



**IDENTIFICATION OF OPPORTUNITIES FOR ORGANIC BEEF PRODUCTION
FROM NGUNI CATTLE TO ENHANCE FOOD SECURITY BY COMMUNAL
FARMERS IN KWAZULU-NATAL SOUTH AFRICA**

BY

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DECLARATION

I, Phumelele Eleanor Kunene-Ngubane declare that this thesis is my original research work, except where otherwise stated and is hereby submitted by me for the Philosophise Doctorate degree in Food Security at the University of KwaZulu-Natal. This thesis has not been previously submitted by me for any degree or examination to another faculty or University. It does not contain other authors writing, unless the source has been specifically acknowledged. Where other written sources have been quoted, then; their writing has been placed inside quotation marks and referenced, in cases where their exact words have been used; their words have been re-written but the general information attributed to them through referencing.

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ABSTRACT

Communal farms are characterised by marginal lands which are suitable for external livestock farming. Communal farmers are in possession of adaptable indigenous cattle breeds and Indigenous Knowledge Systems (IKS) which facilitate the production of beef without the use of synthetic chemicals. As a result, these communal farming systems may be labelled 'organic' by default. In the developed countries, consumer demand for animal products is increasingly shifting towards products that are safe, nutritious, produced through acceptable methods and of good eating quality. Hence the demand for organic beef, which is sold at a premium, is increasing in these countries. Although communal farmers in South Africa are suitably placed to produce organic beef, the organic beef market is not well-developed and consumer demand for organic beef is not known.

The objective of this study was to identify opportunities for organic beef production in providing household food security in communal areas of KwaZulu-Natal, South Africa. The specific objectives were to: assess the potential for organic beef production by communal farming systems; investigate the possibility of organic beef production by South African communal farmers; determine factors affecting consumers' perceptions about organic beef in South Africa; and assess consumers' Willingness To Pay (WTP) a premium for organic beef. Focus Group Discussions (FGDs) and a survey of 300 consumers were employed to collect data from communal farmers and consumers in various retail outlets in KwaZulu-Natal.

Although the literature review indicated a growing concern and controversy regarding the health, safety and environmental benefits of organic and conventional beef, globally, consumers perceive organic beef as healthier as and safer than conventional beef, hence are willing to pay premium prices of up to 25%. These positive perceptions are based on the fact that the production processes of organic beef eliminate the use of chemicals. The indigenous cattle breed, particularly the inherent Nguni, has a lower sero-prevalence for *A. marginale* and *B. bigemina* in both the cool-dry and hot-wet seasons; hence it does not require chemicals for the prevention of tick-borne diseases prevalent in South African communal farms.

South African communal farmers value their production systems which they consider to be wholesome, results in mature and tasty meat with several domestic and medicinal benefits compared to conventional beef. As a result, its produce, such as organic beef, should fetch premium prices in the formal markets. Socio-behavioural factors relating to inferiority, exclusion and lack of external institutional support are the main reasons why communal farmers are not actively participating in the South African formal beef markets, hence the low off-take rates (5 – 10%) from communal farms. The findings revealed that communal farmers were willing to participate in the South African formal beef market as equal partners with differentiated products which should be sold at the right price. This indicates a potential for organic beef production by South African communal farmers which could support and sustain the organic beef niche market in South Africa.

The findings on determinants of consumers' perceptions about organic beef revealed that consumers perceive self-grown food, without the use of chemicals as 'organic,' and hence associate it with health and safety. Organic food is acceptable in South Africa since 60% of the consumers had prior experiences in purchasing and consuming organic food. The Principal Component Analysis (PCA) yielded three components upon which South African consumers base their perceptions about organic beef: safety, health and environment. Safety control was the most important factor with 25.1% variations that determined consumer's decision when purchasing organic beef. Health considerations are also important to the South African consumers regarding the purchasing of organic beef, with 21.5% variations. Information about organic beef and trust of origin were highly regarded by consumers as safety measures, whilst the absence of chemicals and appearance were considered as vital health factors.

The findings on the effects of socio-economic characteristics and taste on consumers' willingness to pay for organic beef indicated that the majority of consumers (76%) were willing to pay a premium for organic beef, with 52% willing to pay less than 25% premium. Taste and safety attributes were important favourable attributes of organic beef over conventional beef. Consumers value organic beef such that even those who did not consider it as safer than conventional beef were willing to pay a premium. Consumers in urban cities were most likely to be willing to pay a premium for organic beef.

The study concludes that South African consumers, similar to those in developed countries, perceive organic beef as healthier, safer and environmentally friendlier than conventional beef. The demand for organic beef in South Africa is high since 76% of consumers were willing to pay a premium. As thus, organic beef production could be employed to ensure household food security on communal farms. The market for organic beef in South Africa is in the urban formal markets. The subjective safety, health and environmental attributes of organic beef have to be addressed in order to allow South African communal farmers to take advantage of the potential organic beef niche market. Civic engagement involving all stakeholders in the South African formal beef markets is essential for the establishment and maintenance of a differentiated organic beef niche market which adheres to set standards in order to ensure trust amongst all stakeholders.

Recommendations for future research include studies on sensory evaluation could be conducted to determine preferences between organic and conventional beef in South Africa. Further studies are required to determine production efficiency of communal farming systems with regards to organic beef production in order to inform policy and facilitate the establishment of organic beef production standards. Studies comparing the chemical composition between organic and conventional beef are also required.

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LIST OF ABBREVIATIONS

BDOCA	Biodynamic & Organic Certification Authority)
DOA	Department of Agriculture
FAO	Food and Agricultural Organization
FGD	Focus Group Discussions
IFOAM	International Federation of Agricultural Movement
IKS	Indigenous Knowledge Systems
ISRDS	Integrated Sustainable Rural Development Strategy
KZN	KwaZulu-Natal
NDA	National Department of Agriculture
NDP	National Development Plan
PCA	Principal Component Analysis
SA	South Africa
SPSS	Statistical Package for Social Studies
STATSSA	Statistics South Africa
SWOT	Strength, Weakness, Opportunities and Threats
USDA	United States Department of Agriculture
WTP	Willingness To Pay

CHAPTER 1: STATEMENT OF THE PROBLEM

1.0 Introduction and background

The world demand for meat consumption is expected to rise by more than 200% from 229 million tons in 1999 to 465 million tons in 2050 (Steinfeld *et al.*, 2006), and global meat productivity will have to increase to meet such demand (Scholtz, 2011). The substantial increase in demand for livestock products in the developing countries (Delgado *et al.*, 1999), partly due to human population growth and improved financial incomes, could offer much larger market opportunities for the livestock producers in these countries. At the same time, Kumm (2002) reported that the economic, ecological and ethical sustainability of meat production is questioned by many. This has led consumers to seek for alternatives to conventional beef, such as organic beef which has been produced in ecological and ethical harmony with the environment.

Organic foods are sold with a premium (O'Donovan and McCarthy (2002). Studies have shown that consumers are willing to pay up to 25% premium for organic meat (Van Loo *et al.*, 2012). Contrary to grass fed beef which is produced from cattle that only eat grass and forage, organic beef is produced from organic pastures without chemicals, such as the veld, whereby cattle are not given antibiotics, hormones and injections (Grunert, 2005).

Although communal farmers in South Africa (SA) are capable of producing organic beef using adaptable breeds reared on the veld, the market segment for organic beef is very little. Hence, this study employed the utility theory which can be used to determine consumer demand for products where the market is not well developed, as it is the case of organic beef in South Africa. Largely, beef is an acceptable protein source in South Africa and its consumption comes second to poultry. Similarly, cattle production is an integral part of communal farming, whereby cattle are reared under extensive systems to enhance livelihood through providing cash and milk; and for ceremonies (Mapiye *et al.*, 2009). Although beef is a vital part of the South African economy, a few studies have been conducted on the demand for organic beef (Engel, 2008).

Extensively reared cattle have the ability to convey resources that could otherwise not be used by human beings into useable substances, such as beef, especially on the non-arable and largely marginal land characteristic of communal farms. These cattle are particularly suited for organic beef production since they are reared under natural conditions which could be adopted for organic beef production. Although the beef market in South Africa is dominated by conventional beef, organic beef demand has to be addressed if communal farmers are to make inroads into organic beef farming which is not only lucrative but can address the African continent's perennial problem with food insecurity.

Literature shows a growing concern and controversy regarding the health, safety and environmental benefits of organic and conventional beef in the developed world (Kouba 2003; Sofos, 2008, Van Loo *et al.*, 2012). As a result, consumers' preferences for either organic or conventional beef are based on perceptions and socio-economic characteristics. There are limited studies done before on the magnitude for organic beef demand in South Africa, this becomes a groundbreaking study.

1.1 Problem statement

Cattle rearing are an important part of the South African communal farming system whereby farmers are predominantly rearing the indigenous and adaptable Nguni breed (Chimonyo, *et al.*, 1999). These traditional communal farming systems could enable communal cattle farmers to produce organic beef. However, in most areas, this breed is fast approaching extinction due to unplanned breeding that is characteristic of communal lands. This breeding system does not par with the communal farmers' management system, and has resulted in high mortality rates (Webb and Mamabolo, 2004). Previous promotion of exotic cattle breeds as superior to indigenous breeds has also challenged organic beef production on communal farms (Mapiye *et al.*, 2009).

Hence, the communal herd is an underutilized resource for cattle production in South Africa, although it has the potential to reduce beef imports, which are presently between 10 and 15% of local production per annum (NDA, 2008; FAO, 2007). There is a need to match socio-economic and pedo-climatic conditions in communal areas in order to increase output and off-take rates, which are between 5 and 10% (Musemwa *et al.*, 2010).

Although the communal farming system could offer viable alternatives in the South African beef market, the demand for organic beef is unknown. The development of an organic niche market, which promotes the use of adaptive breeds in their natural environment, could significantly inspire communal farmers to sell their distinguished products, especially organic beef, with premium prices, in so doing encourage communal farmers to be active participants in the South African formal beef market, thereby increasing the off-take rates from communal farms.

1.2 Justification of the study

Musemwa *et. al.*, (2008) stated that since 70% of South Africa's total areas of 1.2 million square kilometers are only suitable for livestock/game production, the livestock industry in South Africa, particularly cattle, is crucial for creating livelihood and increased levels of welfare for the total population. It is estimated that meat, milk and eggs provide about 20% of the protein in African diets, and around 70% of the human population of South Africa are primarily or partly dependent on livestock (Lenné and Thomas, 2006). Moreover communal farmers are in possession of Indigenous Knowledge Systems (IKS) which, when well documented and integrated with scientific knowledge, can be used to establish management options best suited to the communal farms. Even though communal farmers are in possession of valuable IKS, and adapted indigenous breeds, 49% of communal households in South African farming communities experience hunger during a twelve-month period largely due to their inability to purchase sufficient food at various times. As thus, it is essential that research into opportunities available for organic beef production, which is sold at premium prices, be conducted to maximize food security for communal farmers.

1.3 Objective of the study

The broad objective of the study was to identify opportunities for organic Nguni beef production in providing household food security in communal areas of KwaZulu-Natal, South Africa.

The specific objectives were to:

- a) assess the potential for organic beef production by communal farming systems,
- b) investigate the possibility of organic beef production by South African communal farmers,
- c) determine factors affecting consumer's perceptions about organic beef in South Africa, and
- d) assess consumers' Willingness To Pay (WTP) a premium for organic beef.

1.4 Hypotheses

The main hypothesis tested during this study was that:

- a) communal farmers treasure their indigenous cattle breeds and communal cattle production systems as of high value, and hence consider that these should be positively related to higher market returns.

Based on this expectation, two sub-hypothesis were proposed for investigation:

- b) consumers perceive organic beef as of high value, and
- c) consumers are willing to pay premium prices for organic beef.

1.5 Study limitations

Due to financial constraints, the study was only conducted in KwaZulu-Natal (KZN). Statistics South Africa (2011) report stated that KZN is the second province in South Africa, after Eastern Cape, with the highest livestock production per household. Hence, the data obtained from this study may be generalized to all communal farming households in Southern Africa. However, the lack of an organic beef niche market in the study area and in South Africa at large resulted in the use of scenarios to determine the criteria for purchasing organic beef and for assessing consumers' WTP, *ceteris paribus*.

1.6 Assumptions

It is assumed that communal farmers can be active role players in developing the country's economy through the establishment of alternative marketing systems such as an organic niche market. Sofos (2008) reported that urbanization and increased income are the most significant factors likely to increase demand for organic meat. Hence, limiting the study to consumers sampled from formal retail markets resulted from the assumption that these markets are where the demand for organic beef is.

1.7 Definition of terms

For purposes of this study, the terms below shall apply as follows:

Organic beef – beef that has been produced using natural/biological processes.

Communal farmers – these are smallholder farmers who produce agricultural produce mainly for subsistence purposes.

Food security - a livelihood state reached when all people at all times have access to adequate amounts of safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

Perceptions - the worth that a product has in the mind of a consumer which generally guides their choice behavior.

1.8 Organization of thesis

The thesis is organized as follows. In the next Chapter (Chapter 2), literature is reviewed with regards to the potential for organic beef production by communal farmers in South Africa, based upon global and local experiences. The chapter is a published manuscript whose publication details are found in Chapter 2. Chapter 3 contains a conceptual framework of the study, research methodology (research design) and a detailed description of the study area. A specific research methodology followed for each manuscript has been included in Chapter 4, Chapter 5 and Chapter 6. Chapter 6 has been submitted for publication and is under review, Chapters 4 and 5 are considered for publication.

The 4th Chapter contains an in depth analysis of the factors influencing the possibility of communal farmers' participation in the South African formal beef market. Included in this Chapter is an envisaged community engagement model which could be adopted for civic engagement resulting in the establishment and maintenance of an organic beef niche beef market as an alternative in the South African formal beef market. In Chapter 5, consumers' perceptions about organic beef are determined in order to explore the demand for organic beef. Chapter 6 assesses consumers' willingness to pay for organic beef based on the utility theory in which binary and ordered logit models were employed to analyze data. The last part of the thesis, Chapter 7, presents conclusion of research findings and recommendations.

1.9 References

- Chimonyo, M., Kusina, N.T., Hamudikuwanda, H. and Nyoni, O., 1999. A survey on land use and usage of cattle for draught in a communal farming area of Zimbabwe. *Journal of Applied Science, Southern Africa*, 5(2): 111-121.
- Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S., Courbois, C. 1999. *Livestock to 2020: The next food revolution*. Food, Agriculture, and the Environment Discussion Paper 28. Washington, DC, IFPRI/FAO/ ILRI (International Food Policy Research Institute/FAO/International Livestock Research Institute).
- Engel, W. 2008. Determinants of consumer willingness to pay for organic food in South Africa. Master's dissertation, Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa.
- Food and Agricultural Organization (FAO) 2007. *ISIS Report: FAO Promotes Organic Agriculture*.
- Kouba, M. 2003. Quality of Organic Animal Products. *Livestock Production Science* 80(1-2): 33-40.
- Kumm, K.I. 2002. Sustainability of organic meat production under Swedish conditions. *Short communication Agriculture, Ecosystems and Environment* 88: 95–101.
- Lenné, J.M., and Thomas, D. 2006. Integrating crop livestock research and development in sub-Saharan Africa. Option, imperative or impossible? *Outlook on Agriculture* 35, 167–175.
- Mapiye, C., Chimonyo, M., Muchenje, V., Dzama, K., Marufu, M. C. and Raats, J. G. 2007. Potential for value-addition of Nguni cattle products in the communal areas of South Africa: a review, *Afr. J. Agric. Res.* 2 (10): 488–495.
- Mapiye, C., Chimonyo, M., Dzama, K., Raats, J.G., and Mapekula, M. 2009. Opportunities for improving Nguni cattle production in the smallholder farming systems of South Africa. *Livestock Science*, 124: 196-204.
- Musemwa, L., Mushunje, A., Chimonyo, M., Fraser, G., Mapiye, C. and Muchenje, V. 2008. Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: Review. *African Journal of Agricultural Research*, 3(4): 239-245.
- O'Donovan, P., and McCarthy, M. 2002. Irish Consumer Preference for Organic Meat. *British Food Journal*, 104(3/4/5): 353-370.
- Scholtz, M.,M. 2011. Challenges for beef production in developing countries of Southern Africa. Downloaded from www.ngunicattle.info, on June 14 2013.

Sofos, J. N., 2008. Challenges to Meat Safety in the 21st Century. *Meat Science Journal* 78(1-2): 3–13.

Statistics South Africa report, 2011. Agricultural Household Census, Statistics South Africa. www.statssa.gov.za/census2011/Products/Agricultural_Households.pdf. downloaded on the 11 of November, 2014.

Steinfeld, H., Gerber, P., Wassenaar, T., Castel, V., Rosales, M. and de Haan, C. 2006. *Livestock's long shadow: Environmental issues and options*. Food and Agriculture Organization of the United Nations (FAO), Rome, Italy.

Van Loo, E.J., W. Alali, and S.C. Ricke. 2012. Food Safety and Organic Meats. *Annual Review of Food Science and Technology* 3: 203-25.

Webb, E.C. and Mamabolo, M. J. 2004. Production and reproduction characteristics of South African indigenous goats in communal farming systems. *South African Journal of Animal Sciences*: 236-239.

CHAPTER 2 LITERATURE REVIEW

2.0 Potential for Organic Beef Production by Communal Farmers in Southern Africa: A Review

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Abstract

Southern African countries have similar climatic and agricultural conditions, with 70% of agricultural land suitable for extensive livestock farming. This review assesses the potential for organic beef production in communal farming systems. The findings reveal that consumers' perceptions of organic beef are based on the production processes. The literature shows a growing concern and controversy regarding the health, safety and environmental benefits of conventional and organic beef production. Communal farmers rear almost 50% of indigenous and adaptable breeds such as the Nguni which have proven their hardiness and adaptability through heat tolerance, improved calving rates, efficient utilization of feed resources, disease and parasite tolerance. Nguni cattle have a lower sero-prevalence for *A. marginale* and *B. bigemina* in both the cool-dry and hot-wet seasons. Consumers perceive organic beef as healthier and safer than conventional beef, and are willing to pay a premium. Civic engagement amongst all stakeholders through efficient management of Indigenous Knowledge Systems and science is required for establishing organic beef niche market.

Keywords: Organic beef, Nguni cattle, communal farms, conventional farms

2.1 Introduction

The Southern African region is confronted by analogous socio-economic and beef production challenges and constraints (Scholtz, 2011). About 70% of agricultural land is suitable for extensive livestock farming; with the greatest proportion of this land found in the communal areas (Musemwa *et al.*, 2008). The communal herd is an underutilized resource for beef production, although it has the potential to reduce beef imports, which are between 10 and 15% of local production per annum (NDA, 2008).

Cattle have the ability to graze on a variety of plants and can be reared on marginal land not suitable for crop production. Southern African communal farmers keep indigenous cattle breeds and their crosses. Communal farmers own approximately 40% of the cattle in Southern Africa (Musemwa *et al.*, 2010). Eastern Cape communal farmers own 50% of cattle in the province (Strydom, 2008). The South African communal cattle market off take is between 5 and 10%, compared to 25% found in the commercial sector (Musemwa *et al.*, 2010). Cattle sales are not proportional to the large herd sizes found on communal lands (Mapiye *et al.*, 2009). This may be attributed to a lack of appropriate markets such as the organic beef niche market.

Communal farmers rear cattle under low-input production systems, with little or no chemical use; especially for cattle management activities such as tick control (Muchenje *et al.*, 2007). These farming systems can therefore be adopted for organic beef production. The International Federation of Agricultural Movement (IFOAM, 2012) defines organic beef production as a whole-system approach based upon a set of processes resulting in improved health, care for the environment and animal welfare, without the use of drugs such as antibiotics and growth hormones (IFOAM, 2012). With the exception of Botswana and Namibia, Southern African countries are all net importers of beef, despite the huge and untapped potential use of exceptionally good indigenous cattle breeds (Scholtz, 2011).

Organic farming plays a vital role in preserving animal genetic resources, transfer of Indigenous Knowledge Systems (IKS) that have sustained communal farms for decades and in improving the productivity of the veld through the hoof effect. Organic farming in Europe has lower environmental footprints per unit area than conventional farming, even though it may result in a lower yield (Tuomisto *et al.*, 2012). Emphasis on organic beef production is

not merely on the feed conversion to optimize production, but also on functional efficiency in the farming system.

Organic beef production from inherent indigenous breeds such as the Nguni has the potential for ensuring food security for communal farmers and their generations by turning unusable materials into usable products. Scholtz *et al.* (2013) reported that ruminants have a solitary ability to convert high-fibre vegetation into high-quality proteins sources for human consumption. In terms of protein produced per unit of water, animal products are more efficient than food crops (Bradford, 1999). Meat provides readily available mineral nutrients (Scholtz *et al.*, 2013) and complete proteins.

Developed countries have made significant inroads into organic beef production. However, in Southern Africa it is still at its conception stage. The objective of this review was to assess the potential of organic beef production for communal farming systems in Southern Africa.

2.2 Importance of communal cattle production in sustaining communal farmers' livelihoods

Over 70% of people in the Southern African region are poor and survive on less than one United States dollar a day (Chimonyo *et al.*, 2005). Food insecurity and low levels of income are the major difficulties which have to be addressed to improve the welfare of the majority. Communal farmers own 75% of indigenous cattle breeds (Tada *et al.*, 2013) and these could be efficiently used to improve and sustain livelihoods through organic beef production. The South African National Department of Agriculture, NDA (2008) reported that over two-thirds of the 14.1 million cattle in South Africa are found in communal areas.

