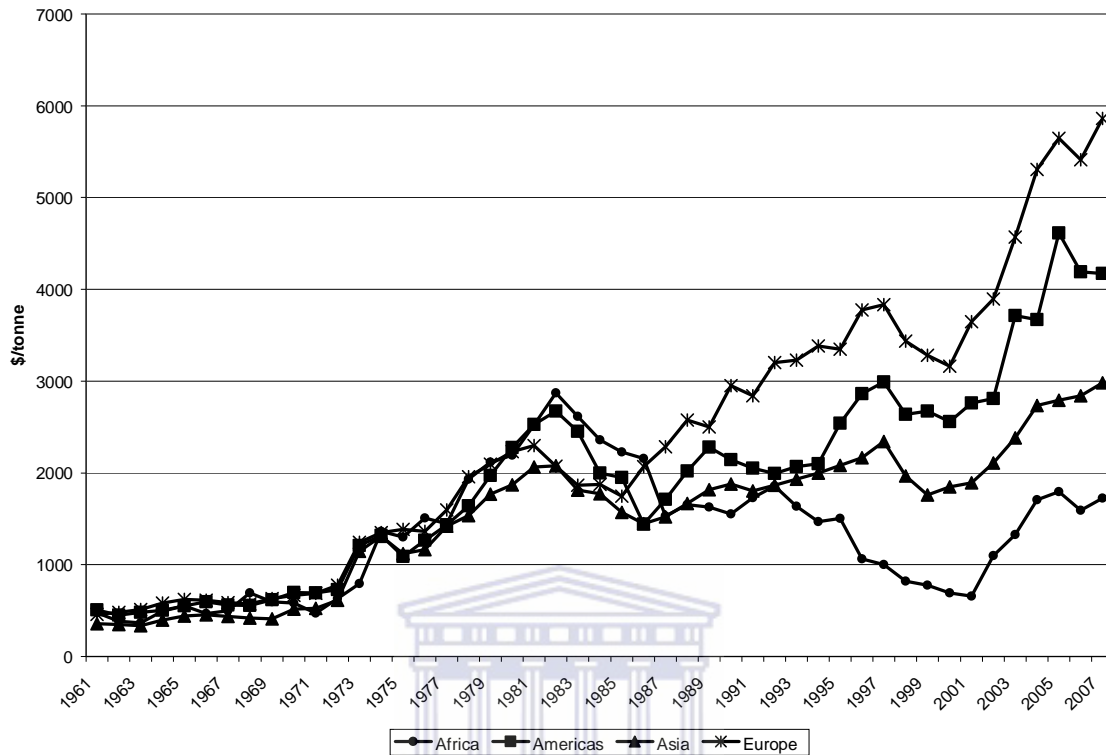
Figure 3.8: Sheep import price in $/tonne for the period 1961 to 2007
Source: FAOSTAT 2010

Despite China being one of the largest wool producers, it dominates imports 27% of the world imports. It is followed by Italy (10%), India and the UK (8% each), and France and Germany (5% each) (Verikios 2009). The Far East (mainly China) dominates the use of wool in terms of stages of production, such as spinning and weaving (or fabric production). Other regions, such as Western Europe (mainly Italy and the UK) are at 21%, while India and Pakistan are at 14%. A similar pattern exists at the garment-manufacturing stage across the regions, except for Western Europe (where the use of wool is less important) and Asia with more important use of wool. The distribution of wool consumption at the retail stage is also different across the regions. Western Europe

and the Far East share 26% each, while North America consumes about 13% (Verikios 2009).

Teklewold *et al* (2009) carried out a survey on determinants of livestock (cattle, sheep and goats) prices in Ethiopian pastoral livestock markets. The results show that livestock prices are affected by occasions such as Christian and Moslem fasting, holidays and time (seasonal factors, described as wet or dry seasons). Other important observable attributes influencing the formation of livestock prices are age, body condition of the traded animals, as well as buyer and seller types.

In the Sahel, livestock such as sheep are sold both within and outside formal markets. Sales in the informal and formal markets occur through negotiations between the seller and the buyer. In these situations, the livestock seller is usually at a disadvantage with respect to market information, and the prices received are relatively low. Non-cash forms of livestock transfers remain important as well. For example, bartering or gift-giving occur as restocking loans (haba nai), bride price, debt repayment, or grain-livestock barter among cash-poor individuals. Such transactions occurring outside of the marketplace are especially important for small stock (sheep and goats) and among those groups specialising in livestock husbandry (Turner and Williams 2002).

Small rural markets in West Africa are socially embedded, with prices determined through negotiation between sellers and buyers. Prices offered by buyers are determined not simply by the commodity in question, but by who is offering the commodity for sale and the number of other buyers at the market on that day (Hoffmann and Bernhard 2007).

Juma *et al* (2004) did a cross-sectional census survey to study the market power and efficiency in indigenous small ruminant marketing channels in Marsatit (Kenya). The results show imperfection in the market, certainly controlled by informed buyers. In this situation, buyers exercise market control, influencing pricing decisions. The implication is that sellers (producers) are absolute price takers, specifically from well-informed buyers. In addition, a regression analysis was done with selling price as the dependent variable. The results show that the selling price of animals was influenced by the location of the market where the exchange take place relative to the producer's location, as well as by the type of animal.

The marketing system for sheep and goats in Indonesia involves farmers selling live animals through two main channels, namely through a middleman or directly to the local markets. The factors that play a role in the farmer's decision include distance from the market and the availability of transport (Knipscheer *et al* 1987).
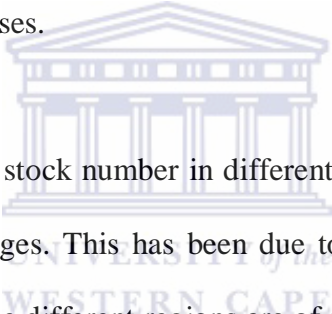
Ray (1995) did a study on the marketing of raw wool in Rajasthan (India). From the study it was concluded that the marketing of raw wool was embedded in multiple exchange relations. Small producers have the option of supplying directly to the markets or selling their wool via agents/middlemen. The factors identified as the determinants of the price-formation process of raw wool include contractual inter-linkages and asymmetry of information.

3.3 Summary and key lessons

One of the lessons that can be drawn is that sheep have been important in history for a long time. This is partly due to their multiple purposes. For example, sheep are a source

of wool, meat and milk. Just like goats, sheep are less costly to produce as they can survive on natural grazing and have the ability to withstand harsh conditions. Their low production cost makes the livestock convenient for resource-poor farmers, most of whom are found in developing countries.

Over the years there has been a shift in the number of sheep from Europe and the Americas towards Asian and African countries. The identified drivers behind these shifts include the changes in consumption patterns, driven by the rising real income in countries like China, with fast growth, political and economic instabilities, carrying capacity and pressure from population increases.

Despite these changes in sheep stock number in different regions, the global sheep trend does not show any major changes. This has been due to the fact that the increase and decrease of sheep numbers in the different regions are of approximately the same margin. This provides a case for the shift in livestock numbers across the regions. Furthermore, there was a substitution of sheep by cattle in the late 1960s. This can be linked to global cattle prices, which were relatively higher than sheep prices (cross price elasticity), and to the significant decline in wool prices.

Global wool production has declined significantly since the early 1990s, probably led by the decrease in production in the Oceanic region (major wool producer prior to 1990). Even thought the production of wool in Asia took over, it did not match the decrease in the Oceanic region. Wool and sheep production shows similar patterns across the region,

showing that a similar shift occurred for both products. Evidence for this could be that there is a close relationship between sheep and wool.

Despite the increase in sheep population in Asia and Africa, high export and import quantities and average prices for sheep meat are in the European. The lack of exports from Africa can be linked to the unstable sheep export price. Another factor is the deterioration of the African rangelands, which has tended to reduce the productivity of sheep products, and meat in particular.

At the global level, the wool industry has lost its monopoly in the textile industry due to the discovery of other fibres. In terms of wool imports and exports, China is currently leading, following a massive decrease in the supply of wool from Oceania.

3.4 South African sheep value chain

This subsection moves to the analysis of the value of sheep in the South African context. The analysis focuses on the following: production and exports, as well as marketing and imports.

3.4.1 Production and exports

Sheep farming sector is a crucial part of livestock production in the South Africa, contributing the through income from agriculture. Apart from the meat production, income is also generated through production and marketing of wool, milk and hides (D'haese *et al* 2005). The sheep meat and wool industry plays a key role in the sheep farming sector of South Africa. According to DAFF (2009), for the period 2008/09, a

total of about R1.15 million was acquired from wool. There are auction markets and non-auction markets for selling of sheep exists nationwide.

Figure 3.9 below shows comparison of sheep numbers against other livestock in South Africa from 1961 to 2009. Clearly, sheep have the highest number for the whole period. However, the gap between sheep and the rest of other livestock have decreased significantly over the years. The decline in sheep population has been linked to stock theft and predictors (NDA, 2008).
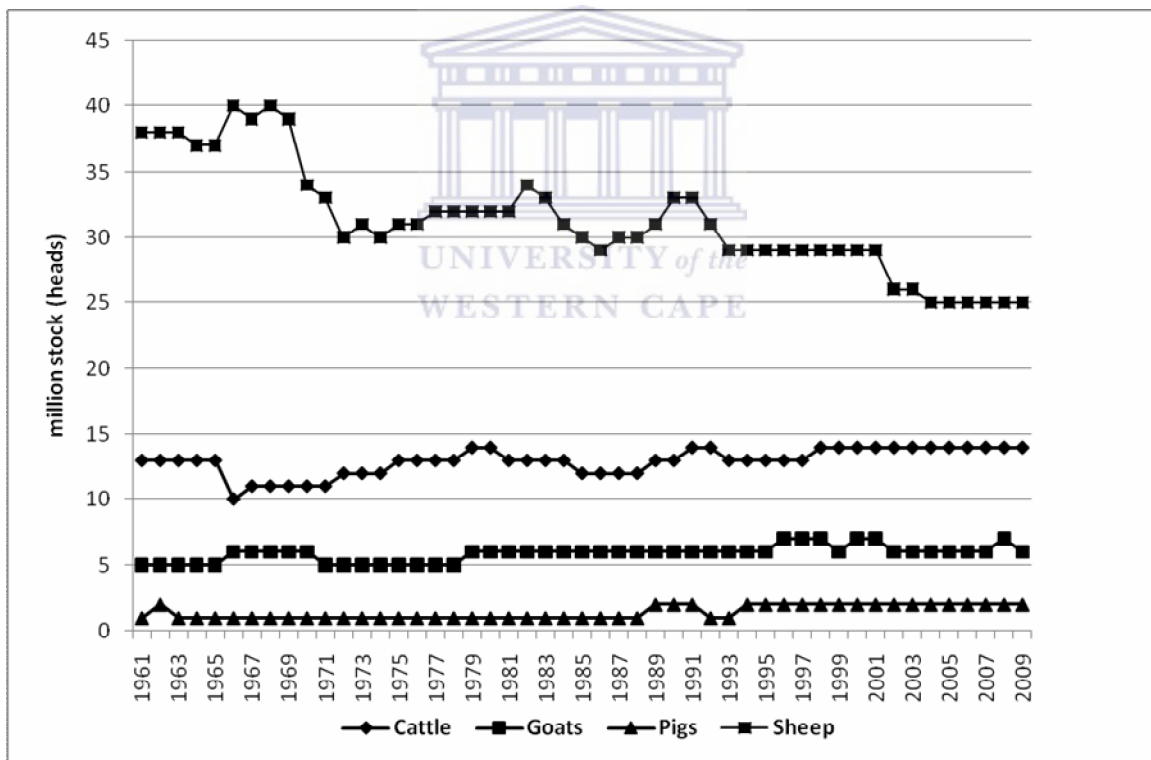
Figure 3.9: Comparison of South African sheep numbers against other livestock (million stock heads) from 1961 to 2009
Source: Statistics South Africa 2010

In South Africa, sheep farming is found in all provinces, but the concentration is higher in the arid parts of the country. Evidence shows that, since 2005, the highest numbers of

sheep are in the Eastern Cape province. According to the Department of Agriculture, Forestry and Fisheries (DAFF 2009), 29.6% of the total sheep numbers in 2009 were from the Eastern Cape, followed by the Northern Cape (25.0%). This can be linked to the climatic and ecological environment in these two provinces, which is conducive to small ruminants. Thus, households in these provinces have relatively more potential to earn a higher income from sheep production than from other livestock.

According to the DAFF (2009), sheep numbers have been higher than other livestock such as goats and cattle for the period between 2005 and 2009, particularly in the Eastern Cape. This is fundamental, as it provides the rationale for focusing on sheep farming.

In commercial farms, sheep are kept in well-managed paddocks, while in the communal areas; small-scale farmers graze their sheep in the poorly managed common lands. Overgrazing and land degradation are problems in the communal lands (Nkonki 2007). During droughts, when the grazing cannot sustain large flocks, there often is a reduction in the livestock head count at household level. The result is fluctuations in the total number of livestock for the respective regions. An example of such fluctuations was observed in the Keiskammahoek region (Monde 2003; Eiseb 2000).

There are many sheep breeds in South Africa; the most common breeds include Dorper and Merino. Dorper sheep are bred mainly for meat and are produced in many parts of the country. Dohne Merino sheep are bred mainly for the supply of wool. The breeds

vary across the country. This is partly as a result of ecological and climatic conditions (National Department of Agriculture 2008).

Evidence shows that the sheep producers of South Africa are getting income from exporting both sheep meat and wool. However, since 1961, wool, specifically greasy wool, has shown the largest exports quantities of all exported sheep products.

In terms of producer prices, sheep (meat and live weight) in general have shown a more stable, increasing trend since 1991. A noticeable change in the two trends (sheep meat and live weight) happened around 2000, as shown by steeper trends. As for wool, the price trend was more unstable over this period. This can be closely linked to the export markets in countries such as Australia and New Zealand, which have been associated with unstable markets for wool (FAO, 2009). Despite wool having the highest price per tonne in 1991 and 1992, by 1994 it had the lowest price of the three. Thereafter it increased to above the live weight price, but below the sheep meat price. The trend for the wool price briefly went above the price of sheep meat in 2002, before decreasing to a lower price again by 2004. From 2006, wool prices have been increasing to such an extent that it had the highest price per tonne by the end of 2008.
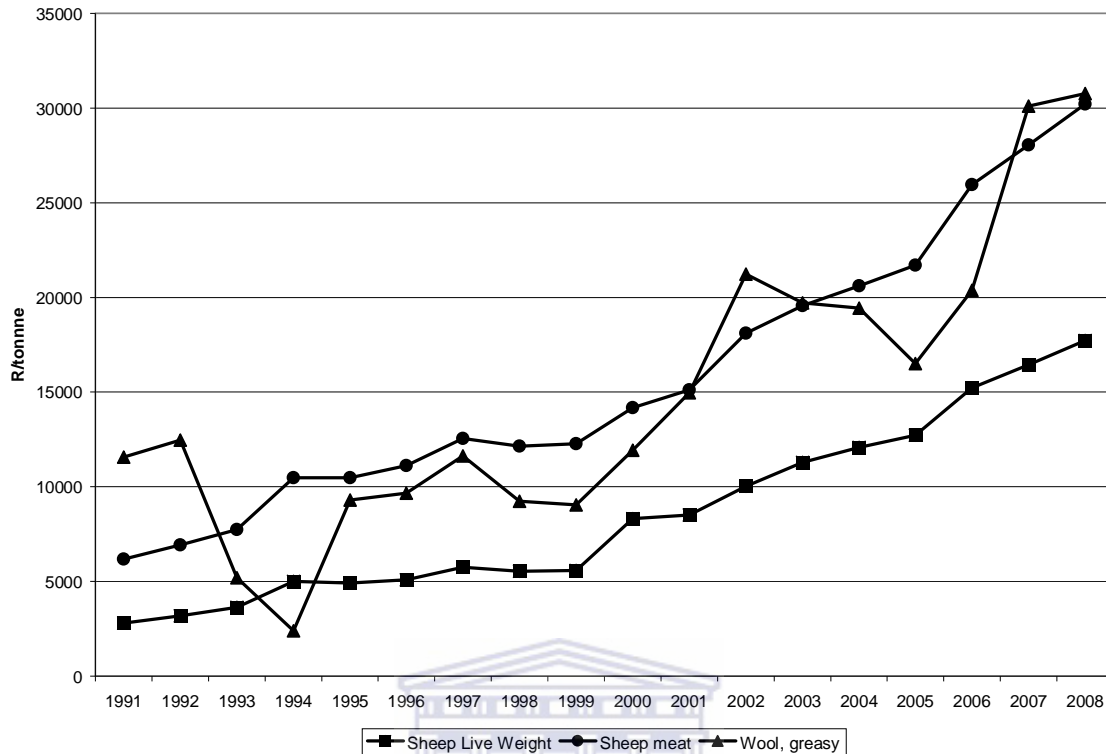
Figure 3.10: Figure 3.10: South African sheep, live sheep and wool producer prices in R/tonne for the period 1991 to 2008
Source: FAOSTATS (2010)

3.4.2 Market demand and imports

The marketing of agricultural products in South Africa went through certain changes in the period from the mid-19th century to the 1990s. One of these changes was the period of concerted government intervention. Marketing boards were introduced to provide facilities for the marketing of crops, livestock and livestock products. Most importantly, it was believed that, through government intervention (the Marketing Act of 1937), prices would be stabilised, thereby reducing price risks.

The Marketing Act of 1937 was replaced by Marketing Act 47 of 1996, which marked the end of the marketing boards[7]. Thus the National Agricultural Marketing Council was established in 1999 to assist farmers to access the markets. Currently, government intervention in the marketing of agricultural products is very limited (Nkonki 2007). Farmers can now market their own farm products directly to a wide range of markets within and/or outside the province.

