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“STRAWBERRIES – FROM PLANTING TO THE PUNNET.
A commodity chain analysis of two farms in the Magaliesberg.”

by

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in Development Studies
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DECLARATION

I declare that this dissertation submitted in fulfilment of the requirements for the degree of Magister Artium in Development Studies in the Department of Anthropology and Development Studies at the University of Johannesburg is my own original work. I acknowledged and referenced where secondary material has been used.

The identity and dignity of the research participants has been protected throughout the study.

ISABEL FALLER
Johannesburg, 21st of May 2014
ABSTRACT

*Keywords: Commodity Chain Analysis, farming, strawberries, sustainability*

The discussion of global development seems increasingly dominated by the notion of sustainability. The debate to replace modern, mechanised agricultural systems with alternative systems, such as organic and natural farming methods, in order to address increased dependency of fossil fuel consumption and its impact on the environment in general has shaped the foundation for this dissertation. Using the commodity chain analysis approach, this study examined a small-scale, alternative strawberry farm and a large-scale, commercial strawberry farm in the Magaliesberg region in the North West Province, South Africa. The study explored the dimensions of ecological, economic and social sustainability within each chain as well as within individual links of the chains.

A commodity chain analysis has many advantages when attempting to explore these dimensions of strawberry production on differing farms in South Africa. It is used as a tool “to identify and illuminate the individuals, institutions, technologies, forms of knowledge, and forms of capital involved in transforming raw agricultural products into consumable foods” (Hamilton, 2009:17).

The sustainability of alternative farming compared to commercial farming is discussed in the findings. Alternative (organic) and commercial farmers are driven by different motivations to sustain their land sustainably. Strawberry farming requires a large workforce as the majority of the work is done manually, therefore the strawberry-farming sector, along with large parts of the agricultural sector, sustains a substantial amount of livelihoods in the country. Statistics illustrate that the strawberry sector in South Africa is currently not growing. Poor global and local economic conditions, the escalating rise of prices, the power of the large retailers as well as the fact that policies aimed at growing agricultural productivity are poor are all contributing factors for the general decline in strawberry farming in South Africa.
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CHAPTER ONE – INTRODUCTION

Sustainability appears to be a widely discussed concept within the current development discourse. Although the term “was first coined several hundred years ago” (Scoones, 2007:588) in Germany, the definition given in the United Nation’s Report of the World Commission on Environment and Development (1987:37) can be considered a milestone in the concept of sustainable development in modern society. This definition is also the most commonly accepted:

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: a) the concept of ‘needs’, in particular the essential needs of the world’s poor, to which overriding priority should be given; and b) the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.

This dissertation is predominantly concerned with agricultural sustainability and its findings are based on a study conducted on two strawberry farms in the Magaliesberg region in South Africa. I carried out a commodity chain analysis on a small-scale, alternative farm and a large-scale, commercial farm exploring the strawberry production process in both cases.1 Raikes et al (2000:13) describes this approach as a “neutral, practical tool of analysis for use in ‘down-to-earth’ applied research.” Coupled with Friedland’s (2001:92) suggestion that any researcher who studies agricultural commodities “must take account of the fundamental biological characteristics (“nature”) of the commodity,” the approach is useful. The key point of interest was to study the three different dimensions of sustainability, namely ecological, economic and social sustainability within each chain attempting to assess differing farming methods (alternative versus commercial) in light of their levels of sustainability.

There is a great debate that modern, mechanised commercial agricultural systems are not sustainable in meeting the needs of the present generation without

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1 The focus of this paper is to analyse two farms in the Magaliesberg region in South Africa with regards to their farming methods. The terminology will be as follows: Farm A is the small-scale, alternative farm whereas Farm B refers to the large-scale, conventional farm. A description of the farms and their respective farming methods is detailed in Chapter Five.
compromising future generations. The increasing dependency on cheap fossil fuels due to the methods utilised to maximise profits, such as applying synthetic fertilisers, replacing labourers with machines and producing mass crops that are distributed to customers’ worldwide call for alternative methods that reduce fossil fuel use and its environmental impact at large (Harding and Peduzzi, 2012:162). It is suggested that alternatives to this modern commercial farming phenomenon are unconventional methods such as localised natural and organic farming. Duffort (2006) and Crinnion (2010) point out that organically grown produce is said to be healthier and causes less harm to the local environment than conventional, commercial agriculture. Curry-Roper (1992) highlights the key characteristics that distinguish conventional, commercial farming systems from alternative agricultures. Conventional systems produce on a national and international scale while alternative systems produce predominantly for the local and regional market. Furthermore, farmers applying conventional agricultural methods perceive farming as a business and act primarily in self-interest whereas alternative agricultures, like organic farming, believe farming is a way of life and value increased co-operation amongst farmers (Curry-Roper, 1992).