Organic farming is sustainable over the long term by ensuring food production generation after generation, while establishing an ecological balance to promote soil fertility and prevent parasite problems. This is attained through mixed farming systems similar to those practised by communal farmers in Southern Africa, whereby renewable local resources and conservation are symbiotically used to produce both plants and animals (Chimonyo *et al.*, 2005).

The indigenous breeds of cattle kept by communal farmers play a significant role in improving health, food security and sustainable livelihoods of the communal farmers in Southern Africa. Some benefits derived from keeping these breeds are medicinal and food supply benefits. Most importantly, these cattle carry socio-economic, psychological and cultural values. For example, manure from these cattle is used to rectify stomach ailments, whilst milk, sour milk and meat ensure continuous availability of food for communal farming households.

The household ownership of these communal cattle is associated with the wealth status of the household; this is a different perspective, as most often traditional or indigenous valuables are often regarded as inferior and for the poor. These cattle are the pride of communal farmers. On a daily basis, the farmer counts and assesses the herd in the kraal, looking for any that may be sick, and uses traditional medicines that have been sourced from local plant materials to heal any sick animals. These traditional herbs are a priority for preventing and controlling cattle diseases; for example, in the removal of ticks from the skin and coat and the use of a special herb called *gobho* for the expulsion of the placenta in difficult calving.

For generations, indigenous breeds of cattle have been used to appease ancestors. These breeds, according to the communal farmers, are acceptable to the ancestors compared to exotic breeds. Cattle are also used for paying the dowry, which unifies households, and for various ceremonies in which specific parts of the carcass have definite functions for groups of society who consume them. Sacred cattle are used for the celebration of a virgin girl child at 21 years signifying adulthood and the possible occurrence of marriage. This instils moral values in the youth.

The Southern African communal farming system encourages the use of locally available resources and information systems to offer valid and appropriate solutions, tested through time in the form of good farming practices and high levels of animal welfare. This promotes stewardship of the shared world in which farmers and their herd-boys cautiously choose resources for their livestock, keeping them away from the fields during the growing season, and sharing of IKS about cattle management, and disease prevention and control.

Records on good practices are kept orally and are passed on from generation to generation. Communal cattle farming systems, which could be adopted for organic beef production, can therefore be used to maintain the moral and socio-cultural fibre in the Southern African society, through which valuable indigenous information can be passed on from generation to generation. These multiple functions reduce the potential to produce organic beef (Mapiye, 2009). Therefore, these functions need to be thoroughly understood and quantified if communal cattle farmers are to realize benefits of their animals through sales.

The demand for organic beef in Southern Africa can increase income for communal farmers and promote socio-economic and ecological stewardship to the local resources through a holistic use of raw materials, produce and recycling of waste materials. The demand for organic beef in Southern Africa evokes an opportunity for enhanced socio-economic and ecological stewardship to the local resources. Musemwa *et al.* (2010) stated that a well-managed and accelerated transition to organic agriculture is likely to boost household and national food security.

In accordance with organic beef production principles, the communal are herded together in the veld and ownership of each animal is known. This enables traceability of these animals, an essential component of organic beef production. Communal farmers rear cattle on communally-owned veld and these cattle are kraaled at night. They provide distinguishable products of economic value.

Consumption of small amounts of animal-source foods is an effective way of preventing household under-nutrition and achieving nourishment, thereby enabling children to reach their full potential as healthy, productive adults (Bradford, 1999). Organic products are sold at premium prices (O'Donovan and McCarthy, 2002). This can substantially increase communal farmers' profit margins and access to a variety of other food sources. The development of organic beef niche marketing co-operatives can result in payment of as much as a 30% premium for organic beef products (Mapiye *et al.*, 2009).

Despite the dramatic increase in demand for sustainably raised beef, the meat market in Southern Africa is dominated by conventionally produced beef. Anderson (2003) reported that concerns about the risk of chemical drug residues, transfer of antibiotic resistance from animal to human beings through animal-derived foods, animal welfare, environmental effects

and improved food quality in veld-based organic livestock, have led consumers to seek out organic food.

There is growing controversy regarding the presence of chemical residues in organic beef. Official monitoring of residues in European cattle found non-compliance concerning the use of illegal growth promoters, including sex steroids, corticosteroids and β -agonists (Nebbia *et al.*, 2011). Pussemier *et al.* (2006) reported that organic products have lower residues as a result of the lower use of chemicals used in production than conventional products. Van Loo *et al.* (2012) argued that organic beef cannot be completely free from chemical residues. Studies by Woese *et al.* (1997) and Van Loo *et al.* (2012) concluded that there are no differences in chemical content between organic and conventional meat.

Part of the reason for this contradiction relates to the different levels of environmental contamination in different farms, localities and regions. Since organic beef is produced without the use of chemicals, the only residues that may be present in organic beef are environmental (Van Loo *et al.*, 2012). Conventional beef is produced using chemical and feed sources which, when combined with environmental contamination and the possible non-compliance of some producers pertaining to adherence to prescribed chemical usage, can increase chemical residues in the conventional beef.

Kouba (2003) stated that, since organic agriculture refrains from using synthetic chemicals, potential hazards from these synthetic input residues are minimal. Table 2.1 provides evidence that the pesticide residue concentrations are lower in organically produced foods, when compared to conventional produce (Van Loo *et al.*, 2012).

Table 2.1: Chemical residue prevalence in organic and conventional produce

Monitoring body	% Residue	
	Conventional Produce	Organic Produce
Pesticide	73	23
Data Program of the USDA	31	6.5
Marketplace Surveillance Program, California		
Consumers' Union	79	27

2.3 Relevance of organic beef production in today's world

World meat consumption has increased considerably in recent decades and is expected to continue increasing (Bradford, 1999). Beef consumption comes second to poultry and it increases with urbanization. Increase in human population, standard of living and urbanization is proportionally related to meat consumption, because of the human desire for a more varied diet.

Simultaneously, the economic, ecological and ethical sustainability of conventional meat production is being questioned by many (Kumm, 2002; Capper, 2013). Consumer demand for meat that is safe, nutritious, produced through acceptable methods and of good eating quality, is increasing (Grunert, 2006; Sofos, 2008). Consumers perceive organic beef as a healthier and safer option which is produced through more acceptable and environmentally safe production systems than conventional beef (O'Donovan and McCarthy, 2002).

Market demand is rapidly increasing for sustainably raised, organic beef products (Kouba, 2003). According to McCarthy and Murphy (2013), the western countries are showing an oversupply of organic meat, with high prices as the main hindrance for purchasing organic meat. While South African communal farmers are better positioned to produce organic beef, its market demand is unknown.

Global consumers' motives and deterrents with regard to the purchasing of organic beef are shown in Table 2.2. Health, nutrition, animal welfare and concern for the environment are the

major motives for purchasing organic beef. High premium prices and unavailability of organic food are the major deterrents hindering consumers from purchasing organic beef (Van Loo *et al.*, 2012).

Table 2.2: Consumers' organic beef purchasing motives and deterrents

Consumers' purchasing motives	Deterrents
Health and nutritional concern ^{1,2,3,5,6,8}	High price premium ^{1,3,7,8,10,1}
Food safety, lack of confidence in the conventional food industry ^{1,2,3,6,7,9,11}	Poor organic food availability ^{1,3,7,9,10,1}
Concern over animal welfare ^{1,2,3,5,6,8,10}	Skepticism of certification boards and organic labels ²
Concern for the environment ^{1,2,3,5,6,8,9,10}	Insufficient marketing, poor merchandising ³
Support for local economy ³	Satisfaction/content with current food supply ^{1,3}
Superior taste ^{1,3,5,8,9,10,11}	Disbelief that organic food is better
No GM and irradiation ⁴	Unsatisfactory quality such as sensory defects ^{1,3}
Freshness ^{5,11}	Unfamiliar with the term organic
Nostalgia ^{3,5}	Certification systems and organic logos ^{1,11}
Fashionable/curiosity ³	
¹ Bourn and Prescott (2002)	⁷ O'Donovan and McCarthy (2002)
² Harper and Makatouri (2002)	⁸ Stobbelaar <i>et al.</i> (2007)
³ Hughner <i>et al.</i> (2007)	⁹ Tsakiridou <i>et al.</i> (2008)
⁴ Kouba (2003)	¹⁰ Wier and Calverley (2002)
⁵ Krystallis <i>et al.</i> (2006a)	¹¹ Yiridoe <i>et al.</i> (2005)
⁶ Magnusson <i>et al.</i> (2003)	

Consumer perceptions on organic beef are based on the production processes, rather than on the final product. Concerns about food safety are exacerbated by food scares such as BSE, foot and mouth, *Salmonella*, and *Escherichia coli* 0157:H7 outbreaks (Van Loo *et al.*, 2012). Consumers are willing to pay premium prices for organic beef, since it is perceived to be safer than conventional beef.

Organic beef production may have great importance in sustainable food provision by using ecological resources as well as by-products that would otherwise not be used (IFOAM, 2012). The establishment of an organic niche market in Southern Africa will make it easier for communal farmers to sell their cattle on a regular basis, thus increasing the off-take rate on communal farms in the Southern African region, which is less than 5% (Chimonyo *et al.*, 2005). There are vast opportunities for organic beef production in the region due to the availability of organic feedstuffs in Southern Africa, such as *Colophospermum mopane*, *Brachystegia spiciformis*, *Dichrostachys cinerea* and *Acacia karroo* (Dube, 2001; Mapiye *et al.*, 2009).

2.4 Suitability of Nguni cattle for organic beef production

Indigenous cattle breeds can potentially produce high-quality beef without the use of chemicals (Mapiye *et al.*, 2009; Muchenje *et al.*, 2009). Mapekula (2009) reported that the small Nguni cattle are adapted to harsh communal environmental conditions such as inadequate and poor-quality feed due to erratic rainfall and high incident of droughts.

This adaptation is achieved through their ability to select quality feeds and utilize the poor feed resources inherent in Southern African communal lands. Nguni cattle thus have a huge potential to produce high-quality products under veld conditions (Anderson, 2003). Nguni cows become sexually mature early and are highly fertile (Muchenje *et al.*, 2007), with an average inter-calving rate of 420 days, and are able to withstand the high ambient temperatures of Southern Africa (Mukuahima, 2008).

Nguni cattle are resistant to ticks and associated tick-borne diseases. The thick skin, flexible and long tail, with a well-developed switch, and the vigorous movements of the ears, are some of the contributing characteristics that prevent the infestation and irritation by pests (Mapiye *et al.*, 2007). Nguni have superior coat and skin characteristics, which enable them to be resistant to tick infestation (Marufu *et al.*, 2011). These cattle have a lower sero-prevalence for *Anaplasma marginale* and *Babesia bigemina* in the cool-dry and hot-wet seasons (Marufu *et al.*, 2010). The Nguni skin, apart from disease resistance, possesses several economic benefits, which can be used to improve the economic condition of

communal farmers and, subsequently, food security. The peculiarity of the Nguni cow skin is highly appropriate for producing leather products.

2.5 Prospects for organic beef production

Indigenous breeds have multiple roles in the functionality of communal farms and all of their products are valuable; manure can be used for medicinal purposes, and as a source of biofuel, whilst the hides possess valuable and disease-prevention characteristics. This point was also made by Mapiye *et al.* (2007), who stated that the multi-functional ability of indigenous breeds can be an economically viable alternative to exotic breeds for communal farmers.

Nguni cattle require minimum external inputs to control inherent tick-borne diseases and can be productive on locally available resources in a sustainable manner. In light of the emerging market, where consumers are more informed and shop more responsibly, there is a need for the transformation of the way in which goods are produced (Allen and Kovach, 2000). The growing demand for alternatively raised beef products, coupled with consumers' willingness to pay premium prices, can be a viable economic solution to increase beef sales from communal lands in Southern Africa.

Fresh meat is sold as an undifferentiated product (Napolitano *et al.*, 2010). Therefore consumer knowledge and perceptions about the beef production system motivates the demand for products with attributes for which they are willing to pay premium prices in the market. Consumers' main motivations for buying organic food are concerns about personal health, the environment and food safety, although many consumers also prefer to buy organic food for its notable enhanced flavour and freshness (Pussemier *et al.*, 2006).

There is a need for an alternative beef production system in Southern Africa, to stimulate the beef industry through the use of adaptable breeds and to promote stewardship with the shared world through IKS. Organic beef production offers different attributes that may appeal to various consumers, significantly contributing to communal farmers' food security. The growth rate for alternatively produced beef is projected to increase steadily in Southern Africa where beef market demands are increasingly emphasizing animal welfare and local

production, thereby providing enhancing opportunities for information exchange in Southern African communal lands.

There is a high demand for Nguni cattle in the commercial sector, where its adaptability traits are exploited (Tada *et al.*, 2013), in spite of the unpopularity of the indigenous breeds owing to the lack of commercialization of their valuable traits (Mapiye *et al.*, 2009). Although consumers associate the word organic with plant materials (Padel and Foster, 2005), consumers are willing to pay a premium price for organic beef. A study by Napolitano *et al.* (2010) reported that consumers were willing to pay higher than the suggested price for organic beef.

2.6 Conclusion

The strengthening of global research in meat over recent years, coupled with beef safety scares, has increased the demand for sustainably raised beef. Consumers perceive organic beef as healthier as and safer than conventional beef, based on the production processes. Southern African communal farmers are in a better position to produce organic beef from their indigenous and adaptable cattle breeds, which are reared under natural conditions. Civic engagement amongst all stakeholders through efficient management of IKS and science is required for the establishment and maintenance of an organic beef niche market in Southern Africa.

Further studies are required in the following areas: consumer demand for organic beef; comparison of chemical residue content between organic and conventional beef, with regard to consumers' health and safety; cost-benefit, socio-economic and environmental analysis of extensive beef production, taking into consideration the whole farming system; and strategies in which the valuable IKS can be preserved and incorporated into scientific methods to provide valid solutions for certified organic beef production.

2.7 Summary of literature review

The summary of literature as given in Chapters 4, 5 and 6 is described in Figure 2.1 below:

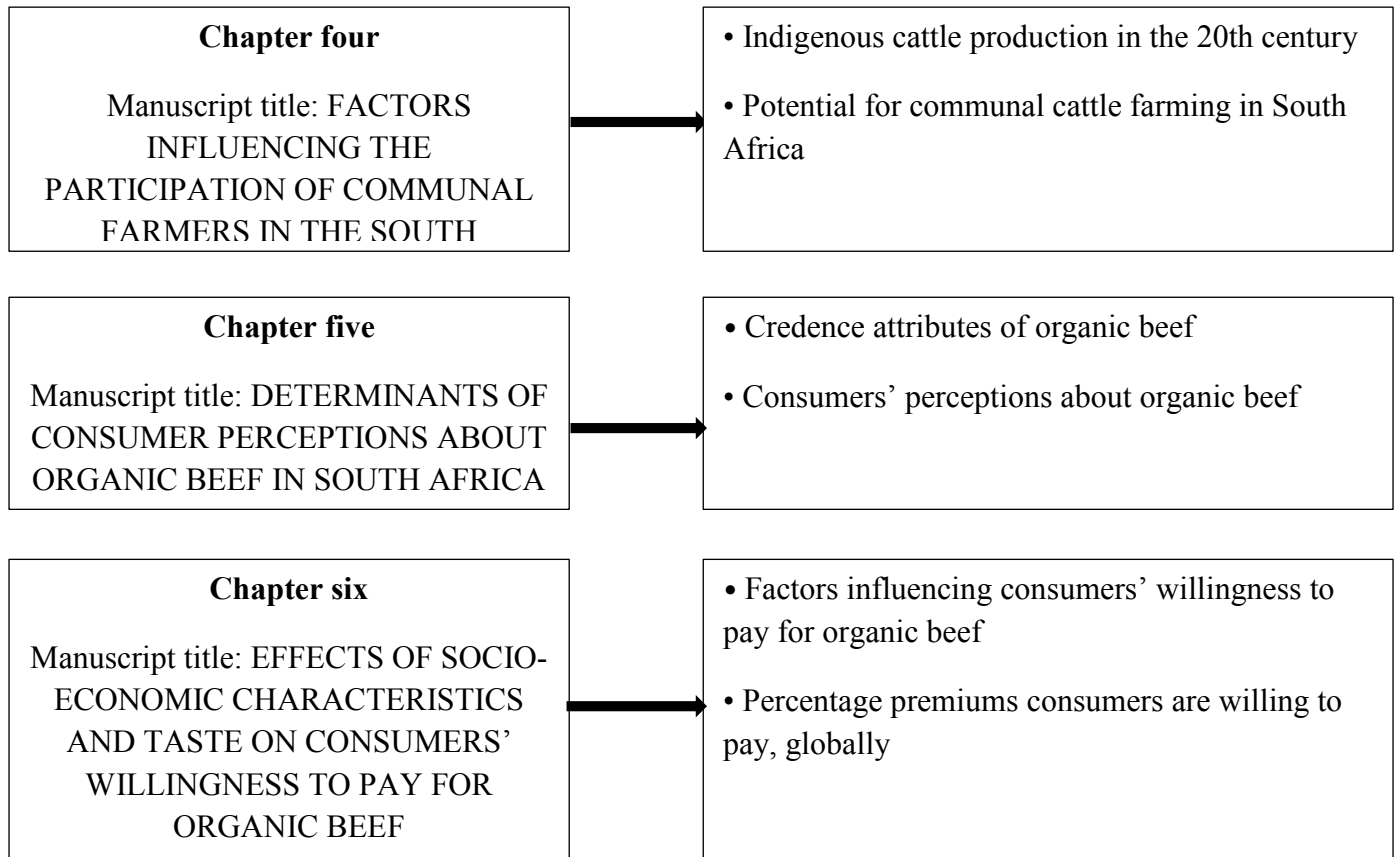


Figure 2.1: Summary of literature review

2.8 References

- Allen, P., and Kovach, M. 2000. The Capitalist Composition of Organic: The Potential of Markets in Fulfilling the Promise of Organic Agriculture. *Agriculture and Human Values* 17: 221–232.
- Anderson, S. 2003. Animal Genetic Resources and Sustainable Livelihoods. *Ecological Economics* 45(3): 331-339.
- Bourn, D., and Prescott, J. 2002. A comparison of the nutritional value, sensory qualities, and food safety of organically and conventionally produced foods. *Critical Reviews in Food Science and Nutrition*, 42:1–34
- Bradford, G.E. 1999. Contributions of Animal Agriculture to Meeting Global Human Food Demand. *Livestock Production Science*, 101(59): 95–112.
- Bryceson D.F. 2002. The scramble in Africa: reorienting rural livelihoods. *World Development* 30(5): 725-739.
- Capper, J. L. 2013. Should We Reject Animal Source Foods To Save The Planet? A Review of the Sustainability of Global Livestock Production. *South African Journal of Animal Science*, 43 (3).
- Chimonyo, M., Bhebhe, E., Dzama, K. Haliman, T. E. and Kanengoni, A. 2005. Improving Smallholder Pig Production for Food Security and Livelihood of the Poor in Southern Africa. *African Crop Science Conference Proceedings*, Vol. 7: 569-573.
- Dube, J.S., Reed, J.D., and Ndlovu, L.R. 2001. Proanthocyanidins and Related Phenolics in Acacia Leaves of Southern Africa. *Animal Feed Science Technology*, 91:59–67.
- Grunert, K. G. 2006. Future Trends and Consumer Lifestyles With Regard To Meat Consumption. *Meat Science*, 74(1): 149-160.
- Harper GC, Makatouni A. 2002. Consumer perception of organic food production and farm animal welfare. *British Food Journal* 104(3/4/5): 287–299.
- Hughner, R.S., McDonagh, P., Prothero, A., Shultz, C.J., and Stanton, J. 2007. Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour* 6: 94-110.
- IFOAM, 2012. International Federation of Organic Agriculture Movements. IFOAM Norms of Agricultural and Production Processes. Downloaded from: www.ifoam.org, on the 14th of April, 2013.

- Kouba, M. 2003. Quality of Organic Animal Products. *Livestock Production Science* 80(1-2): 33-40.
- Kumm, K. I., 2002. Sustainability of Organic Meat Production under Swedish Conditions. *Short Communication Agriculture, Ecosystems and Environment* 88: 5–101.
- Mapekula, M. 2009. Milk production and calf performance in Nguni and crossbred cattle raised on communal rangelands of the Eastern Cape Province of South Africa. PhD Thesis, University of Fort Hare, Alice, South Africa
- Mapiye, C. Chimonyo, M. Muchenje, V. Dzama, K., Marufu, M. C and Raats, J. G. 2007. Potential for Value-Addition of Nguni Cattle Products in the Communal Areas of South Africa: A Review, *African Journal of Agricultural Research* 2(10): 488–495.
- Mapiye, C., Strydom, P. E., Dzama, K., and Chimonyo, M. 2009. Cattle Production on Communal Rangelands of South Africa and the Potential of Acacia Karoo in Improving Nguni Cattle Production. Fort Hare. University of Fort Hare Publishers.
- Marufu, M. C., Qokweni, L., Chimonyo, M., and Dzama, K. 2011. Relationships between tick counts and coat characteristics in Nguni and Bonsmara cattle reared on semiarid rangelands in South Africa. *Ticks and Tick-borne Diseases* 2(3): 172-177.
- Montshwe, B. D., 2006. Factors affecting participation in mainstream cattle markets by small-scale cattle farmers in South Africa. MSc thesis submitted in partial fulfilment of Agricultural Economics. University of Free State, Bloemfontein.
- Muchenje, V., Dzama, K., Chimonyo, M., Raats, J.G., and Strydom, P.E. 2007. Meat Quality Of Nguni, Bonsmara And Aberdeen Angus Steers Raised On Natural Pasture In The Eastern Cape, South Africa. *Meat Science*, 79(1): 20-28.
- Musemwa, L., Mushunje, A., Chimonyo, M., Fraser, G., Mapiye, C., and Muchenje, V. 2008. Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: Review. *African Journal of Agricultural Research*, 3(4): 239–245.
- Musemwa, L., Mushunje, A., Chimonyo, M., Mapiye, C. 2010. Low Cattle Market Off-Take Rates In Communal Production Systems of South Africa: Causes and Mitigation Strategies. *Journal of Sustainable Development in Africa*, 12(5): 209-226.
- Mukuahima, G. 2008. The performance of beef cattle bulls in the Vrede district of Mpumalanga, South Africa. MSc Dissertation, University of Pretoria, South Africa
- Napolitano, F., Braghieri, A., Piasentier, E., Favotto, S., Naspetti, S., and Zanolli, R. 2010. Effect of Information about Organic Production on Beef Liking and Consumer Willingness to Pay. *Food Quality and Preference*, 21(2): 207-212.