Markets for sheep in South Africa are located mainly in the cities/towns. The common marketing channels for livestock in South Africa, particularly in the Eastern Cape, include the community, butcheries, abattoirs and informal traders (Jari and Fraser 2009; Musemwa *et al* 2008).
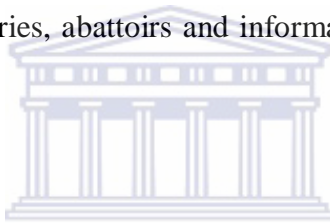
In terms of wool, the largest proportion of wool sold from the Eastern Cape is produced by the large-scale woolgrowers (DAFF, 2009). Figure 3.11 shows the channels for wool in the province. Firstly, small-scale woolgrowers can organise their own shearing and sell directly to brokers. Secondly, they can shear at their homes and sell to local traders/broker, usually at a lower price, as the wool is unsorted at this stage. Buyers at this stage can sell to processors for profit at a relatively higher price. Thirdly, with some shear sheds in place, members of small-scale woolgrowers can employ local labour to do the shearing, sorting and packing (Nkonki 2007; Perret 2003). Due to the small quantities of individual farmers, wool is sold collectively to brokers. The brokers then pay the

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[7] Marketing boards were intended to reduce volatility in the prices of agricultural commodities. In terms of the new Act, the assets of the marketing boards were transferred to industry units, which provide services (e.g. market information, export advice and product development).

farmers according to outcome values from the auction, after deducting transport costs (D'Haese *et al* 2005).

According to Nkonki (2007), farmers who are not members of the local association face the risk of getting relatively lower prices, as their route ends at the local informal traders. The poor quality of the wool from small-scale woolgrowers results in lower prices relative to that for wool from large-scale woolgrowers. Usually the quality of this wool is because of poor shearing methods and contamination. Other factors that contribute to this gap in the price include the financial position of the farmer. That is, large-scale woolgrowers employ their own experienced shearers, while small-scale wool growers sometimes use family labour or hire labour. In addition to these factors, large-scale woolgrower are in frequent contact with a broker, thus are in a good position to negotiate prices (D'Haese *et al* 2005).
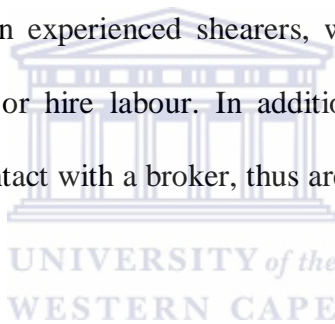
The wool is then transported to the auctions in Port Elizabeth, Durban and Cape Town. Once the wool is sold to processors at the auction markets, wool processing takes place.. This involves wool scouring and combing. The wool is then tested for mean fibre diameter and vegetable content by the Wool Testing Bureau. Then it is either traded for domestic consumption or exported to countries such as Australia and New Zealand (see Figure 3.11 below).
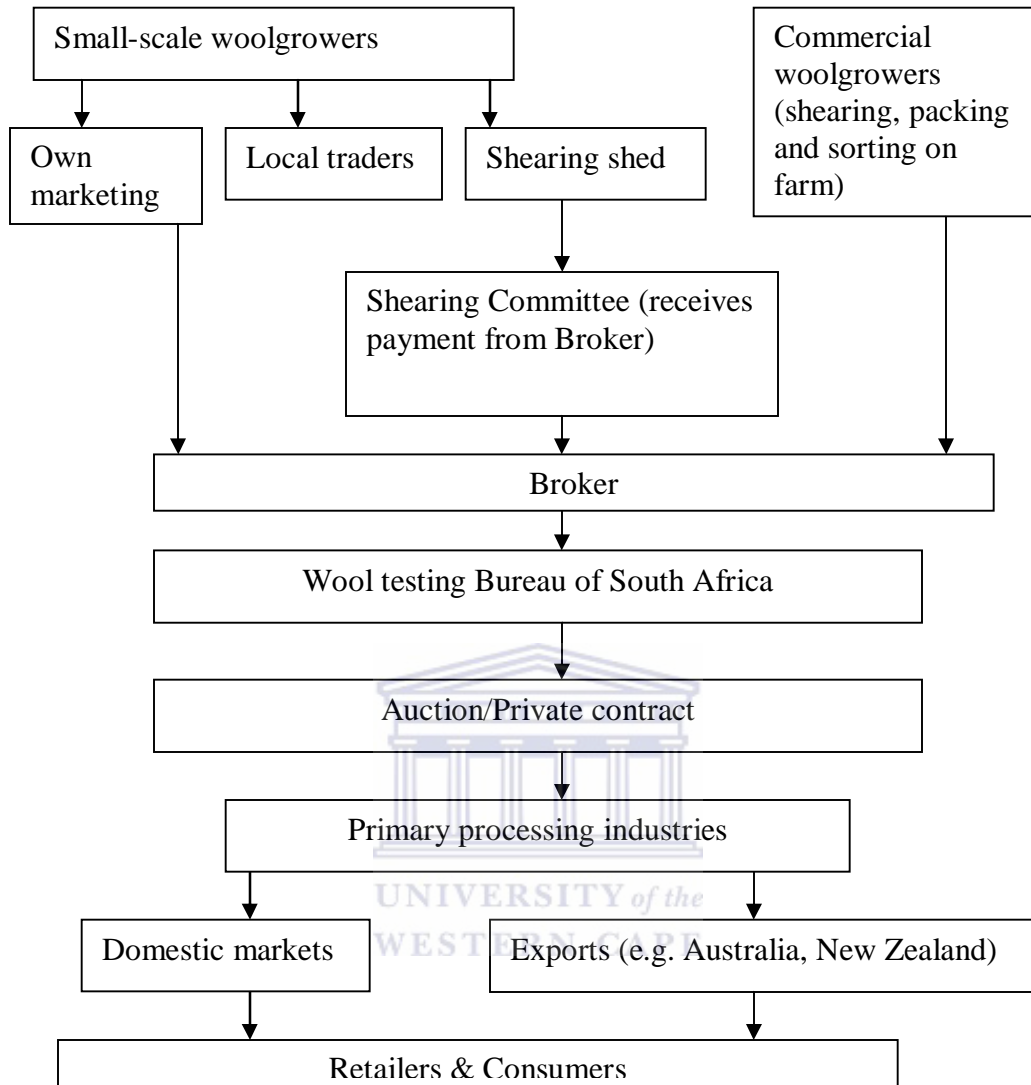
Figure 3.11: Typical wool industry and marketing channels in South Africa (Eastern Cape)
Source: Adopted from Nkonki (2007), originally from D'Haese (2003)

In South Africa sheep meat imports are more than exports, implying that South Africa is a net importer of sheep meat. This basically implies that sheep farmers in South Africa are competing with sheep farmers in other countries.

3.5 Conclusion

Sheep are competitive in terms of production when compared to other domesticated animals. Also, the sheep is important to human lives, at both the global and national

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level. This is because it is multi-purpose, adding to its ability to survive harsh conditions. Hence, sheep has potential solution to the rural farming households, who are often referred to as the poor. However, even though smallholder participation in the agricultural markets is noted by many authors, their survival to the competition is still questionable.

There is evidence of a shift in global sheep production towards regions such as Asia and Africa. Some of the responsible factors include: high demand by the increasing urban population and increasing rangelands. Therefore, Africa has increasing sheep and goat numbers. This implies that sheep can have the potential of improving human lives in Africa.
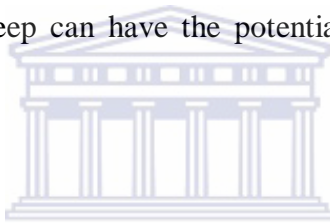
There also is a close link between wool and sheep meat production and trade trends. The major driving force of trade is linked to trade liberalisation. South Africa is a net importer of sheep meat, implying that sheep farmers in South Africa are indirectly competing with farmers in foreign countries. However, producer prices for sheep meat have been relatively more stable than wool prices since the 1990s.

In terms of sheep production, in South Africa sheep numbers are high in the Eastern Cape. However, it has been noted that the sheep population is decreasing because of problems associated with theft and predators. This is more prominent in relation to smallholder farmers in communal areas, where management of grazing land is poor.

Chapter 4: Support for pro-poor agricultural development and rural poverty reduction in Eastern Cape

4.1 Introduction

Official data show that a small proportion of Eastern Cape households evidently derive their main or primary income from farming. But the same data also show that the majority of households with access to small plots suitable for farming are concentrated in Eastern Cape. Furthermore, comparative analyses of standard indicators of human well-being and development of Eastern Cape with the rest of South Africa show that the province consistently reports worse than national average rates of poverty, food insecurity, unemployment and inequality- reaching extreme levels in rural locations. Over the medium term, higher economic growth and service-oriented sectoral change might be inadequate to reverse this dismal track record in human well-being.
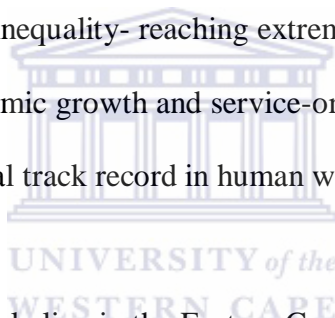
Approximately 6.6 million people live in the Eastern Cape, comprising roughly 13.5% of the South African population, ranking it third in terms of population size behind Gauteng and KwaZulu-Natal (Statssa 2009). The province has seven districts, *see* Map in Figure 4.1. It incorporates the former homelands of Transkei and Ciskei, fragmented enclaves designed under apartheid and systematically underdeveloped through lack of sustainable investment and constant out-migration of its productive workforce. Although the highest population densities prevail in and around Port Elizabeth and Uitenhage, a coastal metropolitan hub constructed around a restricted secondary industrial base, substantial numbers of the province's population reside in rural areas around commercial farms and

communal-tenure villages (Eastern Cape Provincial Government [ECPG], Growth and Development Plan 2004).

What this last point underscores is that any effective provincial development strategy ought to coherently set out empowering and growth-enhancing interventions for rural development, or perhaps more precisely, sustainable agricultural-led development. It must strive to boost productivity and employment creating investment in agriculture as a way to improve human well-being. Moreover, the spatial spread of key development indicators- unemployment and money-metric indicators of poverty and inequality point to rural localities to be at a distinct disadvantage with extremely dismal scores for the standard set of indicators. Comparing these indicators of human well-being with similar national data for South Africa highlights an even more depressing contrast of socio-economic underdevelopment and deprivation. It is indeed a poor province seriously in need of a comprehensive and sustainable development strategy.

Eastern Cape provincial government has an economic development plan which gives marginal attention to its agricultural sector. Furthermore, the new 2010-2014 strategic plan of the provincial Agricultural Department lacks a clear perspective on how to optimize the agricultural resource-potential of the province for sustainable livelihoods and raise the living standards of people living in that region of South Africa. In this context, this paper critically evaluates the current and potential contribution of agricultural development as an integral component of a broader pro-poor Eastern Cape economic development strategy. Agriculture's direct and indirect contributions to

economic development are well-documented (Meijerink and Roza 2007; NDA 2001; Bresciani and Valdes 2007). It contributes to economic growth and has the potential to reduce income poverty on a sustainable basis- especially through wage-labour on farms and income-generating small-scale farming.
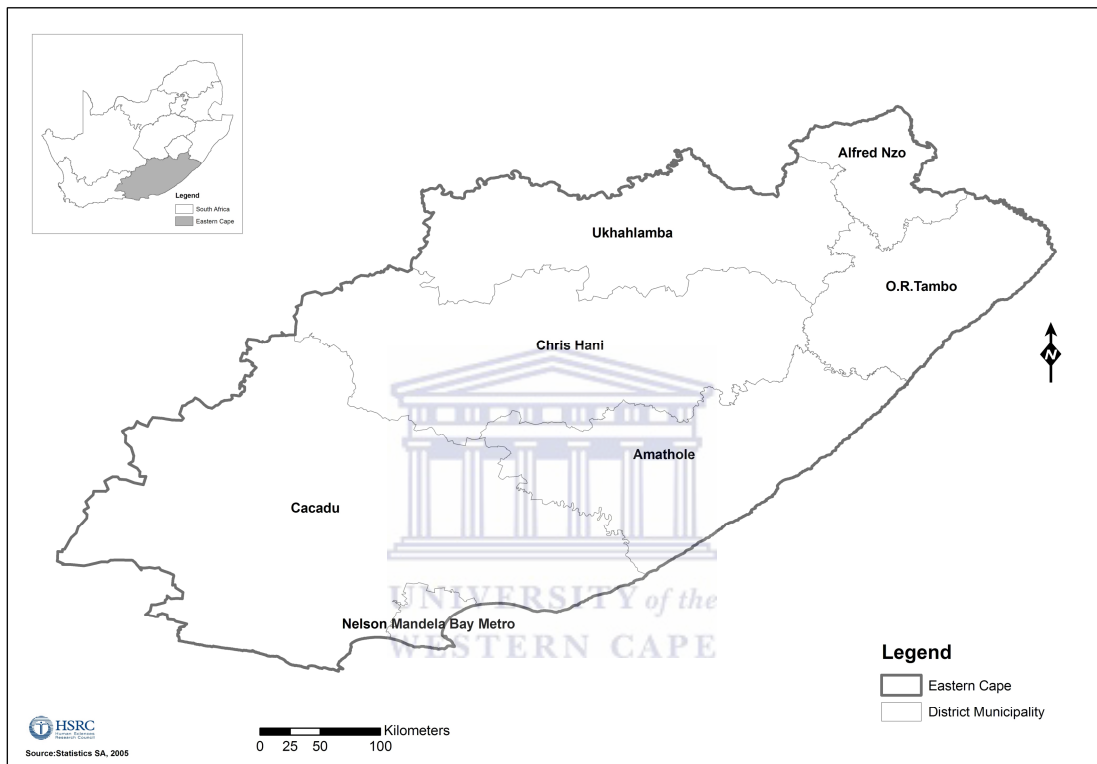
Figure 4.1: Eastern Cape province map
Source: Human Sciences Research Council (2010)

This chapter is divided into three main sections. First, we present a comparative overview of the Eastern Cape economic growth trajectory and pathways, with special attention to sectoral contributions. The second part shifts attention to livelihood strategies and living standards in order to highlight the main ways in which rural people in the province make a living. The third section critically reviews the agricultural sector in the province, focusing on land use patterns by agricultural subsectors (highlighting agro-ecological

changes under way) and land/agricultural reforms, and examines public expenditure on agriculture to demonstrate the extent to which a pro-poor agricultural-led strategy informs policy. Overarching conclusions are offered in the final section.

4.2 Economic development pathways of the Eastern Cape

This sub-section analyses the development pathway of the Eastern Cape from mid 1990s till 2009.

4.2.1 Phases of economic growth

To argue the case for a pro-poor agricultural development strategy for the Eastern Cape, this section starts with a comparative overview of key provincial economic indicators in recent years. This overview draws specific attention to the provincial economic growth rate and trends in the contributions of key sectors to its economic performance. We focus on the post-apartheid era because the 1996 Constitution and subsequent spatial policy framework legally fixed the areas' provincial borders. To contextualise this background information, and where feasible, a comparative analysis with relevant national-level data will be presented.

The Eastern Cape province contributed about 7.5% to the national GDP in 2008 (Statistics South Africa 2009). Figure 4.2 shows that, for the period 1996 to 2009, economic growth in the Eastern Cape roughly tracked the nationwide trend. Over this short period, it is possible to subdivide the economic performance in the Eastern Cape into four distinct phases: a downturn from 1996 to 1998; lacklustre growth for 1998 to 2002; steady and accelerated growth until 2006/07; and an economic downturn post-

2008. The economic upturns and downturns closely matched national trends, albeit usually at lower levels than the national average rate of growth. This implies that sectors that drive economic performance in the province have been and continue to be very sensitive to forces that impact on the national economy.

Historically, the real GDP growth rate for the Eastern Cape has experienced more fluctuations relative to other provinces. Degefe (1998), for example, argues that the economic downturn of 1996 to 1998 was a direct spill-over from the East Asian economic crisis, which evidently had an extended lagged effect on South Africa. Tracking the developmental outcomes of this lacklustre economic performance, Khosa (2002) found that "growth failed to trickle down to the poor", but was, unsurprisingly, inadequate to substantially raise real living standards.
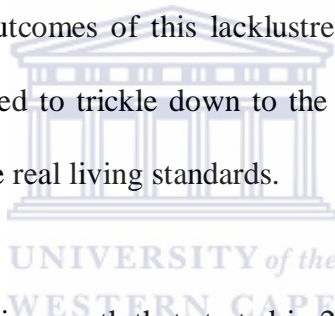
The steady accelerated economic growth that started in 2002 and peaked around 2006 to 2007 was driven and sustained by many factors. However, policy statements tend to focus on the latter period of the growth cycle. Eastern Cape policy makers adapted the Accelerated and Shared Growth Initiative for South Africa (ASGI-SA), which was introduced by the Mbeki administration in 2005, to propel economic expansion in the province in a more focused manner, whilst also aligning it to national policy priorities (Barbour and Sowman 2004). When compared to the national average, growth rates declined in 2008 as a result of the global economic downturn, initially driven by the financial crisis linked to the US housing sector.
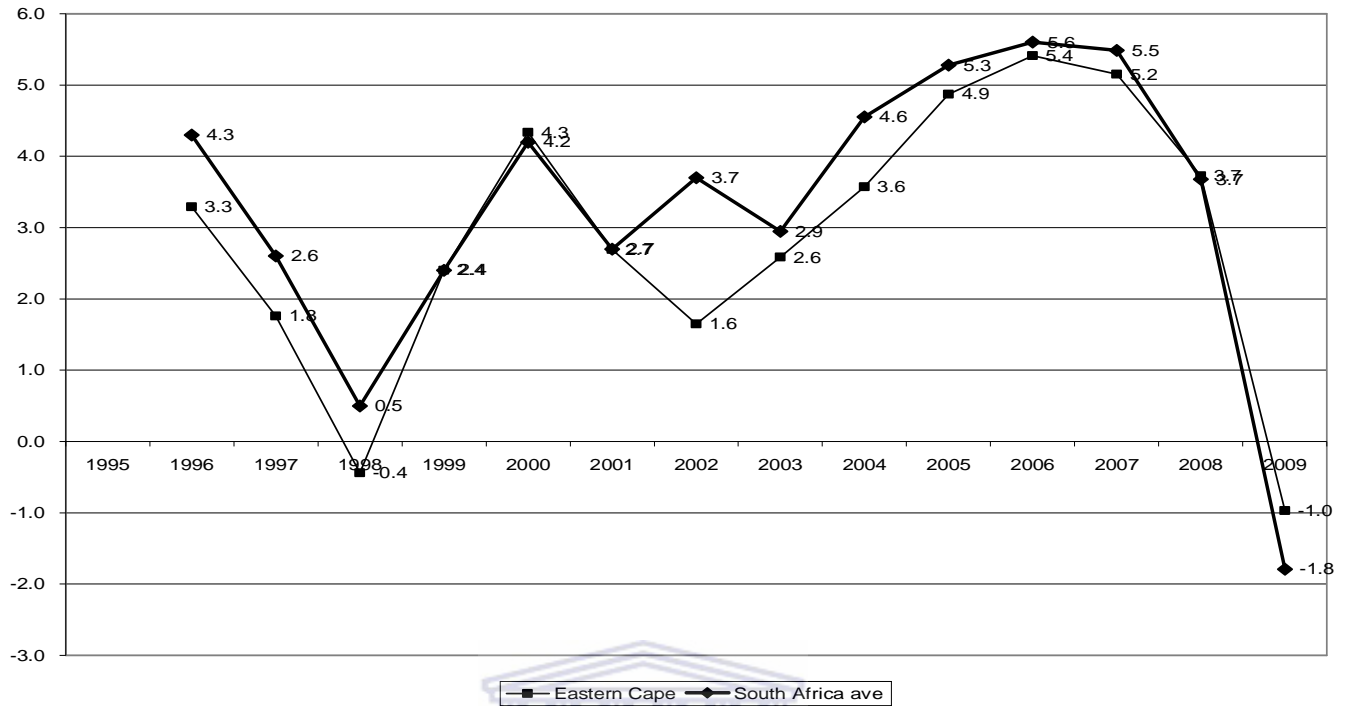
Figure 4.2: Comparison of provincial real GDP and South Africa average GDP at constant price of 2005 for the period 1995 to 2009
Source: Statistics South Africa (2009)
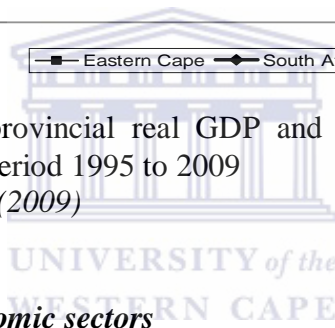
4.2.2 Composition of key economic sectors

Visible shifts in the sectoral composition of economies normally occur over long periods and display structural development patterns (Memedovic and Lapadre 2009). Data limitations and the brief post-apartheid period prevent us from detecting large-scale transformations in the sectoral composition of provincial and national economic output. Against the backdrop of these constraints, we present a snapshot of trends in sectoral composition for the last 15 years. This helps to understand where agriculture fits into overall development, its potential value addition to growth and its status relative to other sectors.