As suggested by Petrescu-Mag and Petrescu (2010:121) organic agriculture forms an integral “component of sustainable development.” Indeed, environmental preservation and biodynamic farming have caused debates since the 1920s when Rudolf Steiner gave “what is arguably the first organic agricultural course” (Paull and Hennig, 2011:361), taking action against “the growing chemicalisation of agriculture” at the time. The next milestone for the organic deliberation was set by Lord Northbourne in the 1940s with his book Look to the Land, which is described as the ‘manifesto of organic agriculture’ (Paull and Hennig, 2011). Northbourne placed particular emphasis on the moral foundation of the organic concept in characterising a farm as “an organism”, warning against monoculture farming and explained that “food of better quality is good which has vitality, individuality, freshness; food which is grown right, not only food that looks right; food which is effective as a vehicle of life and is not either mere stimulant or mere filling” (Paull, 2006:15). Also, a large body of literature (Duffort, 2006; Guthman, 2008; Leu, 2004; Lotti, 2009; Paull, 2006) provides evidence that farming organically without pesticides and chemical fertilisers
contributes immensely to the preservation of the soil and may be regarded as environmentally sustainable.

Miller (2004:37) is amongst the critics who strongly disagree with this notion, going as far as to state that “few activities are as wasteful as organic farming.” Opponents of the organic wave often question the practicality of organic farming and whether it is possible to feed a world population using this method. Miller (2004), Borlaug (2002), and Adams (1990) argue that organic farming produces lower yields, and therefore cannot be regarded as an option to feed the increasing world population. They also argue that organic farming demands more land for food production, which, in opposition to the organic concept, is viewed as placing pressure on “dwindling wildlife habitats” (Adams, 1990).

Paull (2010:11) reminds us that “ancient regime organic agriculture has fed the world for millennia. Ghengis Khan, Beethoven, Socrates, Michelangelo […] had a diet of de facto organic food.” It seems as if the ‘organic is a myth’ advocates, together with the Green Revolutionaries and the scientists, that “opened a case against organic” (Miller, 2004; Borlaug, 2002; Adams, 1990) will have to continue their argument with the ‘unscientific crowd’ that believes organic agriculture can feed the world by producing higher yields which, in turn, increases economic stability in the long run (Leu, 2004, Crinnion, 2010; Duffort, 2006; Petrescu-Mag and Petrescu, 2010; Paull, 2010; Rundgren; Klink, 2009).

Besides this interesting global debate on sustainable farming and whether organic farming is actually a sustainable alternative to commercial chemical farming, I aim to join the conversation on the question of whether farming in general is sustainable in the current South African agricultural environment of deregulation and strict labour legislation. This relates mostly to the dimension of economic sustainability: is it feasible to farm, in this context strawberries, in South Africa? Also, the analysis attempts to evaluate whether the level of sustainability of a farm differs according to the size and farming method utilised. Considering the limited scope of this research, the findings cannot be generalised and may only be discussed within the context of this study. Yet the findings and discussions offered in this paper are worthwhile for gaining a better insight into two very different farms in South Africa and possible
further research could be of great potential to extend the discussions within a broader South African framework.

**Structure of dissertation**

Following this introduction, there will be a discussion of the theory in light of the global context in Chapter Two. This section aims to position the concept of commodity chain analysis in a global as well as local context and look at how it can be linked to changing food systems. The evolution of commodity chains from being a response to increasingly criticised Western development theories to a systematic methodology will be reviewed. The development of global commodity chains and the growing urge to rethink these systems may be related to changing patterns in society within a social, political as well as environmental framework. During the 1960s, when hypermarkets, mass-commercialisation and food chains became increasingly globalised, green activists opposed this development from the standpoint that alternative and unconventional methods such as organically and locally grown foods were “healthier and safer for themselves and the environment” (Crinnion, 2010:4). With these changes, a clear shift in agricultural practices and food chains could be observed. On one hand, the globalisation of food has made it possible to eat anything, anywhere, at any time (if one has the resources), and it has also improved many countries’ economies with an increase in exports. On the other hand, many authors demonstrate that this type of production and consumption is detrimental to the environment.