National Department of Agriculture, 2008. Directorate: Agricultural Statistics of the National Department of Agriculture, Republic of South Africa. Pp. 58-73. Downloaded from http://www.nda.agric.za/docs/Abstract_08.pdf on the 13th of May 2012.

Nebbia, C., Urbani, A., Carletti, M., Gardini, G., Balbo, A., Bertarelli, D., Girolami, F. 2011. Novel Strategies for Tracing the Exposure of Meat Cattle to Illegal Growth-Promoters. *The Veterinary Journal*, 189: 34–42.

O'Donovan, P., and McCarthy, M. (2002). Irish Consumer Preference for Organic Meat. *British Food Journal*, 104(3/4/5): 353-370.

Padel, S., and Foster, C. 2005 "Exploring The Gap Between Attitudes And Behaviour: Understanding Why Consumers Buy Or Do Not Buy Organic Food." *British Food Journal*, 107(8): 606 – 625.

Pussemier, L., Larondell, Y., Van Peteghem, C., and Huyghebaert, A. 2006. Chemical Safety of Conventionally and Organically Produced Foodstuffs: A Tentative Comparison under Belgian Conditions. *Food Control*, 17(1): 14–21.

Scholtz, M., M. 2011. Challenges for Beef Production in Developing Countries of Southern Africa. Downloaded From www.ngunicattle.info, on the 14th of June, 2013.

Scholtz, M., M., Van Ryssen, J. B. J., Meissner, H. H., and Laker, M.M C. 2011. A South African Perspective on Livestock Production In Relation To Greenhouse Gases and Water Usage. *South African Journal of Animal Science*, 43(3).

Sofos, J. N., 2008. Challenges to Meat Safety in the 21st Century. *Meat Science Journal* 78(1-2): 3–13.

Strydom, P. E. 2008. Do Indigenous Southern African Cattle Breeds Have The Right Genetics For Commercial Production Of Quality Meat? *Meat Science*, 80(1): 86–93.

Tada, O., Muchenje, V., and Dzama, K. 2013. Effective Population Size and Inbreeding Rate of Indigenous Nguni Cattle under In Situ Conservation in the Low-Input Communal Production System. Short Communication. *South African Journal of Animal Science*, 43(2): 137-142.

Tuomisto, H.L., Hodgeb, D., Riordan, P., and Macdonald, D. W. 2012. Does Organic Farming Reduce Environmental Impacts? – A Meta-Analysis of European Research. *Elsevier Journal of Environmental Management*, 112(15): 309–320.

Van Loo, E.J., Alali, W., and Ricke, S. C. 2012. Food Safety and Organic Meats. *Annual Review of Food Science and Technology*, 3: 203-25.

Woese, K., Lange, D., Boess, C., Bögl, K.W. 1997. A comparison of organically and conventionally grown foods. Results of a review of the relevant literature. *Journal of the Science of Food and Agriculture*. 74: 281–293.

CHAPTER 3: RESEARCH CONCEPTUAL FRAMEWORK, METHODOLOGY AND DESCRIPTION OF THE STUDY AREA

3.0 Introduction

South Africa ranks among the countries with the highest rate of income inequality in the world. Compared to other middle income countries, it has extremely high levels of absolute poverty. While South Africa may be food secure as a country, large numbers of households within the country are food insecure. Social grants have played an important role in improving household food security since 2001 in South Africa (Van der Berg 2006, Aliber 2009). Ideally, poverty and food insecurity would be addressed by expanding employment opportunities thereby enhancing household incomes. However, the recent years have seen multitudes of people losing their jobs due to the economic recession. As thus, a third potential contributor to food security in South Africa might be small-scale agricultural production.

It may seem counter-intuitive to promote subsistence or small-scale agricultural production, such as communal farming, in a semi-industrialized economy like South Africa. However, many countries have successfully supported small-scale production in Europe and in Japan and Indonesia, often as partial contributors to household food baskets and livelihoods (Altman *et. al.* 2009). Because South Africa has invested so little in this area, it deserves investigation. Since 70% of South Africa's total area is only suitable for livestock farming (Musemwa *et al.*, 2008), organic beef production could be a viable instrument for communal farming households' food security by providing food (meat and milk), energy and most importantly, a source of income through premium prices obtained from organic beef sales.

3.1 Conceptual Framework

The study conceptual framework is summarized in Figure 3.1

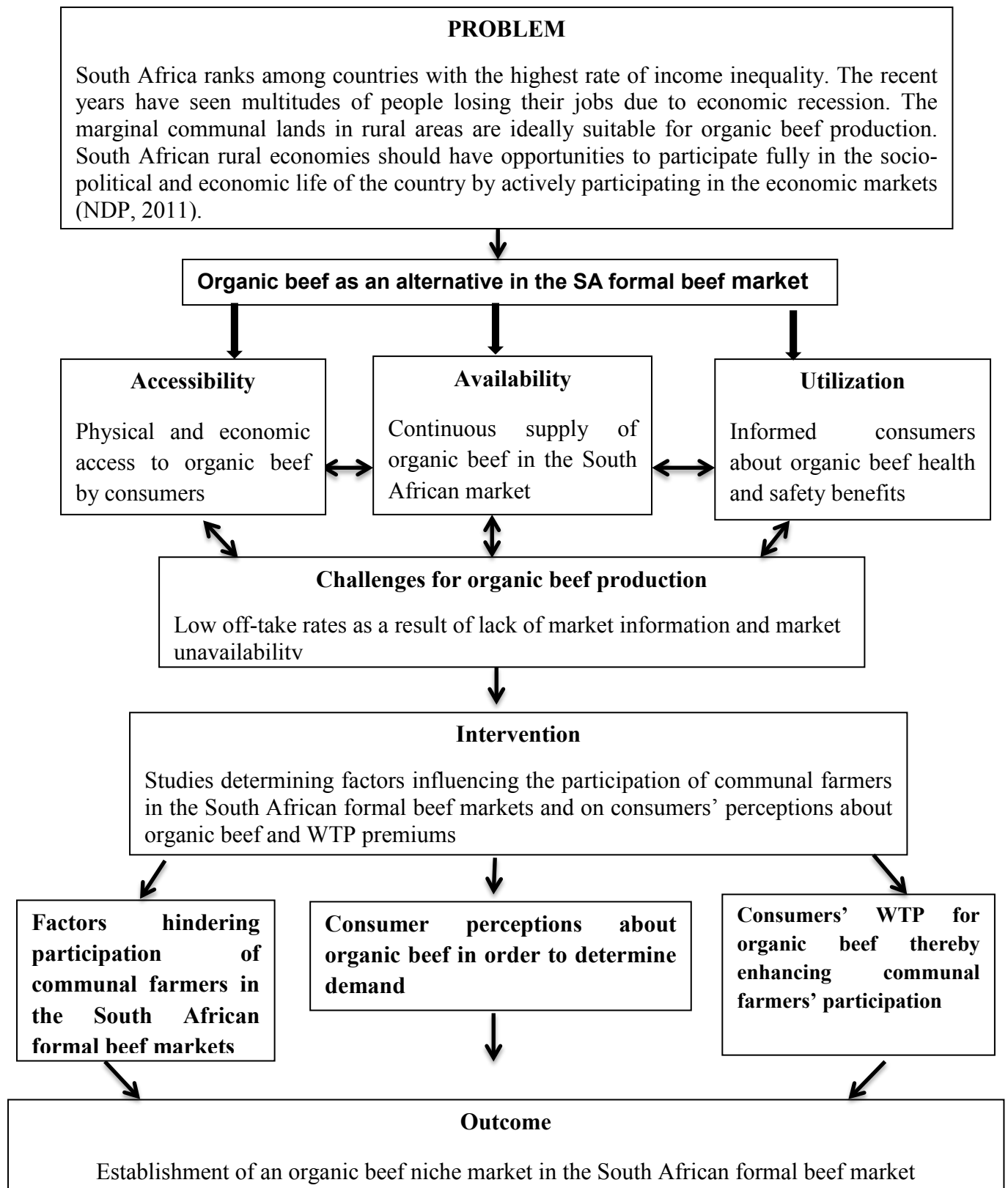


Figure 3.1: Conceptual framework

3.2 Research design

The mixed research methods were employed in this transdisciplinary study in order to accurately portray the organic beef market prospects in South Africa. Validated questionnaires were used to collect quantitative data from consumers and focus group interviews were qualitatively used to provide in-depth understanding of overall market demand for organic beef in order to identify opportunities available for communal farmers to venture into organic beef production.

Eight enumerators were recruited as field workers for the survey. These were trained prior to data collection to ensure high standard of data. Collaboration was made with the Department of Agriculture (Pietermaritzburg) regarding the identification of communal farmers' groups who were to participate in the Focus Group Discussions (FGDs). These FGDs were conducted by an expert facilitator in the communal farmers' native language.

3.2.1 Data Collection tools

3.2.1.1 Questionnaires

Data was collected through a survey in which 300 beef consumers participated in four KZN towns. This was complemented with a series of four FGDs which were conducted with communal farmers from two communities in order to obtain in-depth understanding of organic beef marketing prospects in South Africa. The survey questionnaire included both open and close-ended questions and a Likert scale with several attributes regarding the purchasing of organic beef, which would give rise to values important to consumers as per the utility theory. The questionnaire was validated before conducting the survey to a small group of consumers who reflected the targeted population in order to ensure that it measures what it purports to measure.

The survey participants were randomly selected from several formal retail outlets in the four KZN towns. These retail outlets included Pick n Pay, Boxer, Shoprite, Checkers, Trans-Natal Meats and Mndeni Meats, which were purposively selected by virtue of selling meat. After data collection, the trained enumerators coded the questionnaires in order to enable data

analysis. The questionnaire was structured as follows: socio-demographic characteristics; understanding of organic beef, beef consumption patterns and willingness to pay for organic beef; safety and health issues; and criteria considered when purchasing organic beef.

3.2.1.2 Focus Group Discussions

The survey data indicated that consumers value organic beef and were willing to pay premium prices. Focus group interview guides were developed to obtain in-depth understanding of factors influencing the lack of participation by communal farmers in the South African formal beef markets. The interview guides were structured as follows:

- a) differentiation between organic and conventional beef,
- b) importance of keeping cattle on communal farms,
- c) perceived entrepreneurial opportunities and challenges, and
- d) factors hindering communal farmers from actively participating in the South African formal beef market.

The FGDs interviews were conducted with communal farmer groups from two communities in UMgungundlovu district. These were identified with the assistance of the Department of Agriculture (DOA). Each FGD had nine participants who are consumers of organic beef. All FGD participants were in possession of communal cattle and were responsible for their household food purchase. These FGDs were conducted in isiZulu, the communal farmers' native language, and these provided triangulation which is a form of quality assurance and to provide in-depth understanding of the subject matter.

3.3 Data Analysis

This study was based on the utility theory whereby the binary and ordered logit models were used to quantify consumers' willingness to pay premiums for organic beef, whilst the multinomial logit was employed to determine consumers' perceptions about organic beef. The Statistical Package for Social Studies (SPSS) and Strata were employed to analyse the quantitative data using economic models which indicate the utility of organic beef by consumers. Thematic analysis was employed to analyse outputs from the FGDs in which

three themes were identified and incorporated into the qualitative utility theoretical framework.

3.4 Ethics

The survey questionnaire was submitted and approved by the University of KwaZulu-Natal research ethics committee. All participating consumers were informed of their right to volunteer and or to withdraw at any stage during the face-face interview. The informed consent form was read and or given to respondents to read and sign before the interviews. Participants were informed about the confidentiality of their responses.

3.5 Description of study area

KwaZulu-Natal (KZN) has a total area of 94 361 km², and the population stood at 10, 645,400 as of 2010. The province is one of the main livestock farming areas in South Africa, following Eastern Cape Province, with extensive herds of beef and dairy cattle, flocks of wool and mutton sheep, and numbers of large piggeries. In 2005, KZN had a total population of 2,857 000 cattle. This province has a total of 6, 5 million hectares of land for farming purposes of which 82 percent is suitable for extensive livestock production and 18 percent is arable land (KZN DOA, 2009).

This is in line with Bester *et. al.*, (2003); Eastern Cape Development Corporation, (2003) who stated that over 70% of the resource-poor farmers in South Africa are situated in the harsh agro-ecological zones where cropping is unsuitable, hence livestock production is an ultimate source of livelihood for communal farmers who are rearing indigenous and adaptable breeds.

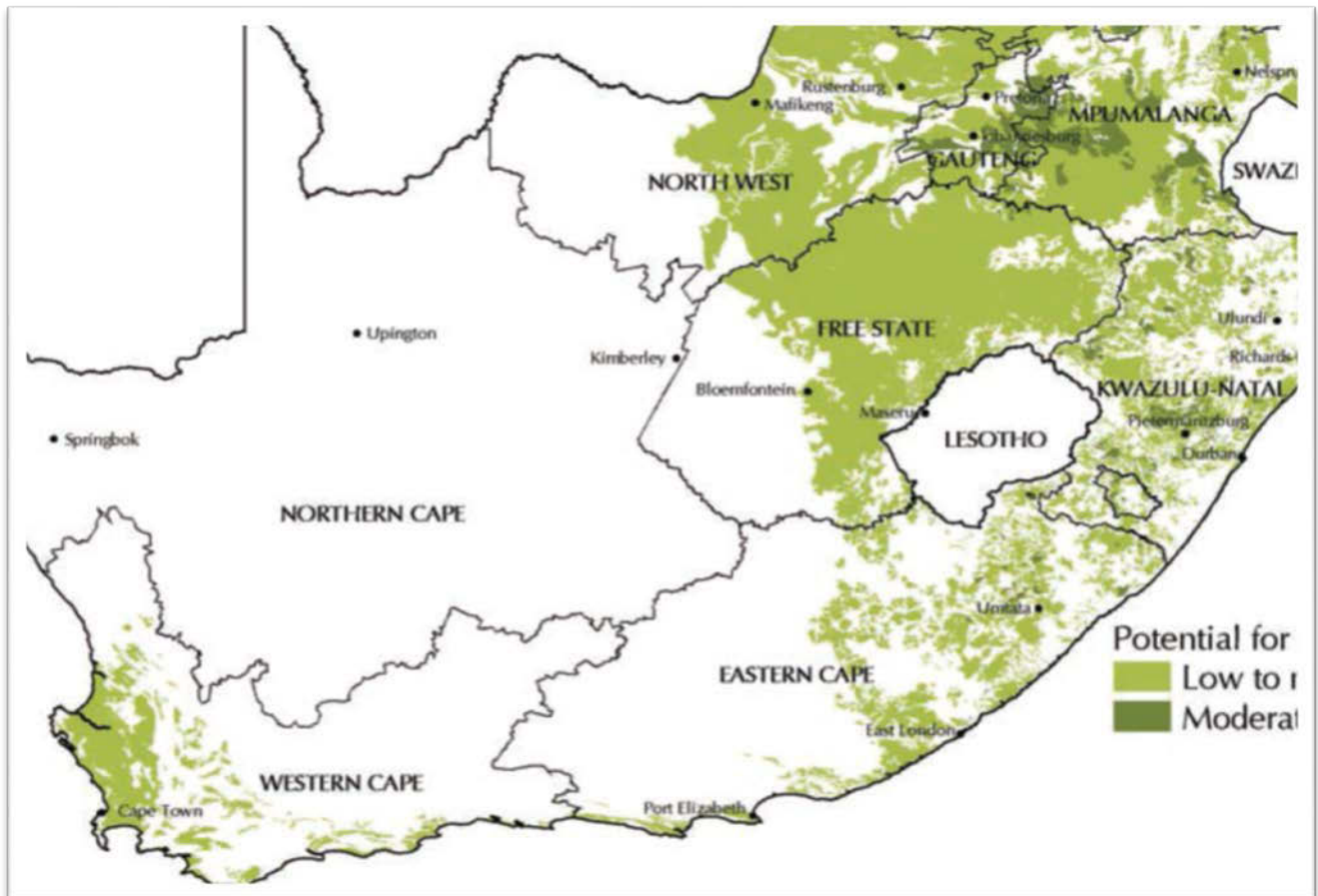


Figure 3.2: The land capability of South Africa

Figure 3.2 shows that a significant amount of land is non-arable in South Africa, with only 12.6% of the country's 16 million hectares suitable for dry land crop production (Antonie *et al.*, 2013). This confirms that there is a need to promote other livelihood strategies, such as organic beef production, in order to sustain communal farming systems.

Data for this study was collected from four KZN districts namely eThekweni, UMgungundlovu, Sisonke and UThukela as shown in Figure 3.3. These districts were selected based on the fact that they contain a substantial number of communal cattle farmers and at the same time, have cities and towns which are of economic value in the province where a majority of consumers are based. One town was selected for each district as follows: Durban, Pietermaritzburg, Ixopo and Escort, respectively.



Figure 3.3: Map showing study sites

3.6 References

- Aliber, M. 2009. Exploring Statistics South Africa's national household surveys as sources of information about food security and subsistence agriculture. Unpublished report, Centre for Poverty Employment and Growth, Human Sciences Research Council, Pretoria.
- Altman, M., Hart, T., and Jacobs, P. 2009. Food security in South Africa. HSRC.
- Antonie F., Louw, W., Morris, E., and Mtwesi, A. 2013. Focus on land. The Journal of the Helen Suzman Foundation. Issue 70.
- Bester, J., Matjuda, I.E., Rust, J.M. and Fourie, H.J. 2003. The Nguni: case study. In: FAO Community-based management of animal genetic resources. Rome: UNDP, GTZ, CTA, FAO: 45-68.
- Eastern Cape Development Corporation (ECDC) 2003a. ECDC Sector Profile: Dairy Opportunities. <http://www.ecdc.co.za/sectors/sectors.asp?pageid=108>.
- KwaZulu-Natal Department of Agriculture and Environmental Affairs (KZN DOA) 2009. Report for KwaZulu-Natal, Pietermaritzburg, South Africa.
- Musemwa, L., Mushunje, A., Chimonyo, M., Fraser, G., Mapiye, C., Muchenje, V. 2008. Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: review. African Journal of Agricultural Research. 3:239–245.
- National Planning Commission, 2011. National Development Plan. Pretoria: Government Printer. ISBN 978-0621-40475-3. RP270/2011.
- Perret, S. R. 2002. Water policies and smallholding irrigation schemes in South Africa: a history and new institutional challenges. Water Policy 4(3): 283 – 300.
- Van der Berg, S. 2006. Public spending and the poor since the transition to democracy. In Bhorat, H. & Kanbur, R. (Eds), Poverty and Policy in Post-apartheid South Africa, Cape Town: HSRC Press.

CHAPTER 4: POSSIBILITY OF ORGANIC BEEF PRODUCTION ON SOUTH AFRICAN COMMUNAL FARMS

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Abstract

Communal farmers in South Africa are in possession of indigenous breeds and resources required for organic beef production. However, the market off-take rate from communal farms is between 5 and 10%, compared to 25% on commercial farms, despite the fact that 40% of cattle are found on communal lands. The objective of the study was to investigate the possibility of organic beef production on South African communal farms, using FGDS conducted with communal cattle farmers in UMgungundlovu, KZN. The findings revealed that socio-cultural factors are the primary reasons for keeping cattle, with cash generation being a secondary importance. Despite the lack of external support, communal farmers value their communal production systems and produce which can be labelled ‘organic’ by default. According to these farmers, this system is wholesome; results in mature and tasty meat with several domestic and medicinal benefits compared to conventional cattle production systems, hence, its products should be sold at a premium. Socio-behavioural factors, such as isolation, inferiority and lack of institutional support, market access and market information pertaining to the marketing of organic beef are the reasons why communal farmers are not actively participating in the South African formal beef market. Communal farmers have a potential to participate in the South African formal beef market in which they are willing to sell their differentiated products. In conclusion, the involvement of communal farmers as stakeholders in the South African beef market through sharing of production and market information is important for the introduction and maintenance of an organic beef niche market.

Keywords: Organic beef, Formal beef markets, Communal farmers, Civic engagement

4.1 Introduction

During the mid-to-late 20th century subsistence agriculture with its relatively low yields was discouraged in most African countries (Bryceson, 2000). This brought about the introduction of large and superior exotic breeds in both the communal and commercial cattle farming sectors in countries such as South Africa (Musemwa *et al.*, 2008). However, these breeds have failed to survive the harsh conditions such as disease and parasite prevalence, insufficient feed resources, poor breeding and marketing management characteristic of communal farms (Musemwa *et al.*, 2008).

Over 70% of the resource-poor farmers in South Africa are situated in the harsh agro-ecological zones where cropping is unsuitable, and thus, rely on livestock for their livelihoods (Mapiye *et al.*, 2009). As a result, the Integrated Sustainable Rural Development Strategy (ISRDS, 2004) identifies livestock farming as the agricultural enterprise with the most likely chance of improving household food security, alleviating poverty, and improving livelihoods in communal farming areas of South Africa.

