UNIVERSITEIT VAN PRETORIA
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YUNIBESITHI YA PRETORIA

Determinants of consumer willingness to pay for organic food in South Africa

by

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submitted in partial fulfilment of the requirement for the degree

MInst Agrar

in the

Department of Agricultural Economics, Extension and Rural Development

Faculty of Natural and Agricultural Sciences

University of Pretoria

Pretoria

November 2008

ACKNOWLEDGEMENTS

I am grateful to both my parents for instilling in me the love for the language of mathematics and especially to my mom for telling me countless stories about her childhood and so sharing with me the love of food and food of love. I would like to thank my two sisters; Lesley-Ann and Tracy-Lee and all my friends for their continuous support and encouragement on my journey.

I would like to thank Professor Rashid Hassan[1] for his guidance, patience and supervising me in this study.

"Truth can never be told so as to be understood and not to be believed."
William Blake

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ABSTRACT

Determinants of consumer willingness to pay for organic food in South Africa

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Abstract

The growing South African domestic organic food industry is a new feature of the recent structural shifts in food demand in the country. Consumer demand preferences for organic food impact on agricultural production methods due to the unintended positive consequences of improved soil fertilisation, increased productivity and increased use of indigenous knowledge. Understanding consumer demand for food, specifically organic food, in South Africa is becoming increasingly important as consumers' attitudes and preferences strongly influence the direction of food retailers' strategies.

This study used a single bound dichotomous choice contingent valuation method (CVM) to analyse the determinants of organic food in SA, specifically organic fruit juice and wine. Data was collected from a CVM questionnaire administered to 550 respondents in a food retail store over 3 days.

Findings from this study indicate consumers believe organic food is more nutritious and tastier than conventional food, organic agriculture benefits both small-scale and local farmers and that consumers require a guarantee of the organic origin of organic products. Emphasising these benefits and directly referring to the small-scale and local farmers from whom organic products have been procured in advertisement campaigns may improve retail marketing strategies for organic food. It also highlights that South African policy makers urgently have to finalise the promulgation of the draft legislation on organic standards to provide certainty to local consumers

and hence a positive signal to current and prospective investors in the local organic industry.

Empirical results from this study show that socio-demographic factors do influence consumer demand and supports the need for disaggregated food demand analysis in South Africa. Socio-demographic factors do influence South African consumers' decision to purchase organic food and younger age increases the probability of the decision to purchase organic food; whereas being married and being in possession of non-formal training qualifications decreases this probability. Organic consumer awareness and education programmes should therefore be targeted at older, unmarried consumers with high levels of formal education.

The domestic market may provide a niche for South African wine producers as this study showed that the majority of respondents interviewed are prepared to pay higher premiums for organic wine. A limitation of this study is that these results may reflect consumers' demand for wine as a luxury good as no separate analysis and questions were included on consumer demand for wine.

Policy makers should support small-scale producers and black vintners in the Western Cape to exploit growing organic wine industry by conducting further research for a organic wine marketing campaign that brands organic wine highlighting procurement from small-scale producers, local farmers and positive contribution to environment, providing extension services to small-scale producers on organic wine production, investing in research and development in organic wine production facilitating mentorship between small-scale farmers and existing organic wine producers and lobbying national department of agriculture to finalise the draft South African organic standard given that South African consumers require guarantee of organic origin. Agents in the private sector may exploit opportunities in the organic wine industry by targeting consumers that are younger and old age of Christian faith, lobby the South African government to finalise the draft organic standard, highlight attitudes that organic wine contribute positively to the environment, local and small-scale farmers in organic wine marketing campaigns and procure more organic wine from small-scale and local organic wine producers.

Local and small-scale fruit producers and fruit processors in the Western Cape are well positioned to exploit growth forecasted in the domestic organic fruit juice sector given its global reputation for producing high quality fruit, proven manufacturing capabilities and expertise in fruit juice production. Both younger and older age positively influences willingness to pay for organic fruit juice but younger consumers are willing to pay higher prices than older consumers for organic fruit juice. Consumers that are the head of households, by being in the position of food purchaser, are also willing to pay higher prices for organic fruit juice. Afrikaans speaking consumers, 77 percent belonging to the coloured population group of which 69 percent earn less than an average monthly income of R3500 are less likely to pay higher prices for organic fruit juice due to lower disposal incomes. South African citizens that represent almost 90 percent of the Western Cape population are concerned about environmental issues confirmed by beliefs that organic food contributes to the environment, small-scale and local farmers. This concern is expressed in the higher prices that South African citizens are willing to pay for organic fruit juice. These empirical findings indicate the target consumers that organic fruit juice marketing campaigns should focus on.

Specific policy interventions to promote the industry include public investment in research and development in organic production methods, extension service provision on organic production methods to small-scale farmers and development of mentorship programmes between existing small-scale and existing organic producers.

CHAPTER 1: Introduction

1.1 Background and motivation

With a growing economy in South Africa household food consumption will change as income rises. Structural reforms in South Africa have impacted on food consumption. South Africa is progressing towards a liberalized economy. Hence the characterization of South African food consumption is becoming more important (Agbola, 2003). It is expected that preferences for food amongst South African households will vary with different socio-economic and demographic groups. This may be attributed to the large inequality in income distribution and disparity in wealth distribution between rural and urban areas. The empirical evidence provided by Bopape's (2006) study showed that demand behaviour in South Africa does indeed differ between rural and urban areas and among income groups. This supports the need for disaggregated demand analysis in South Africa to capture the variability in demand behaviour. Food demand in South Africa is affected by race, age, gender of household head, urbanisation and family size (Agbola, 2003). Emperical results of Agbola's study of aggregated food demand for SA demonstrated that.

The changes in the political and economic environment and lifestyles of South African consumers in the last ten years have also impacted on food consumption and expenditure. The majority of South African consumers purchase their food in food retail stores (Meyer 2002). Therefore the main consumer trends observed in food retail provide insight into the changing consumer trends. The main consumer trends observed over the last ten years are an emerging black middle class, introduction of supermarkets in townships, with the lower income groups spending habits have become more sophisticated, changing households[3] driving trend for pre-paid meals, movement towards fresh food and growth in franchising (smaller stores located closer) as a result of the importance of convenience shopping (Meyer, 2002). These trends have also been influenced by global consumer trends towards foods that

[3] Changing households in this context refers to the increasing number of single headed households and working mothers.

support a healthy lifestyle and a growing awareness and interest in the way food is produced and its impact on the environment.

South African food retailers responded to these changing consumer trends toward health and environmental concerns with the introduction of organically produced food and beverages in the late 1990's and beginning of 2000. The largest volumes of sales from organically produced products have been from organic fresh produce (Mead, 2005). Woolworths, a major South African retailer, introduced organic food into selected stores in 1999 and has experienced annual growth of more than 50 percent over the past two years. Organic products provide a range of attributes to the consumer. These may include food safety, nutrition, value, package and process attributes. The chief executive officer of Pick and Pay, a retailer in SA, says that their customers have become more aware of food safety and the nutritional value of products (Hall, 2005). This is supported by the reports in the South African media of fear that dairy products in supermarkets contain rBST[4] in 2001 and the contamination of food products with Sudan red[5] in March 2005 and subsequent fears of food safety. The Sudan red, i.e. illegal dye was used to colour chillies. The national Department of Health recalled a number of products including spices, powders and sauces contaminated with Sudan red (Pick 'n Pay, 2005). Nigel Sunley, president of the South African Association for Food, Science and Technology was quoted saying: "The reality is that certain substances, which should not be present in food, were found in food and that it has taken investigative journalism rather than routine law enforcement to highlight the problem" (National Consumer Forum, 2003a). This highlights the complexity around food control systems in SA where the day to day implementation is the responsibility of national, provincial and local government departments of Agriculture, Health and Trade and Industry (Food and Agricultural Organisation, 2005).

Few years ago the National Consumer Forum conducted a survey to assess South African consumers' knowledge of the perception of risk of food containing genetically modified organisms (GMO) (National Consumer Forum, 2003b). The

[4] rBST is a growth hormone given to cows to increase their milk production.
[5] Sudan red is a colourant used for colouring non-food products that found its way in food products due to a combination of factors.

findings of this survey showed that 80 percent of the population in the sample had basically erroneous ideas about GMO and 60 percent had concerns ranging from fear of the unknown to general health concerns and thereafter a range of concerns from "they are using us to test these products" to fears about whether these products are "really safe" for consumption (National Consumer Forum, 2003b). Therefore it may be implied that South African consumers' awareness on food safety is low and its relative importance in consumers' decision to purchase food in SA needs to be investigated.

The organic movement has its origins and history in the European countries in the 1840's and later moved to the United States of America, Australia, Japan and developing countries. It emerged as leading pioneers started an organic movement in response to the negative impacts of industrial agriculture and called for a return to the natural order. Inspiration and evidence of this was observed from the soil health and health of people who practised traditional farming methods observed in the Orient encountered by the leading pioneers from Europe and the USA during their expeditions. The global organic food and beverage industry is estimated at US $23 billion with the largest markets concentrated in North America and Europe. The increasing consumer demand in these markets are a result of growing awareness of the nutritional value of food, health and food safety, controversy surrounding introduction of foods containing genetically modified organisms and the impact of agricultural production methods on the environment. The highest growth is expected in European countries and emerging economies of India, Brazil, China and South Africa (Willer and Yussefi, 2004). Smaller regional and local markets are emerging in developing countries that produce organic food and beverages mainly for the export market. The development of regional and local markets is essential to ensure sustainability (volumes, availability and range of products) of supply in these countries and remains a challenge (Willer and Yussefi, 2004). Within the larger cities in Latin America, Africa and Asia a demand for organic products is emerging from consumers with higher and stable incomes and higher levels of education. In Africa, particularly, there are considerable volumes of organic produce that is sold uncertified in local markets (Kotschi, *et al.*, 2003).

South Africa together with Egypt has the largest domestic markets for organic food and beverages in Africa. The value of the South African domestic market is estimated between US $500 000 to US $830 000 with organic products accounting for 0.3 percent of the total food market (Irwin, 2002). Food retail stores are the main outlets where organic products are being sold (Mead, 2005). The major retail food chains in South Africa are Pick and Pay, Woolworths, Shoprite Checkers and Spar. Organic product lines were launched in Woolworths in 1999 with 10 lines, in year 2000 in Pick and Pay and both Shoprite Checkers and Spar in 2002. Woolworths has expanded their product lines from 10 to 150 and organic products are available in 60 percent of their stores.

A study conducted at three branches of a retail supermarket in Cape Town showed that consumers purchasing organic products had high levels of education and income (Du Toit and Crafford, 2003). This is comparable to larger cities in Latin America where consumers of organic products show similar attributes. There is no literature available on trends in consumer demand in this industry in South Africa, sensitivity of demand to changes in income and prices and consequently projections of future demand. This study found that time series data for this type of analysis is not available from retailers and the main market research company, AC Nielsen, does not collect data on foods categorised as organic.

In South Africa there are 239 certified organic producers that manage 25 000 ha mainly for export and include fresh fruits, vegetables, cane sugar, herbs and spices. The availability of supply of organic products locally and in particular organic grocery lines has been cited as a constraint by retail food stores (Conradie, 2005). Small-scale farmers also export organic products under the fair trade logo.

Few studies have been carried out on the organic food industry in South Africa. It is a new field of research as all of the five studies conducted so far were completed between the year 2000 and 2003. Four of those studies have been conducted on organic supply (Mahlanga, 2001; Niemeyer and Lombard, 2003; Irwin 2002). Niemeyer and Lombard (2003) used a survey method to determine what constraints producers were experiencing in the conversion process to organic farming and the characteristics that define organic producers. In their study they identified that there

is a lack of literature on the conditions of organic farming in SA. Mahlanga's (2001) study looked at the comparative advantage of organic wheat production in the Western Cape using a policy analysis matrix. In her study she also confirmed the lack of information about where consumers purchase organic products and what qualities consumers' demand of these products. This was echoed by Du Toit and Crafford (2003) who encouraged investigation into the "food-purchasing behaviour of the South African consumer". The only study on consumer demand (Du Toit and Crafford, 2003) used the Engel-Blackwell-Miniard model of consumer behaviour to determine the beliefs and purchasing practices regarding organically produced food for consumers in three selected branches of a retail chain in Cape Town. Irwin (2002) investigated the adoption practices of small-scale farmers[6] into the organic industry in South Africa and what constraints they encounter. The majority of these farmers provide produce for the export market and the domestic market provides an opportunity for new entrants at a reduced certification cost. Lack of information on the domestic and export market was identified as a constraint by small-scale farmers (Irwin, 2002).

In summary, a growing domestic organic food industry in South Africa is a new feature of the recent structural shifts in food demand in the country. Organic food provides consumers with a range of attributes. South African food demand is affected by socio-economic and demographic factors. South African consumers are becoming more health conscious and aware of food safety. Understanding the food demand patterns and characterisation of organic food consumption will assist policy makers understand the values that consumers attach to attributes like food safety (e.g. free from pesticide residues), nutrition, taste and appearance, package (e.g. labelling) and process (e.g. animal welfare and environmental impact of agricultural production methods). In South Africa only one study has looked at consumer preferences for organic food from four retail stores in Cape Town (Du Toit and Crafford, 2003). Studies by Mahlanga (2001) and Niemeyer and Lombard (2003) that focus on organic supply side have highlighted the gap in existing literature on where consumers purchase organic products and what qualities consumers' demand of these products.

[6] Small scale farmers from previously disadvantaged backgrounds are referred to as emerging farmers, small-scale farmers, smallholder farmers or a combination of the former.

This study, accordingly, plans to contribute to bridging this knowledge gap by investigating the consumer demand preferences for organic food with the objectives below.

1.2 Oobjectives of the study

The study aims to achieve the following objectives:

- Analyse the food purchasing behaviour of South African organic consumers residing in Drakenstein Municipality in the Western Cape,
- Determine factors that persuade South African consumers residing in Drakenstein Municipality in the Western Cape to buy organic food,
- Calculate consumers' willingness to pay for major organic products in the domestic industry,
- Contribute to existing literature on stated preference methods for measuring consumer demand preferences for organic food in general and in particular for a developing country,
- Provide emerging farmers with access to information on the domestic and export demand for organic products and to
- Provide producers and retailers in the organic supply chain and policy makers with information, analysis and recommendations that are expected to contribute to the sustainability of this emerging industry.

1.3 Approach and methods

To achieve the above stated objectives, this study will use the contingent valuation method of the stated preferences' approach to conduct a demand analysis. A questionnaire will be designed to implement the contingent valuation method survey.

Due to lack of actual market transactions data to support revealed demand preferences analysis this study will use the data collected from the contingent valuation method study in an empirical model of consumer demand analysis.

The empirical model formulation will be part of the questionnaire design. Most models applied to valuation use maximum likelihood methods (Haab and McConnell, 2002) as will be done in this study.

1.4 Organisation of the study

The next chapter provides an overview of the history and origin of the organic industry, current status and future prospects globally and within South Africa including regulation and policies that promote the organic industry. Chapter 3 reviews the literature on approaches and methods of conducting demand analysis of organic food and beverages. In Chapter 4 the approach and methods adopted in this study are described with data required. Chapter 5 presents and discusses results of the empirical analysis and Chapter 6 concludes with policy and research implications and limitations of the study.

CHAPTER 2:The organic food and beverage industry: History, current status and future prospects

2.1 Introduction

This chapter provides a summary of the history of the organic food and beverage industry and the socio-political and economic context within which it has developed. An overview of the global demand for and supply of organic products is given with emphasis on the consumer characteristics and description of major producers. The regulation and policies that promote the industry internationally differ from the South African context. A review of the regulatory framework and policies is accordingly given. The chapter then turns to the South African demand and supply of organic products focusing on the distribution and marketing channels, consumer characteristics, total area cultivated, number of farms and the small scale organic farmers. The chapter ends with a brief description of the future prospects and potential for organic products focusing on food products in the global and South African market.

2.2 Origins and History of the Organic Food and Beverage Industry

Various forms of organic methods of producing food and fiber have been in existence for a long time. Such systems have been documented for different cultural groups around the world and more generally labeled as traditional methods of production. In recent times however, the use of labels that indicate organic origin of production with terms like “eco-friendly” and “natural” have become common.

Underpinning organic agriculture is a value system that views the interactions between man and the natural environment in a holistic way. The distinction between organic agriculture and other approaches to sustainable agriculture made by Lampkin and Padel (1994) lies in the legislated and voluntary standards and certification procedures primarily for marketing purposes. This organic agriculture has its roots in an organic movement that started in the 19th century as briefly described next.

2.2.1 Emergence of the organic movement

The organic movement emerged in the 19th and early 20th century in Europe and the United States (US) as a response to growing concerns about the negative impacts of industrial agriculture. This was considered by some in the developing world as ambiguous. An insight into the history of this development provides the context for understanding the current global demand and supply of organic food and beverage industry particularly in developing countries. In exploring how this organic movement emerged the researcher will observe that traditional methods of production existing in the Third World particularly in Africa and the Orient[7] provided inspiration to many of the leading pioneers in the organic movement. The ambiguity as highlighted by Cronford (2001) lies in the fact that the pioneers gained access to the traditional methods as "servants of imperialism" in Africa and Asia and were given the opportunity to undertake large-scale experimentation of their ideas. In addition to being inspired by these ancient methods there were a number of other factors that contributed to the origin of the organic movement.

The organic movement emerged in Europe in the 19th century to provide an alternative to the ever-increasing impacts of industrial agriculture and to support a return to the natural order. This movement later spread to the United States of America and Japan (Cronford, 2001). Supporters of the organic movement cited the negative impacts of industrial agriculture as a decline in the rural countryside, deterioration of soil health due to ever increasing application of inorganic fertilizers and as a result impacting negatively on human health. Proponents of organic farming called for a return to the natural order and adherence to what was known as the *Rule of Return.* The *Rule of Return* proposed that "soil's health and fertility must be maintained by encouraging the presence of humus" in order to return to the natural order (Cronford, 2001).

We explore in the next section the agricultural industry, as it was during the 19th century in Europe particularly Britain and chronologically detail the main events and pioneers who contributed to the development of the organic movement and the present day organic food and beverage industry.

[7] Asia was referred to as the Orient in the past.

2.2.2 Pioneers in the Organic Movement

Early in the nineteenth century there were significant events that changed the face of agriculture in Britain and the world aptly described by Cronford (2001) in his book, *The Origins of the Organic Movement*. The first event was the development of a new theory of plant nutrition that made the link between agriculture and chemistry. A German chemist, Justus Von Liebig (1840) published a monograph titled, *Chemistry in its Application to Agriculture and Physiology.* Prior to this there was a general consensus that plant growth was stimulated by humus in the soil. This new theory emphasized the role of minerals in specific proportions in stimulating and maintaining plant growth. Therefore it was concluded that the role of humus was less important. Two students of Justus Von Liebig namely JH Gilbert and JB Lawes started experimenting with fertilisers at a farm called Rothamsted that later became a famous Experimentation Station. In 1843, JB Lawes established a fertiliser factory in South London based on his patent for manufacturing super phosphates, and so began the introduction of the application of super phosphates to enhance plant growth. With the advent of World War I experiments continued with nitrogen in a process called nitrification to produce explosives. More experiments continued that led to the allocation of the formula of Nitrogen-Phosphate-Potassium (NPK) to get the right balance in the soil. These events informed the philosophy of the formative years of the organic movement in the 1920's and particularly the late 1930's to late 1940's. From the 1920's onwards leading figures emerged to shape this movement. The pioneers included Sir Albert Howard, Rudolph Steiner, Lady Eve Balfour and Jerome Rodale. A brief description of the contribution of these pioneers is given (Cronford, 2001).

Sir Albert Howard founded the Institute of Plant Industry in the state of Indore, India, whilst stationed there as an economic botanist during the early 1920's. This Institute developed the *Indore Process* that was an adaptation of Chinese composting methods to assist Indian cotton growers and later to improve rice yields. The *Indore Process* was well known and adopted world wide in Kenya on coffee, South Africa on sugar cane, Singapore and in later years in Malaysia and Costa Rica. He continued to be a key pioneer in the organic movement by being associated with the Soil Association and in assisting Jerome Irving Rodale with his experiments on organic farming in the United States of America.

Lady Eve Balfour, a founding member and president of the Soil Association in 1945 is well known for authoring *The Living Soil* (Balfour, 1995). The Soil Association, a private entity, upheld the viewpoint that scientific investigation and evidence was required in the pursuit of organic farming. Through organic farming Lady Balfour was able to live out her Christian faith. There were other pioneers who also found organic farming as an extension of their spiritual and religious beliefs, most notably Rudolph Steiner. The Soil Association today is still considered to be a leading authority on certification.