South Africa is also part of this development, as it joined the global community after its attainment of democracy in the 1990s. The country followed the neo-liberal trend, which created a competitive, market-driven economy. Heywood (2002:427) defines neoliberalism as “an updated version of classical political economy, dedicated to market individualism and minimal statism.” Furthermore, neoliberalism can be described as an ideological perspective, which since the early 1980s is defined as the approach and concept of “global change, cooperation, peace and prosperity through collective programs for [liberal economic] reforms” carried out by international institutions (Kegley, 2007:37). In South Africa, these neoliberal reforms “resulted in increased competition for […] agricultural products both on export markets and locally” (South African Policy on Agriculture in Sustainable Development, 8th Draft). With the decrease in government support, South African
farmers are increasingly battling to compete in this international market with state subsidised farmers from the global north.

The challenge for farmers, and the agricultural sector at large, remains to be the “absence of a coherent national policy framework” (South African Policy on Agriculture in Sustainable Development, 8th Draft) that addresses the social, economic and environmental issues mentioned above. This chapter concludes with an outline on conventional farming methods versus organic and alternative farming practices. A discussion around changing consumer behaviour explores the trend of increased consumer demand for organic and sustainable products (Sahota, 2010:54) in the recent past. It is believed that this change in consumer behaviour is a result of the increasing amount of literature explaining the health and environmental benefits of organic produce. However, not everyone agrees with this organic development and experts, such as Borlaug (2002), Miller (2004) and Johnston (2008), are under the impression that the benefits of organic food are mythological and/or misconstrued.

Chapter Three provides a history of the strawberry in a global as well as a South African context. This section aimed to provide general insights into the historical and technical aspects of strawberry farming as well as to document the development of the strawberry industry in South Africa. The first section will review the origin, earliest records and the beginning of the cultivation of the strawberry. It will highlight the journey of the wild, uncultivated strawberry to the modern strawberry (which is now one of the most versatile fruit cultivars). This chapter also offers a brief description of how strawberries are grown in the natural world. The flexibility of the strawberry to be cultivated within different climate conditions makes it “one of the most changeable of all crop plants, and for this reason it is one of the mostly adapted and widely cultivated of all crops” (Darrow, 1966:314). A brief overview of the history of strawberries in South Africa provides the reader with information about the strawberry industry in South Africa and how it developed over time.

The research design is explicated in Chapter Four. The research methods utilised in this study are explained including the commodity chain analysis and case study approach. Although commodity chain analyses are traditionally conducted on a quantitative basis, this study utilised only the qualitative approach alongside
secondary research. This is reflected in the data collection methods that were comprised of exclusively qualitative methods, such as personal interviewing and observation. Semi-structured personal interviews with the farmers allowed me to gain an in-depth insight of the processes during strawberry production. Furthermore, telephonic interviews with experts of the South African strawberry industry were conducted to extend the research scope. The flexibility of less planned and structured interviews let me explore the farms outside my initial research scope. This section further informs about the ethical considerations as well the limitations attached to this study.

Chapter Five is a presentation of the research findings gathered during the field work. An illustration of the established commodity chains of Farm A versus Farm B illustrates an overview of the different links that were identified within a chain, namely runner production, plant rooting, planting, growing/maintenance, early production, harvesting, packaging and distribution on Farm A and plant growing, plant rooting and hanging nursery, planting, growing/maintenance, early production, harvesting, packaging and distribution on Farm B. Also, this section provides an overview of both farms elaborating their farming methods in more detail as well as an analysis of the plant origin, planting, growing, harvesting, packaging and distribution process of strawberry growing at Farm A and Farm B.