Figure 4.3 below shows the sector contribution to the province GDP and confirms the relative decline in the primary and secondary sectors since the mid-1990s. In 2009, the tertiary sector made the main contribution to provincial economic growth – estimated to account for 76% of economic output (increasing from 71% in 1995). At the same time, the contribution of the secondary sector contributed around 21% (25% in 1995), whilst the primary sector (predominantly farming) contributed 3% (4% in 1995) to value-added output. The main components of the tertiary sector are the financial sector (20%) and community and personal services (Barbour and Sowman 2004; Statistics South Africa 2007). The primary sector, particularly agriculture, is unstable, as it remains vulnerable to exogenous environmental and macro-economic shocks.
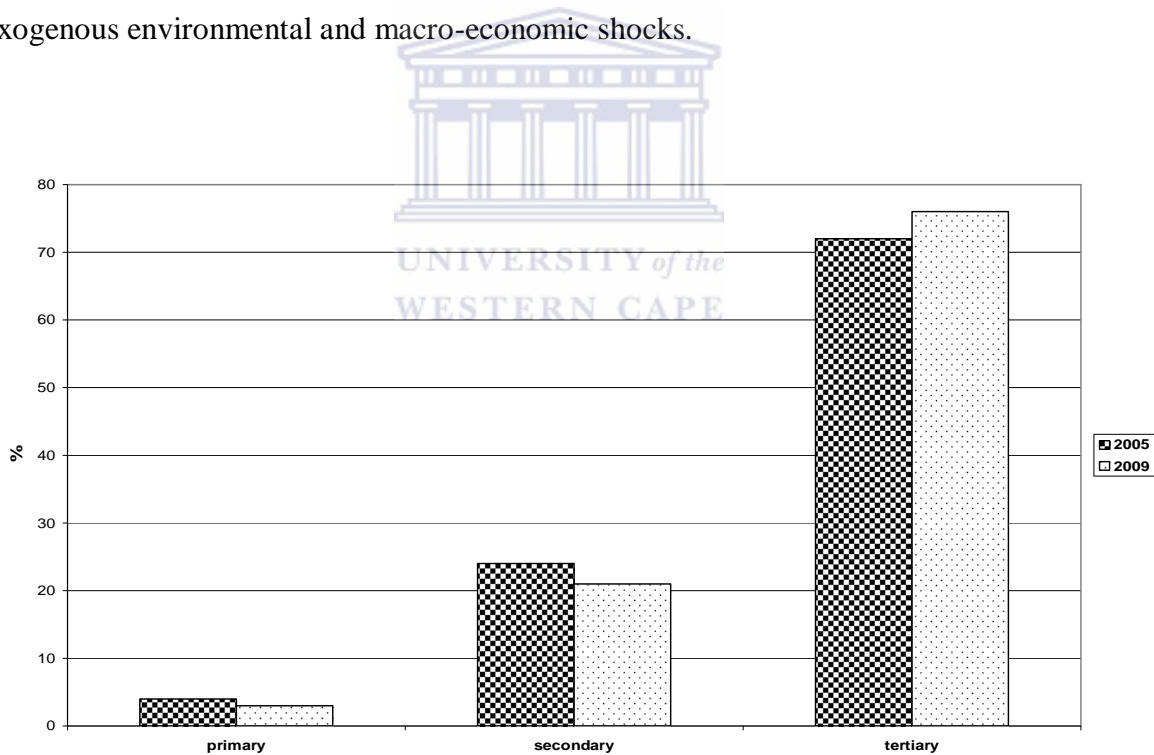
Figure 4.3: Comparison of sector contribution to the provincial economy from 1995 to 2009
Source: Statistics South Africa (2009)

4.3 Livelihood strategies and living standards

In this section we present an overview of the livelihood strategies and living standards of people in the Eastern Cape. Historically, agriculture played a key role in sustaining living standards. Today the sources of household income appear to be more diversified, but heavily reliant on transfer incomes: pensions/grants and remittances – drawing on reported main source of the household income in the General Household Survey (Statistics South Africa various years). However, this might offer a very inaccurate view of what is happening, because people might be investing some of their cash transfers in small-scale farming – anecdotal evidence seems to suggest this.

4.3.1 Employment and livelihood strategies

Employment remains the chief pathway to lift people out of poverty. To understand this, we need to focus on the labour market participation of the population in the Eastern Cape. Historically, rural households in the former homelands have supported their families with remittance incomes from family migrants working in the mines and on commercial farms (Perret *et al* 2000). With the poor performance and weak labour-absorbing growth of mining, employment declined significantly in this sector. Furthermore, the sectoral shift from primary industry towards manufacturing and tertiary industries has led to relatively slow absorption of unskilled and semi-skilled labour, because these sectors demand more skilled labour. Overall, the sectors that drive economic growth in the Eastern Cape have not significantly absorbed the available labour force (Barbour and Sowman 2004).

Officially, agriculture's contribution to job creation in 2002 stood at 9% of the workforce in the province. From 1996 to 2002, the average annual employment growth rate in

agriculture was in the order of 3% (Fraser, Monde and Van Averbeke 2003). The majority of those employed in agriculture are employed on the large commercial farms and, in some instances, by emerging farmers. Smallholder farmers rarely employ permanent non-family workers; they typically rely on family labour (D'Haese *et al* 2005). By 2009, commercial farms employed 725 000 workers (DAFF 2010). Livelihood strategies for rural households are closely tied to labour market participation (Simbi and Aliber 2000).

Even though remittances represent the second component of rural livelihood, it has declined significantly (Barbour and Sowman 2004; see also data in Table 4.2). The province lacks diversity in the rural non-farm economy and abundant labour-intensive, small-scale industries and other local value-adding activities (Farolfi and Perret 2002). As a consequence, there has been significantly reduced employment in the rural non-farm sector alongside the decline in remittance incomes. Islam and Buckley (2009) add that low wages on commercial farms have left workers with virtually no extra income to send to their rural families. In the context of the wave of rapid food price inflation from 2007 to 2008, the inability of migrants to remit might have contributed to rising incidents of household food insecurity.

Farming forms part of a mix of livelihood strategy activities among poor rural households across the Eastern Cape. These households regard livestock as a source to 'smooth incomes' and as a mitigation strategy against uninsured economic shocks/risks (Nkonki 2007). Fraser *et al* (2003) calculated that, in the central Eastern Cape (note: Ciskei area

included for 1999), agriculture contributed 9,3% of the rural household income. Perret (2002) argues that full-time farming (sheep keeping and wool production) remains an alternative strategy to earn cash income, despite high risks and imperfect credit and product markets in many rural localities in the province.

Table 4.1: Main sources of household income in the Eastern Cape and South Africa, 2002-2009

		2002 N	%	2003 N	%	2004 N	%	2005 N	%	2006 N	%	2007 N	%	2008 N	%	2009 N	%
Salaries and wages	E.C.	642,449	39.9	616,074	38.2	577,847	35.0	685,000	39.9	685,206	39.8	814,805	45.5	834,001	47.7	717,739	43.3
	RSA	6,960,693	59.4	7,197,462	57.4	6,836,946	56.2	7,327,832	57.8	7,532,805	58.5	8,050,406	61.2	8,276,504	61.9	7,806,945	58.3
Remittances	E.C.	302,301	18.8	308,780	19.1	285,161	17.3	236,681	13.7	234,851	13.6	239,294	13.4	219,097	12.5	186,757	11.3
	RSA	1,586,143	13.5	1,824,059	14.6	1,730,459	14.2	1,521,707	12.0	1,391,536	10.8	1,325,062	10.1	1,274,165	9.5	1,206,842	9.0
Pension and social grants	E.C.	482,126	30.0	567,293	35.2	654,184	39.7	642,851	37.3	703,448	40.9	650,286	36.3	630,301	36.1	629,594	38.0
	RSA	2,129,910	18.2	2,454,286	19.6	2,617,477	21.5	2,879,294	22.7	3,102,345	24.1	2,971,078	22.6	3,172,570	23.7	3,188,972	23.8
Farm Income	**E.C.**	**13,060**	**0.8**	**14,858**	**0.9**	**19,304**	**1.2**	**17,820**	**1.0**	**28,325**	**1.7**	**22,778**	**1.3**	**6,058**	**0.4**	**3,294**	**0.2**
	RSA	**112,062**	**1.0**	**105,123**	**0.8**	**124,041**	**1.0**	**116,414**	**0.9**	**165,638**	**1.3**	**137,922**	**1.05**	**98,122**	**0.7**	**19,066**	**0.1**
Other non-farm income	E.C.	93,020	5.8	66,579	4.1	89,100	5.4	99,257	5.8	42,288	2.5	48,265	2.7	38,647	2.2	106,960	6.5
	RSA	611,394	5.2	598,596	4.8	680,102	5.8	584,357	4.6	394,287	3.1	385,026	2.9	260,143	2.0	1,058,303	7.9
No income	E.C.	75,564	4.7	38,588	2.4	23,548	1.4	41,824	2.4	27,730	1.6	14,969	0.8	19,918	1.1	14,292	0.9
	RSA	318,711	2.7	346,281	2.8	186,379	1.5	248,154	2.0	285,354	2.2	294,424	2.2	284,125	2.1	101,797	0.8
Total	E.C.	1,608,520		1,612,172		1,649,144		1,723,433		1,721,848		1,790,397		1,748,022		1,658,6361	
	RSA	11,718,913		12,525,807		12,175,404		12,677,758		12,871,965		13,163,918		13,365,629		13,381,925	

Source: StatsSA (various years); own estimates based on GHS household weights

4.3.2 Living standards of population

The Eastern Cape province faces a number of challenges, such as underdevelopment, high unemployment, high dependency ratios, high poverty levels, and a skewed economic structure (Provide Project 2005). This is a province that is more than 60% rural and yet is driven by the tertiary sector, with a total contribution of 68.5% to the economy (Statistics South Africa 2009). The GDP per person in the Eastern Cape is lower than the national average (Provide Project 2005; Statistics South Africa 2009). According to the Labour Force Survey 2000 estimate, the Eastern Cape *per capita* income was R6 774 in 2000, only about half the national average of R12 411. The average income reported by an agricultural household amounted to R17 729, which was lower relative to that of non-agricultural households, which amounted to R32 204. In terms of racial groups, coloured and African agricultural households are the lowest earners, with income levels of R13 690 and R12 749 respectively, while White agricultural households had the highest income, of R145 806 (Provide Project 2005).

Food shortage is also a problem in the province (Barbour and Sowman 2004). The climatic conditions are not conducive for crop production. Grain is acquired from large commercial farmers and group projects under irrigation. Also, some smallholder farmers have small gardens at the back of their homesteads (Bank and Meyer 2006). This grain is not enough to support the whole family. Hence, livestock are sometimes sold to generate income to purchase food (Provide Project 2005). Aliber and Hart (2009) found that three to four million households engage in small-scale farming to supplement their food requirements, with the majority of these resource-poor small farmers in the Eastern Cape.

Poverty has not changed significantly over the period between 2004 and 2008 (BMR 2009). Currently, nearly seven out of 10 people still live in poverty. The east of the province still has the highest concentration of poor. Income inequality can be seen prominently between the urban and rural populations. In the rural population, inequality is seen between the agricultural and non-agricultural households (Provide Project 2005). Poverty is very much directly linked to the historical economic neglect of the province. According to the BMR (2005), the province has the biggest population in the lowest income category, and spends the largest amount on food. In this case, of the R70 billion estimated in 2005, 25.5% accrued to food. Food expenditure accounts for 60% to 80% of the household expenditure and agriculture can help with long-term food security (Baiphethi and Jacobs 2009).
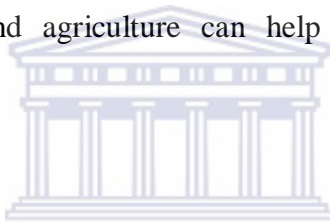
Households in the Eastern Cape can be categorised either as agricultural or non-agricultural (Provide Project 2005). The agricultural households are found mainly in the rural areas, while the non-agricultural households occupy the urban areas. The sources of income for the rural households include agricultural income (sales of agricultural products, wage income from working on the commercial farms) and non-agricultural income (pension funds, child grants and remuneration from working). However, evidence from the Provide Project (2005) shows that agricultural households are worse off in terms of income when compared to non-agricultural households.

Headcount poverty rates measured in monetary terms in the Eastern Cape remain the highest in the country – hovering between 60% and 70%, depending on the estimate used

(Bank and Meyer 2006; Provide Project 2005). At the municipal level, only the Nelson Mandela metropolitan area (around Port Elizabeth) had poverty rates below the national average. Other areas had poverty rates above the national average, with OR Tambo, Amathole and Chris Hani ranked the poorest districts (Provide Project 2005).

Poverty is mainly a rural phenomenon, with agricultural households having the highest levels and depth of poverty. Moreover, poverty is not a static condition, especially among farmers (Perret, 2002). It may shift from one type to another due to lifecycles and other factors, such as shocks/crises and long-term factors. Examples given by Bank and Meyer (2006) include racial/gender discrimination and market failures. The lifecycle plays a major role, as the aging population has greater access to pension funds,[8] given that that has been a significant increase in the contribution of government transfers over the years. Evidence from the BMR (2008) shows that, in the 2008 financial year, 12.8 million households received grants countrywide. Of this figure, about 18% were in the Eastern Cape, which was second highest following the 25.4% in KwaZulu-Natal (KZN). This could be explained by the fact that these are two provinces have the highest number of people in the lowest income group.

Poverty is also correlated with education level. According to Perret (2002), high poverty levels exist in households with no education. The Provide Project (2005) found that poverty is correlated with ill-health and unemployment. From these patterns of poverty

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[8] Government transfers in South Africa include seven types of social grants: Care dependency, Child support, Foster care, Grant-in-aid, Old age grant, Disability, and War Vet grant.

and unemployment, we can deduce that growth in the province has not significantly reduced poverty and joblessness.

Using income as one way of measuring poverty, about 67% of the Eastern Cape population had an income of below R800 a month in 2007 (Statistics South Africa 2007). According to the BMR (2009), the majority of the households countrywide (51.5%) have their incomes trapped in the lowest income group. The Eastern Cape has 19% (1 310 193) of households in the lowest income group, just below that of KZN (20.5%; 1 411 913).

Table 4.2 below shows a set of common measures of human well-being for the Eastern Cape for the period 2000 to 2007. Although there was a decline in the average poverty headcount ratio over this period, and in the absolute numbers of people living in poverty, the provincial human development index (HDI) and Gini coefficient do not show overall improvements in human well-being. In terms of income distribution, the province is characterised by inequality, as shown by the Gini coefficient of close to 1. The Gini coefficient figures in the table show that inequality has worsened from 2000 to 2007, increasing from 0.65 to 0.67. (Estimates by the Provide Project (2005) placed the Eastern Cape Gini in the order of 0.69 in 2000.)

Table 4.2: Comparative overview of human development measures for the Eastern Cape[9]

Measure	2000	2004	2007
Human development index (HDI)	0.49	0.53	0.53
Gini coefficient	0.65	0.67	0.67
Number of people in poverty (million)	3.99	4.31	3.95
Percentage of people in poverty (%)	63.1	67.2	61.9

Source: Global Insight, 2008

The main source of income inequality is from the labour income for the overall Gini coefficient for the province (Provide Project 2005). It is interesting to note that income from gross operating surplus[10] contributes more to the inequality amongst agricultural households than in non-agricultural households. This could imply that the inequalities in the ownership of capital stock and land are the driving factors amongst agricultural households. It is also believed that inequalities in agricultural households are driven primarily by inequalities in the distribution of wages (Provide Project 2005).
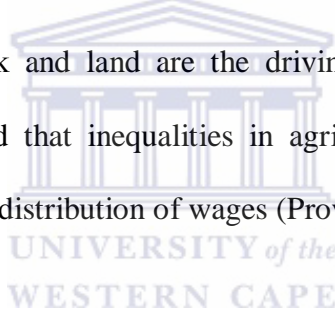
4.4 Support for pro-poor agricultural development

This subsection analyses the nature of support for pro-poor agricultural development. In particular, we unpack the type of agricultural practices in the province and fiscal support towards agriculture.