Rudolph Steiner was an Austrian with a background in mathematics, chemistry and physics who founded the school of anthrosophy. Anthrosophy was based on his earlier teachings from the German philosopher, Goethe, and his relationship and work with the theosophical[8] organisation. Based on anthrosophy he developed *biodynamic cultivation* that is considered to be a form of organic farming referred to as organic-plus. The plus refers to preparations of compost using astral and zodiac forces. After his death in 1925 his pupil, Pfeiffer, began doing presentations and lectures in Europe and the United States of America on biodynamic cultivation at the same time as Sir Howard's *Indore Process* gained popularity. The Demeter mark, a label indicating organic origin of products, is displayed and guarantees compliance with biodynamic cultivation principles applied by consumers' worldwide.

At the age of 43 in 1941, James Irvin Rodale came across writings by the agronomist, Sir Albert Howard (Rodale Institute, 2005). This would determine the course of his life in becoming one of the first proponents in the US of sustainable agriculture and popularising the term "organic farming". Upon purchasing a 60 acre farm in Emmaus, Lehigh County in the United States of America he started corresponding with Sir Albert Howard on organic farming (Rodale Institute, 2005). This relationship resulted in Sir Albert Howard co-authoring *Organic Farming and Gardening* (Kelly, 1991). James Irvin Rodale's son, Robert, held a broader view of sustainable agriculture and was instrumental in pioneering approaches to sustainable agriculture notably regenerative agriculture and the Low Input Sustainable Agriculture Program (The Rodale Institute, 2005).

[8] The Theosophy doctrine is a set of ideas based on the religious Eastern philosophy (Cronford, 2001).

During the 1960's organic agriculture developed in Europe and the United States of America due to wider social, environmental and health concerns as cited by Lampkin and Padel (1994). Those included concerns over increasing unemployment, biodiversity loss and alarming levels of pesticide residues. Increased incidences of food scares in the 1980's shattered consumer confidence in conventional production methods and together with aggressive marketing campaigns at retail outlets in the 1990's the organic food and beverage industry has showed significant growth.

2.2.3 The Organic Industry in Developing Countries

Organic farming was introduced into the Third World in Africa (SA, Kenya), Latin America (Brazil has a long tradition in biodynamic farming) and Asia. Traditional methods of production are and have been in existence in developing countries and are documented. A description of the application of these methods is beyond the scope of this study. Many of these methods are considered organic by default but many small farmers that practice these methods are not currently certified. However, a closer look at the definition of organic in chapter three will provide an understanding of why these methods are considered organic.

2.3 Current Status of Organic Industry

Organic standards and procedures regulate the market for organic products as mentioned earlier. The procedure of compliance with organic product standards is known as certification. Products that comply with standards and have successfully completed certification display a certification mark or label on the product. The regulation of the industry will be expanded on later.

2.3.1 Global Demand and Supply

An overview of the global market is given in this section by looking at retail sales, distribution and marketing channels and consumer characteristics. The description of the supply of organic products includes the area under organic cultivation and major product groups.

2.3.1.1 Overview of global demand for organic products

The global demand for organic products was United States of America $ 11 billion in 1997 using approximate retail sales. This is 1 percent to 3 percent of the total food sales in the respective countries (International Trade Centre, 1999). This demand is concentrated in the major markets of Europe, the United States of America and Japan as shown in Table 2.1. Smaller markets for organic products are emerging in developing countries but not well documented.

Table 2.1 Retail Sales of Organic Food and Beverages in 2002

Country	**Retail Sales US $**
North America	11 750 000 000
Europe	10 500 000 000
Japan	350 000 000
Oceania	200 000 000
Latin America	100 000 000
Other	100 000 000
Total	**23 000 000 000**

Source: Adapted from Willer and Yussefi (2004)

In Europe, organic products are sold to grocery retailers, natural food and health stores and directly from the farm. Consumers in Denmark, Switzerland, Sweden and the United Kingdom get most (more than 70 percent) of their organic purchases from grocery retailers. In Germany, Italy and France the dominant outlet is natural food and health stores where consumers are purchasing approximately 50 percent of their organic products. This is also the case in the United States of America where the majority (62 percent) of retail sales of organic products is from natural product stores (International Trade Centre, 1999). The rest (31 percent) is from super and hypermarkets and 7 per cent through clubs, food box systems and food service outlets.

In Latin America most organic products are produced for the export market and there is a small market for organic products. The retail sales in 2002 (See Table 2.1) for Latin America was $ 100 000 mostly concentrated in the larger cities in Brazil and

Argentina (Willer and Yussefi, 2004) In Argentina, mainly in Buenos Aires, organic products are sold in supermarkets, specialist shops and via home delivery services. A market is developing in Peru with opportunities for sales in farmers' markets and home delivery (Schreiber, 2003). Consumers buy their products directly from the farm or from supermarkets in the Philippines.

Consumption of organic food and beverages is mainly concentrated in Europe and Northern America as indicated in the global retail sales. These consumers are characterised by the following attributes (Willer and Yusseffi, 2004):

- living in an urban area often a big city (location),
- making purchases based on quality and organic production methods (buyer behaviour),
- well educated and often from middle to high social class and
- having relatively high purchasing power.

Consumer demand in Latin America is concentrated in the larger cities of Brazil and Argentina. Consumers of organic food and beverages in big cities in Latin America show similar attributes to those in Europe and Northern America. In Brazil consumers in the big cities of Rio de Janeiro, Curitiba and Sao Paulo have higher, stable incomes and high levels of education (Kotschi, *et al.* 2003).

In Africa there is a large percentage of uncertified organic produce that is sold locally that doesn't enter the export market (Kotschi, *et al.* 2003). Egypt and South Africa are two of the few African countries that have a small domestic market for organic products (Willer and Yussefi, 2004).

In Cape Town, South Africa, a study on the beliefs and purchasing practices of consumers regarding organically produced food was conducted at three selected branches of a retail chain (Du Toit and Crafford, 2003). Results of the said study showed that the majority of consumers that purchase organic products had higher levels of education, higher incomes and that there was a relationship between age groups and frequency in purchasing. In South Africa food retailers have the biggest share of the organic food industry (Mead, 2005; Callear, 2005). Organic food is also

sold at farmers' markets, farm stalls, and health shops and in restaurants. It has also been included as part of the annual Food and Wine Shows.

2.3.1.2 Global Supply of Organic Foods

A wide range of organic products is available to consumers supplied by a range of producers from different geographic regions and countries. Trade in organic food and beverages are determined by the self-sufficiency and consumer demand in each country and subject to regulation. Focusing on the area under organic cultivation, major product groups, value adding and policies that promote organic agriculture, a description of the global supply is given.

In 2004, Oceania (Australia and New Zealand) had the largest share (41.8 percent) of area under organic management globally but a very low share of the total number of organic farms. Organic farming including biodynamic farming is practiced in Australia and New Zealand (Willer and Yussefi, 2004). This large area is due to the extensive livestock production practiced in Australia (Table 2.2).

Table 2.2 Global Production of Organic Agriculture in 2004

Region	**Area under organic management Percentage Share**	**No. of organic farms Percentage Share**
Africa	1.3	15.4
Asia	3.7	13.3
Europe	23.1	37.7
Latin America	24.2	30.9
North America	5.9	2.3
Oceania	41.8	0.5
Total	100	100

Source: Willer and Yussefi (2004)

Latin America has the second largest area under organic management at 24.2 percent and 30.9 percent of the total number organic farms. Argentina (2.8 million ha), Bolivia (0.8 million ha) and Brazil are the three countries in Latin America with the largest area under cultivation (Kotschi, *et al.* 2003).

Europe has the largest share of the total number of organic farms in the world but represents a smaller share of total area under organic cultivation.

Africa has the lowest area under organic management. However it is important to note that in Africa there is certified and uncertified organic production. The uncertified organic production is not well documented. Most of the organic agriculture in Africa is uncertified and will continue to remain so in the short term (Willer and Yussefi, 2004). Therefore it is important to develop and sustain a local market within African countries for these uncertified products and to find alternative forms of standards and certification within this context. Certified organic production for a wide range of product groups is mostly for export by large plantations or farms or small-scale farmers (Willer and Yussefi, 2004). There are products that are sold in farmers' markets often with no price premium. Organic production in this case promotes food self-sufficiency, improves soil fertility and relies heavily on traditional knowledge. Uganda has the largest area under organic cultivation with 122 000 ha under organic management and 33 900 farms with main organic products listed in Table 2.3. Tanzania and South Africa are the second largest producers following Uganda. Uganda, Tanzania and South Africa represent half of the total certified organic production in Africa estimated at 320 000 ha (Willer and Yussefi, 2004).

Table 2.3 Major Producing Countries in Africa

Country	Date	Area Ha	% of Total Agricultural land	No. of organic farms	Organic product groups
Uganda	2002	122 000	1.39	33 900	Fresh veg, tropical fruits, dried fruits, coffee, tea, cotton, sesame, culinary spices
Tanzania	2002	55 867	0.14	26 986	Tropical fruits, dried fruits, tea, cocoa, cotton, palm oil, tree nuts, culinary spices, essential oils, honey
South Africa	2001	45 000	0.05	250	Fresh veg, citrus fruits, grapes, tropical fruits

Source: Willer and Yussefi (2004)

Organic products available on the global market include animal products (meat, dairy products, eggs, honey and fish); vegetable products (roots, tubers, legumes, spices and herbs, fresh fruit, dried fruit, nuts, cocoa, coffee, tea, mate, cereals, oil seeds and oleaginous fruits); processed foodstuffs (vegetable oils and fats, sugars and sugar confectionery, other sweeteners, vegetables, fruits, alcoholic beverages, food additives and other processed food products) and miscellaneous products (feedstuff, cotton, natural pesticides and repellants and other non-food products).

The main products from developing countries are raw and unprocessed as the result of custom tariffs that protect processors from European agro-industries (Schreiber, 2003). Argentina however is one of the few developing countries that have a well-established infrastructure for processing and exporting of products. Costa Rica and Argentina are the only Latin American countries that have third country status in the EU. All products from other countries in Latin America have to be re-certified (Willer and Yussefi, 2004).

Argentina is the largest producer of organic products in Latin America with approximately 900 farmers cultivating 340 000 ha. Bolivia is the world leader in production of organic cocoa and one of the largest producers of organic coffee (Willer and Yussefi, 2004). In Latin America, organic products are mainly for export and intermediaries are used to do the export. Organic production in Bolivia has showed

tremendous growth from 31 025 ha certified production in 2000 to 364 100 ha in 2002 (Willer and Yussefi, 2004). In Asia the Philippines is an important producer of organic coffee. There is very little statistics available on production in Asia (Willer and Yussefi, 2004).

2.4 Regulation in the Global Organic Industry

2.4.1 Standards

The Codex Alimentarius, also referred to as the Food Code, is the benchmark and international reference point for food standards (Food and Agricultural Organisation, 2005). It provides a benchmark for countries to evaluate food standards according to the parameters set by the World Trade Organisation notably the Agreement on Phytosanitary and Sanitary Measures and Agreement on Technical Barriers to Trade. It is also used by a range of producers, food processors and consumers.

The global organic industry is regulated by a plethora of international and national standards, national regulations, private and voluntary standards. A brief description follows.

2.4.1.1 International Standards

The International Federation of Agricultural Organic Movements (IFOAM) has a Basic Standard for Organic Production and Processing (IBS) that is reviewed and published biannually. These basic standards explain how organic products should be grown, produced, processed and handled. IFOAM also provides certification bodies with accreditation criteria for bodies certifying organic production and processing.

The Codex Alimentarius Commission is a joint United Nations (UN) Food and Agricultural Organisation (FAO) and World Health Organisation (WHO) food standards programme. Guidelines on production, processing, labelling and marketing of organically produced products were approved by this commission in 1999 for plant production and in 2001 for animal production. These guidelines are reviewed every

four years and like the IBS provide a framework for standard generating bodies' world wide.

Member states of the European Union (EU) have two regulations applicable to the regulation of the organic industry. EU Regulation 2092/91 regulates labelling of organic plant products and also regulates the labelling of imported organic plant and animal and processed products (Willer and Yussefi, 2004). EU Regulation 1804/99 governs organically produced livestock. Enforcement, monitoring and inspection are the responsibility of each member state. There are however many European Union countries that have developed their own national regulations and logos for organic products prior to the European Union regulation (Vossenaar and Twarog, 2005).

The United States of America organic industry is regulated by the National Organic Programme (NOP). The United States of America NOP gives provisions for importing organically produced products. Inspectors trained on NOP carry out inspections and certification bodies accredited by the United States of America's Department of Agriculture issue certificates.

Provisions have been made both within EU and US regulations for bilateral agreements. EU Regulation 2092/91 makes provision that export countries must issue a request to be listed as a third country. In order to prevent double certification the US is investigating equivalency agreements with Australia, the EU, India and Japan (Willer and Yussefi, 2004).

Private standards are those developed by farmers and farmers associations. These standards are guidelines for the members of the association and also encourage loyalty to the logo associated with the private standard.

There are also many producers from developing countries that comply with organic standards as well as the Fair Trade logo.

2.5 The Status of the Organic Food and Beverage Industry in South Africa

South Africa is one of thirty (30) African countries that produce certified organic products. Most products are exported due to higher revenue from foreign exchange. South Africa exports a range of products to European countries including sweeteners (France), fresh fruits (Netherlands, United Kingdom, Germany and Denmark), dried fruits and nuts (Netherlands) and vegetables (Germany) as reported by the Research Institute for Organic Agriculture (fiBL) (FiBL, 2001). There are also emerging small-scale farmers that sell their organic products under the fair trade logo. The domestic market is growing at an average of 30 percent per year but is faced with challenges of supply shortages.

Irwin (2002) says South Africa has a favourable position for expansion in the domestic market as a result of the following developments in the last few years:

- establishment of a separate section for organics at the Johannesburg fresh produce market,
- proposition of national regulations for organic products,
- establishment of South African organic certification bodies and the
- formation of three South African organic associations.

The South African industry is worth R150 million and a brief review of the demand looking at the size of the industry, distribution and marketing channels and consumer characteristics is given below.

2.5.1 Demand for Organic food and beverages in South Africa

Mahlanga (2001) conducted a study on organic wheat production in the Western Cape Province to determine the comparative advantages of organic wheat production in the Western Cape. The author concluded that the small local market for organic wheat is characterised by consumers that look for “low cost commodity-type products” (Mahlanga, 2001). The South African organic industry has an estimated annual value of between R70 million to R80 million with fresh produce making up the majority (70 percent) of organic food sales (De Vynck, 2005). This represents 0.3 percent of the

total food market (Irwin, 2002). This is low in comparison with the markets in Northern America, Europe and Latin America (See Table 2.1).

It is difficult to determine the local retail demand for organic food as there is no readily available time series data on retail sales. The leading research firm, AC Nielsen does not collate data separately for organic food products. Currently demand is more than the supply particularly for organic milk and chicken (Mead, 2005).

2.5.1.1 Marketing Distribution Channels

South African consumers purchase certified organic food and beverages at supermarket retailers, fresh produce markets, informal markets (including street vendors) and wholesalers. Products are also available to a less extent from farm stalls, health shops and organic farmers'markets (Mead, 2005). Restaurants have also started purchasing organic products for preparation of meals. There is also a small demand from delegates attending international conferences in South Africa.

A brief overview is given next of the marketing and distribution of organic products in food retail stores, organic markets, fresh produce markets and home delivery services.

There is no information specifically on organic products sold in informal markets. However food vending is not only the largest employer in the informal sector but also one of the major contributors to the South African economy (Food and Agricultural Organisation, 2005).

2.5.1.1.1 Food Retail

Supermarket retailers currently have the largest market share of the certified organic food and beverage market. Certified organic products were introduced in South African retail stores between 1999 and 2002. Woolworths led the way by introducing organic products in 1999, followed by Pick 'n Pay in 2000 and Shoprite Checkers and Spar in 2002 (Hall, 2005; Callear, 2005; Conradie, 2005; Mead, 2005).

From the total organic production, 80 percent to 90 percent of organic products currently produced in South Africa, are organic fresh produce (Callear, 2005). Organic fresh produce include fresh fruit, vegetables and herbs. Most of the organic grocery lines sold in retail stores that include tea, coffee, cereals, flour, etc. are imported (Conradie, 2005). Beverage product lines that are sold include wine, fruit juice and fruit and vegetable juice blends.

In November 2006 this study conducted a telephone survey in the Western Cape to determine what percentage of stores stock organic products and what products are stocked. The telephone survey covered the four South African retailers Woolworths, Spar, Shoprite / Checkers and Pick 'n Pay in the Western Cape (See Table 2.4) and had a response rate of 84 percent.

From Table 2.4 it is clear that the majority (94 percent) of Woolworths stores in the Western Cape stock organic products compared to 65 percent of Spar stores and 20 percent of both Pick 'n Pay and Shoprite Checkers. Most of the retail stores that stock organic products sell organic fresh produce (more than 80 percent) and organic grocery lines (more than 80 percent).

In the Western Cape, organic fruit juice and wine is not readily available in all retail stores that stock organic products (See Table 2.4). However, organic fruit juice shows a tremendous growth potential (Mead, 2005). Organic fruit juice included retail-branded products like Woolworth's organic fruit juice and fruit juice blend and traditional brands like Ceres that have introduced an organic range. The full range of organic products (fresh produce, grocery lines, fruit juice and wine) are available in Woolworth's retail stores that stock organic products in the Western Cape. All the other retail stores also stock the full range except for organic wine (See Table 2.4)

Table 2.4 Availability of organic products in Western Cape retail stores in 2006

Retail stores that sell organic products	DISTRIBUTION OF SURVEY RESPONSES IN PERCENTAGES (%)									
	Organic products		Organic fresh produce		Organic grocery lines		Organic fruit juice		Organic wine	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Woolworths	94%	4%	88%	12%	100%	0%	67%	33%	45%	55%
Pick 'n Pay	20%	80%	100%	0%	100%	0%	91%	9%	18%	82%
Shoprite / Checkers	20%	80%	92%	8%	92%	8%	92%	8%	50%	50%
Spar	65%	35%	82%	18%	100%	0%	64%	36%	55%	45%

Source: Own Survey

A few of the retail stores that stock organic products also have confectionary products like chocolates and liquorice on sale.

Du Toit and Crafford (2003) found that depending on availability South Africa consumers purchasing organic products at food retail stores in Woolworths purchase fruit and vegetables, then dairy products, grain and grain products and finally poultry and meat. Organic baby foods and wine were found to be less popular. The product range at Woolworths include fresh fruit and vegetables, eggs, meat, milk, yoghurt and cheeses, juices, and liquorice and grocery lines (like chocolate, jams, pastas, tea, coffee, vinegars, wines) (Woolworths, 2005). Woolworths do offer apparel made from organic cotton that include:

- Womens' wear, baby wear and menswear using 100 percent organic cotton,
- Bed linen and towels using 50 percent organic cotton and
- Womens' wear and menswear using 5 percent organic cotton and cosmetics (Woolworths, 2005).

This is part of a partnership created in 2005 with Marks & Spencer, Nike and Timberland to promote the use of organic cotton through a non-profit organisation called the Organic Exchange.

2.5.1.1.2 Organic Markets

There are organic markets that operate on Saturdays at Waldorf Schools. The Waldorf Schools are based on the philosophy of Rudolph Steiner, a pioneer of the organic movement in Europe as described earlier. Farmers that produce according to his philosophy use biodynamic principles and supply their products to the organic markets of Waldorf Schools (Venter, 2005). Both certified and uncertified biodynamic products as well as organic products are sold at these markets.

There are also other monthly organic markets in operation. Examples include two organic markets operating once a month at Camphill Villages in Philadelphia and Hermanus in the Western Cape (Venter, 2005).

Not all organic markets require that products sold should be certified organic. There are two reasons cited that support why consumers purchase and producers supply uncertified products at organic markets (Venter, 2005). Firstly consumers and producers are of the opinion that the guarantee of organic origin is based on a relationship of trust between the farmer and consumer that does not require a standardised certification procedure. The high cost of certification is also cited by producers for not certifying products.

2.5.1.1.3 Fresh produce markets

Organic produce is available at the Johannesburg fresh produce market. Irwin (2002) attributes this as one of the factors signalling the growth of the local organic industry.

2.5.1.1.4 Home delivery service

There are a few organic box schemes operating in South Africa by individuals and the Melissa range of food stores. Seasonally available fresh produce are sold in a box delivered to your home or collected by consumers. Consumers place orders in advance by telephone, email or internet. Consumers do not have the option of choice as the content of the box depends on seasonal availability of products. This is also one of the challenges. Not all products are certified. Similarly to reasons cited by consumer purchasing and producers supplying to organic markets at Waldorf Schools, guarantee of origin is based on relationship of trust between the consumer and person operating the scheme and therefore not certified.