Bryceson (2000) stated that African rural dwellers value the pursuit of farming in which the subsistence production of food is a major component of livelihoods in sub-Saharan Africa. The rural dwellers are largely made up of communal farmers who are in possession of adaptable, indigenous breeds which have an ability to cope with the local bio-physical and climatic conditions. According to Tada *et al.* (2013), 75% of indigenous breeds are found on communal lands.

Although the motive for keeping cattle on communal farms is to use them for generating income (Montshwe, 2006; Mapiye *et al.*, 2009), the cattle market off-take rate on communal lands is low (5 to 10%) compared to 25% in the commercial sector (Musemwa *et al.*, 2010). This is despite the fact that cattle thrive well on marginalized environments, and that 40% of cattle in South Africa are kept under communal production systems Musemwa *et al.* (2010).

According to Mapiye *et al.* (2009), market unavailability is the reason for the low off take rates on communal farms in South Africa. Montshwe *et al.* (2006) reported that the lack of market information hinders communal farmers from actively participating in the South African formal beef market. As a result, addressing the often neglected cattle marketing problems can improve the viability and sustainability of Nguni cattle in the communal areas (Montshwe, 2006). Hence, the

objective of the study was to investigate the possibility of organic beef production on South African communal farms.

4.2 Justification of the study

Conventional farming which was encouraged by the ‘Green Revolution’ is characterised by high input costs which most communal farming households cannot afford (Bryceson, 2000). As a result, small scale farming including organic beef farming is still practiced among communal farming households all over South Africa. However, communal farmers’ participation in the South African formal beef market is low. Thus, strengthening the indigenous and low-input technologies, such as organic beef farming, is necessary for increasing participation of communal cattle farmers in the formal beef markets.

Organic farming is often promoted as an opportunity for communal farmers in Africa, at subsistence and commercial levels (Walaga, 2002), including environmental sustainability, cultural factors, similarities in production, enhancing indigenous knowledge systems and profit opportunities. Certified organic products are sold with a premium in the market place (Oberholzer *et al.*, 2005).

Although organic plant production has made significant inroads in South Africa, organic beef production is still at inception stage. This is despite the fact that communal farmers have access to land that has not been exposed to intensive chemical agriculture; hence they could gain certification faster than the three-year conversion period recommended by the European Union (Biodynamic & Organic Certification Authority BDOCA, 2006). These farmers are in possession of adaptable breeds which are suitable for organic beef production. Therefore, communal farmers have an opportunity to produce premium-priced products in organic markets and obtain higher revenue than that typically gained from conventional agricultural markets.

Regardless of these benefits in favour of communal farmers, output from communal farms in the South African formal beef markets is very minimal as evident in the thin organic beef niche market. There is therefore a need to investigate why communal farmers are not actively participating in the formal beef market, especially in lieu of the increase in demand for organic products as witnessed recently (Sofos, 2008). The determination of market barriers hindering the participation of communal farmers in the South African formal beef markets is important in order to determine the

possibility of organic beef production, enhance off-take rates from communal farms and ensure efficient utilization of agricultural resources.

4.3 Research methodology

4.3.1 Study sites and sampling technique

A series of four Focus Group Discussions (FGDs) were conducted in two communal farming communities in the peri-urban UMgungundlovu district, KwaZulu-Natal. The two communities which participated in the study were in Willowfontein kraal and Mpendle. These study sites were selected based on the premise that peri-urban farmers tend to sell a higher proportion of their outputs compared to those in rural areas (Omiti *et al.*, 2009). A purposive sample of communal cattle farmers owned indigenous cattle breeds from these study sites were randomly selected from a list that was provided by the Department of Agriculture (DOA), UMgungundlovu district.

4.3.2 Data collection

Nine communal farmers participated in each of the four FGDs which comprised of participants over the age of 21 years. There were two sets of FGDS from each study site. The FGDs were conducted by an expert facilitator in isiZulu which is the native language of the communal farmers. The discussions, included ranking of key issues, Strengths, Weaknesses, Opportunities and Threat (SWOT) analysis and the civic engagement model were recorded on flip chart papers and using a tape recorder. The FGD interview guide comprised of questions regarding differentiation between organic and conventional beef, importance of keeping cattle on communal farms, perceived entrepreneurial opportunities and challenges, and factors hindering communal farmers from actively participating in the South African formal beef market.

4.3.3 Data analysis

Data was analysed using content or thematic analysis which is a method for identifying, analysing, and reporting patterns (themes) within data (Braun and Clarke, 2006). Themes were identified; data coded per theme and analysed to portray an accurate reflection of the content of the entire data set.

The questions that guided the thematic analysis are as follows:

- a) What are the reasons for keeping cattle?
- b) What is the difference between organic and conventional beef? And,
- c) Why are communal cattle farmers not actively participating in the formal South African beef market?

During data analysis, the results were coded and themed into three categories namely: importance of cattle, differentiation between organic and conventional beef and reasons for lack of participation in the South African formal beef markets by communal farmers. Verbatim quotes were used to show the views of the communal farmers participated in this study.

4.4 Results

Sixty five percent of the participants were males who are cattle owners. The importance of cattle is presented in Table 4.1. The results of the FGDs are presented in accordance with the three identified themes. Communal farmers were requested to list the significance of cattle and to rank the identified factors into two sub-themes namely; primary and secondary importance of cattle on communal lands. Socio-cultural values were ranked as primary reasons for keeping cattle by communal farmers. Unexpectedly, rearing cattle for cash was classified under food security which was ranked as a secondary reason for keeping cattle. Contrary to Mapiye *et al.* (2009) who stated that cattle on communal lands is mainly reared for cash, the FGDs participating farmers ranked cash as a secondary reason for keeping cattle.

Table 4.1: Theme 1, Importance of cattle

Sub-theme 1: Primary importance of cattle		
Factor	Description	Quote
Social value (self-worthiness)	Communal farmers have pride and dignity emanating from owning locally adaptable cattle	<i>“We take pride in growing our own food”</i>
Cultural value	Meat from cattle reared by communal farmers is used for paying dowry, appeasing ancestors and in traditional ceremonies and events.	<i>“As long as there are sufficient indigenous and custom related steps from production to slaughter, meat raised on communal farms can be used to appease ancestors”</i>
Sub-theme 2: Secondary importance of cattle		
Food security	Communal farmers rear cattle for food in the form of milk and meat, and for cash as secondary importance	<i>“We sell cattle when there is a domestic need.”</i>
Agricultural activities	Cattle on communal lands are used for draught purposes.	<i>“Cattle enable timely planting and maintenance of field crops.”</i>
Domestic purposes	Manure from communal cattle is used for cleaning traditional houses’ floors	<i>“The chemical free manure from the local cattle is used to floor houses.”</i>

Presented in Table 4.2 are the differences between conventional and organic beef. The differences between conventional and organic beef were divided into five sub-themes namely production, maturity of meat, taste, contribution towards domestic and medicinal purposes. The results indicate that communal farmers have a clear distinction between conventional and organic beef, whereby organic beef is described as chemical free, superbly matured, of better taste and contributes to domestic and medicinal purposes than conventional beef.

Table 4.2: Theme 2, Differences between conventional and organic beef

Sub-theme 1: Production	
Conventional beef	Organic beef
-Conventional beef is produced using synthetic chemicals and artificial hormones	-Organic beef is produced using natural production systems
-Conventional beef production is highly resourced with external support from government and private companies	-Lack of external support for production
	-Organic beef production promotes the use of production methods which farmers are proud of
	-Efficient and effective production through mixed farming
	-source of livelihood (food and income) for communal farmers
Sub-theme 2: Maturity of meat	
-Immature meat and products	-Superbly matured meat
-May contain traces of chemicals	-No traces of chemicals in products
Sub-theme 3: Taste	
-“ <i>Conventional beef is tasteless</i> ”	-Organic beef is of better taste compared to conventional beef
Sub-theme 4: Contribution towards domestic purposes	
-Manure cannot be used for flooring because of its chemical composition	-Manure is used for flooring and regulating ambient temperature
Sub-theme 5: Medicinal purposes	
-Unknown medicinal benefit from manure	-Fresh manure from indigenous breeds can be used to cure stomach ailments

The third theme on reasons why communal farmers are not participating in the South African formal beef market is shown in Table 4.3. This theme gave rise to two sub-themes namely; socio-behavioural and production factors. The results indicate that communal farmers feel isolated, inferior and expressed a lack of institutional support by other stakeholders in the South African beef industry and hence the decision not to participate. These communal farmers are particularly aware

that their products, derived from rearing indigenous cattle breeds under natural production systems, are of significant economic value.

Table 4.3: Theme 3, reasons why communal farmers are not participating in the South African formal beef market

Sub-theme 1: Socio-behavioural factors	
Factors	Quotes
Exploitation by commercial markets	<i>“Communal farmers are currently price takers in the markets.”</i>
Lack of appreciation for communal cattle farming systems by government and markets through support, policies and regulations	<i>“The government is promoting first world standards in a third world country.”</i>
Underestimated by government and consumers	<i>“Organic beef is said to be unclean.”</i> <i>“Local consumers board buses to buy beef from butcheries in town, leaving local markets.”</i>
Communal farmers feel powerless	<i>“We are perceived to be inferior, lazy and lacking skills, hence are excluded from policy development.”</i>
Sub-theme 2: Production factors	
Communal farmers value products from their indigenous cattle which are chemical free and distinguished	<i>“Our products are of high value; hence we deserve high returns from the markets.”</i>

4.4 Organic beef market participation pathway as perceived by smallholder farmers

A SWOT analysis was performed with the communal farmers in which the following opportunities and challenges were identified:

Table 4.4: SWOT analysis for organic beef production and marketing by communal farmers

Strengths <ul style="list-style-type: none">-Communal cattle farming systems adopts the organic livestock management practices because their cattle are still exposed to the natural setting to free range-Communal farmers are in possession of an average of 15 cattle which they could use for both socio-cultural and socio-economic purposes-Communal farming systems have a potential for the marketing of highly valued organic beef and distinguished hides	Opportunities <ul style="list-style-type: none">-Organic beef production could result in the establishment of product differentiation in the South African formal beef market-Organic beef production on communal farms, through improved extension systems could contribute to biodiversity and conservation
Weaknesses <ul style="list-style-type: none">-Lack of access to formal markets (market unavailability)-Limited market information-Insufficient external support to meet organic beef marketing standards and certification	Threats <ul style="list-style-type: none">- Isolation and exclusion-Limited extension services-Limited skills in maintaining organic cattle management and practices-Lack of recognition of smallholder indigenous farming systems

The SWOT analysis revealed that communal farmers identified isolation, exclusion and the lack of extension services as threats hindering them from participating in the South African formal beef market. In line with Montshwe (2006) and Mapiye (2009), communal farmers identified market unavailability and lack of market information as the main factors for the low off-take rates and subsequently, lack of participation in the South African formal beef market.

4.5 Discussion

4.5.1 Importance of cattle

The results indicated that cattle farming are an integral part of the South African communal farmers' livelihoods, supporting the finding by Bryceson (2000) who reported that farming pursuit is inherent in communal lands. However, the results show that there is a shift in focus from economic in favour of socio-cultural values. The results revealed that the primary reasons for keeping cattle are social (pride and dignity) and cultural values.

These results reveal that communal farmers are not willing to be treated as inferior by other formal beef stakeholders in the South African formal beef markets when they are in possession of valuable products in the form of organic beef. Communal farmers take pride in producing their own indigenous food using unconventional systems. These farmers regard the rearing of indigenous breeds using Indigenous Knowledge Systems (IKS) from production to slaughter in a manner that was used by their ancestors is important in conserving cultural values and IKS from generation to generation.

Food and cash are of secondary importance to the communal farmers rearing cattle on communal lands. Interestingly, cash is of secondary importance in cattle rearing by these communal farmers. This could be attributed to the fact that these farmers value their all-round and distinguished products; hence they are not willing to take low sale prices. As thus, they would rather derive satisfaction by keeping their most priced cattle, and only sell when there is an urgent and dire need.

Communal farmers use cattle for draught purposes in order to timeously grow crops and maintain the field crops thereby ensuring continuous food production. One of the FGD participants was quoted: "cattle are a source of renewable energy for draught purposes and for fertilizing crops and vegetable." These farmers consider organic beef as a highly acceptable source of protein with a great potential for the sale of by-products such as the valuable hides from the indigenous Nguni breed which is commonly reared on communal farms. In support, Sibanda (2013) reported that the Nguni breed of cattle has signatory and distinguished hides of high economic value. Rearing indigenous cattle breeds on communal lands contributes to various domestic uses such as provision of flooring materials and for various medicinal purposes.

4.5.2 Differentiation between organic and conventional beef

Communal farmers value their production systems which they consider to yield matured meat that is chemical and additives free. Since organic beef production eliminates the use of chemicals, it is considered healthier than conventional beef. The participating communal farmers gave an example that manure from naturally reared cattle can be mixed with water and taken orally in order to heal stomach ailments. Communal farmers perceived organic beef to be superbly matured than its conventional counterpart: “*i-Ncasa*” meaning that organic beef is tastier than conventional beef.

4.5.3 Reasons why communal farmers are not participating in the South African formal beef market

The findings revealed that socio-behavioural factors are the main reasons why communal farmers are not actively participating in the formal beef market. This results from communal farmers feeling exploited by commercial markets, with a limited voice because of low literacy levels and lack of market information. This is in line with Monshwe *et al.* (2006) who reported that one of the factors hindering the participation of communal farmers in the South African formal beef market is the lack of market information.

Communal farmers are price takers in the South African formal beef markets, even though their produce is of high value. According to Levin and Milgrom (2004), producers are motivated by profit which can be directly measured in order to actively participate in the market. This enables producers to derive utility, defined as experienced satisfaction, and may not directly refer to usefulness (Levin and Milgrom, 2004). The study confirmed that as long as communal farmers feel isolated, inferior and are price takers without market information, they would rather derive satisfaction by keeping their cattle and not participating in the South African formal beef market.

According to the communal farmers, the lack of trust in the communal farming system is evident when the consumers leave the local informal markets on communal farms to purchase cheaper beef from major retailers in surrounding towns. This indicates that consumers trust the renowned formal markets to provide safe and quality meat as some local consumers perceive “*organic beef as unclean and uninspected.*”

The results indicated that although communal farmers are not trusted by the South African formal beef market stakeholders, they are willing to sell their products in a differentiated market which would take into consideration the product value and low-output nature of organic beef production systems. This calls for trust and civic engagement amongst all stakeholders to facilitate the certification of organic beef and the establishment of an organic beef niche market.

4.5.4 Civic engagement model

The model shown in Figure 4.1 indicates that communal farmers desire to be involved in matters affecting the South African beef industry in which they could actively participate in the production and marketing issues as partners. The following model was proposed for consideration during the introduction of organic beef as an alternative in the South African formal beef market:

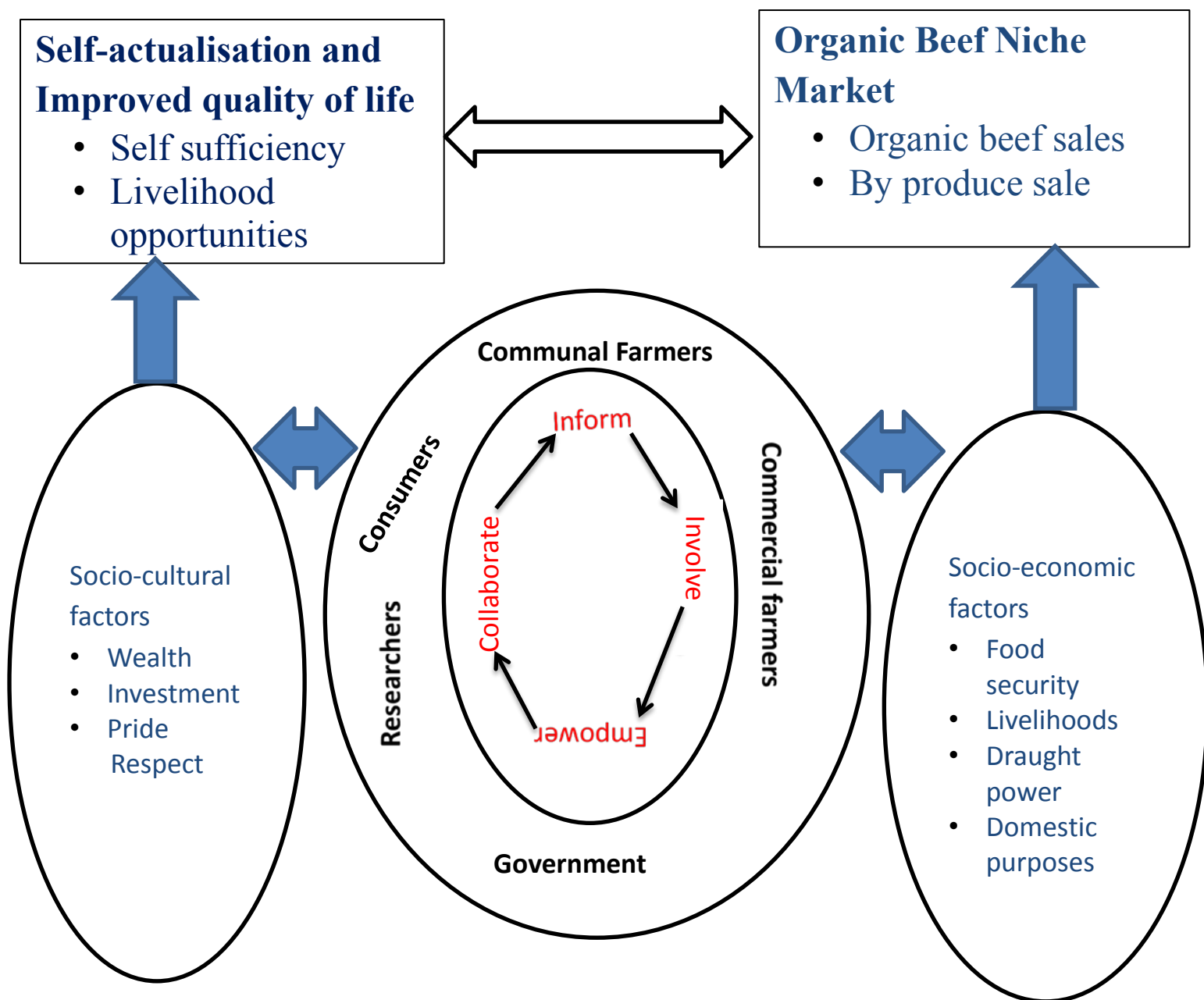


Figure 4.1: Civic engagement model

The model illustrates that cattle are an integral part of the South African communal farming systems in which they could play a significant role in sustaining livelihoods and in ensuring food security through the establishment of an organic beef niche market in which communal farmers could sell their highly valued organic beef at the right price. The model indicates that although communal farmers ranked food security as of secondary importance in communal cattle rearing, there is a potential for organic beef production since they are willing to sell their differentiated products to the right market and at the right price.

Communal farmers identified the need for product differentiation at the market place in order to enable them to sell their valuable products at a premium and allow consumers to differentiate between organic and conventional beef and ultimately, make informed choices. This is particularly

important because organic beef production, despite being of low-output, produces valuable, wholesome products that should fetch high prices in the market place. This is in line with (O'Donovan and McCarthy, 2002) who reported that organic products are sold with premium prices.

4.6 Conclusion

In line with the food sovereignty principle, communal farmers are willing to enhance cattle rearing for the provision of food and for sale. This could be achieved through the establishment of an organic beef niche market in which communal farmers could sell their differentiated organic beef as an alternative to conventional beef. It can be concluded that there is a potential for communal farmers to participate in the South African formal beef market. Communal farmers were willing to participate in the South African formal beef market whereby trust and involvement of all stakeholders in the production and sharing of market information were identified as essential for maintaining transparency and inclusiveness of communal farmers in the development of an organic beef niche market in the South African formal beef market. Hence, there is a need for the rebuilding of trust between all stakeholders in the beef industry including communal and commercial beef farmers, consumers, government and the private sector through civic engagement amongst all stakeholders. This could contribute to the maintenance of the organic beef niche market in the South African formal meat market where the distinguished communal products such as organic beef could be sold.

4.7 Future research

Apart from the lack of market information, market unavailability is another factor hindering the participation of communal farmers in the South African formal beef market. There is therefore a need for further research that determines the demand for organic beef in the South African beef market in order to enable communal farmers to have access to the organic beef niche market in South Africa. Hence Chapters 5 and 6 sought out to determine the factors influencing demand for organic beef and South African consumers' WTP for organic beef.