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[9] Measures the ability to live a healthy life, communicate, and participate in the community and have the means to afford a decent living. The Gini coefficient measures the inequality, taking figures between 0 and 1 to represent perfect equality and perfect inequality respectively.

[10] Income from gross operating surplus can be interpreted as returns to physical and human capital and, in an agricultural context, the returns to land owned by the agricultural household. This implies that inequalities in the ownership of capital stock and land are the driving factors for the inequality amongst agricultural households (Provide Project 2005).

4.4.1 Agricultural dualism

South Africa has a dualistic agricultural sector, which means that many resource-poor small farmers cultivate crops and keep livestock under varied land tenure arrangements alongside the highly capitalised and large-scale commercial sector (NDA 2001). Historically, commercial agriculture has been dominated by a minority of white farmers, either as family farmers, agricultural cooperatives or modernising agribusinesses. Resource-poor small farmers are predominantly black and more than two-thirds of them are concentrated in the former homelands, and mainly, but not exclusively, in the Eastern Cape. According to Table 4.3 below, 70% of the land (17,1 million hectares) is in the provinces' commercial farming regions, against 30% in developing areas (the former homelands). This inequality in land distribution is even starker if examined in conservative per capita terms, because more resource-poor farmers are concentrated on this smaller proportion of land. The post-apartheid government has been implementing policies for a more equitable distribution of land and agricultural resources in an effort to gradually overcome agricultural or agrarian dualism. In the Eastern Cape, as well as in other provinces, some beneficiaries of these land and agricultural reforms form a new category of small black farmers on private farmland, often categorised as emerging farmers.

Land and agro-ecological conditions remain key determinants of farming yields and returns, especially for resource-poor farmers using traditional methods and unable to make huge capital investment in farming. Table 4.3 compares land availability, potential and usage in South Africa and the Eastern Cape. Farmland in the Eastern Cape is mainly

used and presumably suitable for grazing across both agrarian settings. Although farmland classified for commercial farming is more than three times the size of communal land in the province, commercial farming constitutes only 14% of total commercial farmland in the country.

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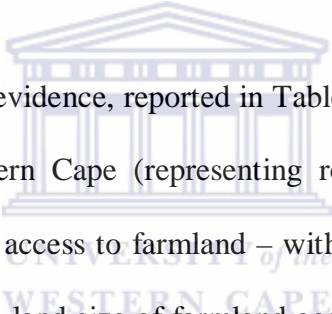
Table 4.3: Land utilization in South Africa[11]

	Total area (ha)	Farmland (ha)	% of total area	Potentially arable land (ha)	% of total area	Grazing land (ha)	% of total area	Nature conservation & forestry (ha)	% of total area	Other	% of total area
Eastern Cape	17061600	14817723	86.8	1172901	6.7	13644822	80.0	756920	4..5	1456957	8.7
South Africa	122320100	100665792	82.3	16737672	13.7	83928120	68.6	13219963	10.8	8434345	6.9
Developing agriculture in former homelands											
Eastern Cape	5175400	4001856	77.3	529400	10.2	3472456	67.1	186587	3.6	986957	19.1
South Africa	17112800	14479766	84.6	2545673	14.9	11934193	69.7	1036468	6.1	1596566	9.3
Commercial agriculture											
Eastern Cape	11886200	1081586	91.0	643501	5.4	10172366	85.6	570333	4.8	500000	4.2
South Africa	105207300	86186026	81.9	14192099	13.5	71993927	68.4	12183495	11.6	6837779	6.5

Source: Department of Agriculture, Forestry and Fishing (2010)

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[11] Very small proportions of the arable land are utilised and such amounts could not be included by the source. The arable land is utilised in commercial agriculture, of which the Eastern Cape province has about 601 651ha utilised against a total of 12 900 122ha.

Preliminary findings from the 2007 Census of Commercial Agriculture show that the biggest share of gross farming income in the Eastern Cape was generated from animals and animal products (Statistics South Africa 2009). Compared to other provinces, the Eastern Cape is a major producer of high quality merino wool and luxury mohair fibres, supplying 30% of South Africa's wool and 80% of national mohair production. Some of the arable land is considered suitable for crop farming: slightly more than 500 000 ha in developing areas compared to 600 000 ha under commercial crop production. Pineapples and chicory are major commercially produced crops and recent data suggest that the output of both crops continues to increase (DAFF 2010).

According to the available official evidence, reported in Table 4.4 below, slightly more than half a million households in the Eastern Cape (representing roughly 40% of all South African households) reported that they had access to farmland – with a land size in the order of 0.68 to 1.25 ha per family. On average, the land size of farmland accessed in the Eastern Cape is below the national average for the entire period.

Table 4.4: Households reporting access to farming plots by average plot size (in hectares) for the Eastern Cape and South Africa, 2002-2009

Year		Avg. land size (ha)	St. dev (ha)	N (households)
2002	Eastern Cape	0.90	1.89	771 370
	South Africa	1.81	4.02	1 686 011
2003	Eastern Cape	1.24	2.56	658 551
	South Africa	1.88	3.91	1 533 575
2004	Eastern Cape	1.17	2.85	749 454
	South Africa	1.79	3.98	1 672 232
2005	Eastern Cape	1.04	1.89	532 255
	South Africa	1.86	3.66	1 183 441
2006	Eastern Cape	1.19	2.13	656 482
	South Africa	1.65	3.57	1 380 252
2007	Eastern Cape	1.23	3.08	526 855
	South Africa	1.92	4.24	1 142 653
2008	Eastern Cape	1.18	2.21	506 506
	South Africa	1.80	3.95	1 242 152
2009	Eastern Cape	0.68	1.56	548 554
	South Africa	0.76	1.51	2 434 360

Source: Statistic South Africa (various years) General Household Survey

4.4.2 Land and agricultural policy reforms

In the Eastern Cape, as in other provinces that incorporate former homelands, the disparities between the commercial and communal (particularly resource-poor smallholder) farmers cut across the areas of access to productive inputs and access to markets. In communal areas, land tenure arrangements remain insecure and uncertain and this is a disincentive to private investment in efficiency-enhancing farming practices. Natural resource degradation and poor access to water, primarily due to inadequate investment in upgrading irrigation, are additional barriers to raising farm productivity in communal areas. Other factors constraining farming in the underdeveloped regions are poor agricultural infrastructure, inadequate access to functional social services, and a lack of ownership of land, capital assets and finance capital.

Over the past 15 years, several state policies have been adopted to bridge the gap between the large commercial farmers and small-scale farmers. Land reform, deregulation of agricultural markets, the formalisation of farm dweller tenure relations, and AgriBEE are examples of these policy changes. The motivation for land reform is grounded in the notion that promoting smallholder agricultural growth can be an effective strategy to reduce rural poverty and income inequality (Machethe 2004). Land Redistribution for Agricultural Development (LRAD), rights-based land restitution and legislation to protect the tenure rights of farm dwellers continue to be national and provincial flagship land reform strategies.

According to the Eastern Cape development plan, only 4.3% of land in the Eastern Cape has been transferred to 'emerging farmers' since 1994 (Barbour and Sowman 2004), partly due to a lack of funding. Some of the challenges facing the land reform programme include inadequate resources, insecure land tenure arrangements, poor monitoring and evaluation systems, weak (often non-existent) intergovernmental coordination and other institutional arrangements (including dysfunctional community property associations). Beside the periodic quality of life surveys, comprehensive information about the socio-economic status of land reform beneficiaries is still lacking and this is an obstacle to systematically track the livelihoods impacts of land reforms (Hall 2009).

4.3.3 Agricultural development support

If agricultural development is to achieve its pro-poor outcomes, appropriate policies and adequate fiscal support are vital. Additional policies, such as the Comprehensive Agricultural Support Programme (CASP) and Agricultural Broad Based Black Economic Empowerment

(AgriBBBEE), have also been selectively implemented to fast track agricultural development support to poor black farmers. National budgets and estimates of national expenditure published annually by the National Treasury show that national fiscal expenditure on agriculture has increased from R872 million in 2001/02 to about R3.3 billion in 2008/09. Whilst provincial governments also raised fiscal support for agriculture, the information in Figure 4.4, comparing trends in spending on agriculture in the Eastern Cape and by the national government, shows that the province continues to lag behind in terms of the pace at which it is raising the level of spending.
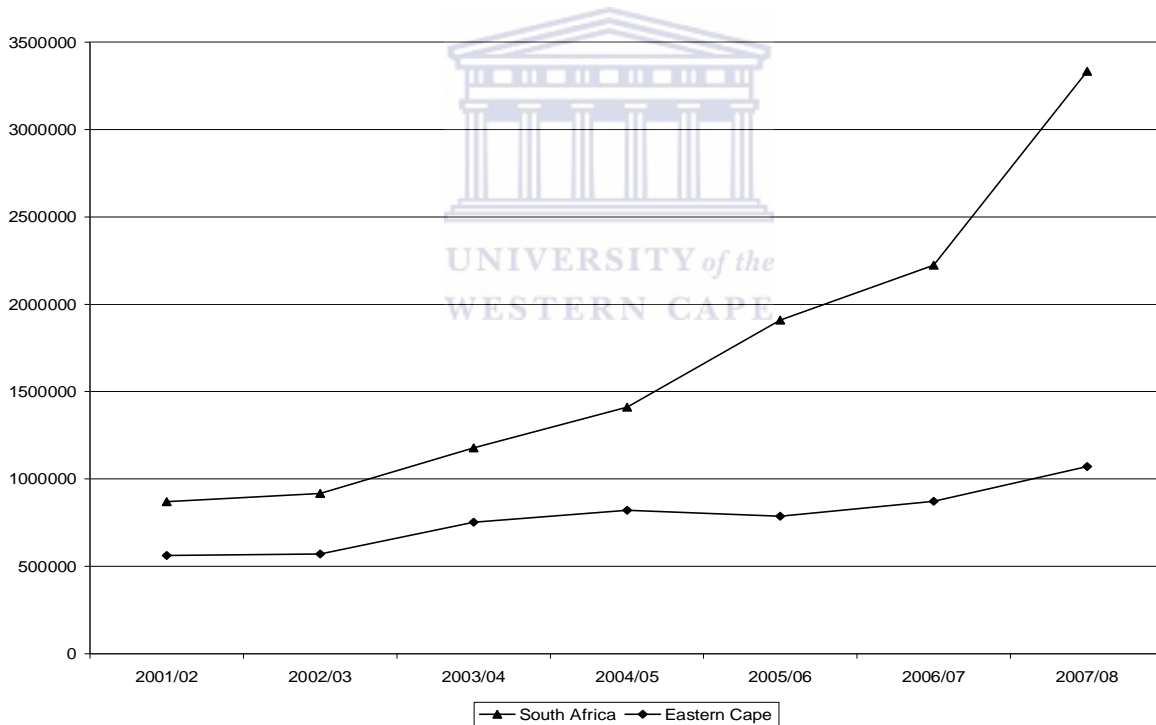
Figure 4.4: Eastern Cape provincial and National government spending on agriculture, 2001-2008
Source: National Treasury (various)

The observed expansion in the monetary value of agricultural development support provides insufficient evidence to assess the importance attached to the agricultural sector. One way to shed light on this is by looking at the changes in two proportions:

(a) the proportion of agricultural spending in total expenditure – to illustrate where agriculture ranks relative to other spending priorities

(b) the proportion of farmer support relative to total agricultural expenditure – to show the extent to which fiscal resources are targeted at resources-poor farmers.

Figure 4.6 graphs the share/proportion of farmer support expenditure relative to total spending on agriculture for the province and that of South Africa respectively. Our estimate of (a) at the national level shows that government continues to spend less than 1% of its total budget on agriculture, and only a small fraction of national expenditure actually goes directly to farmer beneficiaries.
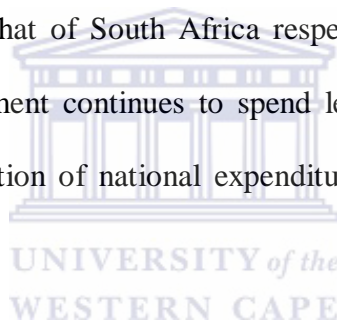
Focusing on the Eastern Cape, it is interesting to observe that its relative share of farmer support spending has been above that of the national average for the period prior to 2004/05. In fact, the share of the farmer support programme has steadily increased, from approximately 21.22% (2001/02) to 41.04% (2005/06). However, after 2005/06 there has not been any substantial rise in the share of fiscal resources allocated to farmer support for the province – rising to a mere 43% by 2007/08.
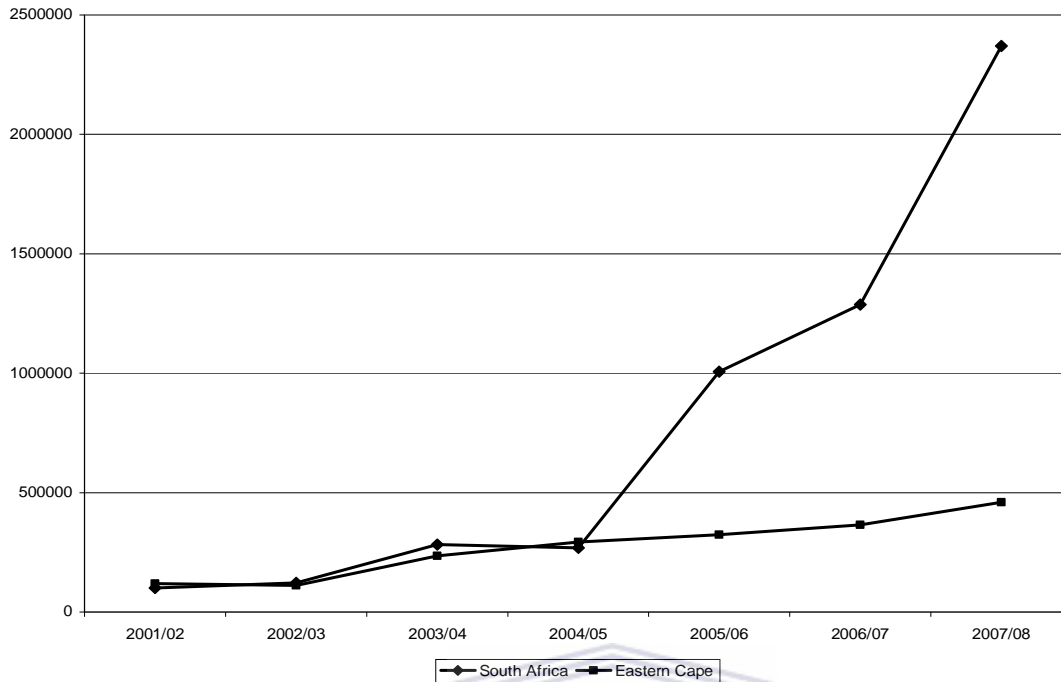
Figure 4.5: Provincial government spending on farmer settlement support and development, 2001- 2008
Source: National Treasury (various)

The observed expansion in the monetary value of agricultural development support provides insufficient evidence to assess the importance attached to the agricultural sector. One way to shed light on this is by looking at the changes in two proportions:

(c) the proportion of agricultural spending in total expenditure- to illustrate where agriculture ranks relative to other spending priorities

(d) the proportion of the farmer support relative to total agricultural expenditure- to show the extent to which fiscal resources are targeted at resources-poor farmers.

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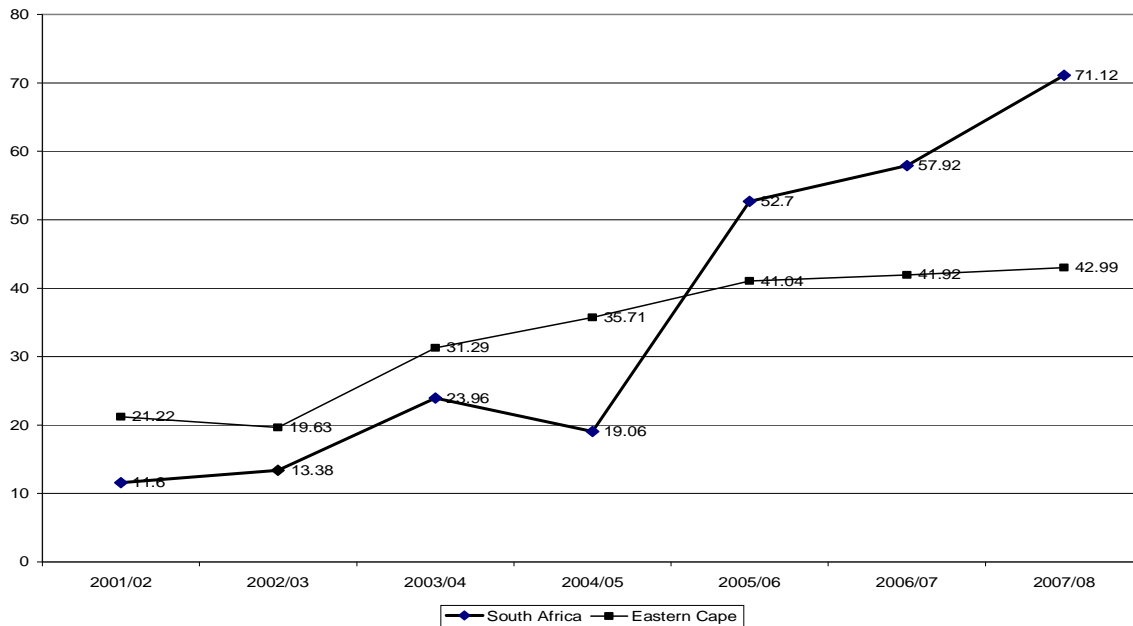
Figure 4.6: Farmer settlement support and development as a percentage of total agricultural expenditure by province, 2001-2008
Source: National Treasury (various)

Going forward, what is the emerging strategic vision of Eastern Cape policy leaders in the domain of agriculture? Given the foregoing analysis of agricultural development expenditure patterns, what evidence is there to show that a dramatic pro-resource-poor small farmer shift is beginning to form the thrust of support for agricultural development? The 2010-2014 Strategic Plan for Eastern Cape agriculture is an informative starting point, because it underscores several initiatives. It laments the underperformance of the agricultural sector relative to the manufacturing, services and tourism sectors. Some of the major constraints to account for this are resource limitations to support poorer farmers and the rising price of fertilizer (Barbour and Sowman 2004). Land transfers through land reform and nominal increases in agricultural development support to date have apparently not reversed the overall decline in agricultural productivity and output. Commentators such as Jari and Fraser (2009) are of the view that

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inefficiencies in agricultural output markets, compounded by weak institutional arrangements, continue to block the poverty-reducing potential of support for farming.