A non-governmental organisation, Abalimi Bezekhaya, based in Cape Town operates an organic box scheme where consumers order via the short message service (sms).

2.5.1.2 Consumer characteristics

There is only one study that has been conducted on beliefs and purchases of consumers regarding organically produced food in South Africa by Du Toit and Crafford (2003). This may be attributed to the fact that this is a new industry and therefore difficult to observe long term trends.

The study by Du Toit and Crafford (2003) does provide us with some insight into the characteristics of South African consumers that purchase organic food. Results showed that consumers who purchased organic products were older than 36 years, English speaking and had high educational qualification and income levels. Their results for influence of gender and income were not conclusive.

Woolworths say that their consumer prefer organic food because of the taste and because it contributes to the environment (Mawson, 2007). Spar sells organic products in most of stores that cater for upper-income groups (De Vynk, 2005). Shoprite Checkers has also introduced organic produce to maintain their market share in the upper end of the consumer market (De Vynk, 2005). There are a few organic box schemes operating in South Africa.

Time series data on consumer purchases of organic food for different food categories over time is not collected by private research firms or government agencies in South Africa as is the case in other countries. This may be the reason for the lack of literature on demand analysis for organic food using revealed preference techniques. Data on organic sales is also not collected from farmers' markets, box schemes[9] and natural health stores are not collected by the associations representing the organic industry, government agencies or parastatals.

[9] In an organic box schemes consumers receive a box or crate of organic fresh produce available in a particular season for a specific price.

From their study Du Toit and Crafford (2003) found that the price premium for organic foods should be in the range of 10 percent to 20 percent. The price paid by consumers in the four selected retail stores in the Cape Town central business district was higher than this price premium except for fruit and vegetables.

Most of the respondents from Du Toit and Crafford's (2003) study believed that organic produced foods has no artificial additives, less pesticide residue, more nutrients, are healthier and tasted better than conventional foods.

Du Toit and Crafford (2003) found that the majority of consumers believed that organic food is suitable for small-scale farmers. Based on the results from their study, they recommended that the "empowerment of previously disadvantaged groups through organic entrepreneurial enterprises" be used when marketing organic food. Woolworths (2005) highlights that the "Woolworths Organic Journey" supports previously disadvantaged farmers by using the case study of organic madumbis, sweet potatoes and baby potatoes supplied by more than 200 organically certified members mostly women of the Ezemvelo Farmers Association (EFA). EFA farmers are referred to as "traditional farmers" that "naturally complied with criteria for growing organic crops" (Woolworths, 2005). Woolworths consumers are encouraged to buy these three organic products from EFA because it is "good for you, better for earth, also an easy, tasty way for you to support much-needed development in our country" (Woolworths, 2005).

All certified organic products sold in the four major retailers in South Africa are labelled organic. Woolworths is the only food retailer with its own organic label. Organic labels includes a certification number or logo of the organic certification authority, and is labelled "organic in conversion" if the farm that produced it has not been farming organically for more than three years or labelled "made with organic" when 70 percent to 95 percent of agricultural-origin ingredients are certified organic. Consumers that purchase organic meat and dairy products have the choice between free range and organic products. Woolworths distinguishes between free range and organic animals as the former can be treated with conventionally veterinary methods and their foods (plant-based) may include synthetic additives as they do not have to be produced organically (Woolworths, 2005). Organic markets sell certified and non-

certified organic products. Organic box schemes also carry mix of certified and uncertified products.

2.5.2 The Supply of organic products in South Africa

Within the organic industry there are producers that are certified organic, certified organic in conversion and not certified. South African producers supply mainly (95 percent) for the export market (Irwin, 2002). The discussion below focuses on organic producers that have been certified organic including the area under organic cultivation, number of farms, farm size and small-scale organic farmers in South Africa.

Niemeyer and Lombard (2003) conducted a survey to determine a broad overview of the South African organic industry and problems experienced during the conversion process. It yielded interesting results on characteristics of producers, farm sizes and problems experienced. Most producers were younger than 41 and the majority in possession of a tertiary qualification. The two motivating factors for conversion were to protect the environment and to improve soil fertility. No clear generalisations about farm size could be made due to huge discrepancies in farm sizes. However it was found that the majority of organic mixed farms were smaller than the average conventional mixed farm.

Farmland represents 82.3 percent of the total land area of 122.3 million ha of land in South Africa (See Table 2.5). Other land uses include nature conservation (11 million ha), forestry (1 million ha) and other land (6.8 million ha) (Nieuwoudt and Groenewald, 2003). The dualistic nature of South African agriculture is evident in the distribution of farmland between commercial (86.2million ha) and developing agriculture (14.2 million ha). It is also important to note that grazing land makes up 70 percent of the total agricultural land.

Table 2.5 Overview of Certified Organic Production

Province	**Area**				**Number of farms**				**Average farm size**	
	Total agricultural area	**Organic[10] agriculture**			**Total number**	**Organic agriculture**				
	hectares (ha)	ha	% of agricultural land	% of organic land	number	number	% of total farms	% of organic farms	Organic farms	Other farms
	ha	ha	%	%			%	%	ha / farm	ha / farm
Eastern Cape	756 946	3 500	0.46	14	2 342	34	1.45	14.23	103	323
Free State	11 342 502	2 000	0.02	8	11 272	9	0.08	3.77	222	1006
Gauteng	5 488 613	2 000	0.04	8	7 273	15	0.21	6.28	133	755
KwaZulu Natal	10 327 660	500	0.00	2	6 338	17	0.27	7.11	29	1629
Limpopo	4 544 012	5 000	0.11	20	4 675	16	0.34	6.69	313	972
Mpumalanga	4 068 401	500	0.01	2	5 037	12	0.24	5.02	42	808
North West	6 179 490	500	0.01	2	7 512	6	0.08	2.51	83	823
Northern Cape	29 734 978	2 000	0.01	8	3 732	7	0.19	2.93	286	7968
Western Cape	9 766 969	7 000	0.07	28	9 759	102	1.05	42.68	69	1001
Unsure of province	0	2 000	n.a	8	0	21	n.a	8.79	95	n.a
Total	**82 209 571**	**25 000**	0.03	100	**57 940**	**239**		100.00		

Source: Adapted from Irwin (2002)

[10] This refers only to organic agriculture that is certified.

In SA the 25 000 ha under organic management represents less than 1 percent (0.03 percent) of the total agricultural area of 82 209 571 ha and 0.41 percent of the total number of farms (Table 2.6). Organic production in the Eastern Cape has the highest share (0.46 percent) of total agricultural area compared to other provinces. The Western Cape has the largest area (7000 ha) under organic management and number of organic farms (102). KwaZulu Natal, Mpumalanga and North West have small areas (500 ha each) under organic management. The organic farms in the Western Cape represent 42.68 percent of the total number of farms. SA has a well developed horticultural sector geared towards the export market (Irwin, 2002). Most of these farms are situated in the Western Cape.

In the Western Cape most farms are certified by EcoCert, which is an international certification body that certifies products mainly for the export market. The Western Cape region is suited for horticultural production. This includes wine grapes in the winter rainfall region, table grapes (in parts of Western Cape), apples (under irrigation in Ceres and Elgin/Grabouw valleys), stone fruit, citrus fruit along the West Coast and vegetables grown in the Southern Cape.

Average farm size for organic production varies across provinces from 29 ha in Kwa-Zulu province to 313 ha in Limpopo province. For conventional farms the average farm size also varies. Variation in farm size is due to a number of factors namely productivity, biophysical conditions and type of farming enterprise. However the average farm size for organic farms is considerably smaller. South Africa's commercial farming has seen a trend towards increasing sizes of farm units as the number of farming units and size of the sector has reduced.

In South Africa 13.9 percent of the total land area is occupied by small-scale farmers mostly in the former homeland areas[11] (Vink and Kirsten 2003). In attempting to de-racialise and address the dualism (commercial and subsistence sectors) government policy provides direct support incentives to small-scale farmers. It is important to look at small-scale farmers in organic production (number of farmers, geographical

[11] The policy of separate development (*Apartheid*) was implemented in SA after the National Party came into power in 1948. This policy prescribed a division of political power in which black people "had jurisdiction over their own nations and territories" referred to as homelands (Bureau for Economic Research re Bantu Development, 1976.

location, contribution to production, level of support services received and access to market information on consumer demand preferences).

In 2002 Irwin conducted a study on the potential for small-scale producers to enter the domestic organic sector (Irwin, 2002). Her aim was to understand how small-scale farmers are involved in the organic produce market, look at what obstacles exist for participating in this sector and identify research areas to improve participation of small-scale farmers in the domestic market. The results showed that:

- access to packaging facilities is a key constraint for gaining access,
- all entrants into this market should do so based on an identified market,
- there exists a lack of marketing information and information on organic production methods and
- participation in the supermarket retail chain can occur at no additional cost to the supermarket if small scale producers make use of an intermediary and hence were seen as a barrier to entry.

All small-scale producers participating in this market receive support from an outside entity, mostly non-governmental organisations. The cost of this support in the form of subsidies and other assistance made it difficult to determine the viability of new entrants. There are also a small percentage of small-scale farmers that sell natural products harvested from the wild as organic products.

The main organic products produced in South Africa are fresh fruit and vegetables, herbs, spices and cane sugar. Organic stone ground flour is currently only being produced in the Orange Free State (Mahlanga, 2001). A brief review of the regulation of the industry follows.

2.5.3 Regulation in the South African Organic Industry

2.5.3.1 Standards

There is only two pieces of legislation in SA that govern the organic industry and both are in *draft* format. These are the *Draft Regulations Regarding Control over the Sale of Organically Produced Products in the Republic of South Africa* (RSA, 2002)

(hereafter referred to as Draft Organic Regulations) and the *Draft Standard and Requirements Regarding the Export of Rooibos and Rooibos Mixtures* (hereafter referred to as Draft Rooibos Standard and Requirements) (RSA, 2001).

The first Draft Organic Regulations was made available in 2000 and second draft published in 2002 (Erasmus, 2006). The Draft Organic Regulations applies to unprocessed plants and plant products; live animals; products from bee keeping and processed products for human consumption derived from the former products (RSA, 2002).

The South African national department of agriculture is currently working on a third draft of the Draft SA Organic Standards (Erasmus, 2006). The third draft will be made available to all interested parties in the South African organic industry as no single industry representative currently exists and to the World Trade Organisation (WTO) for importing countries to comment. After all comments are received and included the Draft SA Organic Standard will be signed by the Minister of Agriculture. There are two certification bodies that certify according to the Draft SA Organic Standards namely the Africa's Farm Certified Organic (AFRISCO) and the Biodynamic and Organic Certification Authority (BODCA) (Callear, 2005).

The other certification bodies in South Africa are EcoCert, Soil Association, SGS and EKO and certify according to international standards. In South Africa the largest number of farms is certified by EcoCert (Irwin, 2002).

Organically produced products destined for the export market have to comply with the organic standard and certification procedure relevant to the exporting country.

Organic products in the domestic market display a range of organic labels. The draft South African Organic Standards provides guidelines for the labelling and marking requirements for organically produced products. The requirements include:

- Products from plant origin that are in conversion may have the mark "produce of organic agriculture in conversion", "organic in conversion" or description with similar meaning after a 12 month conversion period of 12 months with certain provisions;

- Products produced organically may have the words “product of organic agriculture”, “organic” “organically produced”, “certified organic”, “biological”, “ecological” or description with similar meaning;
- The labelling will include that the product has been covered by an inspection scheme and or certification mark will be indicated;
- Products not in final packaging compliant with the regulations may be transported in containers with labelling including a range of information stipulated in the draft SA organic standard;
- Products that are mixed may be labelled according to the composition of the ingredients specified in the draft SA organic standard and
- Products that create misleading impressions may not be marked with the above terminology (RSA, 2002).

The Draft Rooibos Standard and Requirements “relate to rooibos or rooibos mixtures in respect of which an approval for the export thereof is required in terms of section 4” (RSA, 2001) of the Agricultural Product Standards Act (Act 119 of 1990) (RSA, 1990). The specific reference to organic rooibos and rooibos mixtures relates to marketing requirements and the requirement for approval for export. The marketing requirement is that containers containing organic rooibos or rooibos mixtures should have the certification logo or number or name of certifying organisation on the container. The requirement for approval for export as required in terms of section 4 of Agricultural Product Standards Act (Act 119 of 1990) for consignments of organic rooibos or rooibos mixtures is that the certifying organisation must be accepted by the relevant country in the importing country.

The retailer with the biggest market share of the organic food industry, Woolworths, has invested in its own organic label.

The Organic Agricultural Association of South Africa (OOASA), a national non-profit organisation comprising of producers, retailers and consumers encourage members to display OOASA labels on their products. This label provides consumers with a guarantee from OOASA that products comply with the South African draft organic standards.

Producers, agents in the supply chain and consumers are supported by OOASA, Cape Organic Producer Association (COPA) and Biodynamic and the Organic Agricultural Association of Southern Africa (BDAASA). There is limited involvement of extension services and agricultural institutions in this new industry (Niemeyer and Lombard, 2003).

There are a number of non-governmental organisations providing support to small-scale farmers in the form of training, subsidised extension services, research and access to markets.

There are prospects and potential for South African producers and other agents in the supply chain in the future in the organic industry both globally and locally. A brief description of this future prospects and potential follows below.

2.6 Future Prospects and Potential

2.6.1 Global picture

Growth for organic products is expected in many European countries. The United Kingdom is the third largest market in Europe, currently imports 70 percent of its organic products and an annual growth rate of 30 percent per year is expected (International Trade Centre, 1999). The only risk in this market is the increasing use of integrated crop management methods applied by local producers that could be in competition with organic products. Sweden like the United Kingdom will not be able to meet its domestic demand for fruits and vegetables. Germany is the largest importer of organic products in Europe and the demand is mostly for organic fresh fruit and vegetables, dairy products, bread and bakery products and baby food. In France the products with opportunities are honey, sugar cane, edible oil and fats.

The United States of America dominates the largest market for organic food and beverages in North America. The prospects for future growth were not well documented. However the United States of America is an importer of tropical and

processed products and allows certified and uncertified products. This could be an opportunity for African countries where a large majority of the products are uncertified.

Growth is expected in the emerging economies of Brazil, India, South Africa and China (Willer and Yussefi, 2004). An annual growth rate of 10 percent per year is expected for Brazil ((Kotschi, *et al.* 2003).

China represents tremendous growth opportunity in the future with Japan and Korea currently the major markets in Asia (Willer and Yussefi, 2004). There is increased growth in emerging domestic markets in Singapore, Taiwan, Hong Kong, India, Malaysia and Philippines. The highest growth rates in Europe over the medium term (ranging from 30 percent to 40 percent) are expected in Denmark and Sweden. Higher growth rates are expected where grocery retailers are the main outlets for sales as in the case of Denmark, Switzerland, Sweden and the United Kingdom.

2.6.2 Opportunities in South Africa

The NEDLAC Trade and Industry Chamber through the Fund for Research into Industrial Development, Growth and Equity (FRIDGE) project has commissioned a study into the current status to assess the organic industry nationally and provincially (Department of Trade and Industry, 2005). By identifying a practical strategy for organic farming this study looks to ensure the "sustainable growth of organic products over the next ten years" (Department of Trade and Industry, 2005:2).

Irwin (2002) in her study on the adoption of organic production methods by small-scale farmers in South Africa provide five factors in favour of South Africa to develop its domestic organic market:

- existence of three organic association that provide support to producers;
- interest shown by local supermarkets,
- draft national organic standards,
- organic certification bodies operating in South Africa and
- organic section at Johannesburg fresh produce market.

Growth is expected in organic fruit juice, ready-made meals, herbs and spices and baby foods (De Vynck, 2005). There are opportunities in the domestic market as well as the larger cities in Latin America (Brazil), India and China. A supermarket retailer in South Africa cited lack of availability of organic products as a major constraint in the domestic market that presents an opportunity for producers (Conradie, 2005). However this opportunity can only be realised if the producer and retailer are informed about the consumer preferences for different product lines. At present organic fresh products represents 4 percent of total fresh product in Woolworths and more than 100 branded organic products are sold in the stores (Mawson, 2007).

There are opportunities in non-food products. In April 2004 Woolworths introduced a range of 100 percent organic cotton garments. Based on positive consumer feedback organic cotton will be expanded into basic t-shirt and underwear ranges. Currently no organic cotton is produced in South Africa and is outsourced from outside of South Africa.

CHAPTER 3: Review of relevant literature on consumer demand for organic products

3.1 Introduction

This chapter reviews consumer behaviour models applied to demand analysis in general and their use in food demand studies particularly organic food. The literature reviewed highlights the purpose of these studies, describes the different approaches used and identifies their strengths and limitations. It concludes by explaining how the reviewed studies have informed the selection of the approach and methodology for this study.

3.2 Implications of the Theory of the Consumer for Demand Behaviour

The economic theory of consumer behaviour is well documented and widely known.

The neoclassical theory of the consumer provides the analytical framework for analysing demand behaviour based on utility maximisation subject to a budget constraint (Deaton and Muellbauer, 1980a). The utility function measures the satisfaction that the consumer gets from consuming goods and the budget constraint is an expression of the financial limitations of the consumer.

Based on certain assumptions about the structure of consumers' preferences important hypotheses about demand behaviour are derived. The main result is specification of demand curves that characterise consumers' response to variations in prices, income, and other factors.

From the theory of consumer behaviour one may specify the Marshallian (uncompensated) or Hicksian (compensated) demand curves both of which measures the relationship between variations in quantity demanded and prices. Marshallian demand functions express quantities demanded from a particular good as a function of their prices. The Marshallian demand curve is derived from a formulation based on maximisation of consumers' utility function subject to a budget constraint.

Demand functions may also be derived by minimising an expenditure function subject to a given indirect utility function. The demand functions derived from this formulation are known as Hicksian or compensated demand functions.

From these demand curves, price and income elasticities are derived as measures of the responsiveness of demand decisions to changes in these determinants. Price and income elasticities of demand provide information on the effects of changes in price and income on food expenditure. The effect of these economic changes may be accentuated by non-economic factors and socio-economic factors.

The economic theory of consumers' behaviour requires satisfaction of certain regulatory conditions on demand functions. Demand functions that satisfy these conditions add-up, are homogenous of degree zero and compensated prices responses are symmetric and form a negative semi-definite matrix (Deaton and Muellbauer, 1980a: 50-51).

3.3 Emperical consumer demand models

Functional forms of demand functions may be empirically derived arbitrarily and then tested to check whether they satisfy regulatory conditions in order to be consistent with economic theory. The regulatory conditions of homogeneity, symmetry, adding-up, and negativity are often imposed *a priori* to reduce the number of parameters to be estimated.

In the neoclassical theory of the consumer, the consumer makes choices between alternative combinations of goods such that a certain bundle of goods is preferred to any alternative bundle of goods. Data (time series and cross-sectional) on quantities demanded, prices, income and other factors are required to derive demand curves that reveal consumer preferences for these goods and characterise consumers' response to variations in prices, income and other factors. Time series data however do not allow for demand analysis that explains behavioural differences between households as is the case with cross-sectional data (Deaton and Muellbauer, 1980a: 18). The regulatory conditions of homogeneity do not hold for the latter as it implies that no price variation is observed. The adding-up conditions still holds for time series data.

3.3.1 Revealed Preference Models

To specify demand curves one needs data on actual demand decisions (quantity demanded) in response to observed commodity prices, income and other demographic effects. Demand curves in the models described below are derived when data are available on actual market transactions. This group of models are called revealed preference models.

Early empirical demand analysis focused on the methods of single demand equations and measures of elasticity (Bopape, 2006; Hermann and Roeder, 1998). This methodology is useful for modelling detailed commodity demands where single demand equations are derived for each commodity. The focus of earlier empirical demand studies on estimating elasticities amongst economists is because elasticities are a concept that is easily understood, elasticities have no dimensions and may be measured directly as parameters from a regression equation (Deaton and Meullbauer, 1980a). In this methodology only the homogeneity conditions apply and therefore theory (and regulatory conditions) plays a less significant role.

Stone applied this single equation methodology to a logarithmic functional form and enforced the homogeneity condition to reduce the number of parameters (Deaton and Muellbauer, 1980a:61). In his application, complimentarity and substitutability were not measured consistently. Stone (1954) introduced the linear expenditure system, one of the many complete systems of demand equations and changed the focus of demand studies.

The linear expenditure system of demand equations were derived by algebraically imposing the theoretical restrictions of adding-up, homogeneity, and symmetry on a linear functional form. It is important to distinguish between properties of the model and those of the data in the interpretation of results of the linear expenditure system. This model was found to be restrictive as there is an approximate proportionality between price and expenditure elasticities. Hence, its application is limited.