4.8 References

- Braun, V., and Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3: 77 – 101.
- Biodynamic and Organic Certification Authority (BDOCA), 2006. Organic Certification Standards. Biodynamics and Organic Certification. Biodynamic and Organic Certification Authority. Bryanston, Johannesburg, South Africa.
- Bryceson. D., 2000. African rural labour, income diversification and livelihood approaches: a long-term development perspective. *Review of African Political Economy* 26 (80), 171–189.
- Integrated Sustainable Rural Development Strategy (ISRDS) 2004. <http://www.info.gov.za/otherdocs/2000/isrds.pdf>
- Levin, J. and Milgrom, D. 2004. Consumer theory. Downloaded from: [web.stanford.edu/~jdlevin/Econ%20202/choice%20 Theory](http://web.stanford.edu/~jdlevin/Econ%20202/choice%20Theory)
- Mapiye, C., Strydom, P. E., Dzama, K., and Chimonyo, M. 2009. Cattle Production on Communal Rangelands of South Africa and the Potential of Acacia Karoo in Improving Nguni Cattle Production. Fort Hare. University of Fort Hare Publishers.
- Montshwe, B. D. 2006. Factors affecting participation in mainstream cattle markets by small-scale cattle farmers in South Africa. MSc thesis submitted in partial fulfilment of Agricultural Economics. University of Free State, Bloemfontein.
- Musemwa, L., Mushunje, A., Chimonyo, M., Fraser, G., Mapiye, C., Muchenje, V., 2008. Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: review. *African Journal of Agricultural Research*. 3, 239–245.
- Musemwa, L., Mushunje, A., Chimonyo, M., Mapiye, C. 2010. Low Cattle Market Off-Take Rates In Communal Production Systems of South Africa: Causes and Mitigation Strategies. *Journal of Sustainable Development in Africa*, 12(5):209-226.
- Oberholzer I., Dimitri, C., and Greene C. 2005. Price premiums hold on as US organic produce market expands. *Economic Research Service Outlook Report No. VGS30801* (Washington DC: USDA).
- O'Donovan, P., and McCarthy, M. 2002. Irish Consumer Preference for Organic Meat. *British Food Journal*, 104(3/4/5):353-370.
- Omiti, J. M., D. J. Otieno, T. O. Nyanamba, E. Mccullough. 2009. Factors Influencing the Intensity of Market Participation by Smallholder Farmers: A Case Study of Rural and Peri-urban areas of Kenya. *Afjare* 3 (1): 57-82

Sibanda, S. 2013. The Nguni Co Skin Has Got Special Qualities. Downloaded from www.chronicle.co.zw/nguni-cow-skin-has-special-qualities, in June 2013.

Sofos, J. N., 2008. Challenges to Meat Safety in the 21st Century. *Meat Science Journal* 78(1-2):3–13.

Tada, O., Muchenje, V., and Dzama, K. 2013. Effective Population Size and Inbreeding Rate of Indigenous Nguni Cattle under In Situ Conservation in the Low-Input Communal Production System. Short Communication. *South African Journal of Animal Science*, 43(2):137-142.

Walaga C. 2002. Organic agriculture in the continents. In Yussefi, M. and Willer, H. (Eds). *The World of Organic Agriculture: Statistics and Future Prospects*, IFOAM. Tholey, Germany.

CHAPTER 5: DETERMINANTS OF CONSUMER PERCEPTIONS ABOUT ORGANIC BEEF IN SOUTH AFRICA

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Abstract

The future of organic beef production in South Africa is dependent upon consumer demand, hence understanding the perceptions influencing the purchasing of organic beef rather than conventional beef is essential. The objectives of the study were to assess the consumer awareness of organic food products and determine factors influencing consumers' perceptions towards the purchasing of organic beef. Principal Components Analysis (varimax rotation), was employed to identify the latent factors that condenses the motivations most likely to influence consumers to purchase organic beef. Consumers perceive self-grown food without using chemicals as '*organic*', hence associate it with health and safety. Sixty percent of the consumers had prior experiences in purchasing and consuming organic food. Consumer perceptions about purchasing organic beef were influenced by safety control, health and environment. Safety control was the most important factor with 25.1% of the variations that determined consumer's decision to purchase organic beef. Consumers perceived organic beef as of high quality, good appearance, and healthy. Sustainability concerns were further identified as key motivations for the purchasing of organic beef by consumers. It is concluded that there is a need for addressing the subjective safety, health and environmental components of organic beef to take advantage of the organic beef potential market.

Keywords: Consumer perceptions; Organic beef; Principal Component Analysis; Safety control; Health; Environment

5.0 Introduction and background

Urbanization and higher income has increased the demand for sustainably raised beef that consumers perceive to enhance quality and safety (Loureiro and Umberger, 2007). This has increased the demand for broader food choices through enhancing more diversified diets (Gil *et al.*, 2000) and subsequently, increasing the demand for alternatively produced products such as organic beef. Hocquette and Gigli (2005) reported that globally, the consumer demand for animal products is increasingly shifting towards products that are safe, nutritious, produced through acceptable methods and of good eating quality. Organic beef is considered healthier, tastier, and safer and produced through acceptable and environmentally safe production systems than conventional beef (O'Donovan and McCarthy, 2002).

Safety is one of the important meat characteristics that consumers consider when purchasing organic beef because of the elimination of chemicals from the organic beef production process (O'Donovan and McCarthy, 2002). The main factor in the controversial nature of meat is the occurrence of food safety incidents, such as the presence of hormone residues in meat, which could potentially impact on health. The perception of the healthiness of foods is influenced by various factors, such as type, production and processing of raw materials, origin, and date of production, preservation method, packaging and use of additives (Van Loo, 2010).

Recent years have seen an increasing global trend in demand, supply and consumption of organic beef meat. In South Africa, smallholder farmers practise organic cattle farming but lack access to organised markets and are not certified. It is, therefore, of interest to assess the consumer awareness of organic food products including beef, whilst determining the factors that influence consumers' perceptions towards the purchasing of organic beef. Such information assists in the identification and development of beef markets for smallholder cattle producers to sell their products. It is hypothesized that consumers have a limited understanding of organic food products especially beef meat.

Organic beef is produced through the use of traceable organic and biodegradable inputs from the ecosystem which promotes animal health and welfare (Harper and Makatouni, 2002). Organic beef attributes, as perceived by the consumer, are essential means of generating product differentiation thereby determining its demand. It is, therefore, important to understand consumers' perceptions about organic food. The economics of information theory classifies products into three categories namely; search, experience and credence qualities. Search qualities, such as appearance, can be

fully evaluated prior to purchase, whilst experience qualities, such as taste, can only be evaluated after the purchasing and consumption of the product. Credence qualities, for example, health and safety, are those that the consumer can never fully evaluate even after purchase and consumption.

Consumers purchase organic food for the following benefits: health, nutrition, taste and environment (Hughner *et al.*, 2007). Hence the current study is based on the premise that organic beef is largely made out of credence attributes since the level of safety, healthiness and environmental benefits of organic beef are neither clearly observable, nor can they be readily experienced. Consumers should have trust in the product, or rely on the available information, such as health claims. Insights play a significant role in determining whether or not a product will be purchased, hence, without a clear explanation of the credence qualities, consumers will not participate in the purchase process (Verbeke *et al.*, 2010).

There are hardly any intrinsic cues available for judging the credence quality of a good product at the point of purchase (Verbeke *et al.*, 2010). Safety is difficult to assess by many consumers and the level of food safety is, in most cases, unobservable to consumers. As a result, extrinsic cues are the dominant resources used to inform the consumer about the credence quality attributes of a product. Van Wezemael *et al.* (2010) considers freshness as the only salient intrinsic credence quality attribute cue that can be used by consumers to determine safety of meats.

Organic beef quality can be hard for consumers to measure (Grunert, 2005). It starts as a search quality (appearance) continues to be an experience quality (taste) which can only be observed after purchase and ends as a credence quality (health, safety and animal welfare issues) which is impossible for consumers to observe on their own (Hoffman *et al.*, 2000). This is further exacerbated by the fact that beef is sold as an undifferentiated product in the South African beef market. Hence, consumers have to rely largely on their perceptions when purchasing organic beef. Perceptions about organic food are linked to consumer demand (Grunert, 2006). The future of organic animal agriculture is largely dependent upon consumer demand, hence understanding the motives underlying the purchasing of organic foods are crucial for maintaining and growing the organic market. Rodríguez-Lázaro *et al.* (2007) reported that the interest on organic food is brought about by the desire to satisfy health, taste and appearance, convenience and process, all at the same time.

Consumers purchase products based on their perceived quality, since they cannot test quality before purchase. Hence, market growth depends on consumers' perception that the quality of organic

products continues to be higher than their conventional counterpart products (Grunert, 2006). The motives behind the purchasing of organic beef by consumers in South Africa are, however, not known.

Despite the fact that organic beef has made significant inroads in developed countries, there is no information regarding consumers' perceptions about organic beef in South Africa, although the traditional farming systems employed by communal farmers could be adopted for organic production (Thamaga-Chitja, 2008). The main purchasing determinants of organic food by Turkish consumers are health and environmental concerns (Ergin and Ozsacmaci, 2011). These are difficult to measure at the point of purchase or even after consumption. On the contrary, no study determining consumers' perceptions most likely to influence the purchasing of organic beef has been conducted in South Africa, despite the fact that studies indicate that consumers in developing countries have an increasing role in the product and service experience (Helou and Caddy, 2007). As a result, the study was guided by the economics of information theory to determine the perceptions which are most likely to influence South Africa's consumers' purchasing decisions with regards to organic beef.

5.1 Research hypotheses

Consumers' awareness and purchasing patterns of organic beef were analysed. The main research questions were:

- 1:* Are South African consumers aware of organic food products?
- 2:* What are the key components most likely to influence consumers to purchase organic beef over conventional beef?

Hence, the following hypotheses were generated:

- 1:* Organic food is generally accepted by the South African consumers,
- 2:* Credence attributes such as perceived safety, health and environmental benefits of organic beef influences consumers purchasing decisions of organic beef over conventional beef.

5.2 Research methodology

5.2.1 Sampling technique

A total of 300 surveys were conducted in four KwaZulu-Natal (KZN) towns namely Durban, Pietermaritzburg, Ixopo and Escort from January 2013. These cities represented the urban, peri-urban and rural communities of KZN. Consumers from Trans-Natal and Boxer stores in Durban; Mndeni meats, Pick 'n' Pay, Checkers, and Shoprite in Pietermaritzburg; Spar and Shoprite in Ixopo; Boxer and Shoprite in Escort, were surveyed.

Probability sampling methods were used to select the participating retail outlets from which permission to conduct the surveys was sought out first. Non-probability techniques, in particular, purposive sampling, was used to interview consumers who purchased meat and processed meat, such as polony, sausages, from the meat sections of the retail outlets. Selection of consumers was also based on their willingness to participate in the study.

5.2.2 Study design

A semi-structured questionnaire was used to collect data. The questionnaire included information about awareness and purchasing of organic food, since the organic beef market is marginal in South Africa and a five-point Likert scale was used to ask questions about consumers' criteria and concerns regarding the consumption of organic beef. The questionnaire was administered by trained enumerators who requested the participating consumers to sign consent forms.

5.2.3 Statistical analyses

Data generated were analysed in two stages. First, data were analysed through descriptive frequencies indicating consumers' awareness and purchasing patterns of organic food. In the second stage, the Principal Component Analysis (PCA) varimax rotation was analysed to identify the latent factors that summarizes the motivations most likely to influence consumers' organic beef purchasing criteria. From the analysis of the principal components which was based on eigenvalues >1 , three factors with a cumulative variances of 64.7% were found. These were safety control, health, and environment.

5.3 Results

5.3.1 Descriptive results

Table 5.1 shows a description of the consumers' socio-economic characteristics. The majority of consumers were 26 to 40 years old and three out of four earn a monthly income of up to R6, 000.00.

Table 5.1: Demographic characteristics of consumers

Variable	Frequency	Percentage	Variable	Frequency	Percentage
Age			Race		
16 – 25	71.0	23.7	White	14.0	4.7
26 – 40	136.0	45.3	Coloured	10.0	3.3
41 – 60	75.0	25.0	Black	262.0	87.3
>61	18.0	6.0	Indian	14.0	4.7
Total	300	100.0	Total	300	100.0
Location			Income		
Durban	65.0	21.7	<6,000	225.0	75.0
Pietermaritzburg	131.0	43.7	7-15,000	57.0	19.0
Ixopo	49.0	16.3	>15,000	18.0	6.0
Escort	55.0	18.3	Total	300.0	100.0
Total	300.0	100.0			
Education			Gender		
Primary/None	45.0	15.0	Female	161.0	53.7
Secondary	171.0	57.0	Male	139.0	46.3
Tertiary	84.0	28.0		300.0	100.0
Total	300.0	100.0			

Table 5.2 shows a summary of consumers' awareness regarding organic beef, past experiences of consuming organic beef, and the number of consumers who have purchased organic food.

Table 5.2: Consumers awareness about organic food and purchasing of organic beef

	Awareness of organic food	Percentage (%)	Past organic consumption	Percentage (%)	Purchasing of organic food	Percentage (%)
Yes	258	86	268	89	181	60
No	42	14	32	11	119	40
Total	300	100	300	100	300	100

Table 5.2 indicates that 86% of consumers were aware of organic food and that 60% of consumers had actually purchased organic food before. Eighty nine percent of consumers had consumed some form of organic food previously. However, when asked for examples of consumed organic food products, the consumers mainly cited plant-based food, which indicates that consumers tend to associate the term ‘organic’ with plant materials.

Table 5.3 indicates that non-sensory attributes, such as originality, absence of preservatives and chemical residues, and how the food was produced influenced consumer perceptions about organic food. The majority of consumers related organic food with ‘health’, ‘natural’ and as food produced ‘without chemicals’.

Table 5.3: Consumers’ relation to organic food

Consumers interpretation of organic food	Percent
Pure, natural, original	43
Fresh	9
No chemicals	23
Self-grown	19
Healthy	76

Table 5.4 indicates that a majority (77.3%) of consumers perceived that organic beef consumption contributes towards lowering nutrition-related diseases such as anaemia, heart disease, diabetics and some cancers.

Table 5.4: Perceived association between organic beef consumption and nutrient related diseases

Link between organic beef and diseases	Percentage (%)
Organic beef lowers diseases	77.3
Organic beef increases diseases	6.7
No link between organic beef consumption and disease management	16
Total	100

5.3.2 Principal components influencing purchasing of organic beef

The PCA was used to reduce the number of observed variables to a smaller number of principal components accounting for most of the observed variables' variance. The Kaizer criterion states that Eigen values, which indicate the amount of variance explained by the PCA, should be greater than 1 (Suhr, 2005).

5.3.2.1 Criteria for buying organic beef

Table 5.5 shows the factor loadings of three principal components that were extracted using the Kaizer criteria. The components were rotated using varimax rotation to enable them to be meaningful. The 3PCs explained 64.7% of the variation.

Table 5.5: Rotated component matrix for organic beef purchasing criteria

Criteria for purchasing organic beef	Safety		
	control	Health	Environment
	1	2	3
Health benefits	0.116	0.839	0.255
Appearance and quality	0.071	0.832	0.225
Low fat	0.171	0.741	-0.059
Management of illness	0.299	0.655	0.116
Locally produced	0.693	0.231	0.199
Animal welfare concerns	0.737	0.129	0.176
Information on label	0.711	0.075	0.331
Trust of origin	0.745	0.215	0.177
Certification	0.746	0.121	0.172
Environmental and sustain concerns	0.17	0.094	0.753
Contribute to poverty alleviation	0.33	0.163	0.787
Promote indigenous breed production	0.311	0.183	0.781
Eigen values	5	1.7	1.1
% variation	25.1	21.5	18.1

Extraction method: Principal Component Analysis Rotation methods: Varimax with Kaiser Normalization.

The PCA reduced the criterion for purchasing organic beef into three components. The first principal component, explaining 25.1% variation in the data, signifies that five buying criteria namely local production, implying support for beef produced in KZN, animal welfare concerns, information on labels which could be achieved through product differentiation, trust of origin and certification are dominant. This factor, which is named *Safety control*, as suggested by Annunziata and Pascale, (2009), indicated that consumers' perceptions regarding the purchasing of organic beef was associated with the desire to support local production, ensure animal welfare, as well as issues that have to do with trusting the origin of beef, and information labels. Whether organic beef is certified also plays an important role in this factor.

The second component extracted, which is named *Health*, highlights the buying patterns that value health benefits from organic beef, the quality of the beef as well as the fact that organic beef is

perceived as important for the management of illnesses and as having lean fat. The health factor explains 21.5% of the variation.

The third factor is labelled *Environment* because it is extensively explained by the following motivations: environmental and sustainability concerns, contribution to poverty alleviation and the promotion of indigenous breed production. The environmental motivation explains 18.1% of the variance.

5.4 Discussion

The demographic characteristics of consumers indicated that more than half (64%) of consumers are found in Durban and Pietermaritzburg (urban and peri-urban areas, respectively) where studies have shown that the demand for organic products is highest (Sofos, 2008). Kearney (2010) reported that socio-economic characteristics as well as urbanization are driving the dietary patterns towards more diversified diets. The majority (87%) of consumers had secondary or higher education in agreement with other studies which represent organic buyers as well educated (Ergin and Ozsacmaci, 2011).

Organic food is acceptable in the South African context since 89% of consumers had consumed some form of organic food in the past. Although the majority of the surveyed consumers had previously consumed organic food before, a smaller proportion, 60% had actually purchased organic food. The main reasons for not purchasing organic food was market unavailability followed by high prices. These results are in line with Napolitano *et al.* (2010) who reported that price was the major barrier to organic beef purchasing.

Health, originality, absence of chemicals and self-grown are key attributes that consumers relate with organic food. In support, Kearney (2010) reported that globally, health is one of the most important factors in driving the transition to more diversified diets in the 21st century brought about by the rising rates of obesity and chronic nutrient related diseases. The descriptive results also indicated that the majority of consumers regard organic beef as healthier than its conventional counterpart, and hence, perceived it to reduce nutrient related diseases such as cancers. This results from the elimination of chemicals in organic beef production which consumers regard as carcinogenic. Furthermore, studies suggest that grass-based diets elevate precursors for Vitamin A

and E, as well as cancer fighting antioxidants such as glutathione (GT) and superoxide dismutase (SOD) activity as compared to grain-fed contemporaries (Daley *et al.*, 2010).

The PCA results showed that safety is an important factor most likely to influence the purchasing criteria of organic beef over conventional beef, and accounted for 25.1% of total variations. The *Safety control* component has been brought about by several food scares have damaged consumer trust in existing complex food supply chains in recent years, for example, the scandal of Dioxin in animal feed during the winter of 2010 in Germany (Hjelmar, 2011). Hence, consumers are increasingly becoming aware of food production processes and they are concerned about their food choices (Grunert, 2005).

Local production had a factor loading of 0.7 on the PCA, indicating that consumers in South Africa have a strong belief in the local production system, an element most likely to influence their purchasing decisions when choosing between organic and conventional beef. This is in line with Hjelmar, (2011) who reported that consumers have more trust in locally-produced food due to the better transparency of local production processes. Knowledge of product origin, particularly local provenance, leads to higher levels of consumers trust and feeling good (Caswell and Joseph, 2007).

Local production influences consumer trust. The results indicate that trust and certification are important safety control components affecting consumers' perception of organic beef, with factor loadings of 0.75. These results concur with Hoffman (2000) who reported that information and trust positively affect consumers' perceptions of organic beef. Labelling and guarantees from independent third party accreditation organizations can visualize organic products' safety control efforts by transforming the safety element into a searchable attribute during the purchasing of organic beef.

Animal welfare had a factor loading of 0.74 in the safety control component. Animal welfare is a safety control attribute because it is process related (Hjelmar, 2011), and South African consumers positively regard the animal welfare principle promoted in organic beef production as free from exogenous hormones and additives. Consumers were concerned about inappropriate production of animal feeds and drugs such as growth hormones is an animal welfare concern that threatens the safety of consumers. As a result, they perceive a stronger connection between animal welfare and the organic label, and have a higher willingness to pay for organic produce (Hjelmar, 2011).

Padel and Foster (2005) reported that expectations of a better animal welfare in organic production systems motivate the purchasing of organic food, though to a lesser extent than health and environmental benefits. Animal welfare is a credence safety component attribute that influences consumers' organic beliefs and values, and according to Loureiro and Umberger, (2007), better animal welfare and improved safety are correlated.

The information on the label had factor loadings of 0.70. The availability of information can assist consumers by transforming credence attributes into search attributes. Caswell and Joseph (2007) stated that labelling positively influences consumers' preference for beef; the South African consumer considers information about organic beef as a safety control attribute which can enhance the purchasing of organic beef. Since safety is a typical credence product characteristic, building trust in actors who communicate is crucial. Labelling can increase trust and enhance consumers' assessment of organic beef safety; there is a need to sell organic beef as a differentiated product in the South African beef market.

The second principal component identified by consumers was *Health*. The health benefits attribute had the highest factor loading of 0.84 in the health component. The health and safety of beef is not observable, though at the same time also not negotiable for consumers. This indicates that consumers rely on the product's health claims to evaluate the nutritional value of that particular product (Van Wezemael *et al.*, 2010). Beef health is associated with the production system, and it is biased towards traditional farming systems encompassing grass-fed beef, cattle fed with natural food and raised outdoors. The results confirm that consumers in South Africa regard traditional communal farming as healthy because of the elimination of chemicals in the production system. Hence, in concurrence with Saba and Messina (2003), health is the main reason for buying organic food. Health to these consumers denotes wholesomeness and absence of additives which may human wellbeing in some form upon consumption.

The quality of organic beef was identified as another important health attribute, with a factor loading of 0.83. It is an essential intrinsic cue that can be formed at the point of purchase and after consumption, and it is linked to health because consumers perceive high quality and appearance as healthy. Management of illness had a factor loading of 0.655 indicating that consumers believe in that organic beef can be used to keep symptoms at bay because of the absence of external inputs such as synthetic chemicals and growth hormones which may accelerate illnesses.

The *Environment* component is characterised by environment and sustainability concerns, contribution to poverty alleviation and promotion of indigenous breed production. These results are similar to findings by Loureiro and Umberger (2007) who stated that the environment component is dominated by: unity with nature, protecting the environment, and equality. The results showed that the environment component comprised of 18.1 % of the total variance. Poverty alleviation had a factor loading of 0.79, showing that organic beef purchasers in South Africa consider the purchasing of organic beef as a means to alleviate poverty for the communal farming households. These consumers are also interested in sustainable production since the results show that the promotion of indigenous breed production attribute has a factor loading of 0.78, emphasizing importance of sustainability in beef production systems.