Under the six pillar strategic framework for rural development, agrarian transformation and food security comprise two of the pillars. One strategic objective is that of Accelerated participation, equity and productivity agricultural production. To achieve this, the Six-Peg Policy framework was established, which promotes a green revolution strategy for the Eastern Cape. This framework has underpinned infrastructure installation (including fencing, dipping tanks, stock water dams and irrigation schemes) and key farming inputs, such as tractors and implements. In 2007/08, Six-Peg delivered the following: erected some 650 km of fencing, upgraded 72 dipping tanks, developed 42 small irrigation units, provided 25 tractors and established 30 stock water facilities. Despite these achievements, the problem of low productivity is still persistent (ECDARD 2009).
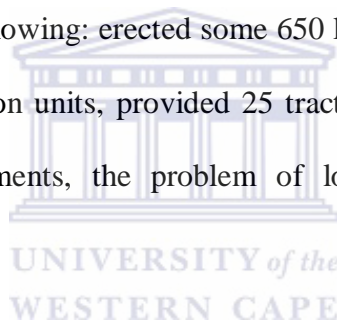
The other strategic objective is to ensure food security. In this regard, the province has programmes such as Siyakula Massive. This is the provincial intervention to improve food security through maize production. According to Tregurtha (2009), this programme did not achieve its stated objectives. However, it had a significant impact on the food insecurity situation in the province.

The province also set a strategic objective: facilitating and supporting markets and redistribution channels to rural farmers. In this regard, the Rural Sustainable Village Model, aimed at expanding investment in agricultural infrastructure, was introduced in Mbizana in 2008. It is set

to be expanded. It promotes entrepreneurial development with a user-friendly marketing information system using cell phone technology. This initiative was developed and launched in December 2008 (Nkwinti 2008) to enable previously disadvantaged farmers better access to market information, particularly output market prices.

4.5 Conclusion

This chapter has argued the need for promoting a pro-poor agriculture-led development strategy in the Eastern Cape province, a populous region incorporating the former homelands of Transkei and Ciskei. Three sets of arguments have been developed in support of this proposition. Firstly, we have demonstrated that accelerated economic growth in the Eastern Cape from 2002 to 2007, based on the tertiary and secondary sectors, has not substantially improved human well-being. Secondly, while the headcount of income poverty has been improving, income inequality and the human development index for the province, especially in the rural areas, have worsened. Thirdly, fiscal support for agricultural development is increasingly lagging behind the pace of national investment, yet the province is home to the majority of resource-poor small farmers in South Africa.

Chapter 5: Research Methodology

5.1 Introduction

The study seeks to understand the determinants of output prices when small-scale sheep farmers exchange their products with different buyers for money. Understanding these determinants is of primary importance, because the sales revenues or incomes, in turn, determine the well-being of the farmers who sell in formal and informal agro-food output markets. The Eastern Cape is arguably one of the poorest predominantly rural provinces, with high poverty and income inequality, as shown in Chapter Three, making it an ideal case study region to investigate the role of agro-food output markets in rural poverty reduction. In this context, it is crucial to know how and why observed livestock (sheep) prices come about between the market participants (farmer and buyer) in local output markets. As argued in the conceptual chapter, these determinants of sheep prices in local trade could be meaningfully examined as structural, institutional, and other livelihood shocks that influence price formation in different ways.

However, the data collection process faced a number of critical problems that had to be dealt with in the methodological design. Firstly, locating a textbook definition of smallholder farmers in South African rural society is much more complex than what it might appear – especially against the backdrop of land redistribution, tenure reform, rural-urban migration and the traditional reliance on social grants and remittance incomes. Farm households might rely on mixed livelihoods and this requires appropriate questions to be asked. Secondly, when rural realities constantly change it is a challenge to settle on a singular data collection method. It is necessary to choose a method to extract in-depth information about the subject under study. This is important to avoid compromising data validity and reliability (Rao 2000). Lastly, we had to

choose the most appropriate technique to analyse the survey, using typical descriptive statistics and a backward stepwise regression model to answer the research questions.

Data collection for this study can be outlined as follows: In the initial stage of the research, information was gathered for the purpose of creating a questionnaire through interviews with key informants, focus groups and observations. Then, in the actual survey, face-to-face interviews were carried out with the help of a structured questionnaire. The technique employed for the selection is known as referral purposive sampling. Under this, agricultural officials were used to identify smallholder sheep farmers.

5.2 Lessons from previous studies

In this section we draw lessons from a selection of research studies published in scientific journals on smallholder farmers to get a sense of the relationship between the research methodology, the scope and core findings. The studies reported in Table 5.1 focuses on different aspects, which include small-scale sheep marketing and the marketing of other small stock (goats) by small-scale farmers. The global studies included focuses on livestock markets and are from developing countries that are at more or less the same stage of economic development as South Africa.

The collection of different studies shows that a variety of methods of data collection can be employed. Amongst these methods are purposive sampling and random sampling. In terms of analytical method, most of the studies identified used the hedonic price regression model, while others used the backward stepwise regression model.

Table 5.1: Lessons on sample design, information collection methods and data analysis from previous studies

	Study purpose/research question	Sample design and information collection method	Data analysis method
Jari and Fraser (2009)	Seeks to identify and assess the technical and institutional factors influencing agricultural market participation behaviour amongst smallholder farmers in the Kat River Valley of the Eastern Cape Province of South Africa by accessing factors that compel smallholder farmers to make certain marketing decisions	Data was collected from a sample of smallholder farmers who were producing a marketable surplus in the Kat River Valley. Farmers were stratified according to farming types: cattle and vegetable farmers. Eighty-six farmers were randomly selected for the survey, where 43 each were cattle and vegetable farmers. The sampling frame from where the farmers were selected was obtained from extension officers. A questionnaire was then administered to the sampled household heads through face-to-face interviews. In the absence of the head, the spouse or any family member who was directly involved in the farming activities and management was interviewed.	Descriptive tables and graphs and a multinomial logistic regression model were used to test the technical and institutional factors causes households to make use of in-depth marketing methods.
Teklewold *et al* 2009	To identify determinants of market prices for cattle, sheep and goats in the export market value chain, starting from pastoral markets to export abattoirs and live animal exporters	Data was collected from a pastoral market and different categories of market participants/actors in the value chain were interviewed. (Purposive sampling was used)	The hedonic price model is employed, under which price is set as the dependent variable depending on the quality of livestock and the characteristics of the market participants (buyers and sellers)
Ayele *et al* 2006	To determine seasonal and inter-market differences in prices after controlling for the effects of different attributes of the animals, the buyers and the sellers	Purposive sampling was used as to choice of the markets to collect data for the survey. The markets were chosen on the basis of the volume of transactions. Data was collected on a weekly basis from each market on one of the main days of transactions for a period of one year.	Implicit/hedonic price model was use to analyse the data
Turner and Williams 2002	To investigate the functioning of livestock markets in the Sahel. More specifically, they aimed at investigating the effects of real livestock markets on stocking decision and the economic vulnerability of households. Linking of households to the market was done through analysing the average livestock	Random sampling of the household for the data prices and destocking in the past prior to the study. The "progeny history" method was used to link livestock owned in the past and the ones presently owned. Based on the information collected, a survey was carried out for which stratified random sampling was employed (strata were based on age, gender,	For analysis the study employed the multiple regression model. More specifically, log transformation on the price of livestock was used as the dependent variable and the independent variables consisted of number of factors that affect prices of livestock (to equalise residual variance)

	price received by a household	and livestock ownership)
Adugna 2006	To identify the determinants of cattle price per kilogram live weight	A survey from the livestock market was carried out on a weekly base for 53 weeks. Purposive sampling was used.	For analysis the study employed a multiple regression model. More specifically, the log-linear regression model was used.
Eze 2007	The paper examines factors relating to the marketing costs, margins and returns of retailed beef meat in southeast Nigeria, and factors influencing the traders' net returns; problems associated with marketing of beef; and the socio-economic characteristics of the respondent traders	Sixty respondents were selected at random, with 20 respondents from each of three purposively selected markets in the study area. A structured interview schedule and personal observations were sources of primary data.	The field data was analysed using cost-return principles, multiple regression analysis and descriptive statistics
Barrett *et al* 2003	This study aimed at identifying the determinants of livestock producer prices for pastoralists in the drylands of the Northern Kenyan rangelands	Data was collected opportunistically, thus does not comprise a random sample. Enumerators recorded information from the transaction site; an amount of 20-30 livestock per day were recorded. Other variables such as rainfall were captured from secondary sources	For data analysis the transactions-level data was analysed through a structural heteroskedasticity-in-mean model. The SHM regression model takes the log-linier form: log of price regressed against various price determinates.
Olawepo 2010	The paper exams the earning activities of farmers in Afon district, a rural area in Kwara State, Nigeria. The main aim was to analyse factors determining rural farmers' income	Data was collected from 10 settlements in the area, selected randomly. Through zoning the communities into five on the basis of wards, two settlements were randomly chosen from each ward. A minimum of 10% of the farming families were chosen, using the rural household heads as the sampling unit. About 268 farmers were interviewed following a structured questionnaire. These questionnaires had been tested prior to the actual survey through a pilot survey	Data analysis used descriptive statistics, percentages and cross-tabulation as means for different variables. Then a stepwise multiple regression analysis was also done to identify the strength of the factors determining income

5.3 Sampling Procedure

Generally, sampling is defined as the process of selecting units (sample) from a population of interest, with the aim of studying the sample and generalising to the population (Leedy and Ormrod 2004). A good sample is expected to be representative of the population where it is drawn from, and for that the selection of units is very critical (Jari and Fraser 2009). A good sample should be large enough to conduct reliable statistical analysis; a sample of at least 30 units is considered large enough (Bless and Smith 2000).

The agricultural officials in the Ukhahlamba and Amathole districts were approached to assist with identifying the small-scale farmers in the pre-survey phase. During this phase, focus group studies were conducted with a variety of small-scale farmers, the majority of whom were in both new and old commonages. In these focus groups, a variety of unstructured questions were posed, including questions about the production and marketing activities they participated in. This process helped in the construction of the questionnaire, which is a tool designed for the collection of primary data. This is the tool used to carry out the interviews in the actual survey. In addition, with the help of information from the pre-survey, we managed to focus the study on sheep farming. Small-scale sheep farmers were preferred because sheep appeared to be common to most farmers and more regularly generated significant income through wool and sales of live animals than cattle and goats.

Another interesting discovery was that these farmers were more like pastoralists who keep livestock for consumption and a store of wealth and sometimes sell them or their products for money to buy other things they cannot produce. However, even though these households were

participating in the agricultural markets, the income reported was too small to make a living from. Thus the idea of focusing on the price formation was perpetuated as a way of finding a solution to boost their incomes.

The sampling method employed in this study is known as purposive sampling. Criterion (LeCompte, Preissle and Tesch 1993), judgmental (Patton 2002) or commonly purposive sampling involves choosing members of a sample with a 'purpose' to represent a location or type in relation to a key criterion (Ritchie and Lewis 2003). This method has two principal aims, which are as follows: ensuring consistency or relevance to the subject matter, and ensuring that the impact of the characteristics under study can be explored fully through the inclusion of some diversity within each of the key criteria.

5.4 Data Collection

The questionnaire consisted of both open-ended and quantitative questions to extract in-depth information. In that way, the questionnaire was designed to collect both qualitative and quantitative data. Face-to-face interviews were conducted with individual heads of households. This kind of interview is regarded as the only means to conduct a survey to yield better results for studies carried out in rural areas (Rao 2000). There are several advantages associated with face-to-face interviews. For instance, Bless and Smith (2000) states that face-to-face interviews prevents the omission of difficult questions by the respondents. In addition, misinterpretations or misunderstandings by the respondents are reduced when interviews are self-administered. Leedy and Ormrod (2004) add that the quality of responses is enhanced, as the interviewer can probe questions more specifically and monitor the respondents' reactions or fatigue. Thus, in a way, such interviews ensure a minimal loss of data.

Heads of households chosen to be part of the sample were interviewed. Our definition of household heads was the main decision maker. However, preference was give to situations where there were at least two main decision makers present than when there was only one. For instance, when both the husband and wife were present they could assist each other in responding to the questions. This was beneficial as some of the questions involved kitchen matters, in relation to which women have relatively more knowledge. On the other hand, some parts of the questionnaire referred to the livestock, and men would have better knowledge. In the absence of the head of the household, any family member who was directly involved in the farming activities and management was interviewed. The main respondent provided most of the information, but was allowed to consult other household members where necessary.

5.5 Variables Considered

The designed questionnaire captured factors that play a role in the process of setting price. Such data collected include:

➢ Structural factors (market availability, price setting – market imperfections, assets owned, market size, family size, age of farmer, distance from the market)

➢ Institutional factors (networking, property rights – land, house)

➢ Exogenous shocks (policy changes, ecological – overgrazing, rainfall variability)

5.6 Data Analysis

Once the information was extracted, it was capture using STATA version 10. Descriptive statistics and frequency tables were used to obtain frequencies and mean values as the main descriptive indicators. These main indicators are important for analysing the characteristics of the households included in the sample. In order to analyse the relationship between the

dependent variable and the independent variables, a multiple regression analysis was carried out. A multiple regression measures the degree to which each of the independent variables contributes to the dependent variable. Since there were many independent variables (predictors), backward stepwise was the technique used to implement the multiple regression (find the independent variables that "best" fit the dependent variable).

Generally, a multiple linear regression analysis (MRA) involves the use of more than one independent variable to explain the dependent variable. The advantage of using more than one independent variable is that it provides a better explanation of the variation in the dependent variable, thus more accurate predictions are provided. The basic assumptions of multiple regression include no or little correlation among the independent variables and that the dependent variable cannot predict the values of the independent variables and must be normally distributed.
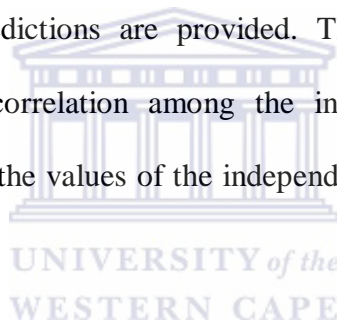
There are a variety of techniques for carrying out stepwise multiple regressions. Generally, the idea is to find a set of independent variables that together provide a "best" fit to the dependent variable of interest (Andersen *et al* 2002). Unlike the forward stepwise regression, this starts with no independent variable in the model and adds them one at a time, backward stepwise works in the opposite way. All the independent variables that are indicated to have some influence on the dependent variable are entered into the model. With a backward stepwise regression the variables with p values statistically not significant are deleted one at a time, leaving only the predictors that explains the dependent variable.

Despite wide criticism of the stepwise techniques in general, it has become a popular technique on the grounds of degrees of freedom, best subset of predictors not picked, and generalisability problems (Knapp and Sawilowsky 2001; Thompson 2001). The backward stepwise method in particular helps to refine the model through the elimination of variables with a p value of greater than 0.05 or 0.1 for tests at the 5% or 10% level of significance, respectively. It reduces the number of chosen independent variables to avoid over-fitting (Haber *et al* 2000). Moreover, through the use of this technique alongside other techniques in one study to compare the results, Andersen *et al* (2002) found similar results.

The model used in this study is rooted in hedonic price modelling. Generally, the hypothesis states that the observed prices of commodities sold in perfectly competitive markets depend on the commodity characteristics (qualitative aspects), as purchasers evaluate the quality of the product to satisfy their utility (Rosen 1974). This implies that only products are differentiated, while their markets, buyers and sellers are not. However, most recent studies argue that the observed price may reflect not only consumer preferences, but also the attributes of buyers and sellers (Ayele *et al* 2006; Teklewold *et al* 2009; Timmer 2009).

In formulating the dependent variable, the shadow prices technique was employed. This is a technique that is generally used to assign market value of the non-tradable goods or other in-kind items. Here we assumed that, if these households were to sell, they could have sold at the market prices of a full-grown/adult sheep. Therefore, these households are assigned the average price of fully grown sheep. This technique helps to accommodate all the sheep farming households that might not have sold at the time of data collection in the analysis. Therefore the general form of the equation is as follows:

$P_i = X_i\beta + \varepsilon_i$ ....(1)

$i = 1,2\ldots\ldots\ldots.N$

where P_i is the average sheep price (shadow) per household, X_i is made up of a range of factors that play a role in the formation of the average price per household, β is the array of the parameters to be estimated (parameters indicating their effect on the observed average prices of sheep per household) and ε_i is a residual. Due to the non-normal distribution of the dependent variable, log transformation was used only on the dependent variable. Therefore, the functional form of this model takes the form:

$log P_i = \alpha + \sum \beta_{si}X_{si} + \sum \beta_{ki}X_{ki} + \sum \beta_{zi}X_{zi} + \sum \beta_{li}d_{li} + \varepsilon_i$..(2)

Where:

logPi – log of average price of sheep for household

X_{si} – explanatory structural (demand-supply side) variables without any transformations

X_{ki} – explanatory institutional (demand-supply side) variables without any transformations

X_{zi} – explanatory exogenous (demand-supply side) variables without any transformations

dli – dummy variables

β_{si}; β_{ki} & β_{zi} – parameters, which after multiplying by 100% indicate how much in percentage points the average price of a product for a household i will rise if we increase the amount of the characteristic by one unit.

5.7 Model specification

By fitting the variables into the model, the model is presented as:

$$log\text{P}_\text{i} = \alpha + \beta_{1}\text{MKS} + + \beta_{2}\text{STLR} + \beta_{3}\text{HHS} + \beta_{4}\text{ASS} + \beta_{5}\text{SLR} + \beta_{6}\text{GOR} + \beta_{7}\text{ASPG} +$$

$$\beta_{8}\text{WYPS} + \beta_{9}\text{SMWI} + \beta_{10}\text{GEN} + \beta_{11}\text{CHS} + \beta_{12}\text{SSPTL} + \beta_{13}\text{TOS}\ \beta_{14}\text{PORS} + \varepsilon_\text{i} \dots\dots\dots\dots\dots(3)$$

where

$log\text{P}_\text{i}$ = log of average price of sheep for household

β_{s} = coefficient of the livestock attributes (qualitative aspect)

STLR = sheep total livestock ratio; ASPG = average price of goat for the household; HHS = household size; WYPS = wool yield per sheep; SMWI = Sheep meat income/wool income; HHC = Household composition – dependency; GEN = Gender; GOR = geographic region; PORS = Main purpose of rearing sheep; CHS = Cattle herd size; SSPTL = Share of sheep per total livestock; TOS = Type of seller; DLTS = Shelter/dwelling type (shack); DFNT = Distance from nearest town.