The Rotterdam model like the linear expenditure system used the theoretical restrictions of homogeneity, symmetry, adding-up and negativity to generate degrees of freedom but differed in that the latter allowed restrictions to be tested statistically (Bopape, 2006). In the Rotterdam model, substitutes and complements may be identified directly from the estimation as it models the whole substitution matrix. In this model the homogeneity restriction was rejected and therefore in conflict with theory.

The group of complete system of demand equations known as flexible functional forms were developed in the 1970's as generating degrees of freedom with *a priori* restrictions did not provide the desired results (Bopape, 2006). The method used is to "approximate the direct utility function, indirect utility function or cost function by a specific functional form that has enough parameters to be regarded as reasonable approximation to its true unknown function" (Deaton and Meullbauer, 1980a).

Flexible functional forms include the transcendental logarithmic model developed by Christensen, Jorgensen and Lau (1975) and the almost ideal demand system of Deaton and Muellbauer (1980b). Both these models have budget shares as linear functions of total expenditure.

The translog model approximates the indirect utility function. This model is inconsistent with economic theory as homogeneity and symmetry restrictions were rejected (Deaton and Muellbauer, 1980a).

The almost ideal demand system relates values of budget shares to a logarithm of total expenditure. The unrestricted estimation satisfies the adding-up restriction. The homogeneity and symmetry restrictions may be tested by imposing the restrictions. The linear and quadratic approximations are the two extensions to the almost ideal demand system. The linear approximation is widely used when expenditure or budget data is available (Deaton and Muellbauer, 1980a).

Both the linear and quadratic approximation allows for aggregation over households (Abdulai and Aubert, 2004). In the quadratic form, expenditure or budget shares are quadratic in logarithm of income. This form allows for non-linearity in household

behaviour to be captured (Abdulai and Aubert, 2004). Researchers decide on an ad-hoc basis on number and composition of commodity groups as economic theory does not provide direction.

The almost ideal demand system is very popular amongst agricultural economists. It is easy to estimate and interpret, it satisfies the axioms of choice exactly, and it is compatible with aggregation over consumers. The almost ideal demand system corresponds with a well-defined preference structure given that it is derived from a specific cost function. Homogeneity and symmetry restrictions are easily tested and or imposed because it depends only on estimated parameters, it provides an arbitrary first-order approximation to any demand system, it "aggregates perfectly across consumers without invoking parallel linear Engel curves" and its' functional form is consistent with known household data (Deaton and Meullbauer, 1980b).

Demographic variables may be included in complete demand systems shown by the earlier work of Barten (1964) that captured heterogeneity in complete demand systems. The review of food demand studies will show how this has been applied.

In summary, revealed preference, models include the single equation methodology and the complete system of demand equations. The single equation methodology is useful when modelling detailed commodity demands but economic theory plays an insignificant role in deriving these demand curves. This methodology was applied extensively prior to the introduction of Stone's linear expenditure system. Complete systems of demand equations like the linear expenditure system and Rotterdam model are applicable to broadly defined groups of commodities. Flexible functional forms include the translog and almost ideal demand systems. Homogeneity and symmetry are rejected and therefore this is in conflict with economic theory. All the models use data on actual market transactions.

Often data are not available when no market exists like in the case of public goods, when individuals do not buy goods and services even if markets exists and when proxy markets do not provide adequate information. Stated preference techniques are used when no data are available.

3.3.2 Stated Preference Models

With stated preference techniques behaviour of individuals in the market place are simulated using questionnaires or experiments. The choice modelling and contingent valuation methods are the two stated preference techniques most widely used in demand analysis. The lesser-known method of conjoint analysis is also applied.

The choice modelling technique originated from marketing research. Goods are described by their attributes and characteristics. This technique uses the choice experiment, contingent ranking, contingent rating and paired comparison method. Only the choice experiment has shown to be consistent with economic theory (Bateman *et al.*, 2002) whereas other methods' welfare estimates are not.

Lancaster's Theory of Value is the foundation of the choice experiment method (Lancaster, 1966). Goods are described by their attributes and utility gained from them are a function of these attributes. Respondents choose between a series of alternative scenarios, normally three (Kallas, *et al.*, 2007). The first scenario includes the current levels of attributes and the other two provide scenarios with changes in one or more of the attributes. The changes or new levels of attributes are an improvement over the status quo and the cost normally paid via a tax. The strength in this method lies in its ability to evaluate goods that consist of several attributes (Kallas, Gomez-Simon and Arriaza, 2007). Respondents may be unable to choose between ranges of different attributes at the same time. This limitation is referred to as the choice complexity (Kallas, *et al.*, 2007). Econometric modelling of choice experiment assumes an additive utility function where the sum of partial utilities of each attributes is equal to the total utility. This assumption may lead to overestimated values due to this part-whole bias. The contingent valuation method is however better suited when valuing the provision of goods chronologically for programmes that have more than one attribute (Bateman *et al.*, 2002).

The contingent valuation method is a survey instrument used to obtain preferences of respondents in monetary values for changes in the price or quality in a particular good or service. These preferences, expressed in monetary values, provide data on respondents' maximum willingness to pay or minimum willingness to accept.

In the contingent valuation method, the survey instrument used is a questionnaire. In the questionnaire, a valuation scenario is presented to the respondents that describe the good or service to be valued. The changes (price or quality) to the good or service because of proposed intervention is then explained. Respondents are then asked how much money (bid level) they are willing to pay for a good when given the chance to acquire it. Different methods or elicitation formats are used to ask respondents to calculate the amount of money (bid level) they are willing to pay for a good when given the chance to acquire it. The elicitation formats are open-ended questions, the bidding game, the payment card, dichotomous choice questions and the randomised card sorting procedure.

In open-ended questions, respondents are asked to identify their individual willingness to pay without being given a starting bid level. Mitchell and Carson (1989) found that this method provides large numbers of no responses, zero answers and outliers. In the bidding game, consumers are asked a number of discrete choice questions. The final question is an open-ended willingness to pay question. This format does provide a starting bid value that may influence responses known as anchoring bias. Its limitation is that it cannot be used in mail and self-completed questionnaires. Payment cards use visual aids to show monetary values for changes in a price or quality of good. Some versions show monetary values in terms of actual household expenditure or taxes. This method is not applicable to telephonic survey. Dichotomous choice questions may be single or double-bounded.

In the single bound format respondents, answer yes or no to whether he or she is willing to pay a given amount for the change in price or quality of a good. The given amount is also referred to as the bid level. In the double-bounded format, an additional follow-up question is asked that specifies a lower bid level. Bias has been reported between the first and second bid in the double-bounded format. The bias was due to inconsistencies. Hanemann *et al*. (1991) found that the gains in the efficiency of using the double-bounded format out-weighed the bias. Calia and Strazzera (2005) found that the efficiency of the double-bounded format is reduced when sample sizes increase. The use of the single bounded approach is advocated when the sample size of the survey is large enough and a pre-test is conducted (Calia and Strazzera, 2005).

In an extensive comparison of the strengths, limitations and application of different elicitation formats mentioned above, the payment card and dichotomous choice format was recommended (Bateman *et al.*, 2002). Payment cards are more advanced than open-ended and bidding games. It provides more information and is cheaper to administer than dichotomous choice formats. The dichotomous choice format was found to be easy to use in collecting data. The single bound dichotomous choice format has been shown to be easier to implement than the double-bounded dichotomous choice format.

Conjoint analysis is a stated preference method based upon economic theory represented in Lancaster's utility model of consumer economics (Lancaster, 1966). Conjoint analysis was introduced in mathematical psychology and used to measure the value that consumers place on product attributes. In this model price is included as a product attribute and therefore may be viewed as an extension of Lancaster's utility model (Wang and Sun, 2003). This method is preferred over the contingent valuation method as all product attributes are rated by respondents. The contingent valuation method values how preferences change with change in product attributes.

A review will follow of the application of the revealed and stated preference models to food demand in general and organic food in particular highlighting the purpose of the studies, the approach, strengths, and limitations. Research gaps in the studies will be identified.

3.4 Survey of Food Demand Studies

There is an extensive literature on the application of consumer behaviour models to food demand analysis using both revealed and stated preference empirical consumer demand models. Revealed preference models were used when data on actual market transactions are available and when not available stated preference models are used.

3.4.1 Revealed Preference Models

Earlier studies on revealed preferences used the single equation methodology was applied extensively and measures of elasticities were computed.

In South Africa this methodology was applied in a number of food demand studies undertaken between 1980 and 2005 (Darroch, 1983; Van Zyl, 1986; Loubser 1990; Bowmaker and Nieuwoudt, 1990; Van Zyl, 1990; Elliot, 1991; Elliot and Van Zyl, 1991; Niebuhr, 1991; Oyewumi and Jooste, 2005; Ortman, 1982; Chadwick and Nieuwoudt, 1984; Hancock, Nieuwoudt and Lyne, 1984 and Hayward-Butt and Ortman, 1994). All of these studies computed measures of price and expenditure elasticities which in most cases was the purpose of the study.

Some studies using single equation methodology included the influence of non-economic variables. Loubser's (1990) study computed elasticities from demand equations for 500 food and non-food groups in South Africa. This study included demographic factors by classifying households into homogenous groups by race and geographical location. Oyewumi and Jooste's (2005) study on pork demand in South Africa included a variable to capture the influence of meat quality as visible pork fat has been found to be "the strongest visual clue" in the decision to purchase meat at the retail level (Resurreccion, 2002). Oyewumi and Jooste's (2005) study was limited to a small geographical area. They assert that the estimated results are useful as the sample is representative of the racial composition and income distribution within South Africa. The willingness to pay for non-economic attributes of pork and pork attributes and the influence of socio-economic and demographic variables on pork demand in South Africa is a gap in research on meat demand studies in South Africa (Oyewumi and Jooste, 2005). Hayward-Butt and Ortmann (1994)'s study included a dummy variable to control for the effects of the 1989 market deregulation. They concluded that a longer period of analysis than the 3-year deregulation was required to make any firm conclusions regarding the impact of deregulation.

Poonyth *et al.* (2001) contributed few improvements upon previous meat demand studies' in South Africa by Hancock *et al.* (1984), Du Toit (1982) and Bowmaker and Nieuwoudt (1990). All the previous meat demand studies used the oordinary least squares method to estimate fixed-parameters over sample observations to estimate demand models. Procedures used to estimate parameters in the above-mentioned studies postulated constant elasticities over time and all exogenous variables and did not test for regularity conditions implied by demand theory. This assumption is convenient but only holds for a short range of prices and income variability. Hence,

parameters estimated provided updated parameters that incorporate economic changes. Poonyth *et al.* (2001) used an econometric estimation technique called Kaman random coefficient filtering technique that "allows for relaxation of constant coefficient assumption in linear model to randomly fluctuate across different observations". This study allowed for estimation of changes in preferences from one period to another not accounted for in fixed coefficient estimation.

Sartorius Von Bach and Van Zyl (1994) used both single demand equation and complete systems of demand equation method to conduct demand analysis for carbohydrates. Maize, wheat, potato and rice were grouped as carbohydrates. They found that single demand equations were "an inadequate basis for predicting actual behaviour in the carbohydrate market" due interrelations between demand for the various carbohydrate commodities. This highlighted the fact that previous studies using single demand equations for carbohydrate demand analysis in SA by Darroch (1983), Van Zyl (1986), Bowmaker and Nieuwoudt (1990), Nieuwoudt (1990), Van Zyl (1990), Elliot (1991), Elliot and Van Zyl (1991) and Niebuhr (1991) ignored this interrelation. Sartorius Von Bach and Van Zyl (1994) also included a time trend variable as an indicator for growth in consumption that showed a changing trend in preferences by South African consumers for white meat over red meat. The trend reflects distribution of income, real meat prices, and increasing level of urbanisation. The reported cross-price elasticity for white and red meat showed that white meat is a substitute for red meat.

Poonyth *et al.*'s (2001) study did not include meat consumption data on informal slaughtering. This is a limitation given the substantial size of the informal slaughtering market in South Africa. The impact of demographic information of consumers and food safety is an area for future research for South African meat demand analyses (Poonyth *et al*, 2001).

Badurally-Adam and Darroch (1997) applied the Rotterdam model to meat demand in South Africa. The purpose of this study was to identify potential impacts of a free trade agreement between South Africa and the European Union on meat demand in South Africa. Non-economic factors were captured by the constant term. Their study showed that beef and mutton were luxuries and chicken and pork were necessities

between 1971 and 1995. Per capita demand for chicken increased and decreased for beef and mutton. The study concluded that the effect of a free trade agreement in the short term would depend on which meat prices change if South Africa is reclassified in zone 4[12] and if import tariffs are reduced. Future import competition was forecasted to come from poultry imports and changes in chicken prices given that South Africa periodically imports chicken. This study focused only on impacts on the demand side but not on the impact on South African meat producers. Therefore Badurally-Adam and Darroch (1997) identified that future research should apply a general demand-supply equilibrium model to identify impacts of a free trade agreement on South African meat producers.

Studies by Blundell *et al.* (1993) and Abdulai (2002) applied complete demand system of food demand analysis in developing countries. These studies show that the Working-Leser form of specification used "does not provide an accurate picture of individual behaviour" (Abdulai and Aubert, 2004:68). There is very little information on price on income elasticities for both individual food and food groups for Sub-Saharan Africa (Teklu, 1996).

Buse (1994) observed that the almost ideal demand system is very popular amongst agricultural economists. A few food demand studies have applied the complete demand system in developing countries (Abdulai and Aubert, 2004; Molina and Gil, 2005; Agbola, 2003; Taljaard, 2003; Bopape, 2006; Meenkashi and Ray, 1999 and Gould and Villarreal, 2006) in China. It was also applied to developed countries (Blanciforti and Green, 1983; Fulponi, 1989; Mergos and Donatos, 1989; Cashin, 1991; Banks *et al.*, 1997; Tiffin and Tiffin, 1999; Blundell and Robin, 1999; Moro and Sckokai; 2000 and Adulai, 2002).

Abdulai and Aubert (2004), Bopape (2006), and Tiffin and Tiffin (1999) captured the influence of demographic and socio-economic characteristics. Both Abdulai and Aubert (2004) and Bopape's (2006) study in Tanzania and South Africa, respectively, included demographic effects in the specification of the food demand system with data collected from surveys. Abdulai and Aubert's (2004) study included a dummy

[12] This zone provides lowest beef export refunds paid by EU (Badurally-Adam and Darroch, 1997).

variable for regions to capture influence of regional taste differences. Abdulai and Aubert's (2004) study showed that there is a strong relationship between education of women and food demand amongst households particularly.

Tiffin and Tiffin's (1999) study on food demand analysis in Britain included a time trend to represent changing consumer preferences. Tiffin and Tiffin's (1999) study improved upon other demand studies using British National Food Survey (NFS) data because it was consistent with theory and used aggregate time series data.

Most studies applying the quadratic approximation were done in developed countries by Banks *et al.* (1997) and Blundell and Robin (1999) in the United Kingdom; Meenkashi and Ray (1999) in India; Adulai (2002) in Switzerland and Moro and Sckokai (2000) in Italy. Adulai and Auber (2004) used this approximation in Tanzania and Bopape (2006) in South Africa.

Abdulai and Aubert's (2004) study selected food groups based on previous food demand studies in developing countries and by classification according to economic and nutritional criteria. This method of grouping reduced the number of parameters estimated. Most studies select food groups according to complementarity of individual food items (Abdulai and Auber, 2004). Abdulai and Aubert (2004) caution against imposing a functional form before investigating the expenditure share equations.

Bopape's (2006) study used the quadratic approximation to estimate a complete system for seven food groups in South Africa and the influence of demographic variables. Previous studies in South Africa by Taljaard (2003) and Agbola (2003) used a linear approximation of the almost ideal demand system. Bopape's (2006) estimated a linear approximation to make comparisons with these studies. Reported price and expenditure elasticities for both models were found to be comparable.

Bopape's (2006) study found that estimated expenditure elasticities between rural and urban samples differed greatly. This supports the need for demand analysis in South Africa to capture difference between rural and urban households (Bopape, 2006).

Various South African food demand studies identified the ever increasing importance of factors other than price and income. Sartorius Von Bach and Van Zyl's (1994) highlighted the need to include the impact of urbanisation on food demand. Taljaard (2003) also stressed the need to include factors other than price and income in his study on meat demand. Both Bowmaker and Nieuwoudt (1990) and Bopape (2006) supported disaggregated demand analysis in South Africa that incorporate income difference amongst individuals and for rural and urban areas.

3.4.2 Stated preference models

Food demand analysis applies stated preference models when data on actual market transactions are not available. Its application has been mainly to assess consumers' demand for food products with enhanced food safety attributes that include reduced use of pesticides and chemical inputs and the use of biotechnology in the case of genetically modified food. The impact of agricultural production methods on the environment (both natural and human capital) has also become an issue of concern for consumers. Food demand studies have emerged to address the need to understand the impact of these growing consumer concerns on food demand. The contingent valuation method, choice experiment method and conjoint analysis method has been used.

The contingent valuation method has been applied to demand analysis of genetically modified food in Japan by Mc Cluskey et al. (2003a), in Taiwan by Chiang (2004), in China by Li *et al.* (2003) and Lin *et al*. (2006) and in Chile by Mc Cluskey *et al.*, (2003b). All above cited studies used the double-bounded elicitation format. These elicitation formats have asked respondents how much they are willing to pay (premium price) and willing to accept (discount). In Japan, Mc Clutskey *et al.*'s (2003a) study asked how much they would be willing to accept (randomly assigned discount prices) for tofu made from genetically modified wheat at different discount prices. Lin, *et al*. (2006) study used discount prices for genetically modified soybean oil and rice in China. Chiang's (2004) study in Taiwan used premium prices for genetically modified soybean oil, tofu and salmon.

Estimated results from Mc Cluskey *et al.* (2003a) showed that 15 percent of 400 Japanese consumers would buy this tofu at discounted prices. Analysis of the willingness to pay function showed that probability of buying genetically modified foods increased with higher price discounts offered and favourable attitudes towards the use of biotechnology.

Li *et al.* (2003) showed that education, income and number of children in the household were not statistically significant in influencing the probability of willingness to pay for genetically modified rice. Results also showed that 38 percent of Chinese consumers were willing to pay for genetically modified rice and 16.3 percent were willing to pay for genetically modified soybean. The probability of buying genetically modified soybean oil improved with increasing consumer knowledge of genetically modified products and increasing age in the case of genetically modified rice (Li *et al.*, 2003). .

A contingent valuation method survey was administered by telephone in Taiwan to determine willingness to pay for genetically modified soybean oil, tofu and salmon (Chiang, 2004). Results showed that 21.9 percent of Taiwanese consumers are willing to pay a price premium for non-genetically modified soybean oil, 37.42 percent for non-genetically modified tofu and 108.4 percent for non-genetically modified fed salmon (Chiang, 2004).

Results showed that 60 percent of respondents in China would purchase genetically modified soybean oil and rice without a price discount and 20 percent of respondents would not accept any genetically modified soybean oil or rice (Lin *et al.*, 2006).
Mc Cluskey *et al.* (2003a) used the contingent valuation method to gather information on consumer acceptance of genetically modified apples. This information was required to successfully market genetically modified apples in Chile. Respondents were asked to state their willingness to pay for second generation genetically modified apples[13]. Five bid levels (discount prices) were given to respondents ranging from five to 90 percent and five bid levels (premium prices) range from five to 50 percent.

[13] Genetically modified products contain first-generation and or second-generation modifications. First-generation modifications refer to *input traits* that address production and may result in public good benefits. Second-generation products include *quality traits* that may result in private benefits (Mc Cluskey *et al.*, 2003b).

This study analysed the impact of demographic and attitudinal variables at grocery stores. Face-to-face interviews were conducted at grocery stores in four different areas in Santiago, Chile.

Mc Cluskey *et al.*'s (2003b) study stated that consumer acceptance of genetically modified foods is critical to the future success of the biotechnology in agricultural products. Hence the food demand studies using the contingent valuation method in Japan, China, Taiwan and Chile have assisted us in understanding consumer behaviour towards genetically modified food.

Low response rate of have been observed for contingent valuation studies using mail surveys (Bateman *et al.*, 2002). Food demand analyses applied the contingent valuation method to determine consumer preferences and attitudes towards food safety and food produced with fewer inputs (Buzby *et al.*, 1995; Kuperis *et al.*, 1999; Govindasamy and Italia, 1997; Baker, 1999 and Boccaletti and Nardella, 2000).