5.5 Conclusions

There is a potential niche market for organic beef in the South African meat industry. Sixty percent of the consumers had purchased organic food previously showing a growing interest and preference for organic produced food products in South African. The main reason cited for not purchasing organic beef was market unavailability. Safety and health concerns are the key factors upon which consumers base their perceptions regarding organic beef, whereby trust of origin and certification are vital safety attributes which producers and marketers have to promote when marketing organic beef. This will require product differentiation during the marketing of organic beef in the South African formal beef markets.

Although no studies have been done before in South Africa comparing attributes between organic and conventional beef, consumers' safety, health and environment's subjective perceptions are important factors most likely to be considered when purchasing organic beef. The demand for beef is shifting towards products that are healthy, of high quality and are sustainably raised. The positive perceptions about organic beef's safety, health and environmental aspects signify a need to assess consumers' willingness to pay for organic beef, since organic food is sold with a premium.

5.6 References

- Annunziata, A., and Pascale, P. 2009. Consumers' behaviours and attitudes toward healthy Food products: The case of Organic and Functional foods, Paper prepared for presentation at the 113th EAAE Seminar "A resilient European food industry and food chain in a challenging world", Chania, Crete, Greece.
- Caswell, J.A., Joseph, S., 2007. Consumer Demand for Quality: Major Determinant for Agricultural and Food Trade in the Future? Working Paper No. 2007-4. Department of Resource Economics, University of Massachusetts, Amherst, MA.
- Daley CA, Abbott A, Doyle PS, Nader GA, Larson S, 2010. A review of fatty acid profiles and antioxidant content in grass-fed and grain-fed beef. *Nutrition Journal*, 9: 10.
- Ergin, E. A., and Ozsacmaci, B. 2011. Turkish consumers' perceptions and consumption of organic foods. *African Journal of Business Management*, 5, 3, ISSN 1990-3839, 910-914
- Gil, J., M., Gracia, A., and Sanchez, M., 2000. Market segmentation and willingness to pay for organic products in Spain. *International Food and Agribusiness Management Review* 14(1): 795-809.
- Grunert, K. G. 2005, "Food Quality and Safety: Consumer Perception and Demand", *European Review of Agricultural Economics* 32: 369–391.
- Grunert, K. G. 2006. Future Trends and Consumer Lifestyles With Regard To Meat Consumption. *Meat Science*, 74(1): 149-160.
- Harper GC, Makatouni A. 2002. Consumer perception of organic food production and farm animal welfare. *British Food Journal* 104(3/4/5): 287–299.
- Helou, M.M. and Caddy, I. N. 2007. Marketing model innovations in the contextualisation of consumer behaviour and service recovery: the case of China. *Innovative Marketing* 3(1): 36 – 43.
- Hocquette, J.-F., and Gigli, S. 2005. The challenge of quality. In J. F. Hocquette and S. Gigli (Eds.), *Indicators of milk and beef quality*. Wageningen Academic Publishers: 13–22.
- Hoffman, D.L., Novak, T.P., Peralta, M.A. 2000, Building consumer trust online. *Comm. ACM* 42(4): 80-85.
- Hjelmer, U., 2011. Consumers' purchase of organic food products. A matter of convenience and reflective practices. *Appetite*, 56(1): 336-344.
- Hughner, R.S., McDonagh, P., Prothero, A., Shultz, C.J., and Stanton, J. 2007. Who are organic food consumers? A compilation and review of why people purchase organic food. *Journal of Consumer Behaviour* 6: 94-110.
- Kearney J 2010. Food consumption trends and drivers. *Philosophical Transactions. The Royal Society Biological Sciences*, 365: 2793–2807.

- Loureiro, M., and Umberger, W. 2007. A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety, country-of-origin labelling and traceability. *Food Policy*, 32: 496-514
- Napolitano, F., Braghieri, A., Piasentier, E., Favotto, S., Naspetti, S., and Zanolli, R. 2010. Effect of Information about Organic Production on Beef Liking and Consumer Willingness to Pay. *Food Quality and Preference*, 21(2): 207-212.
- O'Donovan, P., and McCarthy, M. 2002. Irish Consumer Preference for Organic Meat. *British Food Journal*, 104(3/4/5): 353-370.
- Padel, S. and Foster, C. 2005, "Exploring the gap between attitudes and behaviour - Understanding why consumers buy or do not buy organic food", *British Food Journal*, Vol. 107 No. 8: 606-625.
- Rodríguez-Lázaro, D., Lombard, B., Smith, H., Rzezutka, A., D'Agostino, M., Helmuth, R., Schroeter, A., Malorny, B., Mikog, A., Guerra, B., Davison, J., Kobilinsky, A., Hernández, M., Bertheau, Y., Cook, N. 2007. Trends in analytical methodology in food safety and quality: monitoring microorganisms and genetically modified organisms. *Trends in Food Science & Technology*, Volume 18, Issue 6, June 2007: 306–319.
- Saba, A., and Messina, F. 2003. Attitudes towards organic foods and risk/benefit perception associated with pesticides. *Food Quality and Preference*, 14: 637– 645.
- Sofos, J. N., 2008. Challenges to Meat Safety in the 21st Century. *Meat Science Journal* 78(1-2): 3–13.
- Suhr D 2005. Principal component analysis vs. exploratory factor analysis. SUGI 30 Proceedings. Retrieved January 30 from <http://www2.sas.com/proceedings/sugi30/Leadrs30.pdf>.
- Thamaga-Chitja, J. M., 2008. Determining the potential for smallholder organic production among three farming groups through the development of an empirical and participatory decision support tool. A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Food Security. University of KwaZulu-Natal, South Africa.
- Van Loo, E. 2010. Consumer perception of ready-to-eat deli foods and organic meat. A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science in Food Science. University of Arkansas, United States of America.
- Van Wezemael, L., Verbeke, W., de Barcellos, M. D., Scholderer, J., and Perez-Cueto, F. 2010. Consumer perceptions of beef healthiness: results from a qualitative study in four European countries. *BioMed Central Public Health*, 10: 342-351.
- Verbeke, W., Wezemael, L.V., de Barcellos, M.D., Kügler, J.O., Hocquette, J.F., Ueland, O., and Grunert, K.G. 2010. European beef consumers' interest in a beef eating-quality guarantee: Insights from a qualitative study in four EU countries. *Appetite*, 54: 289–296.

CHAPTER 6: EFFECTS OF SOCIO-ECONOMIC CHARACTERISTICS AND TASTE ON CONSUMERS' WILLINGNESS TO PAY FOR ORGANIC BEEF

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Abstract

Synthetic chemicals usage in conventional beef production has generated consumer concerns regarding health and safety; hence there is a need for alternative products. Although the production of organic beef does not promote the use of synthetic chemicals, information on its market demand and prospects in South Africa is limited. The main objective of this paper was to assess consumers' willingness to pay (WTP) a premium for organic beef. Over 75% of consumers were willing to pay a premium for organic beef, with 52% willing to pay a 25% premium. Consumers valued organic beef; taste and safety were important attributes. Metropolitan consumers were most likely to be willing to pay despite the fact that organic beef is produced on communal lands surrounding the smaller cities. It can be concluded that there is a high demand for organic beef on the South African beef market and consumers are willing to pay a premium. This indicates that there is a vast market segment in which South African communal farmers can improve their socio-economic status through the sale of organic beef.

Keywords: Communal Farming, Food Security, Organic Beef, Premium, Willingness to Pay

6.0 Introduction

Communal farmers in South Africa, just like in many other developing countries are in possession of resources which could yield products that can provide alternatives in the commercial markets. These alternatives could enhance the communal farmer's socio-economic development. According to Musemwa *et al.*, (2010), 40% of cattle in South Africa are owned by communal farmers with 60% found on commercial farms. However, these communal farmers are not actively participating in the formal beef market. This is despite the increase in demand for meat products in developing countries (Delgado, 1999).

According to Mapiye *et al.* (2009), the low off take rates from communal farms is as a result of market unavailability. Hence, the South African formal retail meat market is dominated by conventional beef. This market boasts total meat consumption estimated at 41 kg per capita per year, the second highest in Africa after Ghana, and closely mirrors the global estimates of 41.2 kg per capita per year (FAO, 2013). Population growth, urbanisation and increasing income are fundamental causes of this escalating demand for animal food sources (Sofos, 2008).

Woodward and Fernandez (1999) reported that the consumption of conventional beef has generated consumer concerns regarding health and safety. This is because its production is associated with the intensive use of antibiotics, growth hormones and animal-based proteins. Consequently, this has increased the occurrence of quality, safety and antibiotic resistance threats (including the transmission of animal diseases such as bovine spongiform encephalopathy, dioxin contamination and antibiotic residues) and individual perceptions of beef safety and health risks (Angulo & Gil, 2007; Verbeke *et al.*, 2010). Walshe *et al.* (2006) stated that the increasing number of food scares across Europe over recent years has led to greater awareness of foods produced using chemicals and most recently, genetic modification. The major risk associated with the consumption of conventional beef is linked to the inappropriate use of synthetic chemicals by conventional beef producers who may or may not be aware of the associated health hazards of the chemical residues (Nouhoheflin *et al.*, 2004).

These threats have resulted in serious negative perceptions about the quality and safety of conventional beef. As a result, food quality information has turned into a crucial factor when explaining the existing differences among meat demand profiles (Napolitano *et al.*, 2010). Organic agriculture addresses the demand to reduce environmental contamination of conventional agriculture which adversely affects the safety of food (Sofos, 2008). Organic foods are produced

without the use of synthetic chemicals. Their consumption could enhance the prevention of some of the health hazards related to the consumption of conventional foods (Owusu and Anifori, 2013).

Consumers' health and safety perceptions regarding organic beef are based on the production processes (Van Loo *et al.*, 2012). Organic beef production requires fewer inputs in terms of energy and chemicals and tends to improve soil quality, significantly contributing to biodiversity and food security. Traditionally, South African communal households have reared indigenous cattle breeds and consumed their produce. Engel (2008) stated that the traditional methods of agriculture have been in existence for a long time and many of these are considered organic by default. Organic agricultural systems increase yields, improve livelihoods and food security, conserve indigenous knowledge, plant varieties and animal breeds, cushion against the effects of climate change and contribute to socio-cultural development (FAO, 2013).

Promotion of the consumption of organic foods is an important means of achieving food security through improving safety and of minimizing the health hazards associated with the consumption of conventional foods (Owusu and Anifori, 2013). In spite of the advantages associated with the consumption of organic beef, information on its market demand in South Africa is limited. A number of consumer studies on the consumption of organic food products have been carried out in developed countries (Dransfield *et al.*, 2005, Napolitano *et al.*, 2010). However, a few studies have been carried out on the organic food industry in South Africa, especially on beef (Engel, 2008). The lack of literature regarding consumer studies on organic products in South Africa has resulted in a dearth of market information on organic products, particularly meat products. The objective of the present study is to assess consumers' willingness to pay for organic beef.

6.1 Empirical Literature

Consumer demand for organic products has received some attention recently (Owusu and Anifori, 2013). Different techniques, such as the contingent valuation method, choice experiments and hedonic pricing approaches have been used by different authors. Hedonic pricing and choice experiments are used to estimate economic values for services that directly affect market prices. Contingent valuation models, sometimes referred to as stated preference models, use hypothetical markets in which consumer WTP for products are solicited by asking respondents to value the products on the available market. Where market prices already exist for the product, contingent valuation methods tend to focus on the premiums that consumers are willing to pay for the product.

Organic beef is not available in all retail outlets in South Africa. Therefore the present study employs the contingent valuation method, which, according to Gil *et al.* (2000) is useful in contexts where the organic market is not too well-developed. The contingent valuation method employs the double-bounded approach to value nonmarket goods extensively because it incorporates more information on individuals WTP. The contingent valuation method can be used to understand the impact of growing consumer concerns on food demand (Engel, 2008).

Consumer surveys of empirical literature suggest that socio-economic characteristics such as age, gender, education, household size, income, consumer awareness and perceptions regarding a product such as taste and safety issues are most likely to influence consumers' WTP for organic produce (Owusu and Anifori, 2013). Gil *et al.* (2000) stated that age, gender, education level, household size and income tend to influence consumers' WTP the most. Liu *et al.* (2009) established a U-shaped relationship between age and consumer WTP, showing that WTP for chemical-free foods increases with age, but decreases as age increases beyond a threshold level. Middle-aged females with an education level of high school or less, and who positively assess the beneficial aspects of organic foods, are most likely to be willing to pay a premium for organic food (Gil *et al.*, 2000).

Harris and Burrell (2000) hypothesized that increased income and education have negative effects on purchases of organic produce because those with more income and education have better access to information, resulting in their having a higher confidence in the conventional food system. In contrast, Sofos (2008) stated that consumer WTP is proportionally related to income; hence WTP is expected to increase as consumers' income increases. Darby *et al.* (2008) and Von Loo *et al.* (2012) found no significant relationship between income and consumers' WTP for organic food products. Although consumer concerns about food safety is high, there is usually a low level of change in purchasing behaviour regarding food safety issues (Harris and Burrell, 2000). Consumer perceptions of private effects such as health, taste and quality have a positive influence on consumers' preferences for organic foods (Owusu and Anifori, 2013).

6.2 Theoretical Foundation and the Empirical Model

At the point of purchase, consumers decide which specific item to choose and how much to consume of the chosen product. The contingent valuation method is basically used for monetary evaluation of consumer preferences for non-market goods and when the market is too small (Gil *et al.*, 2000). A rational consumer i chooses between a certain organic product (μ^1) and conventional product (μ^0) based on the expected utility derived from using the chosen product. The consumer may be willing to pay a premium for a particular product if the expected utility of consuming the organic product $E[\Omega(\mu^1)_i]$ is positive and exceeds the perceived utility of consuming the conventional food product $E[\Omega(\mu^0)_i]$. Consumers' willingness to pay a premium for a food product is determined by a change in utility arising out of the consumer choice: $WTP = h[\Delta\Omega(\mu)]$, where $\Delta\Omega(\mu)$ is the change in utility and $h > 0$. Hence, the consumer chooses the organic food μ^1 over the conventional food μ^0 if the change in utility is positive [$\Delta\Omega(\mu) = \Omega(\mu^1) - \Omega(\mu^0) > 0$] for all $\mu^1 \neq \mu^0$. Since the utility of the consumer is not observable, this paper employs the double-bounded dichotomous framework proposed by Hanemann *et al.* (1991) to assess consumer choice behaviour.

The double-bounded dichotomous choice approach uses two consecutive bids proposed to a consumer (Owusu and Anifori, 2013). The second bid is based upon the first bid. The consumer who responds "YES" to the first bid P_i^1 is presented with a second higher bid P_i^{2H} (hence $P_i^{2H} > P_i^1$). For purposes of this study, a bid is the percentage premium for organic beef that is proposed to the respondent. If the first response is "NO", the respondent is presented with a second lower bid P_i^{2L} (hence $P_i^{2L} < P_i^1$). The possible responses are "NO-NO", "NO-YES", "YES-NO" and "YES-YES". Specifically, the possible outcomes used in this study were based on the following four classes of premiums: pay 0% premium (No-No); pay less than 25% (No-Yes); pay 25% (Yes-No) and pay more than 25% (Yes-Yes). The first bid proposed to the consumers was a premium of 25%. The NO-NO category involves those who answered no to the first bid and also answered no to the second bid. These were unwilling to pay any premium for organic beef. The NO-YES category constitutes those who answered no to the first bid, but were willing to pay less than 25% (i.e. answered yes in the second bid). The YES-NO category are those who answered yes to the first bid of 25%, but were unwilling to pay more than the first bid. Lastly, the YES-YES category are those who answered yes in the first bid, and then answered yes to the second bid (i.e. they were willing to pay more than 25% premium for organic beef).

The ordered logit model was used to quantify the effects of the percentage premium that respondents are willing to pay. According to Gil *et al.* (2000), the ordered logit regression is the

best method for studying the discrete nature and ordinal ranking of the WTP variable. This approach is justified because it takes into consideration the possible 0% premium. Theoretically, consumers who are willing to pay for organic beef are willing to pay a certain premium for it. Expressed in Equation 6.1 is the ordered logit model for percentage premium consumers are willing to pay for organic beef:

$$Y^* = x'\beta + \varepsilon \quad (\text{Equation 6.1})$$

Where y^* is unobserved, and what can be observed is:

$$Y_i = \begin{cases} NO - NO & \text{if } y \leq \mu_1 \\ NO - YES & \text{if } \mu_1 \leq y \leq \mu_2 \\ YES - NO & \text{if } \mu_2 \leq y \leq \mu_3 \\ YES - YES & \text{if } \mu_3 > y \end{cases} \quad (\text{Equation 6.2})$$

Where y_i is a dependent variable indicating the proposed percentage premium μ consumers i are not or WTP for organic beef by responding to “NO-NO”, “NO-YES”, “YES-NO” and “YES-YES”, to the two bids. The percentage premium that consumers are willing to pay μ is to be calculated with β^* , presuming that ε is normally distributed across all observations.

The binary logit model used in the study assumes only two values that are coded as one or zero. The WTP variable was categorised into two: those who are unwilling to pay any premium (NO-NO category) and those willing to pay at least some premium (the other categories). A “YES” response is observed if and only when the latent variable is greater than zero. Conversely, a “NO” response is observed when the latent variable is less than or equal to zero. A random variable is realized through y_i , Y_i can take values of one and zero with probabilities π_i and $1 - \pi_i$, respectively. Mathematically, the binary logit model can be written as follows:

$$Pr\{Y_i = y_i\} = \pi_i^{y_i} (1 - \pi_i)^{1-y_i} \quad (\text{Equation 6.3})$$

For $y_i = 0, 1$. Where if $y_i = 1$ π_i is obtained and if $y_i = 0$, $1 - \pi_i$ is obtained, then the expected value and variances of Y_i are:

$$\begin{aligned} E(Y_i) &= \mu_i = \pi_i, \text{ and} \\ Var(Y_i) &= \sigma_i^2 \pi_i (1 - \pi_i). \end{aligned} \quad (\text{Equation 6.4})$$

The socio-economic characteristics investigated in the WTP models were age, gender, education, household size, income, marital status and race. Consumer perceptions with regards to awareness of organic foods, safety and taste preferences in relation to organic and conventional beef are also investigated. According to Gil *et al.* (2000), the willingness to pay for organic produce may be influenced by the individual's ways of living, rather than by the usual socio-economic variables. As a result, the WTP for organic beef in the study was also assessed based on consumers' geographic location, which was segmented as follows; urban, peri-urban and rural. Consumers' WTP for organic beef is expected to be positively correlated with income and level of education (Owusu and Anifori, 2013). Hence it is hypothesized that high income earners were more likely to be willing to pay for organic beef than low income earners. The taste and safety perceptions were expected to have positive relationships with the WTP premiums for organic foods, compared to conventional foods.

6.3 Research Methods

6.3.1 Survey Design, Sampling Method and Data

The data used for the study emanates from a contingent valuation survey conducted among meat consumers in four KwaZulu-Natal (KZN) cities and towns, namely Durban (metropolitan), Pietermaritzburg (large city), Ixopo and Escort (towns, respectively). These study sites were conveniently selected. Durban and Pietermaritzburg are an economic hub for KZN, whilst Ixopo and Escort mirror the lifestyles of the rural people. Non-probability random sampling procedure was employed in the study whereby respondents were purposively selected by virtue of consuming and purchasing meat. The surveys were conducted in seven different formal meat retails outlets in KZN.

A total of 300 consumers participated in the contingent survey in which trained research assistants conducted face-to-face interviews. These interviews offered one-on-one interactions with the consumers and offered an opportunity to explain some of the questions to respondents with low literacy levels. The face-to-face interviews were conducted either in English or Zulu, as preferred by the respondents. To estimate consumer WTP, the concept of organic beef was explained to respondents prior to the questions on WTP and percentage premium prices. Consumers were then given a scenario to determine their WTP stating that, *ceteris paribus*, would they be WTP for organic beef, and, if so, how much percentage premium were they willing to pay. To minimize bias,

the views of the respondents were solicited through open-ended questions made up of pre-coded responses.

The questions focused on specific consumer socio-economic characteristics, including geographic location. Data was also sought on consumer awareness and perceptions about organic beef, in particular, organic safety and taste preferences. Specific perception dummies indicating 1 if the consumer perceives that organic beef is tastier than conventional beef and 0 otherwise, were captured in the questionnaire regarding consumer WTP for organic beef. For the double-bounded dichotomous choice framework, the relevant data on how many percent premium consumers were willing to pay for organic beef was collected based on the four categories: pay 0%, pay less than 25%, pay 25% and pay more than 25%. The respondents were presented with a first bid. Those who accepted the initial amount were given a second higher bid, but those who declined were offered a second lower bid. In both scenarios, some respondents accepted the proposed bids, whilst others declined. The 25% premium base category was based on Van Loo *et al.* (2012), who reported that the majority of consumers are not willing to pay premiums higher than 25%.

6.4 Results

Presented in Table 6.1 is the descriptive statistics of consumers' WTP for organic beef; 76% of the consumers were willing to pay for organic beef, whereas 24% were not willing to pay. The acceptance of organic beef might be attributed to the fact that organic food is inherent in the African context, since traditional farming methods can be labelled organic by default (Engel, 2008).