In the next section, Chapter Six, these findings are further unpacked and discussed in the context of the three dimensions of sustainability, namely ecological, economic and social sustainability. It is established that the small-scale, alternative farm is more ecological sustainable than the large-scale, commercial farm based on its lessened dependency on fossil fuel consumption, and therefore the absence of unnatural and chemical processes that have a negative impact on the environment in general. Farm B’s farming system is regarded as economically more sustainable than Farm A. This dimension was discussed within the context of overall productivity, feasibility of the farm as well within the current environment of agricultural policies in the South Africa. The social dimension of sustainability within the strawberry production chain was only briefly outlined. Both farms are contributing actively to job creation in the South African agricultural sector since strawberry farming is considerably labour-intensive. Most importantly, the interconnectedness of the dimensions of ecological, economic and social sustainability is highlighted.
concluding that the concept of sustainable farming is complex and requires analysis beyond environmental impact.

Chapter Seven concludes this research paper. Due to various limitations regarding the research scope and research design, it is impractical to propose whether Farm A or Farm B is more sustainable. Their dimensions of sustainability could be examined within each link of the chain; however a more-in depth analysis and further research would be required to come to a broader conclusion. This study also looked at strawberry farming in South Africa and how it is performing within the aspects of sustainability mentioned in the research.

With 91 per cent of South Africa’s arable land being arid, semi-arid or dry sub-humid (Department of Agriculture, Draft 8:7), the country’s agricultural sector is doubtlessly facing constant social, economic, and environmental challenges, making it worthwhile to research alternative agricultural methods. The Policy on Agriculture in Sustainable Development (Department of Agriculture, Draft 8:6) states that the “high unemployment rate, poverty, food insecurity, crime, [and the] growing incidence of HIV / AIDS” are social challenges that also affect the agricultural sector. A healthy and productive workforce is crucial for any successful farming business. The future of South Africa’s agricultural sector looks rather bleak. Degradation of natural resources, the rapid decline in water resources for irrigation purposes and high species extinction rate are a few outcomes of “unsustainable farming practices, deforestation and […] industrial development” (Department of Agriculture, Draft 8: 8).

This study focused on the three issues discussed above: the social, economic, and environmental issues faced on a farm. As mentioned, I researched a small-scale, alternative strawberry farm and a large-scale, commercial strawberry farm in the Magaliesberg area, analysing the dimensions of environmental, economic and social sustainability within the chain as well as the individual links within the chain. This research aims to develop an understanding of how two farmers in South Africa grow strawberries and how their differing farming methods play a part in their survival. Analysing the strawberry production chain aims to give an insight whether farming for these two farms is as challenging as indicated in the above paragraph.
CHAPTER TWO – LITERATURE REVIEW: THEORY AND GLOBAL CONTEXT

Introduction
As the title of this study indicates, the commodity chain analysis approach forms an integral part of this research. The terminology for this research tool varies greatly: there are commodity chains, commodity systems, filières, value chains and global value chains. Although it is acknowledged that these terms differ slightly in their origin and contextualisation, throughout this study the terms will be used interchangeably as they “have a similar meaning and refer to the methodology for studying a specific commodity” (Friedland, 2004:5).

The literature reviewed below will describe the evolution of commodity chains in the 1970/80s from being a response to the increasingly criticised development theories from the West to a systematic methodology to analyse “how processes of production and consumption vary across physical and social space” (Ciccantell and Smith, 2009:361) in a globalised context. Firstly, various paradigms addressing commodity chain studies are outlined, including Hopkins and Wallerstein’s World-Systems approach towards commodity chains (1986) and Gereffi’s and Korzeniewicz’s Global Commodity Chain (GCC) approach (1994). Over time, building on the existing strong approach that GCC bring forward, theorists, such as Ciccantell and Smith (2009) and Raikes et al. (2000) encourage us to rethink global commodity chains. Collins (2005) advises new directions in commodity chain analysis. As this study is concerned with the commodity chain analysis of strawberries, and the research method applied is following the French filière approach (see also Chapter 3, Research Design), a comparison between the GCC and the filière approach will provide further insight to the topic.

The concept of globalisation through the lens of commodity systems forms a further theoretical element in this study. As stated by Gereffi (1999a:37) “globalisation has altered the competitive dynamics of nations, firms, and industries”, and therefore contributed to the restructuring of commodity and food chains in particular. The literature will offer various definitions of globalisation followed by a brief elaboration of the distinction between ‘internationalisation’ and ‘globalisation.’ The debate on globalisation will start within a macro-level framework taking into consideration
broader concepts affiliated with globalisation. A discussion regarding the “social norms, production structures and global-local relationships” (Goodman, 1997:665) that are viewed to be changing and transforming within a globalised system offers an integrated overview of factors of change concerning globalisation.