Three food demand analyses have applied the conjoint analysis method combined with cluster techniques to genetically modified food products (Vermuelen *et al.*, 2005). Vermuelen *et al.* (2005) analysed attitudes and acceptance of urban consumers in South Africa of genetically modified white maize. This study was limited to a very small sample of ninety consumers in a limited geographical area. Price, brand, and type of maize were identified as the three main attributes that provide utility to consumers.

There is lack of research in consumer attitudes towards genetically modified white maize in South Africa (Vermuelen *et al.*, 2005*)*. Research into consumer acceptance of genetically modified food has become more important in South Africa particularly for genetically modified maize, soya beans and cotton given that South Africa is the eight largest producer of genetically modified food.

3.5 Organic food demand analysis

A review was done in 1995 on studies on organic food demand analysis (Wier and Andersen, 1995). Results showed that very few studies used actual purchase data and

therefore revealed preference methods and most studies used stated preference methods.

Most studies focused on organic fresh produce with concern for impacts of health of conventionally produced food cited as the main reason for purchasing organic food. The most valued attribute of organic food was that it is free from pesticides. Results from the studies were not conclusive regarding the impact of income, marital status and whether the respondents lived in a rural or urban area on the tendency to buy organic food.

3.5.1 Revealed Preference Models

The revealed preference model has been applied to organic food demand analysis in the United States of America by Glaser and Thompson (1998), Thompson and Glaser (2001) and Lengyel (2006) and in Germany by Jorgensen (2001). Organic food demand analysis in South Africa has not applied this model.

All the studies used the almost ideal demand system with time series data on retail organic food sales except for Lengyel (2006) that used the single equation methodology. Data used in these studies was sourced from global marketing research companies like AC Nielsen in the United States of America and GfK in Denmark. Retail food sales data was not all categorised as organic. In her study on organic frozen peas, Lengyel (2006) contacted individual manufacturers to differentiate between retail sales data for organic and conventional frozen peas. Glaser and Thompson (1998) also contacted individual manufacturers to distinguish organic from conventional frozen vegetables retail sales data. Time series data on retail food sales are available in South Africa from AC Nielsen at a huge expense with no differentiation between organic and conventional products.

Glaser and Thompson (1998) used a nonlinear almost ideal demand system to estimate a complete system of demand equations for four organic and conventional frozen vegetables in the United States of America. Frozen vegetable sales follow a seasonal trend in the United States of America. A dummy variable was included in each budget share equation to capture this seasonality. Results showed large own-

price elasticities at the sample mean for organic frozen vegetables. This is because organic frozen vegetables had only recently been introduced into retailers. Estimated own-price elasticities decreased over a 12-month period. This was due to a change in price sensitivity as consumer became familiar with the newly introduced product. Reported cross-price elasticities were very small. Estimated expenditure elasticities showed no clear trend.

Results from Glaser and Thompson's (1998) study showed that comparisons between organic and conventional frozen vegetables were difficult for consumers. Little variation in the display of organic products as compared to conventional products caused the confusion. Glaser and Thompson (1998) did not capture the potential impact of income distribution and demographic factors on the demand for frozen organic vegetables.

Thompson and Glaser (2001) used a quadratic approximation of the almost ideal demand system to estimate five groups of organic and conventional baby food in the United States of America. Results showed large own-price elasticities for organic baby food at sample means that declined over the sample period. Glaser and Thompson (1998) observed a similar trend for organic frozen vegetables in the United States of America. This may have caused the declining own-price elasticity. A reduction in retail prices will have less of an effect on organic purchases as the market share of organic baby foods increases. Estimated expenditure elasticities varied tremendously across organic baby food items. Thompson and Glaser's (2001) study was also not able to find a pattern in reported expenditure elasticities. Results from Glaser and Thompson's (1998) study showed that the organic baby food market in the United States of America has the fastest growing market among all organic foods at the retail level.

Frozen pea sales follow a seasonal trend in the United States of America. A dummy variable was included in Lengyel's (2006) study to capture this seasonality similar to Glaser and Thompson's (1998) study on organic frozen vegetables. Lengyel's (2006) study used the single equation methodology to study consumer demand for organic peas that included demographic variables. Results from Lengyel's (2006) study on organic peas showed that prices of conventional vegetables did not have a significant

impact on the purchase of organic vegetables. Trends in organic pea consumption were difficult to identify due to a correlation between income, female labour rates, and the dummy trend variable. The limitation of Lengyel's (2006) study is that most organic purchases occur at smaller nature food stores and cooperatives in the United States of America that are not equipped with scanners[14] to capture organic sales data and therefore were not included in her study.

3.5.2 Stated Preference Models

Mier *et al*. (2000) conducted organic demand analysis using stated preference models in the Denmark, Wang and Sun (2003) in the United States of America and in by Du Toit and Crafford (2003) in South Africa.

Mier *et al.* (2000) used the contingent valuation method to determine willingness to pay for organic milk, rye bread, potatoes, and cereal. Wang and Sun's (2003) study used the conjoint analysis method to determine demand for organic milk and apples. Du Toit and Crafford's (2003) study used the Engel-Blackwell-Miniard model of consumer behaviour to determine beliefs and purchasing practises of South African consumers regarding organic food. The study done by Du Toit and Crafford (2003) is the only study in South Africa on organic demand analysis.

Wang and Sun's (2003) conjoint analysis used a mail survey that yielded a response rate of 31.3 percent. This low response rate is common with mail survey. Not all questions were answered in the returned mail surveys. Estimated results showed that there is a niche market for organic milk and apples and people are willing to pay more for organic milk and apples produced locally and that are certified (Wang and Sun, 2003).

Du Toit and Crafford (2003) used a mail survey that was distributed to respondents at the entrance of four retail stores in the central business district of Cape Town, South Africa. The managers of the stores recommended the busiest time to improve the response rate. The response rate was however only 15.4 percent. The questions in the

[14] Large marketing research firms obtain retail sales data from scanner data from supermarkets. Scanner data are the data collected from scanners (bar-coded) installed at supermarkets that provide data per item on price, unit, brand, etc.

survey were designed to include data on the following groups of variables; namely: food purchasing practises, demographic and socio-economic information, perceptions about organic farming and organic foods.

Questions on purchasing practises included consumers' purchasing frequency, purchasing location, and willingness to pay within a price range and product choice. Demographic information collected included gender, age, home language, level of education, income and main food purchaser. Home language was included as it is often used in South African surveys to reflect cultural differences.

A brief description of results on impact of demographics on likelihood of buying organic products and frequency of purchasing organic food follows. It was not possible to make any conclusions regarding influence of respondents' gender and income on likelihood of purchasing organic food. Studies by both Jolly and Norris (1991) and Estes *et al.* (1994) found that women were willing to pay more for organic products than men and a correlation exists between respondents' age and frequency of organic food purchases. More than 70 percent of respondents were more likely to purchase organic food. Jolly and Norris (1991) however found no correlation between age and purchases of organic produce in the United States of America. Estes *et al.* (1994) found that respondents with higher levels of education and English as a home language were more likely to purchase organic food. This finding is consistent with Jolly and Norris (1991) who found respondents with higher education in the United States of America to be willing to pay more for organic products.

Du Toit and Crafford's (2003) study found that most of the respondents stated that organic agriculture protected the environment, treated animals humanely, and was appropriate for small-scale farmers. South African respondents' preference ranking for organic products depending on availability was for organic fruit, vegetables, dairy products, grains, grain products, then poultry, and meat (Du Toit and Crafford, 2003).

Du Toit and Crafford's (2003) study was limited by the small sample and very low response rate. The study also did not determine the relationship between consumers' willingness to pay and demographic or attitudinal variables. The presence of babies and young children in the household in influencing the household's decision to

purchase organic food was identified as an area for future research in organic demand analysis in South Africa. This is an important area of research given the growing demand for organic baby food in South Africa (Mead, 2005).

Millock *et al*. (2005) compared results from using the revealed and stated preference models. Results from revealed preference model showed that consumers pay less than their stated willingness for organic milk, potatoes, beef, and rye bread. The share of consumers that stated they are willing to pay more for organic milk exceeds the share of consumers who were paying more. Danish consumers are willing to pay more for organic food but at a lower price than current market price premium. These results support the literature indicating that there is a strategic bias in the contingent valuation method and that stated willingness to pay exceeds revealed willingness to pay.

The results on impact of attitudinal variables on willingness to pay for organic food in Denmark and summarised in what follows (Millock *et al.*, 2005). The study showed that 35 percent of respondents that are willing to pay more for organic products have been members of an environmental protection' organisation that protects nature compared to 18 percent that have never been members. Results showed that 66 percent of respondents did not believe organic agriculture contributed to the environment and 57 percent said that it would make no difference to your health if you ate organic food. These results support Tregear *et al.*'s (1994) findings in Britain that concern for the environment did not have an influence on the decision to purchase organic food. Millock *et al.*'s (2005) study showed that 96 percent of Danish consumers recognise the national government organic label and 64 percent have trust in the label.

Millock *et al.* (2005)'s study showed that Danish consumers (64 percent of respondents interviewed) lacked confidence in imported foods. These results support Wang and Sun's (2003) results that households in Vermont in the United States of America were willing to pay more for organic apples that were produced locally. Padilla Bernal and Perez Veyna (2005) showed there is an increase in the buy local movement in the European Union. This may have implications for marketing strategies of organic producers in developing countries particularly as most of the organic products are exported.

The results on impact of demographic variables and attitudinal variables on willingness to pay for organic food in Denmark are outlined here (Millock *et al.*, 2005). The probability of willingness to pay decreased with age and level of price consciousness. The belief that the environment problems are exaggerated decreased the probability of being willing to pay. The presence of children in the households and indicator variables of health, nutrition, and environmental awareness did not affect significantly on willingness to pay.

Consumer confidence in organic product labelling; the impact of differences in food culture particularly for imported foods, prepared and unprepared foodstuffs and the influence of various sales channels like supermarket, direct sales and health food shops amongst different consumer groups in a country and amongst different countries were identified as future research areas by Millock *et al.* (2005).

Retail sales data in South Africa is expensive and not categorised as organic. Lack of data and high costs are the norm in countries in which the organic industry is relatively new. Given that no data on actual market transactions of organic food is available, a stated preference technique will be used in this study. A contingent valuation method questionnaire using single-bounded elicitation format will be designed to collect data on demographic variables, purchasing behaviour and WTP from the valuation scenario. The contingent valuation method questionnaire will be used to conduct a face-to-face survey mode to avoid the low response rate of the mail surveys such as that administered by Du Toit and Crafford (2003). The next chapter provides description of the data required to conduct the intended analyses and the approach and method followed in this study.

CHAPTER 4: Approach and Methods of the study

4.1 Introduction

This study adopts the stated preferences approach to analyse demand for organic food in South Africa. The contingent valuation method (CVM) will be employed to measure consumers' willingness to pay for organic foods and investigate determinates of such demand. The consumer utility maximization framework which provides the basis for measuring WTP in terms of change in welfare is discussed first. The CVM employed in the analysis is then described, based on which an empirical model is specified for calculating WTP and for analysing determinants of demand for organic food in South Africa. The chapter then concludes with a discussion of the types and sources of the data required to implement the intended analyses.

4.2 Consumers' utility and measures of welfare change

The preference (utility) function for an individual may be written as $u(x,q)$ where $x = x_1,.....x_m$ is the vector of private goods and $q = q_1,....q_m$ is the vector of the public goods. Private goods are chosen by individuals and public goods are considered exogenous.

An individual maximises utility subject to income y. The indirect utility function $v(p,q,y)$ is given by:

$$V(p,q,y) = \max_x \{u(x,p) | p \cdot x \leq y \} \quad 4.1$$

The minimum expenditure function $m(p,q,u)$ is the dual to the indirect utility function given by:

$$M(p,q,u) = \min_x \{p \cdot x | u(x,q) \geq u \} \quad 4.2$$

The properties of both the indirect utility and expenditure function are well known (Deaton and Muellbauer, 1980a). The derivative of the expenditure function yields

the Hicksian or utility-constant (compensated) demand function with the subscript indicating the partial derivative:

$$x_i^u(p,q,u) = m_{pi}(p,q,u) \qquad 4.3$$

The negative of the ratio of derivatives of the indirect utility function yields the Marshallian or ordinary demand curve:

$$x_i(p,q,y) = \frac{-V_{pi(p,q,y)}}{V_y(p,q,y)} \qquad 4.4$$

When $u(x,q)$ is increasing and quasi-concave in q, $m(p,q,u)$ is decreasing and convex in q and $V(p,q,y)$ is increasing and quasi-concave in q (Haab and Mc Connell, 2002). Welfare measures may be directly calculated from the utility functions. Welfare measures or descriptions of changes in well-being may be explained by the concepts of compensating variation (CV) and equivalent variation (EV) and WTP and willingness to accept (WTA) as discussed in chapter 3.

WTP measures the maximum amount of income the individual will be willing to pay for an improvement in their circumstances (utility maximisation) or maximum amount an individual is willingness to pay to avoid a decline in circumstances. WTP is defined using the indirect utility function as:

$$V(p,q^*,y-WTP) = V(p,q,y) \qquad 4.5$$

where $q^* \geq q$ and increases in q are advantageous ($\frac{\partial V}{\partial q_i} \succ 0$, implying that higher consumption levels of q lead to higher utility).

Since utility can not be observed directly we cannot directly derive empirical measures of economic surplus such as CV and EV as indicators of welfare change. They however can be indirectly derived from demand functions which can be empirically specified using revealed preference data (market price and quantity data). Empirical research on measures of WTP and valuation resort to alternatives such as stated preference methods when data on observed actual choices of consumers or products are not available for a number of reasons.

This is the case of organic food products in South Africa where data on observed market choices are not available and hence the need to use stated preference methods such as the CVM.

4.3 The contingent valuation approach to studying demand behaviour

The CVM is the principal tool for soliciting stated preferences of economic agents. It is based on survey techniques through which information is compiled about peoples choices and their willingness to pay (accept) a premium (compensation) to avoid (endure) an undesirable outcome. The *dichotomous choice valuation method* (DCVM) employed to conduct the WTP analyses for this study is one of the CVM most commonly used instruments. Hanemann (1984) developed the basic random utility model to analyse dichotomous contingent valuation method responses. This model uses the framework of Mc Fadden's (1974) random utility model by rationalising the responses to CVM questions and placing them within a framework that may be estimated and interpreted (Haab and Mc Connell, 2002). In this formulation the indirect utility for the j^{th} respondent may be written as

$$v_{ij} = v_j(y_j, z_j, \varepsilon_{ij}) \qquad 4.6$$

where $i = 1$ is the condition when the CVM valuation scenario is implemented and $i = 0$ is the condition before the CVM valuation scenario is implemented. The j^{th} respondent's discretionary income is indicated by y_j, z_j is the m-dimensional vector of household characteristics and attributes and ε_{ij} is the part of the preferences known to the respondent but not the researcher.

The j^{th} respondent answers yes to WTP at a given bid level t_j if the utility at $i = 1$ is more than utility at $i = 0$ such that:

$$v_1(y_j - t_j, z_j \varepsilon_{1j},) \succ v_0(y_j, z_j, \varepsilon_{0j}) \qquad 4.7$$

The random part of the preferences is not known by the researcher and therefore only statements about the probability may be made. The probability of a *yes* response is that the respondent is better off in $i = 1$ such that $v_1 \succ v_0$ and probability is :

$$\Pr(yes_j) = \Pr(\, v_1(y_j - t_j, z_j, \varepsilon_{1j}) \succ v_0(y_j, z_j, \varepsilon_{0j})) \qquad 4.8$$

4.4 The empirical CVM model for food demand in South Africa

The probability statement of section 4.3 based on the random utility framework of McFadden (1984) described above is the starting point for non-parametric estimation. Use of a parametric model however, allows for inclusion of socio-economic characteristics of respondents into the WTP function. The validity and reliability of the CVM may be determined by understanding the relationship between WTP and such characteristics. In most cases it also allows for extrapolation from the sample to population. The functional form of $v_{ij} = v_j(y_j, z_j, \varepsilon_{ij})$ must be chosen and distribution of ε_{ij} must be specified in order to carry out parametric estimation.

Two steps will be taken to do this. The first step is to derive parameter estimates for the part of the preference function that allows calculation of WTP. The second step involves using the estimated parameter values to calculate the welfare measure, WTP.

All random utility models start with the specification of utility as a sum of random and deterministic components as additively separable in deterministic and stochastic preferences (Haab and McConnell, 2002). The random term may be written as a single random term $\varepsilon_j = \varepsilon_{ij} - \varepsilon_{0j}$ with $F_\varepsilon(a)$ representing the probability that the random variable $\varepsilon_j < a$. The probability of a yes response to the WTP question is:

$$\Pr(yes_j) = 1 - F_\varepsilon[-(v_1(y_j - t_j, z_j) - v_0(y_j, z_j)] \qquad 4.9$$

The next step is the selection of functional form and distribution of ε_j. The linear functional form is known as the foundation of the econometric application to dichotomous choice contingent valuation questions (Haab and McConnell, 2002:25). It is also considered to be the simplest and most commonly used estimated function. The disadvantage is that income is excluded as a determinant in linear models by assuming constant marginal utility of income.

In this study the random utility model with a linear utility function will be used. A linear utility function may be expressed as:

$$v_{ij}(y_j) = \alpha_i z_j + \beta_j(y)_j \qquad 4.10$$

In equation 4.10 the deterministic part of the preference function is linear in income and covariates such that y_j is discretionary income, z_j is an m-dimensional vector of variables related to individual j and α_j an m-dimensional vector of parameters.

Therefore $\alpha_i z_j = \sum_{k=1}^{m} \alpha_{ik} z_{jk}$ 4.11

The respondent chooses between the conditions at current state and conditions at required payment t and the deterministic utility is:

$$v_{1j} - v_{0j} = (\alpha_1 - \alpha_0) z_j + \beta_1 (y_j - t_j) - \beta_0 y_j \quad 4.12$$

It is assumed that marginal utility of income is constant between current and proposed state. Therefore $\beta_0 = \beta_1$ and difference in utility is:

$$v_{1j} - v_{0j} = \alpha z_j - \beta t_j \quad 4.13$$

where $\alpha = \alpha_1 - \alpha_0$ and $\alpha z_j = \sum_{k=1}^{m} \alpha_k z_{jk}$. The probability of a yes response is:

$$\Pr(yes_j) = \Pr(\alpha z_j - \beta t_j + \varepsilon_j) > 0 \quad 4.14$$

where $\varepsilon_j \equiv \varepsilon_{1j} - \varepsilon_{0j}$

The specification of the cumulative distribution of ε_{ij} is the next step in parameter estimation. Most distributions assume that ε_j is independently and identically distributed (IID) with mean zero. Based on this assumption the two distributions most widely used are the standard normal (probit model) and logistical (logit model). There is however no theoretical basis to justify the selection of logit over probit model (Greene, 1997). The logit model will be used in this study.

The normal distribution for difference $\varepsilon = \varepsilon_1 - \varepsilon_0$ would occur if ε_1 and ε_0 are independently normal. The difference between two extreme value distributions forms the basis of deriving the logit model. The logit model calculates both predicted probabilities and marginal effects.

Haab and McConnell (2002: 28) state that the probability of a variable distributed as a standard logit $\leq \quad x = (1 = \exp(-x))^{-1}$. The probability therefore that respondent j answers yes is:

$$\Pr(yes_j) = [1 + \exp(-(\frac{\alpha z_j}{\partial L} - \frac{\beta t_j}{\partial L}))]^{-1} \qquad 4.15$$

The maximisation of the likelihood function will provide parameter estimates. The coefficients on the variables in the matrix z will be estimates of $\frac{\alpha}{\partial}$ and coefficients on bid level t is estimates of $\frac{-\beta}{\partial}$.

The *WTP* for the linear random utility model may be calculated as follows:

$$WTP_j = \frac{\alpha z_j}{\beta} + \frac{\varepsilon_j}{\beta} \qquad 4.16$$

The estimated parameters derived from the first step in modelling will be used to calculate *WTP* defined in section 4.16. WTP derived from the CVM studies is random (Haab and McConnell, 2002). The functional form selected has implications for the validity of the welfare measure of WTP. Haab and McConnell (2002) suggest three criteria to determine whether the WTP calculated is a valid measure based on the assumption that services, valuation scenarios, etc. do not provide negative utility. These are:

- Lower bound of WTP is non-negative and upper bound > income.
- No arbitrary truncation used in estimation and calculation.
- Consistency between randomness for estimation and calculation.

The specification of $0 \leq WTP \prec$ income satisfies the conditional expectation that WTP is non-negative and bounded above by income. Linear functional forms have a range of $(-\infty, \infty)$ that does not satisfy the above mentioned criteria. Log-linear functions are bounded above by income and exponential functions are bounded below at zero.