Table 6.1: Descriptive statistics of consumers WTP for organic beef

<i>Variable</i>	<i>Description of variables</i>	<i>Willingness to pay</i>		<i>Chi-square</i>
		<i>No (%)</i>	<i>Yes (%)</i>	
<i>Age</i>	<i>16 – 25</i>	<i>24</i>	<i>24</i>	<i>7.86**</i>
	<i>26 – 40</i>	<i>40</i>	<i>47</i>	
	<i>41 – 60</i>	<i>35</i>	<i>22</i>	
	<i>≥61</i>	<i>1</i>	<i>7</i>	
<i>Gender</i>	<i>Female</i>	<i>58</i>	<i>52</i>	
	<i>Male</i>	<i>42</i>	<i>48</i>	
<i>Education level</i>	<i>No education</i>	<i>3</i>	<i>4</i>	<i>0.62^{ns}</i>

	<i>Primary</i>	21	8	
	<i>Secondary</i>	39	62	
	<i>Tertiary</i>	37	25	
<i>Number of people in household</i>	< 5	51	52	15.56***
	6 – 10	47	40	
	11 – 15	0	6	
	16 – 20	3	3	
<i>Income (monthly)</i>	< 6000	72	76	4.02 ^{ns}
	7 000 - 15 000	25	17	
	16 000 - 30 000	3	5	
	> 31 000	0	2	
<i>Marital status</i>	<i>Cohabitation</i>	3	1	3.53 ^{ns}
	<i>Divorced</i>	1	2	
	<i>Engaged</i>	6	4	
	<i>Married</i>	27	30	
	<i>Single</i>	55	59	
	<i>Widowed</i>	9	4	
<i>Race</i>	<i>Black</i>	90	87	2.46 ^{ns}
	<i>Coloured</i>	3	4	
	<i>Indian/Asiatic</i>	6	4	
	<i>White</i>	1	6	
<i>Organic awareness</i>	<i>Organic aware</i>	97	97	0.01 ^{ns}
	<i>Not organic aware</i>	3	3	
<i>Taste preferences</i>	<i>Org tastier</i>	59	83	18.59***
	<i>Conven tastier</i>	21	7	
	<i>No difference</i>	20	11	
<i>Is it safe to consume organic beef?</i>	<i>Yes</i>	70	85	8.32**
	<i>No</i>	30	15	
<i>Geographic location</i>	<i>Durban</i>	17	23	1.73 ^{ns}
	<i>Pietermaritzburg</i>	44	44	
	<i>Ixopo</i>	20	15	
	<i>Escort</i>	20	18	

Notes: *** p < 0.001; **p < 0.05; *p < 0.1

There was no association between variables such as gender, education, income, marital status, race, awareness of organic food and geographic location with WTP for organic beef. A majority of consumers with tertiary education (37%) were not willing to pay a premium for organic beef, compared to 25% who were willing to pay. Table 6.1 shows that 86% of whites were willing to pay a premium for organic beef. Most (23%) metropolitan consumers were willing to pay a premium for organic beef, compared to the other towns, which are likely to have access to organic beef because of proximity to communal farms.

There was a significant relationship between age, number of people in the household, taste preferences and safety perceptions regarding consumer WTP. At the 5% level, there was an association between age and WTP for organic beef. This implies that older people (≥ 61) are the most willing to pay a premium for organic beef than the other age categories. These results agree with Liu *et al.* (2009) who reported that age and consumers' WTP a premium increases up to a certain threshold. The results suggest that consumers 41- 60 years were the least willing to pay for organic beef, compared to the other age categories. The number of people in the household significantly influences consumer WTP at the 1% significance level. The results indicate that households with 15 people were willing to pay for organic beef the most, followed by households with lower than five people.

A significant relationship between taste preferences and consumer WTP for organic beef was observed at the 1% significance level. Over 80% of respondents who perceived organic beef to be tastier than conventional beef were willing to pay a premium. Safety is a significant determinant of consumer willingness to pay for organic beef since 85% of consumers who perceive organic beef to be safer than conventional beef were willing to pay. Remarkably, half (50%) of consumers who did not perceive organic beef as safer than conventional beef were willing to pay a premium for organic beef. This signifies that consumers place a high value on organic beef, apart from its safety attribute.

6.5 Variables used in the empirical model

Listed in Table 6.2 is a description of the explanatory variables that were used in the empirical models. The explanatory variables included in the analysis captured key socio-economic characteristics that are most likely to influence consumers' WTP for organic beef, geographic location and product attributes that were likely to influence WTP. The explanatory variables are

dummy variables. For each group of dummy variables one variable was omitted, to avoid the dummy variable trap.

Table 6.2: Description of explanatory variables used in empirical models

<i>Variable</i>	<i>Variable description</i>
<i>Dependent variables</i>	
<i>WTP a premium</i>	<i>Consumers' WTP for organic beef, yes or no closed question</i>
<i>How much premium consumers are willing to pay</i>	<i>Percentage premium consumers are willing to pay for organic beef</i>
<i>Independent variables</i>	
<i>Age1</i>	<i>1 = 16-25 and 0 otherwise</i>
<i>Age2</i>	<i>1 = 41 - 60 and 0 otherwise</i>
<i>Age3</i>	<i>1 = ≥ 61 and 0 otherwise</i>
<i>Gender</i>	<i>1 = Male and 0 otherwise</i>
<i>Education1</i>	<i>1 = No education and 0 otherwise</i>
<i>Education2</i>	<i>2 = Tertiary and 0 otherwise</i>
<i>Number of people in household</i>	<i>Household size</i>
<i>Monthly income range1</i>	<i>1 = \leq R6 000 and 0 otherwise</i>
<i>Monthly income range2</i>	<i>1 = $>$ R15 000 and 0 otherwise</i>
<i>Marital status1</i>	<i>1 = Single/Engaged and 0 otherwise</i>
<i>Marital status2</i>	<i>1 = Divorced/Widowed and 0 otherwise</i>
<i>Race 1</i>	<i>1 = White and 0 otherwise</i>
<i>Race 2</i>	<i>1 = Coloured and 0 otherwise</i>
<i>Race 3</i>	<i>1 = Indian and 0 otherwise</i>
<i>Organic awareness</i>	<i>1 = Awareness and 0 otherwise</i>
<i>Organic beef safety</i>	<i>1 = Yes and 0 otherwise</i>
<i>Taste preferences</i>	<i>1 = Organic beef is tastier and 0 otherwise</i>
<i>Location1</i>	<i>1 = Durban and 0 otherwise</i>
<i>Location2</i>	<i>1 = Ixopo/Escourt and 0 otherwise</i>

The questionnaire was designed to implement the two empirical models. The questions used were derived from consumers' WTP literature. Socio-economic characteristics were listed first, followed by awareness of organic beef, WTP, and important product attributes.

6.6 Empirical Results

Both binary and ordered logit models were estimated to investigate the factors that influence consumers' WTP for organic beef. The binary logit results are shown in Table 6.3. All estimated coefficients were statistically significant, since the LR statistic has a p-value less than 1%. The model correctly predicted about 80% of the cases, confirming that the model fits the data well.

Table 6.3 shows that age; education level and taste perceptions are significant determinants of WTP for organic beef. Respondents in the above 60 age category had higher chances of being willing to pay for organic beef than those in the base category (that is, those in the 26-40 year category). This suggests that older people are significantly more willing to pay for organic beef, compared to younger people.

6.3: Factors affecting WTP: Binary logit results

<i>Variables</i>	<i>Coefficients</i>		<i>Marginal effects</i>	
	<i>Value</i>	<i>Standard error</i>	<i>Value</i>	<i>Standard error</i>
<i>Age1</i>	-0.097	0.404	-0.014	0.060
<i>Age2</i>	-0.605	0.426	-0.090	0.063
<i>Age3</i>	2.065*	1.169	0.308*	0.173
<i>Gender</i>	0.200	0.310	0.030	0.046
<i>Education1</i>	-1.313***	0.442	-0.196***	0.063
<i>Education 2</i>	-1.138***	0.377	-0.170***	0.054
<i>Number of people in household</i>	0.040	0.053	0.006	0.008
<i>Monthly Income1</i>	0.006	0.389	0.001	0.058
<i>Monthly income2</i>	1.209	0.858	0.181	0.127
<i>Marital status1</i>	-0.243	0.413	-0.036	0.062
<i>Marital status 2</i>	-0.477	0.615	-0.071	0.092
<i>Race1</i>	0.942	1.134	0.141	0.169
<i>Race2</i>	0.305	0.860	0.046	0.128
<i>Race3</i>	-1.045	0.727	-0.156	0.107
<i>Organic awareness</i>	-0.713	0.472	-0.106	0.070
<i>Organic beef safety</i>	0.501	0.386	0.075	0.057
<i>Taste preferences</i>	1.238***	0.370	0.185***	0.052
<i>Location1</i>	0.257	0.429	0.038	0.064
<i>Location 2</i>	-0.369	0.355	-0.055	0.053
<i>_cons</i>	1.107	0.813		
<i>N</i>	300			
<i>LR χ^2 (19)</i>	50.93***			
<i>Correctly predicted</i>	80%			
<i>Pseudo R^2</i>	0.16			

Notes: *** p < 0.001; **p < 0.05; *p < 0.1

Those respondents with primary or no education were less likely to be willing to pay compared to those with secondary education. Consumers with less than secondary education had a 19.6% chance of being not willing to pay than those with secondary education. This suggests that little education had a negative influence on consumers' WTP a premium for organic beef. Interestingly, those respondents with tertiary education had lower chances of being willing to pay than those with

secondary education. Those with tertiary education had a 17% probability of being unwilling to pay. This suggests that, just like too little education, too much education has a negative influence on people's willingness to pay for organic beef. Better taste perceptions of organic beef compared to conventional beef were also found to be a significant determinant of WTP. The respondents, who felt that organic beef tastes better than conventional beef have an 18.5% chance of being willing to pay, compared to those who did not think so.

6.6.1 Ordered logit results

Table 6.4 shows the results of the ordered logit model. As explained earlier, consumers were requested to bid on the percentage premium that they were willing to pay for organic beef using a double-bounded dichotomous framework. The results were captured in four categories: $Y = 0$, pay 0% premium; $Y = 1$, pay less than 25%; $Y = 2$, pay 25%; and $Y = 3$, pay more than 25%.

Table 6.4: Factors affecting WTP

<i>Variables</i>	<i>Coefficients</i>		<i>Marginal effects</i>			
	<i>Coef.</i>	<i>Standard error</i>	<i>Y=0</i>	<i>Y=1</i>	<i>Y=2</i>	<i>Y=3</i>
<i>Age1</i>	0.309	0.303	-0.047	-0.005	0.035	0.017
<i>Age2</i>	-0.743**	0.331	0.133**	-0.026	-0.074**	-0.033**
<i>Age3</i>	0.150	0.549	-0.023	-0.002	0.017	0.008
<i>Gender</i>	0.198	0.233	-0.032	0.000	0.022	0.010
<i>Education1</i>	-0.687*	0.354	0.126*	-0.031	-0.066**	-0.029**
<i>Education 2</i>	-0.827***	0.296			-	
					0.082**	
			0.147**	-0.028	*	-0.037***
<i>Number of people in household</i>	0.036	0.036	-0.006	0.000	0.004	0.002
<i>Monthly income1</i>	0.039	0.310	-0.006	0.000	0.004	0.002
<i>Monthly income2</i>	1.454***	0.539			0.175**	
			-0.156***	-0.153	*	0.134*
<i>Marital status1</i>	-0.013	0.301	0.002	0.000	-0.001	-0.001
<i>Marital status2</i>	-0.321	0.491	0.056	-0.009	-0.033	-0.015
<i>Race1</i>	1.177**	0.594	-0.135**	-0.109	0.145**	0.098
<i>Race2</i>	0.737	0.619	-0.095	-0.046	0.090	0.052
<i>Race3</i>	-1.268**	0.577			-	
					0.100**	
			0.266*	-0.125	*	-0.041***
<i>Organic awareness</i>	-0.198	0.345	0.030	0.003	-0.022	-0.011
<i>Organic beef safety</i>	0.330	0.330	-0.056	0.007	0.034	0.016
<i>Taste preferences</i>	1.159***	0.320			0.107**	
			-0.219***	0.066	*	0.047**
<i>Location1</i>	1.095***	0.317			0.131**	
			-0.146***	-0.061	*	0.076***
<i>Location 2</i>	-0.285	0.265	0.047	-0.003	-0.030	-0.014
<i>/cut1</i>	-0.275	0.610				
<i>/cut2</i>	2.481	0.630				
<i>/cut3</i>	3.956	0.660				

<i>N</i>	300
<i>LR</i> χ^2 (19)	70.54***

Notes: *** $p < 0.001$; ** $p < 0.05$; * $p < 0.1$

The ordered logit model indicates that factors such as age, education level, income level, race, taste preferences and location influence the consumers' premium they are willing to pay. The results indicate that the consumers in the 41- 60 years age group had less chances of being in the higher premium categories, compared to those in the 26- 40 age group. These consumers have a 13.3% more chance of being willing to pay zero premium (Y=0 category), 7.4% less chance of being in category Y=2 and 3.3% less chance of being in category Y=3.

Those consumers with less education (primary or no education) and more education (tertiary education) had less chance of being in the higher categories. While the less educated had a 12.6% higher chance of being in the Y=0, they had a 2.9% less chance of being in the Y=3 category, in comparison to those with secondary education. As expected, income had a positive effect on the amount of premium consumers were willing to pay. The results indicate that the consumers in the R15 000+ (about US\$1,500+) category were more likely to be found in the higher premium categories compared to those with less income. For example, they had a 15.6% less probability of being in category Y=0, and a 17.5% and 13.4% more chance of being in categories Y=2 and Y=3, respectively. The logit model results indicated that whites were more likely to be willing to pay a higher premium for organic beef than blacks. Whites had a 13.5% less chance of being category Y=0 and a 14.5% chance of being in category Y=2. In contrast, Indians were found to be less likely to be in the higher categories, compared to blacks.

As emphasized in the binary model, those who consider organic beef to be tastier than conventional beef were more likely to be found in the higher premium categories than those who do not. They had higher probabilities of being willing to pay higher premiums. The model also highlights the role of location in shaping consumer behaviour. Metropolitan consumers were more likely to be willing to pay higher premiums than those in peri-urban areas.

6.6.2 Proposed Percentage Premiums for Organic Beef

Table 6.5 shows that 52% of the surveyed consumers were willing to pay less than 25% premium. Van Loo *et al.* (2012) stated that consumers were willing to pay up to 25% premiums for organic meat. The present results indicated that 76% of KZN consumers are willing to pay a premium for organic beef.

Table 6.5: Percentage premium consumers are willing to pay for organic beef

<i>Dependent variable</i>	<i>Percentage premium</i>	<i>Frequency</i>	<i>Percent</i>
	<i>Not willing to pay a premium</i>		
<i>Y = 0, No-No</i>	<i>(0%)</i>	73	24.3
<i>Y = 1, No-Yes</i>	<i>Willing to pay less than 25%</i>	156	52.0
<i>Y = 2, Yes-No,</i>	<i>Willing to pay 25%</i>	48	16.0
<i>Y = 3, Yes-Yes,</i>	<i>Willing to pay more than 25%</i>	23	7.7
<i>Total</i>		300	100.0

6.7 Discussion of Empirical Results

The results from both models indicate that consumers in the other age categories were more willing to pay for organic beef than the base category (26 - 40 years). Consumers above 60 years were the most likely to be willing to pay for organic beef than other consumers. This is consistent with Liu *et al.* (2009) who reported that consumers' willingness to pay a premium for organic food increases with age until a certain threshold is reached. Angulo & Gil (2007) reported that more experienced consumers who were purchasing beef before the safety incidents were more willing to pay premiums after these incidents.

It would be expected that consumers with a tertiary education would be more likely to be WTP a premium. However, findings of the study revealed that too little or too much education adversely affects consumers' willingness to pay for organic beef. This implies that consumers with primary or lower education and those with tertiary education were less willing to pay a premium than those with a secondary education. Hence, consumers' WTP for organic beef was low with less education, increases to a threshold level (secondary/high school), but eventually drops with tertiary education.

It may be hypothesized that tertiary educated consumers are more informed and have trust in the conventional system. Harris and Burress (2000) stated that despite consumers' concerns about chemical residues in conventionally grown food, consumers with tertiary education have a high trust in the safety of the food system. Hence, it is only highly educated consumers who consider the food control mechanisms as inefficient who are most likely to buy organic food.

The ordered logit results revealed that income has a positive influence on consumer WTP. This is supported by Batte *et al.* (2007), who reported that consumers with a higher income are likely to pay a premium for organic foods. According to Owusu and Arifoni (2013), income is expected to be positively related to consumer WTP, in order to concur with the economic theory. In addition, sensory attributes, in particular taste preferences between organic and conventional beef, influence consumer WTP. This concurs with Chabikuli (2011), who reported that taste and appearance can positively influence WTP. McEachern and Willock (2004) stated that taste preferences come second to health as a motivation for the purchasing of organic meat.

The findings indicated that there was a significant relationship between race and the percentage premium that consumers are willing to pay for organic beef. These findings agree with Batte *et al.* (2007), who found that race was a major determinant of the amount of premium that consumers are willing to pay. Non-white consumers were willing to pay higher premiums for locally grown pesticide-free foods than white consumers (Batte *et al.*, 2007). In contrast to Batte *et al.* (2007)'s findings, the observation in Table 6.4 reveals that whites were willing to pay higher premiums than blacks. This may be attributed to the fact that, for native black households, organic foods are inherent and hence black consumers may not be willing to pay a high premium for a product that could be freely, locally available or be self-produced. Even though KZN has a high population of Indians, this ethnic group is willing to pay the least premium for organic beef. This is influenced by the fact that few Indians consume beef as a result of religious beliefs.

According to McEachern and Willock (2004), the geographic location of the consumers is an important factor influencing organic-meat purchasing behaviour. In support, Engel (2008) stated that organic demand in South Africa is higher in urban areas than rural areas. Interestingly, the present results showed that metropolitan city consumers were willing to pay higher premiums compared to other cities and towns, despite the fact that the majority of organic beef producers are found in communal areas surrounding the latter. This is because metropolitan consumers have a higher purchasing power and their purchases are most likely to be based on quality and the benefits of organic production methods.

6.8 Conclusions

The majority of consumers in KZN were willing to pay premiums of up to 25% for organic beef. Metropolitan consumers are more likely to be willing to pay for organic beef than those in the towns surrounding communal farming areas, in spite of easy access to the organic beef production sites. Consumers above 60 years of age, and those younger than 40 years, valued the benefits associated with the consumption of organic beef. They were the most likely to be willing to pay for organic beef than consumers in the 41 – 60 year age category. Too little or too much education adversely affects WTP. Income is positively related to consumer WTP.

Consumers consider organic beef to be tastier than conventional beef and are willing to pay a premium. Consumers value organic beef, such that even those who do not consider organic beef to be safer than conventional beef are willing to pay a premium. This implies that there is an untapped market demand for organic beef in South Africa which could be explored for the development of communal farmers who are suitably positioned to produce organic beef as an alternative in the South African beef market.

6.9 References

- Angulo A.M, and Gilm, J.M. 2007. Risk perception and consumer willingness to pay for certified beef in Spain. *Food Quality and Preference* 18(8): 1106-1117.
- Batte M.T., Hooker, N.H., Haab, T.C., and Beaverson, J. 2007. Putting their money where their mouths are: Consumer willingness to pay for multi-ingredient, processed organic food products. *Food Policy* 32(2): 145 – 159.
- Bond-Ankomah, S., and Yiridoe, E.K. 2005. Organic and Conventional Food: A Literature Review of the Economics of Consumer Perceptions and Preferences. Organic Agriculture Centre of Canada, Dalhousie University.
- Chabikuli, N. 2011. Market segmentation and consumer willingness to pay for high fibre products: the case of Johannesburg and surrounding areas. Master of Science in Agriculture dissertation, University of South Africa.
- Darby, K., Batte, M.T., Ernst, S. and Roe, B., 2008. Decomposing local: A conjoint analysis of locally produced foods. *American Journal of Agricultural Economics* 90(2): 476–486.
- Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S., Courbois, C. 1999. Livestock to 2020: The next food revolution. Food, Agriculture, and the Environment Discussion Paper 28. Washington, DC, IFPRI/FAO/ ILRI (International Food Policy Research Institute/ FAO/International Livestock Research Institute).
- Dransfield, E, Ngapo, T.M, Nielson, N.A., Bredahl, L., Sjoden, P.O., and Magnusson, M. 2005. Consumer choice and suggested price for pork as influenced by its appearance, taste and information concerning country of origin and organic pig production. *Meat Science*, 69(1): 61–70.
- Engel, W. 2008. Determinants of consumer willingness to pay for organic food in South Africa. Master's dissertation, Agricultural Economics, Extension and Rural Development, University of Pretoria, South Africa.
- FAO, 2013. The State of Food and Agriculture. Livestock in the Balance Report. Downloaded from <http://www.fao.org/catalog/inter-e.htm> on 08/03/2014.
- Gil, J.M., Gracia, A. and Sanchez, M. 2000. Market segmentation and willingness to pay for organic products in Spain. *International Food and Agribusiness Management Review* 14(1): 795-809.
- Hanemann. M,W., Loomis, J.B., and Kanninen, B. 1991. Statistical efficiency of double-bounded dichotomous choice contingent valuation. *American Journal of Agricultural Economics* 73(4):1 255 –1263.