ε_i is the error term

5.8 Conclusion

In this chapter, the methods that were used to analyse the data were reviewed. Data was collected from small-scale farmers in the Ukhahlamba and Amathole districts. The research is focused mainly on small-scale sheep farmers. In order to select a sample of smallholder farmers, a referral purposive sampling method was employed under which agricultural officials played a crucial role in locating the participants. To prepare the survey instrument, focus groups were conducted with the small-scale farmers in a pre-survey visit. Based on responses and
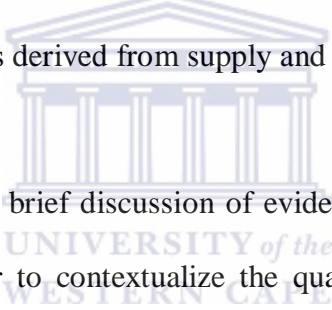
observations from this pre-survey visit, a questionnaire was created. This is the instrument used to accompany the self-administered face-to-face interviews. Such interviews reduce misunderstanding and misinterpretation, as well as prevent the omission of difficult questions. For analysing the data, the hedonic price model (stepwise log linear multiple regression) was chosen; the reasons and its advantages have been highlighted. The results of the research are presented in the next two chapters.

Chapter 6: Research Findings and Discussion

6.1 Introduction

In this chapter we apply the analytical methods explained in the previous chapter to analyse and discuss information collected from farm households in Ukhahlamba (Joe Xabi) and Amathole between September 2009 and May 2010. The econometric method used to formally test the main hypothesis that the output price a farm household receives is influenced by different structural, institutional and exogenous shocks is a stepwise backward regression model. The specification of the model shares many properties with econometric relationships tested in hedonic pricing models- the price of a commodity is derived from supply and demand factors.

Before testing the formal model, a brief discussion of evidence from key informant interviews and focus groups will be in order to contextualize the quantitative findings. The data under analysis was collected from small-scale sheep farming households. Also, a brief explanation of the demographic characteristics of the sampled households is given. This is followed by an overview of results on households' assets ownership, income and expenditure. These are some of factors which can play a role in the process of price formation. Also discussed, are results related to farming activities and income from agro-foods markets. Descriptive statistics such as mean, counts and standard deviation are the main statistical tool employed. Finally, empirical results from the formulated model and diagnostic tests are also presented in this chapter.

6.2 Evidence from key informant interviews and focus groups

This section uses the evidence from key informants interviews and focus group to reflect on the evidence from the survey. Five interviews with groups and key informants are as follows: Qoboshane wool association, Walaza Goat Project, Kwezilomso Project, Qhlana farm (Fowl ran), Border Glen farm and Phambili Makhesa Farm.

Case 1: Qoboshane wool association

Qoboshane wool association is located in Sterspruit near Lesotho border. It has 25 members and Mr Makhosonke is one of the members in this association. He started sheep farming 5 years ago, at the time of interview he owned about 41 fully grown sheep

In terms of agricultural activities and production systems, the main type of livestock is sheep (Marino sheep) which is mainly kept for wool production. Members in the association own flock as large as 200 and minimum of 4 sheep per household. Other types of livestock reported are goats and cattle. All the livestock graze in the mountain slope nearby. The grazing area had no fence at the time of the visit due to vandalism. Thus, farmers faced challenge of overgrazing, poor management of the grazing area is the reason highlighted by our key informant.

In terms of marketing activities: We did not find any evidence that permanent farm workers were employed by members of the association. Rather, household utilise their family labour. The main types of farm workers employed are shearers and wool packers, are employed seasonally (Backward linkage to markets).

In terms of forward linkage with the markets, the members of the association sell their wool to auction market in Port Elizabeth through the brokers (BKB and MMW). These brokers usually collect the wool from the shear shed available after local classing and weighting. The farmers receive their money after the auction, which can take weeks to reach them. Transport cost is deducted per bell from the total revenue from wool. Members outside the association sell their wool to local traders, mainly from Lesotho. These local traders pay on spot, but very low price (R2 per kilogram compared to auction price of R39).

Mr Makhosonke reported income of about R1030 in the previous season, which was the highest return from wool he ever acquired. Mr Makhosonke does not normally sell sheep, only sales when there is an immediate need for cash. The problem identified in the market for sheep is lack of market information, market price information in particular. There are limited livelihood strategies to assist the income from wool/sheep apart from pension/grant for Mr Makhosonke.

Information Source: Mr Makhosonke member of the Qoboshane local wool growers association.

Case 2: Walaza Goat Project

Walaza goat project is situated north of Sterkspruit under Senqu municipality. At the time of the interview the project was running with only active members.

In terms of agricultural production, cattle sheep and goats are found in this area, but goats dominate. More than 80 goats are found around Walaza village. These all the livestock graze along the mountain slopes where two camps are available for the livestock in the whole village.

Small-scale wool growers are available but not organized into associations. None of the members in project had intensions of shifting to wool production. This mainly because they consider sheep costly to keep, "sheep requires special treatment".

As for market information, services are supplies by agriculture department extension office. Family labour is utilised by these farmers. The goats are kept mainly for meat, but the farmers were trying to enter into cashmere market in Free State. At the time of the interview, the farmers had sold the cashmere to Cradock through agents (Mr Rocks and Mr Mashile from the agriculture institute). However, they had not received the money, despite having agreed on the price. The prices agreed range: R180 to R200 per kilogram depending on the quality of the cashmere. A demonstration had been carried out on the quality required by the market for these farmers. Even though the farmers had not yet received the cash for their product, they had received record from Cradock that their cashmere had poor quality. It is important to note that before this cashmere markets was realized these farmers used to burn the product.

Information sources: Mr Magengenene (Chairperson); Mr Mqhednla and Mr Mabokwe (members of the project) and Mr Mavungwana youth in the area

Case 3: Kwezilomso Project

The project was found by members from a commonage located in Venterstad town under the Gariep municipality. The commonage is about 6 000 hectares in size and it has about 89 members.

Agricultural activities and production system: The association is mainly at production level as a common land is shared. An amount of R5000 per annum is paid to the municipality by the members for the commonage. Thus, each member pays approximately R290 per year. Government support is in the form of veterinary services to combat diseases and extension services. Members of the association are involved in keeping three main types of animals namely; sheep, goats and cattle.

Sheep and goats have the highest numbers with rough estimates of over 2000, while for cattle estimated 1500. Per household the highest number for sheep, goats and cattle were 400, 205 and 60 per household respectively. While lowest for sheep, goats and cattle were; 3, 5 and 1 respectively. The grazing is also a problem for these small-scale farmers. The fence around the grazing area is still available. There is a functional pasture management practiced even though there were complaints about overgrazing and vandalism of the fence.

Dorper is the common type of sheep identified in this area, mainly for meat. Marino sheep found in the other eastern side of the district for wool is said to be difficult to start. "*It is very expensive as it is affected by the environment in addition to the problem in acquiring loan from the bank to maintain them. However, Dorper sheep it is resistant to the ecological environment and in terms of breeding it is better than the Marino sheep*" said one of the members. Dorper sheep is a hybrid breed from the Muddleberg research station of the indigenous sheep 1930s and the Indian breed. This hybrid produces enough meat for the local market using the veld.

Market activities: Farmers work together at production level, but at marketing level individuals market their own agricultural products. A variety of markets were identified namely: the local butcheries and butcheries in nearby towns (Colesberg), commercial farmers, community members (including those staying on the nearby mine) and few selling to auction markets in Bloemfontein. Buyers come directly to the individual small-scale farmers, but sometime the come through the chairperson.

Livestock, cattle in particular are weighed and the price is settled based on the scale. The farmers do not have enough information about the markets for their livestock, more specifically the price. Thus the price charged technically comes from the buyers (determines the price). The average price of a fully grown sheep and goat reported; R700 and R800 respectively.

Some of the informal traders buy animals to improve the quality (fatten them) and then sale to the auction markets at a relatively higher price. The farmers in the association had no interest in selling directly to auction markets. One problem identified was the transport costs involved in reaching such markets. Hence, farmers prefer informal who do not charge transport costs. The farmer identified to be selling sheep to a commercial farmer was satisfied by deal. Some of the reasons why farmers would continue to sell their livestock the way they do includes: the need for immediate cash to support their families and repayment of loan.

Wool marketing is not evident in this area due the ecology which is suitable for Dorper. However, if government assists them in keeping Marino sheep, the farmers were willing to

practice wool farming. Other product identified is the animal skins. Again farmers do not have any knowledge about the market for these products, such that buyers tend to exploit them.

Information Source: Members of the Kwezilomso project.

The other cases/interviews were with the farmers who had recently benefited from the LRAD programme (farmers who recently graduated from the communes). These are as follows: Fowl ran farm in Burgersdorp under Gariep Municipality, Border Glen farm and Phambili Makhesa Farm in Lady Grey. The idea was to compare challenges facing these so called emerging farmers to those facing small-scale farmers still in the communes.

Firstly, it was observed that the emerging farmers had no problem with livestock graze of management of pasture. Secondly, it was found that emerging farmers too were still constrained in terms of market information. Thus, in some case buyers would still set the prices. Thirdly, unlike the smallholder farmers in commune whose sell of livestock is driven by the emergence need of cash, with emerging farmers a sell is profit driven. This is mainly because emerging farmers have a wide range of farming activities namely: crop production and marketing, wool and cashmere production and marketing. Furthermore, in terms of asset wealth namely; land, livestock and other moveable emerging farmers are well ahead of the farmers in the commune.

Source of information: Mr Qhlana and son, Mr Sifatsa and Mr Nxele

6.3 Descriptive Statistic

In this sub-section analyses the demographic and livelihood factors of the smallholder sheep farmers using the data collected from the area under study.

6.3.1 Demographic

This section covers discussion on aspects such as gender, age, occupation and highest educational levels of the household head. These demographic factors are important in the analysis of price formation because they affect decision making within a household (Makhura 2001). Also presented in this section are the household characteristics aspects which are mainly the household size and structure. Analysis of such factors is important because they can influence the household economic behaviour (Randela 2005).

Table 6.1 below shows an overview of the self-reported/identified occupation for female and male household heads included in the sample. The sample size was 134 households from the two districts of Eastern Cape Province (Amathole and Joe Xabi). Across the different occupations, there are clear gender differences in occupation. Males are more likely to be farmers and farm workers than females. This is substantiated by the findings from studies carried out in the province. For instance, livestock are generally owned by males in the Eastern Cape Province (Montshwe 2006; Jari and Fraser 2009). Clearly, it is evidence of gender-based inequities in primary agriculture/farming which is still prominent in the province.

Table 6.1: Self-reported occupation of males and females by district, Amathole & Ukhahlamba

	Amathole		Ukhahlamba		
	Male	**Female**	**Male**	**Female**	**Total**
Farmer	26	10	47	2	85
Farm worker	11	0	16	5	32
Other	6	1	8	2	17
Total	43	11	71	9	134

Knowledge and experience tends to accumulate with age (Jari and Fraser 2009). This implies that, age of the household head can be an important aspect in marketing of agricultural products. Furthermore, age tend to affect decision making, particularly in situations where adoption of new ideas is required. It is important that the sample consists of the mixture of both young and old farmers to balance both aspect of experience and adoption of new ideas. Table 6.2 below shows results on the age of respondents by the different occupations. As expected, farmer category has the oldest average age of 63 for both districts. Thus, there is no much difference on age across the districts. The youngest farmer from Joe Xabi had 32 years, while from Amathole the youngest had 41 years both males. It is expected that, the younger the farmer the more likely they are to be active and more informed in the markets to avoid price exploitation by well informed buyers.

Table 6.2: Household head age by district and main occupation (average)

	Amathole district	**Ukhahlamba district**
Farmers	63	63
Farm workers	37	42
Other	60	61

Levels of education are important as an indicator of the respondent's ability to interpretation information and acquire knowledge (Jari 2009). In addition, level of education plays an important role in the choice of marketing channels (Gong 2007). The rational is that better educated farmer would choose marketing channel that yields the highest income or markets with

better prices, *ceteris paribus*. Alternatively, educated farmer stand a better chance of avoiding price exploitation by well-informed buyers. Thus, education level plays a role in the process of price formation in the local agricultural markets.

Table 6.3 below shows the counts on educational levels of respondents from the two districts by gender and occupation. Only 9% heads of household under the farmer category from Amathole had none educated, against 29% from Joe Xabi.   As for household heads with primary education, Amathole had 45% under farmer category, against 37% from Joe Xabi. Generally, the highest number of respondents in the sample had at least primary education; which enhances the quality of responses. There is no difference in the number of respondents with secondary education for the two districts. However, there are some individuals in the sample who indicated to have gone as far as matric and post-matric education

Table 6.3: Household head level of education by district, Amathole and Ukhahlamba (N)

		None	Primary	Secondary	Matric	Post-matric	Total
Amathole	Farmers	3	15	13	2	0	**33**
	Farm workers	0	7	3	1	0	**11**
	Other	1	4	1	0	0	**6**
Ukhahlamba	farmers	14	18	13	2	2	**49**
	Farm workers	3	11	3	1	0	**18**
	Other	1	5	1	1	1	**9**
Total		**22**	**60**	**34**	**7**	**3**	**126**

According to Randela, (2005) both household consumption and production can influence the performance a product/commodity offered by a household in the market. Larger households can be discouraged from selling because a household needs to supply household consumption before decision to sell (Jari and Fraser 2009). However, for the households practicing livestock farming, livestock are kept for assurance against emergencies (Fafchamps and Gavian 1995). High consumption associated with large household size can be one of the factors leading to distress

sales. Alternatively, household with higher dependency are more likely to face pressure to sell livestock than those with lower. Generally, households with larger number of children are more likely to have more scholars. This also implies that, such households are more likely to be facing higher expenditure on school fee and uniform. Therefore, such expenditures can affect price formation in as farmers can be forced to sell livestock mainly for this reason

Table 6.4 below shows that, there is no much difference across the district on the household size for all the categories of respondents. There is also no significant difference in the dependency ratio. Hence, in that case both household size and structure are not expected to be significant under factors influencing the price formation.

Table 6.4: Household composition by district and main occupation (averages)

	Amathole district			**Ukhahlamba (Joe Xabi)**			
	Children	Adults	Child/adult ratio	Children	Adults	Child/adult ratio	Household size
Farmers	2	4	0.72	3	3	1.08	6
Farm workers	2	2	0.76	2	3	0.66	4
Other	3	4	0.74	2	3	0.75	7

6.3.2 Asset ownership, incomes and Expenditure

Assets ownership considered in this case are subdivided into four groups; immovable, movable, financial and livestock assets. This is important because such categorisation helps to show the different asset aspects which can play a role in price formation. Stroebel (2004) states that, agricultural related assets ownership do affect production and marketing decisions among smallholder farmers. It is more likely those farmers who own more assets are better placed in terms of wealth. Thus, such households can avoid price exploitation through distress sales than

those who lack assets ownership. This is mainly because such assets can help to generate extra income for the respective farming households (Turner and Williams 2002).

Classified under immoveable assets is: land, house and storage facility. A large number of the livestock farmers in the province use communal grazing land for animal feeding. However, 23% of the respondents reported to have ownership/access to arable land. Such land is used to grow crops that generates additional income or reduce the amount spend of food purchases. It is expected that households with access to arable land to have less pressure to sell their livestock. Dwelling type can be an indicator of wealth status of a household. Generally, poor households are expected to be living in shacks than brick houses. However, in the rural set-up a household can own a shack as a tradition. Nevertheless, the results show no significant difference between the two districts on dwelling type.
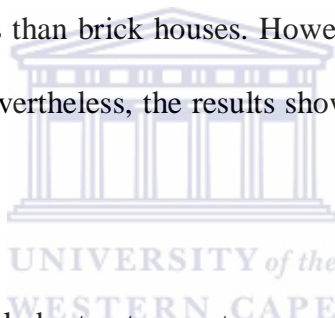
The movable assets considered include; tractor, motor-car and motor-cycle. Ownership of such asset can have an impact on the price formation. That is these assets can reduce transport costs, enable the farmer to access distant markets/formal markets. Furthermore, such assets can be used to generate extra income, reducing pressure to sell livestock and avoid exploitation. Therefore, households who own at least one of the above assets are expected to be associated with relatively higher average sheep prices than those without. Results show that very few households with access to a tractor, motor-car sedan or bakkie. This is a clear indication to show that majority of the farming households under study rely heavily on public transport.

In terms of financial assets, it is found that majority of the farmers for both districts have pension funds (grants) as their main source of income. This is substantiated by BMR (2009) which states that, Eastern Cape Province is second following KwaZulu Natal on number of grant recipients. On average, farmer category has relatively higher amount of income than other categories (see Table 6.5). Surprisingly, only 15.3% of the respondents under farmer category reported selling farm/garden products as their main source of income. This goes to the core of the problem outlined: That is, even though small-scale farmers are involves in the marketing of agricultural products, majority cannot rely on it to identify it as their main source of income.

Table 6.5: Household head ownership of movable and immovable assets (counts)

	Farmer	**Farm worker**	**Other trader**
Land (*n*)	26	3	2
Brick house (*n*)	72	15	15
Shacks (*n*)	37	13	7
Storage facilities (*n*)	34	2	7
Tractor(*n*)	7	0	0
Sedan(*n*)	13	0	2
Bakkie (*n*)	25	0	3

Household stated secondary sources of income by occupation and district (*monthly averages*)			
	Farmer	**Farm worker**	**Other**
Grants (R)	1459.73	596.00	1317.50
Savings (R)	5659.26	1507.14	1000.00
Other Secondary income & remittances (R)	1272.00	611.88	935.79

The livestock identified from the two districts include cattle, goats, sheep, pig and poultry. Farmer category from the two districts, own the highest number in all the livestock cattle on average. Also on average, Joe Xabi district has relatively higher number of all the livestock.

Generally, for the livestock, sheep has the highest numbers (see Figure 6.6). Caution, the numbers might not reflect the actual picture on livestock numbers because of the use of purposive sampling method. In this case, mainly farmers with sheep were included in the sample.