There are two ways to implement bounds on *WTP*. Firstly an unconstrained function may be estimated and then the *EWTP* may be cut off at a lower bound of zero and upper bound income. The second way is to estimate a model that has the correct bounds and then impose the bounds in the estimation and calculation stages. Given

that the linear functional form used in this study does not satisfy above validity conditions, the first method will be used.

WTP estimates will be derived by substituting the maximum likelihood parameters into the expression for mean *WTP* . Haab and McConnell (2002) state that these *WTP* estimates will be consistent estimates of the true population when the specification of the distribution of WTP is correct, a global maximum to the likelihood function exists and may be identified and the parameter space is closed and bounded.

Table 4.1 provides a list and description of the explanatory variables to be used in the empirical model. The explanatory variables included in the analysis capture key socio-economic characteristics believed to influence demand for organic food. Most of the explanatory variables are dummy variables. For each group of dummy variables one variable was omitted to avoid the dummy variable trap.

Due to lack of significance of demographic variables in earlier studies, Bernard *et al.* (2006:378) caution researchers to note that respondents bid or attitude may be jointly determined by socio-economic characteristics captured in demographic variables. This leads to violation of model assumptions. A possible solution for that is to develop the model only with demographic variables.

Table 4.1 Description of explanatory variables included in the empirical model

Variable name	**Codes and description**
Gender	1 = female and 0 = otherwise
Age1	1 = 20-24 years and 0 = otherwise
Age2	1 = 25-29 years and 0 = otherwise
Age3	1 = 25-29 years and 0 otherwise
Age4	1 = 30-34 years and 0 otherwise
Age5	1= 35-39 years and 0 otherwise
Age6	1= 40-44 years and 0 otherwise
Age7	1 = 50-54 years and 0 otherwise
Age8	1= 55-59 years and 0 otherwise
Age9	1 = 60-64 years and 0 otherwise
HH1	1 = household size consists of 1-2 people and 0 otherwise
HH2	1 = household size consists 2-3 people and 0 otherwise
HH3	1 = household size consists of 3-4 people and 0 otherwise
Income1	1 = monthly income < R2500 and 0 otherwise
Income2	1 = monthly income R2501-R3500 and 0 otherwise
Income3	1 = monthly income R3501-R4500 and 0 otherwise
Income4	1 = monthly income R4501-R6000 and 0 otherwise
Income5	1 = monthly income R6001-R8000 and 0 otherwise
Income6	1 = monthly income R8001-R11000 and 0 otherwise
Income7	1 = monthly income R11001-R16000 and 0 otherwise
Income8	1 = monthly income R16001-R30000 and 0 otherwise
Lang1	1 = home language is Afrikaans and 0 otherwise
Lang2	1 = home language is English and 0 otherwise
Lang3	1 = home language is Xhosa and 0 otherwise
Lang4	1 = home language other than Afr, English and Xhosa and 0 otherwise
Educ1	1 = no formal education and 0 otherwise
Educ2	1 = highest education is primary school and 0 otherwise
Educ3	1 = highest education is secondary school and 0 otherwise
Educ4	1 = highest education is > secondary school and 0 otherwise
Empl	1 = employed and 0 otherwise
Religion1	1 = individual is Christian and 0 otherwise
Religion2	1 = individual is Muslim and 0 otherwise
Religion3	1 = individual is Jewish and 0 otherwise
Religion4	1 = individual has no religion and 0 otherwise
Marital1	= 1 if the individual has never been married and 0 otherwise
Marital2	= 1 if the individual is married and 0 otherwise
Marital3	= 1 if the individual is living together and 0 otherwise
Marital4	= 1 if the individual is a widow or widower and 0 otherwise
Marital5	= 1 if the individual is divorced or separated and 0 otherwise
Marital6	= 1 if the individual is marital status other than marital1-5 and 0 otherwise
Citizenship1	= 1 if the individual is a South African and 0 otherwise
Citizenship2	= 1 if the individual is European and 0 otherwise
Citizenship3	= 1 if the individual is from the rest of Africa and 0 otherwise

4.5 Sources and methods of data collection

A questionnaire was designed to provide the data needed to implement the empirical models described above. The sequence of questions used was from recommendations of earlier CVM studies (Bateman *et al.,* 2002:148-151; Haab and Mc Connell, 2002). Questions on demographic and socio-economic characteristics were listed first as respondents can easily complete these, followed by questions on food purchasing behaviour, attitudes towards organic food and agriculture and lastly questions on respondents WTP for organic fruit juice and wine within the valuation scenario.

The first draft of the questionnaire was sent to a panel of knowledgeable experts in the domestic organic industry in the Western Cape that included an independent organic inspector, a trained horticulturalist who provides support and advice to emerging organic producers and an organic processor. Their comments and suggestions were incorporated into the final questionnaire that was administered.

Retailers in South Africa have the largest share of the organic market (Mead, 2005). The availability of organic products (fresh produce, grocery lines, dairy, fruit juice and wine) in these retailers was determined through a telephonic survey of Woolworths, Spar, Pick ‘n Pay and Shoprite Checkers stores in the Western Cape in November 2006. Findings showed that Woolworths has the largest share of the organic market amongst retailers in South Africa and currently stock the widest range of organic products including organic fruit juice and wine. In the Western Cape, 12 Woolworths, stores stock organic fruit juice and wine. All these stores were contacted for permission to conduct the CVM survey. Only the Woolworths store in Paarl responded positively.

The questionnaire was administered to 550 respondents by two enumerators over 3 days. A face-to-face survey mode (direct interviewing) was chosen given the low response rates of mail surveys experienced in developing countries in general (Food and Agricultural Organisation, 2000) and in South Africa in particular (Du Toit and Crafford, 2003). The store manager suggested the appropriate time of the day (morning till lunch time) for the survey to minimise delays in the store’s operations and to reduce the time taken to complete the questionnaires.

A brief discussion follows on the different types of data collected in the CVM survey. Data on socio-economic characteristics of households are included in CVM questionnaires to determine the representativeness of samples and to determine to what extent these characteristics explain WTP (Bateman *et al.* 2002:179). Questions included in the section on demographic and socio-economic characteristics were sourced from Du Toit and Crafford's (2003) study on South African consumers' demand for organic food and those used in the Western Cape Census for 1996 (Statistics South Africa, 2005). For more information on questions asked see Appendix 1. Answers were categorised according to the Western Cape census question system.

In the only study on consumer demand for organic food in South Africa it was shown that consumers' beliefs about organic food were positive as they believed it was more nutritious, healthier, contained more flavour and was more tastier than conventional food (Du Toit and Crafford, 2003). Attitudes towards organic food and agriculture were obtained by asking respondents to answer yes or no to a number of statements related to benefits to small-scale farmers, preferences for organic foods' nutritional value, impact on the environment, etc. (See Appendix 1 for further details). One limitation in the questions included is that it was assumed that respondents understood the term: small-scale farmers.

Questions on food purchasing behaviour were included to provide market information to retailers, producers and other agents in the organic supply chain on where consumers purchase organic food, the frequency of their purchases and most importantly their expenditure on organic food. Similar questions were asked on conventional food to make comparisons between the two (See Appendix 1 for details on asked questions).

For all the questions on food purchasing behaviour respondents were given a range of answers. The options for answers to questions on food purchasing behaviours for frequency of purchase was daily, once a week, two times a week, weekly, monthly and other. The options given to consumers on where they purchase food both conventional and organic were retail stores (selection between four major retail stores), farmers' markets, directly from a farm, informal traders, fruit and vegetable

stores and other. Categories for monthly expenditure on food were R500, R500-R1000, R1001-2000 and more than R2000 similar to those in the Western Cape census.

A description of the perceived benefits of organic food preceded the valuation scenario. The scenario given to respondents was that the government was planning to implement a policy to promote organic agriculture, fruit and wine in particular. In order for this to happen funding was required. Respondents were then told that they have to contribute to funding this programme and hence should indicate how much they would be willing to contribute.

A single-bounded dichotomous choice format was used for its simplicity in data collection as less information is required (Calia and Strazzera, 2005). A sufficiently large sample was used to improve efficiency of the single-bounded elicitation format. The two products included in the valuation scenario were organic fruit juice and wine as they show tremendous growth potential and organic fruit juice in particular has been identified as a niche product for emerging farmers (Mead, 2005). Respondents were first asked whether they were willing to pay more for organic fruit juice and then asked to indicate how much more they were willing to pay given provided bid levels. The same was applied to organic wine.

The FAO (2000) recommends that a broad range of bid levels is used. The bid levels[15] used in the questionnaire were obtained from average prices for a litre of organic fruit and 750 millilitres of wine sold in Woolworths' retail stores.

The following questions were included the valuation scenario:

- Conventional fruit juice costs between R8-R10 a litre. Are you willing to pay more for organic juice?
- How much more are you willing to pay for organic juice?
- Conventionally produced wine costs between R25–R60 a bottle. Are you willing to pay more for organic wine?
- How much more are you willing to pay for organic wine?

[15] Bid levels are amounts presented to the respondent in the questionnaire to choose from.

- Respondents were then given a selection of four bid levels for both organic fruit juice and wine to indicate how much more they were WTP.

The data generated from the valuation scenario therefore provides information on whether WTP is positive and the level of the positive WTP (Bateman *et al.*, 2002). A limitation of this scenario is that it did not include a question asking respondents whether they drink conventional fruit juice or wine. Another limitation in that the CVM questionnaire did not include a follow-up question to explain why respondents were WTP more and also why they were not WTP more. The effect of the latter limitation on the analysis of WTP responses will be discussed at a later stage.

CHAPTER 5: Results of the Empirical Analyses

5.1 Introduction

This chapter presents results of the empirical analyses. First, summary statistics on survey response rates are discussed followed by descriptive statistical analyses of sample attributes. Results of the dichotomous choice valuation of CVM are discussed in section 5.4. The results of this study are then compared to the only study on organic demand in South Africa by Du Toit and Crafford (2003). Comparisons are also made with results from other organic demand studies applying the CVM.

5.2 Survey response rates

A total number of 550 questionnaires were administered by two enumerators. Non-response rates for questions on household characteristics and valuation are summarised in Table 5.1. In the case of household attributes, usable responses amounted to 78.55 percent of the total as there were missing data in 118 questionnaires. Most of the missing data were caused by providing incomplete information (107) whereas only 11 respondents did not complete any of the questions in the survey.

Bateman *et al.* (2002:181) assert that the most widely used method to overcome problem of missing information is to impute values for this data. This study did not attempt to correct for missing information given that non-response rates were considered relatively low and hence cases with missing data were removed.

In addition to missing data on socio-economic characteristics there were respondents who refused to answer the questions on the valuation scenario. Non-responses constituted 6.48 percent (28 questionnaires) of "useable" responses (total of 432). The majority (78.6 percent) of non-responses were from respondents that refused outright to answer the valuation question and 21.43 percent that responded with a zero value for WTP (Table 5.1). The latter non-responses are referred to as protest bids (Bateman *et al.* 2002:178).

Table 5.1 Survey non-response rates[16]

Category of non-response	**Number**	**Percentage**
1. Missing data on household characteristics		
No questions completed	11	9.3
Incomplete information excluding the income question	78	66.1
Incomplete information in the income question	29	24.5
Total	**118**	**100**
2. Missing data in valuation question		
Outright refusal	22	78.6
Zero WTP	6	21.4
Total	**28**	**100**

Protest bids in other CVM studies have been identified by including a follow-up question (Bateman *et al.* 2002:177). The follow-up question asked respondents to explain why they are not willing to pay. A distinction is then made between respondents who genuinely have a zero value and those who indicate a zero value for other reasons. In this study one of the reasons why respondents reported zero value may be because they do not use fruit or wine and therefore not willing to pay any additional premium on such products. One limitation of this study is that it did not include a follow-up question. This study however, assumed that WTP by non-respondents is similar to that of respondents with similar socio-economic characteristics as suggested by Bateman *et al.* (2002: 177). Based on this assumption the analysis of WTP is only biased if the exclusion of non-responses biases the representativeness of the sample.

5.3 Socioeconomic attributes of the surveyed population

Table 5.2 provides a comparison of key socio-economic characteristics of the sample with and without missing data. The comparison illustrates a less than 1 percent difference in summary statistics on socio-economic characteristics between the two samples. Therefore no bias in analysis of WTP is expected from excluding non-responses from the sample.

[16] Note that these response rates do not include missing data for questions on attitudes, food purchasing behaviour and the valuation scenario.

Table 5.2 Summary statistics on socio-economic characteristics with and without missing data

Variable	Category	Sample including		Sample excluding	
		N	Percentage	N	Percentage
Age	20-24 years	135	35.0	129	35.8
	25-29 years	56	14.0	49	13.6
	30-34 years	30	8.0	25	6.9
	35-39 years	39	10.0	37	10.2
	40-44 years	37	10.0	36	10
	45-49 years	32	8.0	30	8.3
	50-54 years	27	7.0	23	6.4
	55-59 years	12	3.0	11	3.1
	60-64 years	9	2.0	9	2.5
	65-69 years	7	2.0	7	1.9
	70-74 years	2	0.5	1	0.3
	>74 years	3	0.5	3	0.8
Home language	Afrikaans	322	82.8	299	83.0
	English	48	12	43	11.9
	Xhosa	15	3.8	14	3.9
	Other	4	1	4	1.1
Monthly	<R2500	92	24	85	23.6
Education	No formal schooling	10	3	10	2.8
	Completed primary school	32	8	30	8.3
	Completed secondary school	144	37	137	38.1
	Completed > secondary	141	36	128	35.6
	Other	62	16	55	15.3
Employment	Employed	267	69	245	68.1
	Unemployed	122	31	115	31.9
Religion	Christian	367	94	336	93.3
	Islam	16	4	16	4.4
	Judaism	2	0.5	1	0.3
	No religion	2	0.5	2	0.6
	Other	5	1.2	5	1.4
Marital status	Divorced / separated	13	3.3	12	3.33
	Living together	7	1.8	6	1.7
	Married	154	39.5	145	40.3
	Never married	193	49.6	176	48.9
	Widow / widower	11	2.8	11	3
	Other	11	2.8	10	2.8
Citizenship	South Africa	382	98.2	354	98.3
	SADC	4	1	4	1.1
	Rest of Africa	1	0.2	1	0.3
	Europe	2	0.5	1	0.3
	Other	0	0	0	0

5.4 Attitudes toward organic food

Questions on attitudes towards organic food and agriculture and food purchasing behaviour were included to provide market information to retailers and other agents in the organic food supply chain. A brief discussion follows of the main findings from data collected.

Table 5.3 shows that majority of respondents believe organic food is more nutritious (84.2 percent) and tastier (72.5 percent) than conventional food. This supports results from Du Toit and Crafford's (2003) study. The vast majority of respondents (92 percent) confirmed the importance of organic labels as necessary to guarantee organic origin of products. More than 80 percent of respondents believe that organic food comes with positive environmental impacts. A large number of respondents believe that organic agriculture benefits small-scale (71.6 percent) and local farmers (80.8 percent). It is also worth noting that almost 90 percent of the respondents believe in the role and power of consumers' attitudes in changing the way food is supplied.

Table 5.3 Summary statistics on attitudes toward organic food and agriculture (number and percentage of YES responses)

Variable	Description	Number	Percent
Nutrition	Organic food more nutritious than conventionally produced food	294	84.2
Taste	Organic food tastes better than conventionally produced food	257	72.5
Appearance	The appearance of organic products is more attractive than products produced from conventional methods	283	81.0
Conscience	Organic food leaves you with a good conscience	283	81.6
Labels	Organic labels necessary to guarantee organic origin of products	328	92.1
Soil Conservation	Organic agriculture conserves soil and has less impact on the environment	292	86.1
Pesticides	Organic food contains less pesticide residue than conventional food	290	83.0
Animal welfare	Organic food improves the welfare of animals	283	83.9
Impact on environment	The impact of agriculture on the environment is exaggerated	211	89.8
Environmental problems	The environmental problems faced today are not too serious	168	67.0
Local farmer	Organic production is good for local farmers	272	80.8
Small farmers	Emerging small farmers benefit from organic agriculture	58	76.6
Consumer Behaviour	Consumer behaviour has a major impact on the way food is produced	311	89.0

More than 80 percent of the surveyed sample reported that they buy organic food (Table 5.4). While most shoppers reported they buy food daily (29.8 percent) or weekly (30.4 percent), most of those who purchase organic food do so monthly (33.5 percent). Although the survey was conducted at Woolworths, the largest number of respondents reported shopping at Pick ‘n Pay (66.5 percent) followed by Shoprite/Checkers (53.4 percent) then Woolworths (39.4 percent) and Spar (18 percent). than those who do not (33.5)[17]. Nevertheless, most of organic food buying takes place at Pick ’n Pay (51.7 percent) and Woolworths (45.8 percent). Fruit and vegetables stores appear to also be a major source of organic food supplies to more

[17] Note that as respondents selected more than one answer to the question on location of food purchase the percentages do add to more than 100 percent.

than 20 percent of those who buy organic food. While most respondents spend more than R1001 per month on food (> 70 percent), most spend less than R500 on organic food (73.6 percent).

Table 5.4 Summary statistics for food purchasing behaviour

Variable	**Response**	**Food purchasing**		**Organic food purchasing**	
		N	**Percentage**	**N**	**Percentage**
Purchase Organic food	YES			288	82.3
Purchase Frequency	Once/week	109	30.4	0	0
	Twice/week	66	18.4	58	22.5
	Daily	107	29.8	45	22.5
	Monthly	69	19.3	67	33.5
	Other	6	1.7	30	15.0
Purchase Location	Woolworths	141	39.4	132	45.8
	Shoprite/Checkers	191	53.4	91	31.6
	Pick ‘n Pay	238	66.5	149	51.7
	Spar	63	18.0	31	10.7
	Farm	6	2.0	14	4.8
	Fruit & Veg. store	64	18.0	58	20.1
	Information traders	5	1.0	5	1.7
	Farmers’ market	5	1.4	8	2.7
	Other	13	4.0	8	2.7
Monthly food expenditure	R500	45	12.6	212	73.6
	R501-R1000	61	17.0	62	21.5
	R1001-R2000	128	35.7	0	0
	>R2000	124	34.6	13	4.5

Responses to the valuation and WTP questions indicate that 83 percent responded with a positive WTP for organic fruit juice and 63 percent for organic wine (Table 5.5). This may be just a reflection of a simple fact that more people use juice than wine irrespective of being organic or conventionally produced. It is interesting to note

that while the WTP for organic fruit juice follows an expected pattern of declining percent of people WTP with increasing bid levels, this does not seem to be the case with WTP for organic wine for which more people are prepared to pay higher premiums than lower. The above suggests that analyses of determinants of WTP for organic food is a bit more complex and requires taking into account the influences of various socio-economic factors, which is the task for the next section.

Table 5.5 Summary statistics for Willingness to pay questions

Variable	**Category**	**N**	**Percentage**
Organic Fruit Juice			
Willingness to pay	**YES**	**298**	**82.78**
Bid Level	R2	111	37.25
	R3	82	27.52
	R4	50	16.78
	>R4	55	18.46
Organic Wine			
Willingness to pay	YES	228	63.33
Bid level	R5	77	33.77
	R10	92	40.35
	R15	12	5.26
	>R15	47	20.61

5.5 Results of the empirical analyses

This section discusses the empirical results of the binary logit to analyse the decision to purchase organic food or not and the ordered logit to analyse determinants of WTP for organic fruit juice and wine.

It is well known that parameter estimates in the binary logit present the qualitative effect of the explanatory variables and indicate the direction of change. In this study all the explanatory variables are dummy variables and hence the qualitative effect is derived by comparing the probability of the dummy variable for a specific value with the probability that the dummy variable takes on another specific value. Other studies have shown that the difference between the mean probability values of the second and first comparison is the marginal probability effect (MPE). All the estimation procedures used the econometrics software packaged called STATA.

5.5.1 Empirical results of the binary logit model

The decision to purchase organic food is influenced by socio-demographic factors as reported in other studies. All the variables as described in Table 5.1 represent the socio-demographic factors that were included in the estimation procedure.

It is important to note that the *LangOther* and *CitSA* variables predicted success perfectly and were subsequently dropped from the estimation procedure. Perfect prediction problems occur when there is no variation in the dependent variable for a given category of the binary explanatory variable (Winkelman and Boes, 2005). *HH2* and *Educ>Sch* were dropped due to high collinearity.