- Harris, B. and Burrell, D. 2000. "Demand for local and organic products: A brief review of the literature." A Report of the Kaw Valley Project for Environmentally Identified Products, Report number 254A.
- Liu, Y., Zeng, Y., and Yu, X. 2009. Consumer willingness to pay for food safety in Beijing: a case study of food additives. Contributed paper prepared for presentation at the International Association of Agricultural Economists Conference, Beijing, China, August 16-22, 2009: 6 -15.
- Mapiye, C., Strydom, P.E., Dzama, K., and Chimonyo, M. 2009. Cattle Production on Communal Rangelands of South Africa and the Potential of Acacia Karoo in Improving Nguni Cattle Production. Fort Hare. University of Fort Hare Publishers.
- McEachern, M.G, and Willock, J. 2004. Producers and consumers of organic meat: A focus on attitudes and motivations. *British Food Journal* 106(7): 534–552.
- Musemwa, L., Mushunje, A., Chimonyo, M., Mapiye, C. 2010. Low Cattle Market Off-Take Rates In Communal Production Systems of South Africa: Causes and Mitigation Strategies. *Journal of Sustainable Development in Africa*, 12(5): 209-226.
- Napolitano, F., Braghieri, A., Piasentier, E., Favotto, S., Naspetti, S., and Zanolli, R. 2010. Effect of information about organic production on beef liking and consumer willingness to pay. *Food Quality and Preference* 21(2): 207–212.
- Nouhoheflin, T., Coulibaly, O., Cherry, A.J., Al-Hassan, R., and Adegbola, P.Y. 2004. Consumers' perception and willingness to pay for organic vegetable in Benin and Ghana. Paper presented at the Inaugural Symposium of the African Association of Agricultural Economics, Nairobi, Kenya.
- Owusu, V., and Anifori, O. 2013. Consumer Willingness to Pay for Organic Fruit and Vegetable in Ghana. *International Food and Agribusiness Management Review*, 16(1): 67-86.
- Sofos, J.N., 2008. Challenges to meat safety in the 21st century. *Meat Science Journal*, 78(1-2): 3–13.
- Verbeke, W., Pérez-Cuetoa, F.J.A., de Barcellosb, M.D., Krystallis, A., and Grunert, K.G. 2010. European citizen and consumer attitudes and preferences regarding beef and pork. *Meat Science* 84(2): 284-292.
- Van Loo, E.J., Alali, W., and Ricke, S.C., 2012. Food Safety and Organic Meats. *Annual Review of Food Science and Technology*, 3: 203-25.
- Walshe, B.E., Sheehan, E.M., Delahunty, C.M., Morrissey, P.A., and Kerry, J.P. 2006. Composition, sensory and shelf stability analyses of Longissimus dorsi muscle from steers reared under organic and conventional production systems. *Meat Science*, 73(2): 319-325.
- Woodward, M.I., and Fernandez, B.W. 1999. Comparison of conventional and organic beef production systems I. feedlot performance and production costs. *Livestock Production Science*, 61(2-3): 213–223.

CHAPTER 7: GENERAL DISCUSSIONS AND CONCLUSION

7.0 Discussions

The thesis explored various areas of organic beef production by South African communal farmers and organic beef demand in the South African formal beef market. The premise of the study, as outlined throughout the thesis, was the fact that seventy percent of the total area in South Africa is only suitable for extensive livestock production (Musemwa *et al.*, 2008). As a result, cattle farming are an integral part of the South African communal farming systems whereby communal farmers are in possession of adaptable indigenous breeds such as the Nguni which could be adopted for organic beef production. The extensively reared cattle have an ability to convey resources that could otherwise not be used by human beings into valuable products such as organic beef.

Organic beef is produced without the use of chemicals under production systems similar to those practised by South African communal farmers. As a result, Engel (2008) reported that produce from the traditional communal farming systems could be labelled organic by default. Consumers perceive organic beef as healthier and safer than conventional beef based on the production processes. However, there is concern and controversy regarding health between organic and conventional beef whereby Woese *et al.* (1997) and Van Loo *et al.* (2012) concluded that there are no differences in chemical content between organic and conventional meat. On the contrary, Kouba (2003) and argued that since organic agriculture refrains from using synthetic chemicals, potential hazards from these synthetic input residues are minimal and are largely environmental.

Although literature concurs that the effect of both conventional and environmental chemical residues on human health has not been established, consumers value organic meat as healthy and safer than conventional meat, hence organic meat is sold with a premium (O'Donovan and McCarthy, 2002). These premium prices could be employed to enhance household food security on communal farms through the sale of organic beef. Whilst these farmers are better placed to produce organic beef, the demand for organic beef in South Africa was unknown. As a result, the organic beef market is not well-developed, with off-take rate from communal farms in between 5 and 10% compared to 25% in the commercial sector (Musemwa *et al.*, 2010). This is despite the fact that 40% of cattle are found on communal lands in South Africa (Musemwa *et al.*, 2010).

The National Development Plan (NDP, 2011) states that South African rural economies should have opportunities to participate fully in the socio-political and economic life of the country by actively participating in the economic markets. On the contrary, the South African communal farmers are not actively participating in the formal beef markets as evident in the thin organic beef market. Organic beef production and marketing has made significant inroads in developed countries, however in developing countries such as South Africa, it is still at conception stage.

Willingness to pay premium prices for organic beef could encourage communal farmers to actively participate in the formal markets thereby enhancing food security through the availability of healthier food sources and extra income for accessing variety foodstuffs in a stable market, ultimately increasing off-take rates from communal farms. The availability of organic beef in the South Africa formal beef markets could enable consumers to access and use preferred choice in the form of perceived healthier organic beef, resulting in improved food security, livelihoods and well-being for both communal farmers and consumers.

As thus, the broad objective of this study was to identify opportunities for organic beef production from Nguni cattle by communal farmers to enhance food security. The utility theory was employed to determine demand for organic beef in the South African formal beef markets. This theory is used to determine demand where the market is not well-developed as it is the case in South Africa. Specifically, this study sought to; assess the potential for organic beef production by communal farmers in Southern Africa, since the Southern African region is characterised by analogous climatic and agricultural conditions; investigate the possibility of organic beef production by South African communal farmers; determine factors affecting consumer's perceptions about organic beef in South Africa, and assess consumers' WTP a premium for organic beef.

In Chapter 2, the potential for organic beef production in Southern Africa was assessed using a review of literature on organic beef production and demand dating from 1999 to 2013. The findings indicated that 75% of indigenous cattle breeds are found on communal lands (Tada *et al.*, 2013). These indigenous breeds are adapted to the harsh climatic and disease prevalent conditions characteristic of communal lands, and do not require external inputs such as synthetic chemicals. As a result, these breeds could be adopted for organic beef production. According to Mapiye *et al.*, (2009), the low off-take rates on communal farms are caused by market unavailability, implying that South African communal farmers are uninformed about the demand for organic beef.

This is despite the fact that globally; organic beef production has been employed to enhance household food security through premiums obtained from the sale of organic beef. Regardless of the controversy and concern about the benefits of organic beef consumption as shown in literature, consumers in the developed world perceive it as of high quality, safer, healthier and environmentally friendlier than conventional beef. A few studies have been conducted on the demand for organic beef in South Africa, in spite of the opportunity to sell the highly distinguished and valuable hides and organic beef from indigenous cattle breeds such as the Nguni.

Even though communal farming systems could be adopted for organic beef production, very little has been documented on organic beef production in South Africa. Hence, Chapter 4 investigated the possibility of organic beef production on South African communal farms. A series of four FGDs were conducted with communal farmers from two communities in UMgungundlovu district, KZN. According to a Statistics South Africa report (2011), KZN is the second province with the largest cattle numbers in South Africa.

The findings revealed that socio-cultural values were of primary importance for cattle rearing in communal farms, whilst food security in the form of cash and food were of secondary importance. These results differ from Montshwe (2006) and Mapiye *et al.* (2009) who reported that the main reason for keeping cattle on communal farms in South Africa is cash. The findings of the study imply that communal farmers would rather keep their cattle for self-worthiness and cultural reasons, and derive satisfaction, rather than to sell their valuable organic beef at low prices in the South African formal beef market. These communal farmers reported that under the current circumstances, they would only sell cattle when there is a dire household need such as the education of children. This results in the low off-take rate from communal farms.

Communal farmers value their production systems and produce which they perceive should fetch premium prices in the market. Socio-behavioural factors such as inferiority and exclusion from decision making in the South African formal beef market were ranked as the most important factors hindering communal farmers from participating in the formal beef market. Hence, communal farmers would rather derive utility from possessing the valuable indigenous and highly adapted cattle breeds rather than to participate in the formal beef markets where they are not obtaining value for money. However, the civic engagement model derived from the FGDs with communal farmers indicated that these farmers were willing to sell their valuable products as differentiated in the South African formal beef market in which they could participate as equal and involved partners.

This reveals that there is a potential for organic beef production on South African communal farms to sustain an organic beef niche market in the South African formal meat market.

Montshwe (2006) identified the lack of market information as another factor hindering communal cattle farmers from actively participating in the South African formal beef market. Hence, this study infers that enhancing socio-behavioural factors to facilitate the inclusion of communal farmers as stakeholders in the South African formal beef market through civic engagement could encourage communal farmers to participate in these markets through the sharing of information about market demand and prices, thereby enabling these farmers to sell organic beef to the right market at the right price.

Consumers, similar to communal farmers, consider organic beef as of high value. The literature review indicated that globally, consumers perceive organic beef as of high value and quality than its conventional counterpart. As thus, Chapter 5 sought to determine factors affecting consumer's perceptions about organic beef in South Africa in order to estimate the demand for organic beef in the South African formal beef market. 300 surveys were conducted in with purposively sampled consumers in four KZN towns namely Durban, Pietermaritzburg, Ixopo and Escort in formal retail outlets.

The results revealed that organic food is acceptable in the South African context where by the majority of respondents were aware of organic food. These consumers positively perceived organic food and related it with 'health', 'natural' and as food produced 'without chemicals.' However, consumers tend to associate organic food with plant materials indicating that the market for organic beef in South Africa is very thin compared to organic plant foods which are readily available in both formal and informal retail outlets in South Africa. Consumers perceived organic beef as healthy with a potential to lower nutrient related diseases.

The Principal Component Analysis (PCA) was used to classify the criteria considered by consumers when purchasing organic beef into three components namely safety, health and environment. This implies that South African consumers are most likely to purchase organic beef because they positively associate it with safety, health and environmental benefits. This perception indicates that the demand for organic beef in the South African formal beef market is high, and the main reason cited for not purchasing organic beef was market unavailability.

The findings of the study, similar to Kumm (2002), indicated that the demand for beef in South Africa is shifting towards products that are healthy, of high quality and are sustainably raised. The positive perceptions about organic beef's safety, health and environmental aspects indicate a demand for organic beef in the South African formal retail market; hence a need for the determination of consumers' willingness to pay for organic beef was identified. As a result, Chapter 6 sought to assess consumers' willingness to pay for organic beef, since organic food is sold with a premium.

A total of 300 face-to-face interviews were conducted by trained enumerators with meat consumers in several formal KZN retail outlets in rural, peri-urban and urban towns. The interview questions focused on consumers' willingness to pay a premium for organic beef and on how much percentage premiums were they willing to pay. Binary and ordered logit models were used to analyse the data. The results indicated that the majority of consumers were willing to pay premiums for organic beef, with a significant number of consumers willing to pay premiums of up to 25%. Consumers in rural towns were least in willing to pay premiums for organic beef, whilst urban consumers were willing to pay premiums for organic beef the most, indicating that the market for organic beef in South Africa is in urban areas.

7.1 Conclusion

It can be concluded that communal farmers value their traditional communal cattle farming systems which are likely to continue existing well into the future. Although organic beef production may not meet the demand for the growing population, it may offer a viable and differentiated alternative in the South African formal beef market for the benefit of both communal farmers and consumers.

These communal farming systems could yield valuable products such as organic beef, distinguished hides and play a significant role in the conservation of IKS and ecological systems. The study concludes that the Southern African communal farms have a potential to produce organic beef through the use of local resources, such as the veld, indigenous breeds, organic feedstuffs, traditional medicines and the sharing of IKS. IKS and scientific knowledge is not only vital for organic beef production but also, for maintaining the social fibre in communal farming communities.

South African consumers positively perceive organic beef as safer, healthier and its production environmentally friendlier compared to conventional beef. These consumers value organic beef

such that even those who do not consider organic beef to be safer than conventional beef are willing to pay a premium. Hence, it can be confirmed that there is a potential for an organic beef niche market in the South African formal markets in which the demand for organic beef is high.

Transparency and inclusion of communal farmers in the production and marketing of organic beef products is most likely to encourage communal farmers to participate in the South African formal beef market resulting in an increased off-take rate and the establishment and maintenance of an organic beef niche market in the South African formal beef market.

7.2 Limitations of the study

The study design was limited because it only employed interviews to determine consumers' perceptions and willingness to pay for organic beef. Due to the lack of an established organic beef niche market in South Africa, the study could have been complemented with a sensory evaluation to identify consumers' preferences between organic and conventional beef.

7.3 Policy implications

The review assessing the potential for organic beef production on communal farms revealed that market unavailability was the main reason for the low off-take rates on communal farms. In contrast, the study on the determinants of consumer perceptions about organic beef revealed that the main reason for not purchasing organic beef was its unavailability in the South African formal markets.

As a result, there is a need for institutional support and information sharing involving all beef stakeholders in the establishment of an organic beef niche market. This implies the need for the finalization of the National Draft Policy on organic farming in order to ensure adherence to set standards and maintain organic beef quality in South Africa. The utility theory upon which this study was based assumes that producers are motivated by profit, which can be directly measured, whilst consumers purchase what they like, something that cannot be directly measured but inferred to. The study revealed that consumers positively perceive organic beef as of high value and are willing to pay premiums which could benefit communal farmers. This emphasizes the need for product differentiation in the South African formal beef market to offer consumers choices upon which they could make informed decisions.

7.4 Recommendations for future studies

More studies on sensory evaluation could be conducted to determine preferences between organic and conventional beef in South Africa. Further studies are required to determine production efficiency of communal farming systems with regards to organic beef production in order to inform policy and facilitate the establishment of organic beef production standards. Studies comparing the chemical composition between organic and conventional beef are also required.

7.5 References

- Kumm, K.I. 2002. Sustainability of Organic Meat Production under Swedish Conditions. *Short Communication Agriculture, Ecosystems and Environment* 88:5–101.
- Mapiye, C., Chimonyo, M., Dzama, K., Raats, J.G., and Mapekula, M. 2009. Opportunities for improving Nguni cattle production in the smallholder farming systems of South Africa. *Livestock Science*, 124, 196-204.
- Montshwe, B. D., 2006. Factors affecting participation in mainstream cattle markets by small-scale cattle farmers in South Africa. MSc thesis submitted in partial fulfilment of Agricultural Economics. University of Free State, Bloemfontein.
- Musemwa, L., Mushunje, A., Chimonyo, M., Fraser, G., Mapiye, C. and Muchenje, V. 2008. Nguni cattle marketing constraints and opportunities in the communal areas of South Africa: Review. *African Journal of Agricultural Research*, 3(4): 239-245.
- National Planning Commission, 2011. *National Development Plan*. Pretoria: Government Printer. ISBN 978-0621-40475-3. RP270/2011.
- O'Donovan, P., and McCarthy, M. 2002. Irish Consumer Preference for Organic Meat. *British Food Journal*, 104(3/4/5):353-370.
- Statistics South Africa report, 2011. Agricultural Household Census, Statistics South Africa. www.statssa.gov.za/census2011/Products/Agricultural_Households.pdf. Downloaded on the 11 of November, 2014.
- Tada, O., Muchenje, V., and Dzama, K. 2013. Effective Population Size and Inbreeding Rate of Indigenous Nguni Cattle under In Situ Conservation in the Low-Input Communal Production System. *Short Communication. South African Journal of Animal Science*, 43(2):137-142.

APPENDICES



UNIVERSITY OF
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SURVEY ON CONSUMERS' PERCEPTIONS ABOUT ORGANIC BEEF PRODUCTS IN KZN, SOUTH AFRICA

1.0 DEMOGRAPHICS

Please complete the following questions and circle the most appropriate answer where necessary.

For office use

1.1 Age	<input type="text" value="16-25"/>	<input type="text" value="26-40"/>	<input type="text" value="41-60"/>	<input type="text" value="≥61"/>	<input type="text"/>		
1.2 Gender:	<input type="text" value="F"/>	<input type="text" value="M"/>			<input type="text"/>		
1.3 Education:	<input type="text" value="No Education"/>	<input type="text" value="Primary"/>	<input type="text" value="Secondary"/>	<input type="text" value="Tertiary"/>	<input type="text"/>		
1.4 Number of people in household.....					<input type="text"/>		
1.5 Income range (gross monthly income)	<input type="text" value="≤ R6000"/>	<input type="text" value="7000-15000"/>	<input type="text" value="16000-30000"/>	<input type="text" value="≥31000"/>	<input type="text"/>		
1.6 Marital status	<input type="text" value="Cohabitation"/>	<input type="text" value="Divorced"/>	<input type="text" value="Engaged"/>	<input type="text" value="Married"/>	<input type="text" value="Single"/>	<input type="text" value="Widowed"/>	<input type="text"/>
1.7 Ethnic group	<input type="text" value="African"/>	<input type="text" value="Coloured"/>	<input type="text" value="Indian/Asiatic"/>	<input type="text" value="White"/>			<input type="text"/>

2.0 PLEASE COMPLETE THE FOLLOWING QUESTIONS AND CIRCLE THE MOST APPROPRIATE ANSWER WHERE NECESSARY

2.1 a) What is your main source of protein?

- a) Beef
b) Poultry
c) Other (please specify).....

☐

2.1b) Please state the frequency of consuming the source of protein stated above on a weekly basis.

Source of protein	Frequency of consumption per week
Beef	
Poultry	
Other:	

☐

2.2a) Do you understand what organic food is?

- i) Yes
ii) No

2.2b) Please state your understanding of organic food?

.....
.....

☐

2.2c) In the past, have you eaten any organic products?

- i) Yes
ii) No

☐

2.2 d) Please state the most consumed organic product.

.....

☐

2.3 What is your taste preference between organic and conventional beef?

- a) Organic beef is tastier than conventional beef
b) Conventional beef is tastier than organic beef
c) There is no difference in taste between organic and conventional beef.

☐

2.4 Do you purchase organic beef?

- a) Yes
b) No

☐

Key: if not, go to question 2.5., then Q 2.8. If yes, go to question 2.6 on wards

2.5 If not, please state the reason for not purchasing organic beef

- a) It is not available

☐

- b) It is too expensive
- c) There is no difference between organic and conventional beef
- d) Other (please specify).....

2.6 If so, where do you purchase organic beef?

- a) At informal markets
- b) At formal retail shops, for example, supermarkets, butcheries etc.
- c) Other (please specify).....

☐

2.7 What is the frequency of purchasing organic beef?

- a) Daily
- b) Weekly
- c) Monthly
- d) Annually
- e) Never

☐

2.8 Are you willing to pay a premium price for organic beef?

- a) Yes
- b) No

☐

2.9 If yes, how much premium are you willing to pay for organic beef?

- a) Pay 0%
- b) Less than 25%
- c) Pay 25%
- d) More than 25%

☐

3.0 THE FOLLOWING ARE QUESTIONS RELATING TO HEALTH, NUTRITION AND SAFETY OF ORGANIC BEEF

3.1 In your opinion, is it safer to consume organic beef than conventional beef?

a) Yes

b) No

☐

3.2 Please support your answer to Question 3.1

.....
.....
.....

☐

3.3 Are there any people you know who are suffering from a nutrient related disease such as anaemia, heart disease, diabetes and some cancers in your household?

a) Yes

b) No

☐

3.4 What is the link between organic beef consumption and the nutrient related diseases stated above?

a) Organic beef lowers the risk of nutrient related diseases

b) Organic beef increases the risk of nutrient related diseases

c) There is no difference between consuming organic beef and the incidence of nutrient related diseases

☐

4.0 PLEASE RATE HOW STRONGLY DO YOU AGREE OR DISAGREE WITH EACH OF THE FOLLOWING STATEMENTS BY CIRCLING AN APPROPRIATE NUMBER BELOW:

Strongly agree - 5 Neutral – 3 Disagree - 2

Agree - 4 Strongly Disagree - 1

4.1 CRITERIAFOR BUYING ORGANIC BEEF

What are the reasons for buying organic beef?	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
It is healthier than conventional beef	5	4	3	2	1
It looks good and it is of better quality	5	4	3	2	1
It has less fat	5	4	3	2	1
It is good for the management of illness	5	4	3	2	1
It is locally produced	5	4	3	2	1
Concerns about animal welfare	5	4	3	2	1
For information on the label	5	4	3	2	1
There is more trust to its origin	5	4	3	2	1
It is certified	5	4	3	2	1
Because friends are doing so	5	4	3	2	1
Because I saw it advertised on TV or heard on radio	5	4	3	2	1
Environmental and sustainability concerns	5	4	3	2	1
Organic beef can be used to alleviate poverty and improve the livelihood of organic beef farmers	5	4	3	2	1
To promote indigenous breed production	5	4	3	2	1

END – THANK YOU!!!!!!

Focus Group Discussion Interview Guide

- a) Differentiation between organic and conventional beef,
 - What is consumers' broader understanding of organic foods?
 - Is there a difference between conventional and organic beef?

- b) Importance of keeping cattle on communal farms,

- c) Perceived entrepreneurial opportunities and challenges, and
 - What do you think are the advantages/disadvantages of purchasing organic beef?
In terms of nutritional, health and safety benefits of organic beef production
 - Discuss your concerns about the red meat being consumed nowadays?
 - Perceived special attributes for organic beef production over conventional beef production

- d) Factors hindering communal farmers from actively participating in the South African formal beef market.