Table 6.6: Household ownership of the livestock by district and occupation (average)

	Amathole			Ukhahlamba (Joe Xabi)		
	Farmer	Farm Worker	Other	Farmer	Farm Worker	Other
	Mean	Mean	Mean	Mean	Mean	Mean
Livestock assets-cattle	11	3	6	17	2	5
Livestock assets-goats	16	0	17	30	4	26
Livestock assets-sheep	63	1	43	101	4	2
Livestock assets-pigs	0	1	0	1	0	0
Livestock assets-poultry	18	7	25	7	3	2

In terms of expenditures, the results in Table 6.7 show that on average majority of the farming households spend largest proportion of their income on food. This is consistent with the findings by the BMR (2008) which reported that majority of household in the province have more than half of their income spend on food. A comparison of incomes and expenditure is important as it can indicate the amount of pressure the household can be under to sell its livestock to cover all the expenditures. The higher the income above the expenditures implies less pressure to selling the livestock. Hence, avoid lower price from distress sales. In terms of expenditure, farmer category spends relatively higher than the other categories.

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Table 6.7: Farming household income and expenditures by district location and occupation (average)

	Amathole			Ukhahlamba		
	Farmer	Farm worker	Other	Farmer	Farm Worker	Other
	Mean	Mean	Mean	Mean	Mean	Mean
Share of food expenditure per household income	0.56	0.55	0.52	0.41	0.65	0.37
Annual expenditure on food	10109.67	8656.36	13834.29	13295.76	6852.00	9838.80
Annual expenditure on energy	1729.33	1212.00	1028.57	2904.49	590.29	1392.00
Annual expenditure on water	0.00	0.00	0.00	668.57	25.71	1620.00
Annual expenditure on rent	0.00	0.00	0.00	514.78	38.86	72.00
Household annual expenditure of other	18285.81	3535.64	4685.71	10516.57	4599.90	5865.00
Annual total household expenditure	30124.81	13404.00	19548.57	27900.16	12106.76	18787.80
share of food per total expenditures	0.61	0.65	0.73	0.55	0.59	0.61

6.3.3 Farming Activities and income from Agro-food Market

Basically, the two districts have both livestock and crop farming as the main broad farming activities, but livestock farming dominants. This picture is very clear when the amount of income received from each of the two farming activities consideration. On average, farming households in both districts are earning more income from livestock than from crops (see Table 6.8 below). Furthermore, additional income from livestock farming is also earned through selling of livestock products such as wool. However, on average farming households from Ukhahlamba tend to earn relatively higher income from livestock than those in Amathole. This can be explained by the differences in the prices as well as the quantities of livestock sold. In this case,

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results in Table 6.8 show that on average farming households in Ukhahlamba reported to have obtained relatively higher prices than those in Amathole. Moreover, the quantities sold from Ukhahlamba are on average higher than those from Amathole farming households.

In terms of expenditure on farming activities, there is no difference in the two districts. However, farming household who are full-time farmers are on average spending relatively higher amounts than other groups for both districts.

Interestingly, the component of indirect income from livestock and crops is relatively higher than the direct component. This implies that, households are consuming the largest portion of their income from farming activities. This point is important in the sense that it shows the opportunity costs of consuming own produce. In this case, the cost is relatively less to consume than to sale. This position can be linked to the results which show that most of the households are farming mainly for consumption.
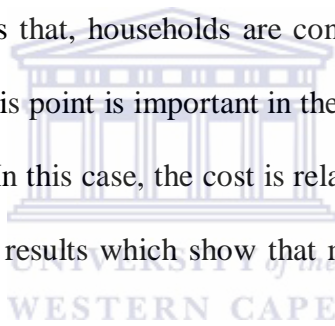
Table 6.8: Household farming activities and income from agro-food markets (average)

		Amathole			Ukhahlamba		
		Farmer	Farm worker	Other	Farmer	Farm Worker	Other
Gross annual livestock income (direct component)		14647.04	7500.00	8292.50	47742.56	9000.00	6578.57
Imputed livestock income (imputed component)		17436.76	6250.00	12337.50	64355.25	4937.50	7687.50
Gross annual crop income (direct component)		733.00	.	1016.25	4595.83	.	20.00
Imputed crop income (imputed component)		808.09	195.00	1187.14	2349.77		865.00
Total income from wool		1187.50	2500.00	1475.00	2098.26	587.50	4433.33
Total expenditure on farm inputs		2097.61	163.33	1632.80	3803.44	.	1519.17
Net farm income (direct + imputed components)		32373.65	7414.29	17049.12	105647.34	7625.00	15487.68
Main purpose of rearing/keeping sheep	Consumption & donations	19	11	4	26	20	10
	Selling	17	0	3	23	1	0

6.4 Empirical Results

6.4.1 Introduction

The previous section presented the descriptive results of the data analysis, thus laid a foundation for the analysis section. An Overview of factors that influences the average price of sheep for a household has been discussed. Hence, this section focuses on empirical results on factors determines sheep price for the farming households in the two districts (Joe Xabi and Amathole). The empirical results are presented and discussed, base on the model formulated in chapter 4. More specifically, the independent variables are tested for influence on the dependent variable. Conclusions are drawn based on these results. This section commences with laying out the hypothesis and expected results (giving the anticipated signs and information). The empirical results of the hedonic price regression model are presented. An in-depth explanation is provided for the significant variables under the interpretation of findings/discussion of results. Finally, a brief explanation on some diagnostic tests is given.

6.4.2 Hypothesis of the Expected results

Average sheep price for a household is determined by a variety of factors which can be broadly classified under; structural, institutional and exogenous shocks factors. Such factors can either influence price positively or negatively. Structural factors include; market size, distance from the market, age of household head, wealthy status, gender, household structure and prices of related products. While institutional factors include; social capital, market power, cooperative/group and exogenous shock includes drought.

Table 6.9: Definition of independent variables used in the model

Variable	Variable description	Expected sign
ASPG	Average price per goat (continuous variable)	+
WYPS	This is the contribution of each sheep to the income from wool (continuous variable)	+/-
DFNT	This is the actual distance from the nearest town (continuous variable)	-
GEN	Gender: Male=1 and female =0 Institutional/structural, Dummy variable	+/-
HHC	Child-adult ratio (continues variable)	-/+
(DL)	District location :Ukhahlamba=1 and Amathole =0 Structural, Dummy variable:	-/+
SMWI	This the ratio of income from sheep meat to the income from wool (continuous variable)	-/+
DT	number shack per brick rooms ratio reported by each farming household (Structural, continuous variable)	-/+
PORS	Ratio of sheep sold to sheep consumed/donated. If sheep sold is more consumed = 1: if sheep consumed more than sold = 0 Dummy variable	+/-
CHS	Livestock wealth-Cattle herd Size: Continuous variable	+
SSPTL	Position of sheep to a household- Share of sheep per total livestock: Continuous variable	-/+

6.4.3 Detailed explanations of the above variables

i. ASPG: The prices of sheep can be influenced by prices of goats. Sheep and goats in the rural areas of the province are demanded in the local market. In most cases, families demand both animals either for traditional ceremonies or general household consumption. Even though the two are not perfect substitutes, we expect some relationship between the prices of the two livestock. On the demand side, suppose the goat price increases in the market *ceteris paribus,* sheep becomes relatively cheaper. We therefore expect to people to demand more of sheep, thereby pushing the sheep prices higher as well. Alternatively on the supply side, if the sheep farming household should have perfect knowledge about prices of sheep and goat, since the livestock are sold in the same market. In other words, for household dealing with sell of sheep and goats, if it is capable of getting higher price per goat then we expect the same for sheep, *ceteris paribus.*

ii. WYPS: If income from wool per sheep (per sheep yield) is high, then the average of price sheep for a household is also high. According to Bailey *et al* (1999) income from livestock required by the farmers is in the products (e.g. wool), rather than the sales of livestock themselves. Capital assets are held until income generating value fall below the salvage value (Turner and Williams 2002). Household finds it hard to let go their asset if its yield is relatively high. Therefore, the hard it is for a household to sell its sheep, the higher is the average sheep price. In other words, the opportunity cost of income from selling a sheep is equal to the wool income that could have been

extracted from that sheep. This works as supply side factor, either positive or negative signs are expected since this is a ratio.

iii.   DFNT: Distance from town does affect the average sheep price for a household. Considering the fact that the high demand of meat in general is concentrated in town (urban area), this should push the average price of sheep up for those closer to town. The further away from the market the lower is the demand (fewer buyers) for sheep, thus the lower the price per sheep.

iv.   GEN: Gender does have an effect on average price of sheep for a household. This is based on the ability to negotiate between the males and female. Generally, female are said to have relatively lower power to negotiate a price than male.

v.   HHC: The higher the number of child in relation to adult (child-Adult ratio) affects the average price of sheep per household. That is, the higher the ratio the more children in the household than adults the higher the dependency ratio, thus the lower is it average sheep price, because such household are likely to be under pressure to sell for income to support the family (Case for distress sales).

vi.   SMWI and SSPTL is a measure of the importance sheep meat as a source of income relative to other sources to a farming household. Higher ratios imply that, selling of sheep dominates other sources of income as a source of income for a particular

household. Since, these are ratios the expected signs can either be negative or positive. Most importantly, these are is a supply side factors.

vii. On the supply side DT is a measure poverty/wealth status of the farming household. Higher ratio is expected to act as an indicator of poor household. Since, this is a ratio, again both signs are expected.

viii. On the supply side, PORS is the ratio of sheep sold to sheep consumed. This variable measures the effect of distress sales. In this case, factors such as desperate need of cash/stock theft can force farming households to sale their sheep. These households are characterized by relatively higher sales of sheep than consumed. Again both signs can be expected since this is a ratio.

ix. CHS measures the livestock wealthy aspect in a household in the form of cattle herd size. In some cases, livestock such as cattle can generate additional income for a household. On the supply side, cattle can bring income which reduces the desperate need of cash pressure in a household. Thus, the larger the size of cattle herd the less the pressure, then the higher should be the average price of sheep for the household. In that case, a positive sign is expected**.**

6.4.4 Checking for the assumptions of OLS

This section uses Stata to explore or check on how well your data meet the assumptions of OLS regression. In particular, the following assumptions are considered:

- Linearity – the relationships between the independent variables (predictors) and dependent variable should be linear (see Table 6.10)

- Normality - the errors should be normally distributed. This is technically necessary only for hypothesis tests to be valid. A test for residual normality using Kernel density plot/estimate shows no indications of non-normality. This implies that, for this model estimation of the coefficients the errors are identically and independently distributed (see Figure 6.11).

- Homogeneity of variance (homoscedasticity) - the error variance should be constant. Graphically, the residuals are plotted versus fitted (predicted) values (see Figure 6.12 below). Residuals are scattered randomly, an indication of no homoscedasticity problem. In other words, this amounts to say that the variance is homogenous. Thus, our model is well fitted.

- Independence - the errors associated with one observation are not correlated with the errors of any other observation

- Errors in variables - predictor variables are measured without error
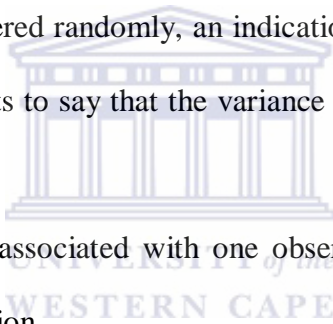
Table 6.10: Correlation matrix between quantitative variables (predictors) for linearity test

	logPs	ASPG	WYPS	SSPTL	DFNT	CHC
logPs	1.0000					
ASPG	0.4598	1.0000				
	0.0000					
WYPS	0.2655	0.3184	1.0000			
	0.0023	0.0002				
SSPTL	0.2416	0.4801	0.3145	1.0000		
	0.0103	0.0000	0.0002			
DFNT	0.2442	-0.0655	-0.1035	-0.0189	1.0000	
	0.0095	0.4523	0.2342	0.8283		
CHC	0.2714	0.5289	0.4132	0.9232	-0.0834	1.0000
	0.0038	0.0000	0.0000	0.0000	0.3380	

Figure 6.1: Kernel density plot for normality test

Spearman's correlations were used for the correlation between the dependent variable and categorical or ordinal predictors. The following independent variables were correlated to the dependent variable: PORS, DL and RES.
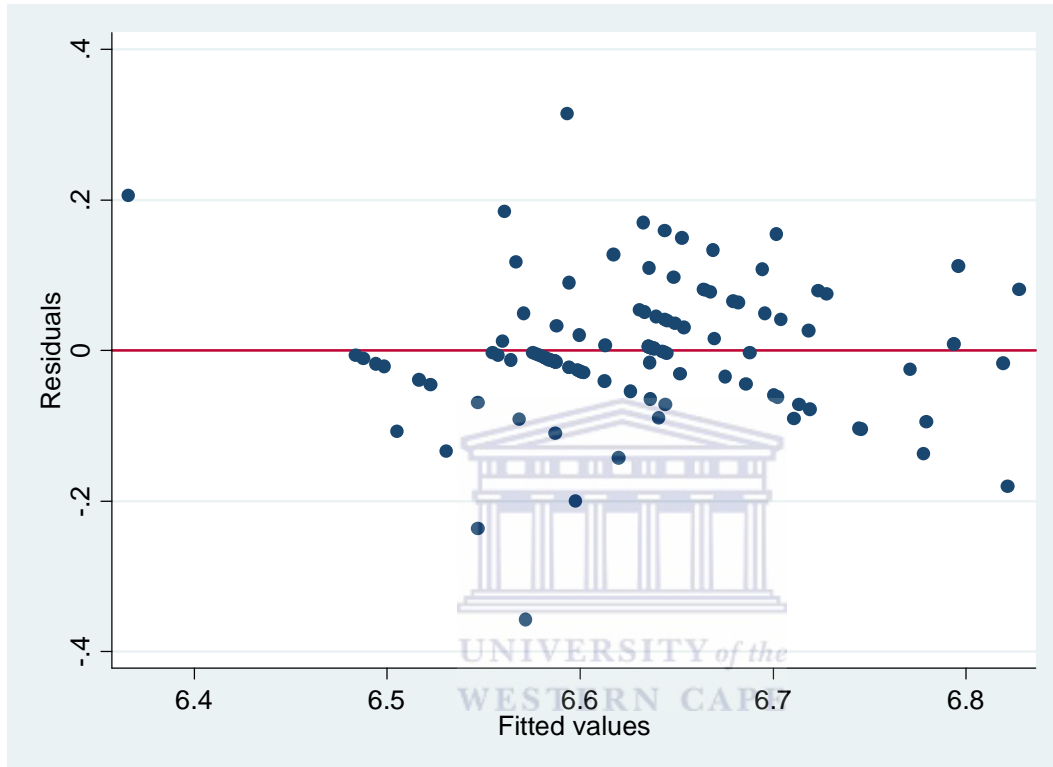
Figure 6.2*:* Residual and fitted value plot for homogeneity of variance (homoscedasticity)

6.4.5 Estimation of the Empirical Model

The model is estimated with OLS. Estimates of the model coefficients are presented in Table 6.11 below.

Table 6.11: Hedonic price model for the sheep market in the Eastern Cape (OLS regression)

Variable	Coefficient (β)	Standard error	T	P-value
Constant	6.3191	0.05975	105.77	0.000***
ASPG	0.0003	0.00006	4.88	0.000***
WYPS	0.0142	0.00056	3.99	0.000***
SSPTL	0.0989	0.03117	3.17	0.002***
CHS	0.0012	0.00069	1.69	0.095**
PORS	-0.1205	0.01990	-6.06	0.000***
GEN	0.0492	0.02919	1.69	0.095**

p-value < 0.05***   p-value<0.10**

Number of observations = 106
F-test = 15.22
Prob > F = 0.000
R^2 = 0. 452
Adjusted R^2 = 0.446
Degrees of freedom = 6

6.4.6 Interpretation of findings/discussion of results

The beta coefficients (Bs) indicate the degree of influence corresponding with the independent variable on variations in the dependent variable. A higher coefficient implies that the corresponding independent variable strongly determines or highly influences the dependent variable. The signs on the coefficients measure the direction of influence of the respective independent variable on the dependent variable (Gujarati 1995). In other words, the sign shows the nature of the relationship between the independent variable and the dependent variable. A positive sign implies that the independent variable and the dependent variable move together/in the same direction, while a negative sign means that the two move in opposite directions. However, the sign and value of the independent variables are not enough; there is a need to check the significant value. The significant value, also known as the p-value, shows whether the

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independent variable's influence on the dependent variable is significant enough. In order for a variable to be considered significant at 5%, its corresponding p-value must be less than 0.05 (5%). This implies that there is only a 5% probability that the independent variable does not influence/determine the dependent variable, negatively/positively and with that beta coefficient value. In other words, a significant level greater than 0.05% means the evidence is not enough to conclude that the respective independent variable determines the dependant variable.
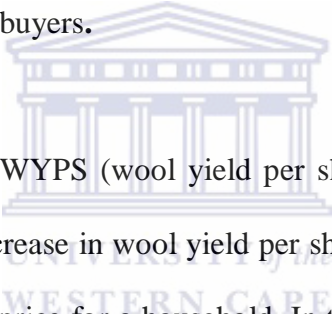
Adjusted R^2 is of more importance than simply R^2, because many independent variables are considered (multiple regressions). Usually, Adjusted R^2 is required to be above 0.25, which is interpreted as being that 25% of the variation in the dependent variable can be explained by variation(s) in the independent variable(s). The F value must be high and the overall significance level (Prob > F) of the model must be less than 0.05%, if the analysis is at 5% level of significance.

6.4.7 Significant variables in the model

The regression results from Table 6.11 above shows a coefficient of 0.03% for the independent variable ASPG (average goat shadow price). This means that, for a household with average price of goat increasing by 10% household, the average sheep price per household will marginally increase by only 0.3%. The sign of the beta came out as expected. This result is statistically significant at the 5% level of significance. Thus, we reject the hypothesis that goat prices have no relation with sheep prices. We therefore can conclude that the higher the prices of goats sold by one household, the higher is the prices of sheep sold by the other household.