Table 5.6 Regression results of Binary Logit Model

OrgFoodPur	**Variable description**	**Coefficient**	**Marginal probability effect**[18]
Gender	1 = female and 0 otherwise	0.1514143	
HH	1 = household head and 0 otherwise	0.0051587	
AgeI	1 = 20-24 years and 0 otherwise	2.542342**	0.4258563**
AgeII	1 = 25-29 years and 0 otherwise	2.500715**	0.3968076**
AgeIII	1 = 25-29 years and 0 otherwise	2.209829***	0.2083917*
HH3	1 = household size consists of 3-4 people and 0 otherwise	0.1461025	
HH4	1 = household size consists of > 4 people and 0 otherwise	0.0036352	
Marital1	= 1 if the individual has never been married and 0 otherwise	-0.5988055**	-0.1060805**
Afr	= 1 if home language is Afrikaans and 0 otherwise	-0.6213881	
Eng	= 1 if home language is English and 0 otherwise	-0.954592	
EducI		-0.4605913	
EducIII		-0.854293**	-0.1696669**
RelChrist		-0.1450252	
Empl		0.2434506	
Number of observations = 349 **Log-likelihood = -180.83659** **LR chi-square (13) = 16.5** **Prob > chi-square = 0.2233** **Pseudo R^2 = 0.0436**			

* Significant at 1%, ** Significant at 5%, *** Significant at 10%

18 $\frac{dy}{dx}$ refers to the discrete change of dummy variable from 0 to 1.

Empirical results showed that the significant socio-demographic factors that influenced the decision to purchase organic food were age, marital status and level of education (See Table 5.2).

All the age variables (*AgeI*, *AgeII*, *and AgeIII*) were statistically significant and positively influenced the decision to purchase organic food. *AgeI* had the largest effect on *OrgFoodPur* shown by the reported MPE of 0.428563. This indicated that consumers younger than thirty years increased the probability of purchasing organic food by 43 percent. A comparison of reported MPE across age groups showed that the size of this positive effect decreased as the age of consumers increased. The positive effect was highest for younger (MPE of 0.4258563 for *AgeI*) and lowest for older consumers (MPE of 0.2083917 for *AgeIII).* There was a small difference between the positive effect for younger (MPE of 0.4258563 for (*AgeI*) and consumers in the middle age (MPE of 0.3968076 for *AgeII)* category.

Results discussed above suggest that younger age increases the probability of purchasing organic food. These results contrast with observations made by Harris and Burres (2000) which showed that age provided little information on who is likely to purchase organic food. On the other hand, Thompson (2002) found that younger consumers within the age group between eighteen and twenty-nine years and consumers aged between forty to forty-nine years (middle age category) were more concerned about environmental issues than older consumers. In literature reviewed a correlation has been found between consumers that purchase organic food and those that are concerned about environmental issues. The only study on organic consumer demand by Du Toit and Crafford (2003) did not investigate influence of age on the decision to purchase organic food and hence it is not possible to make a comparison with the results of this local study.

These empirical results show that marketing campaigns focusing on promoting organic food should target consumers younger than thirty years old and those between the age of thirty and sixty.

Being married (*Married*) decreased the probability of purchasing organic food by 10 percent with magnitudes considerably lower than age. In the literature surveyed no

conclusive relationship between marital status and the decision to purchase organic food was found. The negative influence of being married may be attributed to food consumption expenditure of married people being focused on necessities particularly in the case of married couples with children. Organic food is more expensive than conventional food and may be perceived as a luxury good. A comparison of marital status amongst population groups showed 58 percent of White, 43 percent of Coloured, 32 percent of black African and 54 percent of Indian or Asian people are married in the Western Cape (Statistics South Africa, 2001). It may therefore be implied that consumers in White and Coloured population group are less likely to purchase organic food due to cultural preferences or values.

Consumers with non-formal[19] levels of education (*EducIII*) decreased the probability of the decision to purchase organic food by 17 percent. This is consistent with Du Toit and Crafford (2003) which showed that higher levels of education increased the probability of purchasing organic food. However in this study the higher formal levels of education represented by *EducI* and *EducII* were not found to be statistically significant.

The value of the log-likelihood function is -180.83659 for the unrestricted model and likelihood ratio statistic is 16.5 as reported in Table 5.6. As discussed earlier the likelihood ratio statistic computes the difference between the log-likelihood function of the full model and restricted model (all slopes equal zero and free constant term). Therefore the null hypothesis that the variables reported in Table 5.6 had no effect on the decision to purchase organic food is rejected and the full model was retained.

Therefore it is important for policy makers to note that socio-demographic factors do influence South African consumers' decision to purchase organic food. Younger age increases the probability of the decision to purchase organic food whereas being married and being in possession of non-formal training qualifications decrease this probability. Programmes aimed at promoting and sustaining the continued growth in this flourishing domestic organic industry should be targeted to younger age and more educated consumers particularly those who are not married.

[19] Non-formal levels of education refer to early school leavers that have completed informal training and have competencies in specific skills.

5.5.2 Empirical results of the ordered logit model

In the literature reviewed there is no broad consensus on the influence of socio-demographic factors on the WTP for organic products. Studies by Buzby and Skees (1994), Byrne *et al.* (1991), Fotopoulos and Krystallis (2002), Misra *et al.* (1991) and Wandel and Bugge (1997) have shown that socio-demographic factors have a significant impact on WTP.

The empirical results presented below for WTP for organic wine and fruit juice will contribute to this literature and shed light on the influence of socio-demographic factors on WTP for organic products in SA. Reported parameter estimates indicate the influence of the explanatory variables (socio-demographic factors) on the WTP of organic fruit juice and wine. The marginal probability effects (MPE) as explained earlier is reported for different bid levels to determine effect with increasing bid levels.

The results for organic fruit juice will first be presented followed by organic wine.

5.5.2.1 Results for organic fruit juice

The regression results and marginal probability effects (MPE) for the ordered logit model for organic fruit juice are reported on in Table 5.7 and Table 5.8 respectively. *AgeII* and *EducIII* were dropped due to collinearity.

Gender, size of household, marital status, level of education, religion, employment status, having English as a home language and a home language other than Afrikaans and English were not found to be statistically significant. These explanatory variables and socio-economic factors represented therefore do not explain the variation in the dependent variable, *WTP*, for organic fruit juice.

The statistically significant variables were age (*AgeI, AgeII*), language (*Afr*), head of household (*HH*) and citizenship (*CitSA*). As mentioned previously the parameter estimates of these dummy variables reported in Table 5.7 only represent the qualitative effect and indicate the direction of change. The MPE, as reported in Table

5.8, is the difference between the mean probability values of the dummy variable when the specific value of 0 is taken compared to the specific value of 1. It indicates the change (negative or positive) in the probability of the dependent variable, *WTP*.

Being of younger and middle age and head of the household has a positive effect on *WTP* for organic fruit juice. This positive effect of age on WTP confirms Bernal and Veyna's (2005) study of WTP for organic peaches and tomatoes for Mexican consumers.

The effect of younger and older age on different bid levels will now be discussed. Younger and older age decreased the probability of *WTP* for the lowest bid level (*WTP=2)*. As the bid levels for organic fruit juice increased both younger and older age have a greater positive effect on *WTP*.

Table 5.7: Regression results of Ordered Logit Model for $WTP_{FruitJuice}$

Variable	**Coefficient**	**Standard error**	**Z**	**P>|z|**	**95% confidence interval**	
					Lower bound	**Upper bound**
Gender	0.3287726	0.2134479	1.54	0.123	-0.895776	0.7471228
HH	0.3870446***	0.236865	1.63	0.102	-0.772247	0.851314
AgeI	1.54827*	0.4689553	3.30	0.001	0.6291349	2.467406
AgeII	0.7358441***	0.4467773	1.65	0.100	0.6291349	1.611512
HH2	0.8435983	2.017909	0.42	0.676	-0.1398234	4.798628
HH3	1.27845	2.015861	0.63	0.526	-3.111431	5.229464
HH4	1.406108	2.0131152	0.7	0.485	-2.672564	5.351813
Married	-0.2393403	0.198527	-1.21	0.228	-0.628446	0.1497654
Afr	-0.8642398**	0.5223785	-1.65	0.098	-1.888083	0.1596032
Eng	-0.8851174	0.588119	-1.5	0.132	-2.03781	0.2675747
LangOther	0.7114073	1.432113	0.5	0.619	-2.095483	3.518297
EducI	-0.040063	0.2723879	-0.15	0.883	-0.5739334	0.4938074
EducII	-0.1477794	0.2898241	-0.51	0.610	-0.7158242	0.4202653
RelChrist	-0.5295153	0.3929951	1.35	0.178	-0.240742	1.299771
Empl	0.3118802	0.2219643	1.41	0.160	-0.1231619	0.7469223
CitSA	-1.214885**	0.7184228	-1.69	0.091	-2.522968	0.1931979
Threshold parameters for index:						
1	-0.4828304	2.270281		-4.9325	3.966839	
2	1.130763	2.268429		-3.315297	5.576833	
3	2.162933	2.269153		-2.284524	6.610391	
4	3.035033	2.274721		-1.423338	7.493404	
Number of observations = 359				**Log-likelihood = -542.1831**		
LR chi-square (16)38.11				**Prob > chi-square = 0.015**		
Pseudo R^2 = 0.0399						

* Significant at 1%, ** Significant at 5%, *** Significant at 10%

Table 5.8: Marginal Effects of Explanatory Variables on $WTP_{FruitJuice}$ Probabilities

Explanatory variable	**Prob (WTP=1)**	**Prob (WTP=2)**	**Prob (WTP=3)**	**Prob (WTP=4)**	**Prob (WTP=5)**
HH	-0.0485796***	-0.0473765***	0.016092***	0.0312723***	0.0485919***
AgeI	-0.2037608*	-0.1642081*	0.0605648*	0.1143725	0.1930316**
AgeII	-0.0933695***	-0.0877395***	0.0304868***	0.0585244*	0.0920978***
Afr	0.0920093***	0.1134746***	-0.0128072	-0.0650974	-0.1275793
CitSA	0.1037949*	0.1614115***	0.0215243	0.0737533	-0.2129773

* Significant at 1%, ** Significant at 5%, *** Significant at 10%

Consumers that are the head of households are willing to pay higher prices for organic fruit juice than conventional fruit juice. This is confirmed by reported MPE that increases from 16 percent to 48 percent as the bid level increases from three rand to five rand indicated by WTP=3, 4 and 5. This may be explained by the high correlation between consumers are head of households and food purchasers[20]. Therefore the head of the household is in a position to pay more for organic fruit juice and positively increases probability of WTP for organic fruit juice.

Afrikaans speaking[21] consumers are less likely to pay higher prices for organic fruit juice than conventional fruit juice as shown by the negative MPE reported for *Afr* for WTP=3, 4 and 5. In the Western Cape 58 percent of total population's first home language is Afrikaans (Statistics South Africa, 2001). Comparisons across population groups show that 77 percent of Afrikaans speaking consumers are Coloured, 19 percent are White, 2 percent is Black African and the rest unspecified (Statistics South Africa, 2001). The Western Cape census indicated that the majority (69 percent) of Coloured population group earn less than an average monthly salary of three thousand five hundred rand and therefore in low income group (Statistics South Africa, 2001). It may be deduced Afrikaans speaking consumers mostly of the Coloured population group are less likely to pay higher prices for organic fruit juice due to low disposal incomes.

South African citizens are willing to pay bid levels of R2, R3 and R4 more for organic fruit juice compared to conventional fruit juice. For the highest bid level of more than R4 they are less likely to pay more. In the Western Cape 97.6 percent of the total population is South African by birth. The results indicate that South African citizens are concerned about environmental issues. Reported results on attitudes towards organic food and production discussed earlier in the chapter confirm that consumers believe organic food contributes positively to the environment, benefits small-scale and local farmers.

The value of the log-likelihood function is -542.1831 for the unrestricted model and likelihood ratio statistic is 38.11 as reported in Table 5.6. As discussed earlier the

[20] Food purchases refer to people that make the food purchasing decisions and pays for the purchases.
[21] Afrikaans speaking consumers have Afrikaans as their first home language.

likelihood ratio statistic computes the difference between the log-likelihood function of the full model and restricted model (all slopes equal zero and free constant term). The p value of obtaining a chi-square value of 38.11 for 16 degrees of freedom is 0.0015 which is a small probability. Therefore the null hypothesis that the variables reported in Table 5.7 have no effect on the WTP is rejected and the full model was retained.

In summary, empirical results presented above show that the socio-demographic factors of age, head of household, first home language and citizenship do influence WTP for organic fruit juice. Both younger and older age positively influenced WTP for organic fruit juice. However younger consumers are WTP higher prices than older consumers for organic fruit juice than conventional fruit juice. Consumers that are the head of households, by being in the position of food purchaser, are also WTP higher prices for organic fruit juice. Afrikaans speaking consumers, 77 percent belonging to the Coloured population group of which 69 percent earn less than an average monthly income of R3500 are less likely to pay higher prices for organic fruit juice due to lower disposal incomes. South African citizens that represent almost 90 percent of the Western Cape population are concerned about environmental issues confirmed by beliefs that organic food contributes to the environment, small-scale and local farmers. This concern is expressed in the higher prices that South African citizens are willing to pay for organic fruit juice. These results provide insight into consumer demand for organic fruit juice.

The Western Cape has a global reputation for producing high quality fruit, proven manufacturing capabilities and expertise in fruit juice production illustrated by competitive local manufacturers of fruit juice that include Ceres Fruit Juice, Elgin Fruit Juice, Associated Fruit Processors and Granor Passi. Organic fruit juice has been identified as a specific growth opportunity within the domestic organic market as discussed in Chapter 3. The empirical results on WTP for organic fruit juice as presented above analysed key determinants of consumer demand. From this, specific recommendations for policy makers and the private sector have been identified. These recommendations will now be discussed.

South African citizens in the Western Cape are concerned about environmental issues shown by the positive marginal probability effects and hence higher prices that South African citizens are willing to pay for organic fruit juice. These Western Cape consumers also believe that organic food not only positively impacts the environment but also support local as well as small-scale farmers. This presents an opportunity for the national and provincial government to support small-scale farmers to enter the organic fruit juice sector and in so doing achieve their mandate to transform the agricultural sector. There are a number of successful small-scale fruit producers in the Western Cape particularly in the Koue Bokkeveld region. Specific recommendations for policy makers to support these produce to enter the sector include:

- Provision of extension services on organic fruit production;
- Facilitate organic fruit contract growing schemes between small-scale farmers, local manufacturers of fruit juice and food retailers;
- Create mentorship programmes for small-scale farmers with existing organic fruit producers;
- Invest in research and development in organic fruit juice production by the Agricultural Research Council's deciduous fruit arm, Nietvoorbij and
- Create incentives for small-scale producers to add value to fruit production to fruit processing in manufacturing of fruit juice.

Organic food products are currently sold in food retail stores and to a lesser degree at organic markets and organic box schemes as described in detail in the South African organic sector review in Chapter 2. The key determinants of consumer demand for organic fruit juice may be determined by analysing the empirical results of WTP for organic fruit juice. The key positive determinants are younger age, head of households and being a South African citizen whereas having Afrikaans as a first home language negatively influences WTP for organic fruit juice. Therefore organic fruit juice marketing campaigns should focus on younger consumers that do not have Afrikaans as their home language, are the household head and South African citizens.

The empirical results presented above show that socio-demographic factors; particularly age, head of household, citizenship and home language do influence Western Cape consumers' WTP for organic fruit juice. It supports the empirical

evidence of Agbola's (2003) aggregated food demand study in SA in which he demonstrated that food demand is indeed affected by race, age, gender of household head, urbanisation and family size. Once again, this identifies the need for disaggregated demand analysis in SA to capture the variability in demand behaviour.

The results for organic wine will now be presented.

5.5.2.2 Results for organic wine

The regression results for *WTP* for organic wine reported no convergence after 15 iterations and hence the maximum likelihood estimation failed. Green (2000) stated that the convergence will occur in a few iterations if the data is in a good condition. Winkelman and Boes (2005) suggest that convergence occurs when the iterative procedure ends and the predefined convergence criterion is satisfied which did not occur in this case. The failure of maximum likelihood estimation may be caused by two problems. This first arises from a deficiency in the sample and the second from an identification problem. A deficient sample results when there is no variation in the dependent variable, explanatory variables or a combination of both.

The regression results and marginal probability effects (MPE) for the ordered logit model for organic wine are reported on in Table 5.9 and Table 5.10 respectively.

Consumers' employment status (employed or unemployed) was not found to be statistically significant and therefore does not explain the variation in the dependent variable, *WTP*, for organic wine.

The statistically significant variables were younger and older age; consumers with Afrikaans, English or language other than Afrikaans, English or Xhosa as the home language and being of the Christian faith (See Table 5.9).

Younger and older age consumers were less likely to pay more per litre for organic wine at a bid level of R5 more than conventional wine. It is confirmed by positive MPE reported for WTP=3, 4 and 5 for both younger (*AgeI*) and older (AgeII) age. For prices ranging from R10 to more than R15 younger and older consumers was

WTP more (See MPE reported on in Table 5.10). Therefore younger and older consumers are WTP higher prices for organic wine compared to conventional wine.

Afrikaans and English home language speakers are less likely to pay higher prices for organic wine as shown by negative MPE reported in Table 5.10. Consumers with home languages other than Afrikaans, English and Xhosa will be more WTP for organic wine. In the Western Cape 58 percent of total population's first home language is Afrikaans and 20.1 percent is English (Statistics South Africa, 2005). A comparison across population groups show that 77 percent of Afrikaans speaking people are Coloured, 19 percent are White, 2 percent is Black African and the rest unspecified (Statistics South Africa, 2005). The negative influence of being Afrikaans speaking may be explained by low average monthly income of R3500 for the majority (69 percent) of Coloured people and therefore making less disposable income available for organic wine. For English speaking people, 45 percent are White and 44 percent are Coloured.

Being of Christian faith increases the probability of WTP for organic wine for all bid levels but is highest when the price of organic wine is R10 more than conventional wine. In the Western Cape 77.8 percent of the total population is Christian, 7.9 percent belong to other faiths and 14.3 percent were uncertain or had no religion. The positive effects of being Christian on WTP for organic wine may be linked to beliefs expressed on attitudes about organic food that is positively impacts the environment, supports local and small-scale farmers.

Table 5.9: Regression results of WTP_{Wine}

Variable	**Coefficient**	**Standard error**	**Z**	**P>|z|**	**95% confidence interval**	
AgeI	1.802333*	0.5174682	3.48	0.000	0.7881141	2.816552
AgeII	1.150798**	0.513462	2.24	0.025	0.1444308	2.157165
Married	-0.5121189***	0.1992797	-2.57	0.010	-0.9026999	-0.1215378
Afr	-1.10317***	4573676	-2.41	0.016	-1.999594	-0.2067462
Eng	-1.018862***	0.5310309	-1.92	0.055	-2.059663	0.0219393
LangOther	-1.960824***	1.022282	-1.92	0.055	-3.96446	0.0428117
RelChrist	0.9470692***	0.4316438	2.19	0.028	0.1010629	1.793076
Empl	0.1553828	0.2174081	0.71	0.475	-0.2707292	0.5814949
Threshold parameters for index:						
1	0.5327843	0.8126281			-1.059938	2.125506
2	1.475177	0.8169438			-0.1260039	3.076357
3	2.889549	0.8218432			1.278766	4.500332
4	3.17052	0.8242773			1.554967	4.786074
Number of observations = 359 **Log-likelihood = -490.21122** **LR chi-squared (8) = 42.91** **Prob > chi-squared = 0.0000**						

Significant at 1%, ** Significant at 5%, *** Significant at 10%

Table 5.10: Marginal Effects of Explanatory Variables[22] on WTP_{Wine} Probabilities

Explanatory variable	**Prob (WTP=1)**	**Prob (WTP=2)**	**Prob (WTP=3)**	**Prob (WTP=4)**	**Prob (WTP=5)**
AgeI	-0.3916301*	-0.0212245	0.787898*	0.0401749*	0.1938898*
AgeII	-0.2535802**	-0.0213717	0.1225894**	0.0270793**	0.1252832**
Afr	0.2180896**	0.0508838***	-0.092714**	-0.0280079**	-0.1482515**
Eng	0.24669**	-0.0260357	-0.1231422**	-0.0195593**	-0.0779529***
LangOther	0.4430408*	-0.1149704	-0.2022047*	-0.266129*	-0.0992528*
RelChrist	-0.2304445 **	0.0265314	0.1150774**	0.017949**	0.0708887*

Significant at 1%, ** Significant at 5%, *** Significant at 10%

[22] The statistically significant explanatory variables were included.