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This can be explained as effects from the demand side. Since sheep and goats are more like substitutes than complements, it implies that, with an increase in the price of goats, sheep becomes relatively cheaper, leading to an increase in the price of the latter. Thus, an increase in the demand for sheep will put pressure on the price, causing the sheep price to increase as well, *ceteris paribus*. In other words, everything else held constant, the increase in the goat price has a tendency to shift demand towards sheep meat, as it is a substitute. Thus, with an increase in demand for sheep, the sheep price can increase as well. Alternatively, since it is assumed that the market for sheep is the same as the markets for goats, it is rational that a household involved in the selling of goats and informed about goat prices will be informed about sheep prices as well to avoid exploitation by opportunistic buyers.

Estimate of the parameter for the WYPS (wool yield per sheep) variable had a coefficient of 1.4%. This indicates that a 10% increase in wool yield per sheep for a household will result in a 14% increase in the average sheep price for a household. In this case, the sign is consistent with that expected. Furthermore, with a p-value that is less than 0.05 ($p\text{-value} < 0.05$), the WYPS variable is statistically significant at 5%. Hence, we reject the set hypothesis and conclude that the income from wool per sheep does have an influence on the price of sheep in the local markets of the Eastern Cape province.

This result proves the theory that states that, in smallholder farming households, the primary role of sheep is income from wool rather than from the sale of the sheep. This is substantiated by Fafchamps (2005), who states that livestock in the rural markets of most African countries are primarily considered a productive asset. This implies that livestock are kept more for the income

obtained from the sale of their products than for direct income from selling the animal. Income from livestock (e.g. sheep) needed by the farmers is in the products (wool), rather than in the sale of the livestock themselves (Bailey *et al* 1999).

Furthermore, there is the economic theory that states that such capital assets (sheep) are held until their income-generating value falls below the salvage value (Turner and Williams 2002). In other words, farming households will hold on to their livestock as long as the income from livestock products per animal (wool yield per sheep) exceeds that from selling the livestock (sheep). Therefore, the only time the sheep farming household is willing to sell the livestock (sheep), is when it is driven by fetching a price (income) higher than the income value the sheep would produce. Hence, the higher the income from wool yielded by a sheep, the higher is the value or price attached to the sheep by the household.
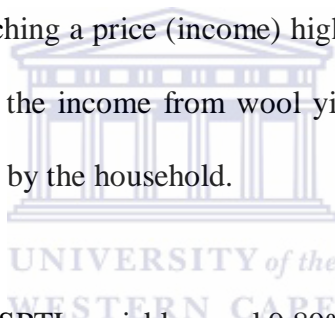
Estimates of the parameter of the SSPTL variable equal 9.89%. This indicates that, if the share of sheep per total livestock per household increases by 10%, the average sheep price per household increases by about 98.9%. With a p-value of 0.002, it is statistically significant at the 5% level and we can reject the null hypothesis and conclude that the share of sheep held by a household per total livestock influences the average price it receives from the sale of sheep. This is logical, based on the rationale that the higher the ratio (sheep/total livestock number), the larger the flock size relative to the total stock size for the respective household. Thus, the higher the ratio, the higher the degree of the household's involvement in the sheep farming business and the higher is the average price per sheep.

Another variable, CHS, was included in the model with a coefficient of 0.12%, indicating that a 10% increase in the size of livestock for a household will result in a 1.2% increase in the average price of sheep per household. However, at a 5% significance level, CHS was found to be not significant, having a p-value = 0.095 (p-value > 0.05). Thus, we could not reject the null hypothesis, and therefore conclude that the size of livestock does not influence the average price of sheep per household at the 5% significance level. This outcome is similar to the findings of Turner and Williams (2002) that the owner's livestock does not have an effect on price. But at the 10% significance level, CHS was found significant enough to reject the null hypothesis. Therefore we can conclude that the cattle herd size held by a household matters when it comes to the average sheep price per household.
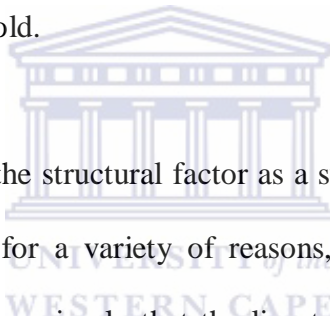
This result can be explained from the structural factor as a supply side factor, which means that livestock such as cattle are kept for a variety of reasons, include draught power and other income-generating activities. This can imply that the livestock provide the farming households with stable income, preventing the sale of sheep out of distress. In that case, the household is capable of resisting opportunistic behaviour.

Parameter PORS is a dummy variable indicating the main purpose of rearing sheep. It shows us the relationship between farming households that sold sheep more than they consumed. Farming households that consumed more than they sold = 0, and are not included in the model, being the reference category. Variable PORS had a coefficient of -0.1205. This implies that the category of households with a higher proportion of sheep sold than consumed have an average sheep price that is 12.05% lower than household with a higher proportion of sheep consumed than sold. With

a p-value of 0.000, there is enough evidence to reject the null hypotheses and conclude that the main purpose of rearing livestock influences the average price of sheep per household.

Ayele *et al* (2006) states that livestock are sold primarily for generating income to cover emergencies (unforeseen expenses). Even though there are many reasons for the sale of livestock by smallholder farmers, about 66% of livestock sold (Ayele *et al* 2006) and 71% of small stock sold (Turner and Williams 2002) were due to cash shortages. According to Chaudhuri (1996), these types of sales have been termed distress sales. Smallholder livestock owners rely heavily on livestock markets (to sell their animals) during difficult times.

The general observation is that smallholder farmers tend to sell large stock when cash needs are large – mostly associated with grain purchases (Turner and Williams 2002). Furthermore, small animals are the first to be considered for sale when food is depleted (Gryseels 1988). Based on this empirical evidence, we can argue that sales by households with relatively higher number of sheep sold than consumed could have been driven by a shortage of cash. This can be the reason for the above result of a negative coefficient for the PORS dummy variable.

A similar outcome was found by Ayele *et al* (2006), who showed that sheep farmers who received lower prices were those associated with cash shortages as the reason for the sale. This can be explained by the fact that such farmers will be under pressure to sell, hence can end up accepting lower prices. According to Ayele *et al* (2006), even though livestock may provide cash in times of crisis, the terms of trade can be worsened during that time.

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Alternatively, there have been widespread reports of stock theft in the province, particularly thefts of sheep. Sheep selling might be a strategy to avoid the risk of stock theft. In that case, it is possible that the households that sold more did so to reduce the risk of stock theft. Hence, in that way they received a relatively lower price.

The parameter of the GEN variable (dummy variable) presents the gender difference in terms of average price of sheep for a household. The gender dummy variable has a coefficient equal to 0.0492, which is only statistically significant at the 10% significance level. The female-headed household category is the reference group, and therefore does not appear in the model. The coefficient is interpreted as that the male-headed households receive an average sheep price 4.92% higher than that achieved by female-headed households.

In the light of the women's ability to bargain relative to that of men, the outcome is consistent with the empirical findings of Turner and Williams (2002) that show a relatively higher price for men. This can be explained on the bases of differences in power relations between the two categories. Furthermore, these authors found that the lower prices achieved by women as they are absent during the sell. That is to say, women tend to assign other people sell the livestock on their behalf. Hence, men were found to be the primary sellers of livestock.

The overall model has an adjusted R^2 score of 44.6%, implying that all the independent variables included in the model explained 44.6% of the dependent variable (average sheep price). Furthermore, the F-value of 15 and a low p-value for the entire model ($0.04 < 0.05$), implies that the entire model is statistically significant.

6.4.8 Model diagnostic tests

- Model specification - the model should be properly specified (including all relevant variables, and excluding irrelevant variables). The link-test is used to test for model specifications under which two new variables, the variable of predation – hat, and the variable of squared prediction – hatsq, are created. The model is refitted using these two. Using the p-value at the 5% level, hatsq (0.95%) implies that we had a problem with specification in our model.

Other diagnostic tests not restricted to assumptions of regression, but that are important for data analysis:

- Collinearity - predictors that are highly collinear, i.e. linearly related, can cause problems in estimating the regression coefficients. When there is a perfect linear relationship among the predictors, the estimates for a regression model cannot be computed uniquely. The term collinearity implies that two variables are near perfect linear combinations of one another. When more than two variables are involved it is often called multicollinearity, although the two terms are often used interchangeably.

The primary concern is that, as the degree of multicollinearity increases, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients can become wildly inflated (large). In this section, we detect multicollinearity in our model using the variance inflation factor (VIF). A value of VIF bigger than 10 indicates the presence of multicollinearity in the model. The results show very low VIF values

(maximum value of 1.35), which is an indication that there is no multicollinearity (see Table 6.12).

Table 6.12: Variance inflation factor (VIF) test for multicollinearity

Variable	VIF	1/VIF
ASPG	1.12	0.15101
WYPS	1.16	0.16530
SSPTL	1.30	0.76630
CHS	1.11	0.15541
PORS	1.35	0.74175
Mean VIF	1.21	
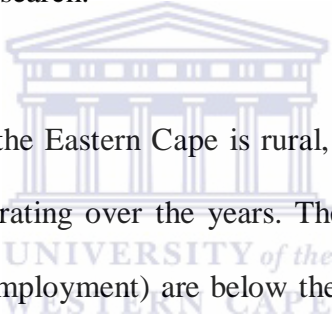
6.5 Conclusion

The results of the study show that the sheep-farming households in the two districts of the Eastern Cape (Amathole and Joe Xabi) are not homogenous. They differ in various aspects, ranging from education level, household size and structure. Other aspects can be observed under the livelihood strategies and activities. We have also shown that farming households engage in other livelihood strategies, namely pension/grants, remittances and farming.

In terms of the analysis of factors that determine the average price of sheep from a household perspective, six factors emanating from the three structures have been found to be significant in the model. The strongest impact is found in distress sales.

Chapter 7: Conclusion

This study has developed a framework on the determinants of price formation in local agricultural markets. It started from the hypothesis that structural and institutional determinants and livelihood shocks exert varying influences on output prices for resource-poor small farmers, and that these, in turn, affect rural livelihood strategies and living standards. To empirically test these propositions, it used a purpose-built research design to collect data from farm households in the Ukhahlamba and Amathole districts of the Eastern Cape that actively engage in local sheep markets. In this chapter we synthesise the main theoretical and empirical insights, as well as highlight directions for further research.

The majority of the population of the Eastern Cape is rural, yet the agricultural contribution to economic growth has been deteriorating over the years. The provincial levels of human well-being (poverty, inequality and unemployment) are below the national average. It is argued that the years of economic expansion before the economic downturn in 2008 did not substantially transfer benefits to the rural poor. This reopens the debate about options for sustainable and appropriate rural development. Pro-poor smallholder farmer development strategies and the potential role of agricultural output markets to boost rural development are some of the strategies. Furthermore, such strategies increasingly become important because the contribution from remittances as one of the livelihood strategies has declined substantially over the years. Thus, the majority of the rural population have become dependent solely on handouts (grants) from the government.

Statistics shows that sheep have the highest population in the province relative to other livestock, such as goats and cattle. Sheep are also common livestock for smallholder farmers. Their ability to survive on natural grazing makes them convenient for the resource-poor farmers. Furthermore, sheep are a multipurpose livestock that can be used to produce wool, milk and meat.

In the global market, sheep production has shifted away from Europe and the Americas to the Asian and African regions. Some of the driving forces include that the Asian and African regions are experiencing a rapid rise in the levels of income per capita and increasing rural-urban migration. These factors have increased the demand for meat in general. The decline of the sheep population in areas such as Europe and the Americas is associated with a decline in sheep meat prices relative to beef, and less priority being given to the industry. The global trend for wool production is not much different from that for sheep meat.

In South Africa, sheep still have the highest numbers, despite the significant decline associated with stock theft and predators. Sheep meat producers have a range of markets, which include abattoirs and butcheries. Smallholder farmers can sell to the local communities. Wool is sold at auction markets around the country. In the Eastern Cape, wool is sold at the auction market in Port Elizabeth. Small-scale wool growers produce small quantities, which are combined and sold at the auction market through an agent. Generally, sheep farming has the potential to reduce the worsening standards of living for the rural population.

Following the argument on how output market prices are formed, the emphasis is on the role of different price formation determinants rather than merely on market forces of supply and demand. Three sets of factors, namely structural, institutional and exogenous shocks, have been

developed. Such a classification is important in that it helps to show the varied nature of output price determinants. Structural factors incorporate deeply embedded socio-economic forces (size of demand) and social infrastructure that need huge investment and time to construct. Institutional factors cover both arrangements to capture power relations among market actors and policy reforms that set the 'rules of market exchanges'. Exogenous shocks track unpredictable events that result in sudden deviations of output prices from longer-term trends.

An assessment of different studies shows clearly that small-scale farmers are participating in both formal and informal livestock markets. However, farmers receive varying prices for sheep in local markets, even if the physical characteristics of the stock differ marginally. Therefore, the socio-economic determinants identified in this study might weigh heavily in the average price of sheep per household.
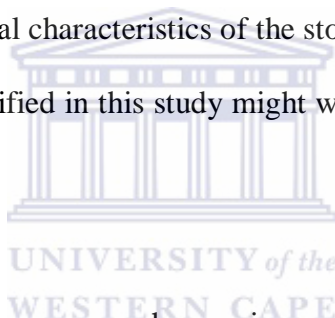
A negative relationship between the average sheep price and the dummy PORS (the household whose sheep sales are more than consumption or otherwise) is logical. The conclusion is that households whose sales are higher could be driven by a high need for immediate cash, as stated in the literature. Alternatively, reports of higher rates of sheep theft seem to be forcing farmers to dispose of their sheep to avoid risk. Thus, either way, households are under pressure to let go of their livestock in exchange for cash, thereby getting relatively lower prices for their sheep.

A positive relationship between the variable average sheep price per household and wool income per sheep (wool yield per sheep) is also logical. It proves the theory regarding the primary role of sheep for smallholder farmers. It is stated that livestock in the rural markets of most African

countries are primarily considered a productive asset. In other words, sheep are kept more for the income obtained from selling the products they produce, in this case wool, than for the income from selling the animal. This fulfils the economic theory that states that such capital assets (sheep) are held until their income-generating value falls below the salvage value. Therefore smallholder sheep farmers are found to hold on to their livestock as long as the livestock are productive.

Under the theory of asset wealth we learnt that resource-poor farmers can use their assets to generate additional income. Thus, a positive sign between the average price per household and cattle head size is logical. This is because cattle might be an income-generating asset, generating enough income to smoothen the spending pattern for the respective households. In that case, such household are under relatively less pressure to sell their sheep.

Farmers with more sheep than other livestock are more likely to be classified as fulltime sheep farmers. Such farmers are more likely to be knowledgeable about the value of sheep in the markets. Thus a positive relationship between average sheep price per household and the proportion of sheep held is logical.

These results shows that the average sheep price per household can differ from one household to another due to structural and institutional factors, as well as unpredictable and uninsured exogenous shocks. Furthermore, the descriptive analysis has shown heterogeneity in terms of livelihood strategies, farming activities and income, and expenditure amongst the sheep-farming

households from the two districts. Hence, the average prices do vary from one household to another.

Firstly, it has to be accepted that the local markets for livestock are not perfectly competitive. Different factors other than market forces of supply and demand have been identified as the determinants of price formation. Sheep as a multi-purpose livestock are kept as productive assets, mainly producing wool. Thus the household with sheep that yield higher income from wool are associated with relatively higher average price of sheep. In other words, the households that receives greater yield from wool tend to place higher price on their sheep than those receiving lower yield from wool. The logical explanation comes from the economic theory that states that an asset is only realised if its income-generating value falls below the salvage value. Hence, this implies that there is a link between the wool markets and sheep meat markets. Policies formulated targeting the wool industry could work positively for the sheep meat industry.

Considering the sheep proportion against the rest of the other livestock, households with higher proportion of sheep are more likely to be specialising in sheep farming. Thus, the implication is that, these are full-time sheep farmers who would get relatively higher prices for their sheep. In this case, a full-time sheep farmer tends to hold relatively more market information about sheep prices than a part-time sheep farmer.

In terms of livestock wealth in relation to average sheep price per household, only cattle had a positive effect. In other words, households with a higher number of cattle tend to be stable such that they can acquire relatively higher prices for their sheep.

Distance from the market or nearest town did not matter, as it did not come through the regressions. This could be explained by the fact that buyers are not confined to nearby towns, but come from different areas, including the local area. Whether a household does or does not benefit from grants does not influence average sheep price for a household, as that too was not significant.

Policy Recommendations

With regard to smallholder farmers, the determinants of price formation in the local agricultural markets have been revealed by theory and empirical evidence. This implies that policy recommendations can be suggested. This section provides some options that can be used to improve the well-being of small-scale farming households in South Africa.

> **Create more meat markets for small-scale sheep farmers to sell their sheep**

The situation of distress sales, supported by empirical evidence, has shown that smallholder farmers are selling their sheep under pressure, thereby losing their bargaining power. The creation of more markets for livestock can provide farmers with more market options to sell their livestock.

> **Promote pro-poor government support policies in the rural areas**

The smallholder farmers in the rural areas of South Africa and in the Eastern Cape in particular, lag behind the national average in terms of financial support. Resource-poor farmers need financial support that will enable them to withstand the stiff competition in the markets. In this regard, they fail to meet the required quality standards of meat because of poor grazing and diseases. In order to meet the required standards, the South African government needs to consider support policies and regulation that are necessary to improve the quality of sheep among smallholder farmers. Promoting pro-poor support policies through the agro-foods market can help to improve their well-being.

> **Promote institutional factors aimed at addressing resource management in communal areas (fencing, grazing area)**

One of the factors identified in the study that are forcing small-holder sheep farmers to sell their livestock is stock theft. Generally, the management of resources in communal areas is very poor. This results in problems such as overgrazing and vandalism (destruction of fences). All these problems put farmers under pressure to sell their sheep as a way to reduce risks (loss of sheep due to theft/ killed by predators).

> **Promote wool marketing and sheep meat marketing jointly**

From the empirical result we learnt that there is no separation between wool and sheep. Therefore, policies aimed at increasing wool prices can work positively for the price of sheep.

> ➤ **Promote better prices in agro-output markets for resource-poor farmers to improve the well-being of rural smallholder farmers**

From the theoretical evidence we have shown that output markets can improve the well-being of rural small-scale farmers through better prices. One way for this to happen is through supporting and encouraging smallholder farmers to participation in more formal markets.

Areas for further research

This study has focused on determinants of price over a short period of time. Future research should investigate these determinants over time in order to begin to explore how seasonality and supply responses might affect market prices.

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