Currently the South African wine industry, particularly red wine producers are experiencing low prices due to global oversupply of red wine. In addition to that the growth in domestic wine industry is expected to grow by 6 percent per year for 2008 (Van Wyk, 2008). It is due to a combination of low per capita wine consumption of South Africans and lower disposal incomes for luxury goods like wine due to rising inflation and food prices. Organic wine has been identified as a niche product that has growth potential within the local organic industry as discussed in the South African organic industry review in Chapter 2.

The empirical results presented above provide an insight into what socio-demographic factors influence consumer's WTP for organic wine. A limitation of this study, as mentioned in Chapter 3 is that these results may reflect consumers' demand for wine as a luxury good as no separate analysis and questions were included on consumer demand for wine. Nonetheless specific recommendations may be made from these empirical results for both policy makers and the private sector.

Policy makers as alluded to earlier have a mandate to transform the agricultural sector by supporting new entrants also referred to as small-scale farmers. In the Western Cape there are a number of new entrants in the wine entrants mostly farming in farm equity schemes[23] and also a number of black vintners[24]. The agribusiness is then operated in this entity. This entity has been used extensively in the wine industry for implementing black economic empowerment. There are a number of commercial organic wine producers in the Western Cape, mostly notably Stellar Organics selling wine locally to food retailers, restaurants, deli's and to a lesser extent in organic food markets. The specific recommendations for policy makers to support small-scale producers and black vintners are outlined below:

- Conduct further research for a organic wine marketing campaign that brands organic wine highlighting procurement from small-scale producers, local farmers and positive contribution to environment;

[23] A farm equity scheme refers to an agribusiness entity primarily in primary agricultural sector where the original farm owner transfers agricultural land ownership to a new business entity where both the farm owner and workers have equity.
[24] Vintners refer to agents in the wine supply chain other than producers and may be involved in bottling, packaging and or distribution of wine. There are a number of new black entrants in this industry over the last 5 years.

- Provide extension services to small-scale producers on organic wine production;
- Invest in research and development in organic wine production;
- Facilitate mentorship between small-scale farmers and existing organic wine producers and
- Lobby national department of agriculture to finalise the draft South African organic standard given that South African consumers require guarantee of organic origin.

Organic wine presents an opportunity to a number of agents in the wine industry supply chain given the current prices received by red bulk wine producers and cellars, rising input costs of 30 percent this year and lower disposal incomes available for luxury goods. Specific recommendations for these agents in the private sector to exploit opportunities in the organic wine industry are:

- Target younger and old age of Christian faith in their organic wine marketing campaigns;
- Lobby South African government to finalise draft organic standard;
- Highlight attitudes that organic wine contribute positively to the environment, local and small-scale farmers in organic wine marketing campaigns and
- Procure more organic wine from small-scale and local organic wine producers.

Table 5.11 Socio-economic characteristics from 1996 Census

Variable	Category	1996 Census	
		N	Percentage
Age	20-24	397253	10.0
	25-29	378230	9.6
	30-34	348557	8.8
	35-39	293404	7.4
	40-44	239895	6.1
	45-49	191723	4.8
	50-54	147868	3.7
	55-59	121561	2.5
	60-64	99636	2.0
	65-69	77663	1.4
	70-74	53764	0.9
	>74	70904	1.9
Home language	Afrikaans	2315067	58.5
	English	795212	20.1
	Xhosa	747978	18.9
	Other	98614	2.4
Monthly Household Income	<R2500	950423	69.1
	R2501-R3500	116941	8.5
	R3501-R4500	77799	5.6
	R4501-R6000	68376	4.9
	R6001-R8000	38434	2.8
	R8001-R11000	26629	1.9
	R11001-R16000	15831	1.1
	R16001-R30000	9488	0.6
	>R30000	3951	0.2
Education	No formal schooling	153110	6.3
	Completed primary school	566693	23.4
	Completed secondary school	1336815	55.2
	Completed > secondary school	243952	10.0
	Other	119854	4.9
Employment	Employed	1374173	54.7
	Unemployed	299144	11.9
Religion	Christian	2983838	77.8
	Islam	263911	6.8
	Judaism	15193	0.4
	No religion	198997	5.2
	Other	373384	9.8
Marital status	Divorced / separated	107880	4.0
	Living together	119259	4.5
	Married	1195931	44.7
	Never married	1098881	41.0
	Widow / widower	134381	5.0
	Other	18884	0.7
Citizenship	South Africa	3912977	98.9
	SADC	5663	0.1
	Rest of Africa	1019	0.0
	Europe	26267	0.6
	Other	10942	0.3

Source: Statistics South Africa (2005)

Table 5.12 Socio-economic characteristics of Drakenstein municipality

Variable	Category	N	Percentage
Gender	Female	99212	51
	Male	95204	49
Age	0-1 years	7575	4
	2-5 years	13784	7
	6-14 years	34171	18
	15-17 years	12553	6
	18-35 years	63505	33
	36-65 years	55262	28
	>65 years	7787	4
Education	Not attending	25366	60
	Pre-school	2827	4
	School	45572	1
	College	855	1
	Technicon	791	1
	University	476	1
	ABET[25]	77	0.1
	Other	193	0.3
Labour market	Employed	65323	50
	Unemployed	19321	15
	Not economically active	46676	36
Household monthly income	0-R800	9909	22.3
	R801-R3200	18186	40.9
	>R3200	16316	36.7

Source: Statistics South Africa (2001)

[25] ABET refers to adult basic education training.

CHAPTER 6: Conclusions, Summary and Recommendations of the Study

The growing domestic organic food industry in SA is a new feature of the recent structural shifts in food demand in the country. South African food demand is affected by socio-economic and demographic factors supported by empirical evidence from Bopape (2006) and Agbola (2003). In line with global consumer trends South African consumers are becoming more health conscious and aware of food safety. Du Toit and Crafford's (2003) study was limited by the small sample and very low response rate common with mail surveys. Their study also did not determine the relationship between consumers' willingness to pay and demographic or attitudinal variables. The role of presence of babies and young children in the household in influencing the household's decision to purchase organic food was identified as an area for future research in organic demand analysis in SA. This is an important area of research given the growing demand for organic baby food in SA (Mead, 2005).

Lack of data and high costs are the norm in countries in which the organic industry is relatively new and may explain the fewer number of organic demand studies that are available in developing countries. In SA the only organic consumer demand study using the stated preference Engel-Miniard model was done by Du Toit and Crafford (2003) to investigate preferences for organic food in four retail stores in Cape Town. Other studies in this new field of research in organic agriculture in SA highlighted the gap in the existing literature on where consumers purchase organic products and what qualities consumers' demand of these products (Mahlanga, 2001; Niemeyer and Lombard, 2003 and Irwin, 2002).

Very few organic demand studies used actual purchase data (actual market transactions) that is required to specify demand curves for revealed preference models. Studies in countries with mature organic markets having access to time series retail organic food sales data from global marketing research firms used the revealed preference almost ideal demand systems (AIDS) method in the USA, Denmark and Germany (Mier *et al.*, 2000; Glaser and Thompson, 1998 and Thompson and Glaser, 2001. Findings for organic frozen vegetables in the USA showed large own-price elasticities due to recent introduction into retailers and decreasing own-price elasticities as a result of a change in price sensitivity as consumer became familiar

with the newly introduced product (Glaser and Thompson, 1998). American consumers also found it difficult to compare organic and conventional frozen vegetables as there was little variation in the display of organic products as compared to conventional products. At the retail level organic baby products is the fastest growing organic product in the USA and has also been identified as having high growth potential in SA (Glaser and Thompson, 1998 and Mead, 2005). Therefore there is a future area of research in demand preferences for baby food in SA. Policy makers also have a role to play in assisting South African organic producers to enter the organic baby food market in the USA. Organic food demand analysis in SA has not applied revealed preferences methods. Time series data on retail food sales are available in SA from AC Nielsen at a huge expense with no differentiation between organic and conventional products which could be the reason why the revealed preference method has not been applied in SA.

A few organic consumer demand studies have used stated preference methods. The stated preference contingent valuation method (CVM) was used in Denmark by Mier *et al*. (2000), conjoint analysis using a mail survey by Wang and Sun (2003) in the USA and Engel-Miniard model of consumer behaviour by Du Toit and Crafford (2003) in SA. Findings from Wang and Sun's (2003) study showed that there is a niche market for organic milk and apples and people are willing to pay more for organic milk and apples produced locally and that are certified.

Organic agriculture was introduced into Africa (South Africa, Kenya), Latin America (Brazil has a long tradition in biodynamic farming) and Asia mainly for export markets. Traditional methods of agriculture have been in existence in developing countries many of which are considered organic by default but many small farmers that practice these methods are not currently certified. The USA is one of the few larger organic markets that accept uncertified organic products and may be a captive market for these small-scale farmers.

Organic agriculture is a value system that views the interactions between man and the natural environment in a holistic way. Legislated and voluntary standards and certification procedures differentiate it from other sustainable agriculture approaches. Its roots are in an organic movement that started in the 19th century in Europe later

moving to the United States of America (USA) and Japan in a response to the negative impacts of industrial agriculture and a return to natural order.

The organic food and beverage market industry is valued at approximately US $23 million concentrated in North America and Europe. Hence a considerable amount of literature is available on consumer demand preferences and trends in these markets. Organic consumers in these markets live in an urban area often a big city, make purchases based on quality and organic production methods, are well educated and often from middle to high social class and having relatively high purchasing power (Willer and Yusseffi, 2004).

Organic consumers are supplied with a wide selection of organic products supplied by different geographic regions and countries with the largest area under organic management in Australia and New Zealand. In Australia and New Zealand these refer to areas under extensive livestock production. Latin America has the second largest area under organic management with the largest areas in Argentina, Bolivia (coffee and cocoa) and Brazil. Argentina is one of the few developing countries that have a well-established infrastructure for processing and exporting of organic products. Most developing countries export raw and unprocessed organic products resulting from custom tariffs protecting European agro-processors (Schreiber, 2003). Europe has the largest number of farms under organic management although it represents a small area. Africa has the lowest area under organic management mainly concentrated in Uganda, Tanzania and SA.

SA has the third largest area under organic management in Africa with 25 000 ha representing less than 1 percent (0.03 percent) of the total agricultural area and 0.41 percent of the total number of farms. The main organic products are fresh fruit and vegetables, herbs, spices and cane sugar. The Western Cape has the largest area (7000 ha) under organic management and number of organic farms (102) focused primarily on horticulture.

Given the large area and number of farms under organic management in the Western Cape, significant contribution of the horticulture sector to export earnings and employment in Western Cape and the growing number of small-scale producers this

province is well positioned to make use of growth opportunities forecasted in the organic industry. A combined effort by the Western Cape trade promotion agency, Wesgro; provincial department of agriculture; agricultural research institutions and organised agriculture groupings is required to conduct a more detailed study to identify specific opportunities in export of organic horticultural products.

In developed countries active government policy not only provides incentives to organic farmers but in certain instances requires it through established targets. In contrast organic agriculture policies in developing countries are lacking. Policy makers in these countries recognise the environmental and economic benefits but have reservations regarding the ability of organic agriculture to respond to food security. Hence no policy changes to support organic agriculture in developing countries are expected in the short term (Scialabba, 2000).

Literature reviewed showed the majority of the organic production in Africa is uncertified and sold in farmers' markets often with no price premium. However this uncertified organic production is not well documented and is a research gap. Policy makers in Africa are therefore challenged to establish organic agricultural policies that achieve both income generation and improved domestic food production goals through raising productivity using local resources including traditional knowledge. It also requires the need to find alternative forms of standards and certification procedures that recognizes this local context.

In SA all small-scale certified organic producers receive external support mostly from non-governmental organisations with no government programmes supporting small-scale organic farming. There are a number of successful small-scale conventional fruit producers in the Western Cape particularly in the Koue Bokkeveld region. The Western Cape has a global reputation for producing high quality fruit, proven manufacturing capabilities and expertise in fruit juice production illustrated by competitive local manufacturers of fruit juice that include Ceres Fruit Juice, Elgin Fruit Juice, Associated Fruit Processors and Granor Passi. Organic fruit juice has been identified as a specific growth opportunity within the domestic organic market. Empirical results on WTP for organic fruit juice showed that South African citizens in the Western Cape are concerned about environmental issues as shown by the positive

marginal probability effects and the higher prices that South African citizens are willing to pay for organic fruit juice. These Western Cape consumers also believe that organic food not only positively impacts the environment but also supports local as well as small-scale farmers. This presents an opportunity for the national and provincial government to support small-scale farmers to enter the organic fruit juice sector and in so doing achieve their mandate to transform the agricultural sector. The study identified the following specific recommendations for policy makers to support these small-scale organic producers to enter the sector:

- Provision of extension services on organic fruit production;
- Facilitate organic fruit contract growing schemes between small-scale farmers, local manufacturers of fruit juice and food retailers;
- Create mentorship programmes for small-scale farmers with existing organic fruit producers;
- Invest in research and development in organic fruit juice production by the Agricultural Research Council's deciduous fruit arm, Nietvoorbij and
- Create incentives for small-scale producers to add value to fruit production to fruit processing in manufacturing of fruit juice.

In SA organic agriculture has emerged without public support. Major private investment in the sector has come from commercial organic producers' willing to experiment, donor funded non-governmental organisations' support programmes for small-scale organic farmers and local consumers' willingness to pay price premiums.

This investment is focussed on certified organic products to earn foreign exchange revenue for commercial and small-scale organic farmers and to increase market share for local food retailers. No attention has been paid to organic agriculture's potential to contribution to local food security especially in low-potential areas which is an area of future research.

Findings from this study showed that South African consumers require a guarantee of the organic origin of organic products. Currently Regulations Regarding Control over the Sale of Organically Produced Products (RSA, 2002) is in its fourth draft. In the absence of a local standard, food retailers have introduced private organic labels that

comply with this draft standard or any one of the range of international organic standards. Policy makers urgently have to finalise the promulgation of this draft legislation to provide certainty to local consumers and hence a positive signal to current and prospective investors in the local organic industry. The importance of investing in the local organic industry is two-fold. Firstly significant growth is forecasted for the local organic industry. Secondly the overwhelming focus of this industry on exports may be adversely affected by growing "buy local" campaign and consumer preference towards low carbon print food products in Europe.

Empirical results from this study show that socio-demographic factors; particularly age, head of household, citizenship and home language do influence Western Cape consumers' WTP for organic fruit juice. It supports the empirical evidence of Agbola's (2003) aggregated food demand study in SA in which he demonstrated that food demand is indeed affected by race, age, gender of household head, urbanisation and family size. Earlier food demand studies by Taljaard (2003), Bowmaker and Nieuwoudt (1990) and Bopape (2006) also highlighted the importance of factors other than price and income. Results from this study support the need for disaggregated demand analysis in SA to capture the variability in demand behaviour.

Retail sales data in SA is expensive and not categorised as organic & non-organic. Given that no data on actual market transactions of organic food is available, a stated preference technique was used in this study. A CVM questionnaire using the single-bounded elicitation format was designed to collect data on demographic variables, purchasing behaviour and WTP. The single bound dichotomous choice format was used as it has been shown to be easier to implement than the preferred double-bounded dichotomous choice format. The contingent valuation method questionnaire was used to conduct face-to-face survey to avoid the low response rate of mail surveys such as that administered by Du Toit and Crafford (2003). Prior to the valuation respondents were given a description of the perceived benefits of organic food. The scenario given to respondents was that the government was planning to implement a policy to promote organic agriculture, fruit and wine in particular. In order for this to happen funding was required. Respondents were then told that they have to contribute to funding this programme and hence should indicate how much they would be willing to contribute. Respondents were then given a selection of four

bid levels for both organic fruit juice and wine to indicate how much more they were WTP. A limitation of this study is that it was funded by the author which impacted on sample size.

It is important for South African policy makers to note that socio-demographic factors do influence South African consumers' decision to purchase organic food. Findings of this study showed that younger age increases the probability of the decision to purchase organic food whereas being married and being in possession of non-formal training qualifications decrease this probability. No conclusive results on the influence of being married on buying organic food were found in the literature. Organic food is perceived as a luxury and the negative influence of being married may be due to married people's focus on necessities. A comparison of marital status amongst population in the Western Cape revealed that consumers in White and Coloured population groups are less likely to purchase organic food due to cultural preferences or values. Organic consumer awareness and education programmes should be targeted at older, unmarried consumers with high levels of formal education.

Empirical results revealed that WTP for organic wine is positively influenced by both younger and older age consumers that have Afrikaans, English or language other than Afrikaans as their home language and belonging to the Christian faith. Both younger and older consumers are WTP higher prices for organic wine compared to conventional wine. Afrikaans and English home language speakers are less likely to pay higher prices for organic wine. The negative influence of being Afrikaans speaking may be explained by low average monthly income of R3500 for the majority (69 percent) of Coloured Afrikaans speaking population group and therefore making less disposable income available for organic wine. The positive effects of being Christian on WTP for organic wine may be linked to beliefs expressed on attitudes about organic food that is positively impacts the environment, supports local and small-scale farmers. One limitation of this study is that these results may reflect consumers' demand for wine as a luxury good as no separate analysis and questions were included on consumer demand for wine.

There are a number of successful farm equity schemes and black vintners in the Western Cape that have contributed to black economic empowerment in the wine industry. Results of this study have shown a growing niche market for organic wine locally and have provided insights into the specific determinants of consumer demand. These results have highlighted the need for specific policy interventions that include organic wine marketing campaign that brands organic wine highlighting procurement from small-scale producers, local farmers and positive contribution to the environment; extension service provision to small-scale producers on organic wine production; investment in research and development in organic wine production; facilitating mentorship between small-scale farmers and existing organic wine producers and lobby national department of agriculture to finalise the draft South African organic standard given that South African consumers require guarantee of organic origin.

Results from attitudes towards organic food and agriculture and purchasing behaviour provide important market information to retailers and other agents in the organic food supply chain. No clear trend was identified in purchasing frequency of organic food. Although the survey was conducted at Woolworths the overwhelming majority of consumers purchased food (66.5 percent) and organic food (51.7 percent) at Pick ‘n Pay. This is interesting given that Woolworths has the largest market share of organic food. It may signal the positive effects of the aggressive marketing campaigns of these food retailers to increase their market share.

This study confirmed that consumers spend more of their disposal income on conventional than organic food. More (83 percent) consumers were willing to pay for organic wine than for organic fruit juice (63 percent). A limitation of this study is that the survey did not include a question on whether consumers drink fruit juice and wine. While WTP for organic fruit juice followed an expected pattern of declining percent of people WTP with increasing bid levels this was not the case with organic wine. With the latter, more people were prepared to pay higher premiums for organic wine. Given the low prices currently being realised by South African wine producers this may provide a niche market for producers to realise higher incomes.

The organic industry is relatively new and growing with tremendous opportunities in the local market providing evidence of recent structural shifts in the economy and impacts of global consumer trends. Understanding consumer demands for food specifically organic food is becoming increasingly important as consumers' attitudes and preferences strongly influence direction of food retailers' strategies. These preferences for organic food also impact agricultural production methods and have other unintended positive consequences of improved soil fertilisation, increased productivity and increased use of indigenous knowledge. This study identified and analysed South African consumers' attitudes and preferences towards organic food and their willingness to pay for organic fruit juice and wine and provided specific policy recommendations.

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8. APPENDIX 1: SAMPLE CHARACTERISTICS

The 550 questionnaires were administered in the Paarl branch of a Woolworths stores as mentioned previously. Paarl forms part of the Drakenstein municipality in the Western Cape. The socio-economic characteristics of the sample are compared to data on key attributes of Drakenstein municipality (Table 5.12). The questioning system that generated the municipal census data was different from that used in our survey, which makes it difficult to compare all socio-economic characteristics.

In the Drakenstein municipality females make 51 percent of the population compared to 60.5 percent in our sample. With regards to age distribution, 35 percent of the Drakenstein population is below 35 years old compared to 56 percent of the sample. In the sample 40 percent is within the 35-65 years category compared to 39 percent in Drakenstein. Unemployment also showed In Drakenstein 50 percent of the population is unemployed compared to 68.1 percent in the sample. It is not possible to compare income distribution due to differences in categorisation of the variable. The differences in the sample distribution of socio-economic characteristics and Drakenstein municipal data are less significant. Therefore it may be concluded that the sample is representative of the Drakenstein municipality.

A comparison was made between the sample characteristics and the characteristics of households in the 1996 Census (Table 5.3). Results show that for the age variable there is a significant difference (25.8 percent) for the 20-24 age category, Four percent for the 25-29 age category and between 2-3 percent difference in the 30-34, 35-39, 40-44, 45-49 and 50-54 age category. Citizenship is the only variable for which the sample is representative of the population in the 1996 Census. Therefore it was observed that a large variation in distribution on responses between the sample and 1996 Census. Therefore this sample is not representative of the Western Cape population and the results of the empirical analysis may not be aggregated for the Western Cape.