Post-World War II, the goal of a more globalised, industrialised and efficient system was to increase economic productivity by promoting a free market system and an open trade community. Two phases characterise this global shift – phase one, somewhat Keynesian, lasted from the early 1950s to the mid-1970s, in which national agricultural systems on the global periphery were protected to a degree, and phase two, the ‘neo-liberal’ one since the late 1970s, in which financial deregulation and its concomitant policy prerogatives have reigned supreme. This time was the beginning of mass-commercialisation, increased research support for in-vitro biology, and the promotion of “the application of new seed varieties and the introduction of chemical fertilizer” (Brandon, 2008:26). Burch and Lawrence (2005:1) explain that the increased demand for mass consumption constitutes one of “the fundamental social and economic changes occurring in post-war Europe and North America” which also led to a redirection in the food chains. This process of capitalist expansion and trade liberalisation headed by the global north is described as ‘globalisation from above’ while counter-movements demanded a ‘globalisation from below’ which would be inclusive of growing marginalised populations (Barndt, 2008:63). Furthermore, it prompted the introduction of environmental awareness and the growing need for an improved quality of life. This thought was strengthened by the end of the Cold War during the late 1980s. An increasingly globalised world streamlined the Western idea of liberalisation and democracy, which has inevitably had an impact on the landscape of the Third World and emerging countries. By the late 1970s and early 1980s with the advent of neo-liberal ideas denigrating the role of the state in the economy, structural adjustment programmes assisted (or forced) newly independent nations to stabilise their economies through reducing state expenditures and liberalising the market (Riddell, 1992:53).

Neo-liberal reforms have been taking place in South Africa since the 1980s’ attempts to incorporate most African economies into the ‘neo-liberal’ global order. Apartheid South Africa adopted the so called “Normative Economic Model (NEM)” that emphasised restructuring the South African economy by eradicating “political and
socio-economic barriers to the market” (Habib and Padayachee, 2000:248). The Mbeki regime’s Growth, Employment, and Redistribution (GEAR) policies, which could be said to have gone back to NEM’S precepts after the state’s brief redistributionist moment after 1994, hoped to strengthen economic growth and to increase employment by the end of the 1990s.

These reforms have also affected the South African agricultural sector. Since the rules of trade have changed, South Africa has had to adjust its heavily state-protected agricultural sector to an independent, free-from-state-intervention sector. Post-apartheid, policy and draft documents highlighted the commitment of the new government to include the agricultural sector in the broader transformation of South Africa’s society (Wilson, 1999). Organised agricultural organisations demand to have an increased say in policy reviews related to the agricultural sector in order to strengthen farmers’ access to markets, profitability and competitiveness.

This chapter will conclude with an outline on organic and alternative farming practices versus conventional farming methods. The discussion is based on the shift in consumption behaviours as observed by Guthman (2002:295) and Sahota (2010:54) among others. The section on terminology and statistics provides information about the development of the organic sector globally as well as in Africa. Moreover, benefits of organic farming methods are discussed, taking into consideration relevant critics. A timeline of the development and growth of biotechnology in Africa provide insight into this topic by way of explanation how biotechnology works. Lastly, alternative farming methods, such as agroecology and the Slow Food Movement will be discussed briefly followed by a concise outline of the organic sector in South Africa.

**Commodity Chains, Global Commodity Chains and Filières**

**Historical Emergence**

Commodity chains have been described as “central to development discourse” (Collins, 2005:1) and as “an insightful way to understand issues of ‘development’ ” (Ciccantell and Smith, 2009:361). Prior to it becoming a methodological tool and a strategy to collect data, discussions of commodity chains were entrenched “within broader frameworks of class struggle or world systems dynamics” (Collins, 2005:2). The trade of fruits, spices and coffee between the underdeveloped countries and the
West since colonial rule are proof of commodity exchanges. However, the theories underpinning these commodity chains were not focused on an approach or an analysis to explain the various segments within the chain but tried to explain “the distribution of poverty and underdevelopment in the 20th century” (Collins, 2005:2).

Commodity chain analysis “began to emerge during the 1970s in the social sciences” (Friedland, 2004:6) and since then produced a substantial body of literature contributing to the topic. Researchers perceived the study of commodity chains as an alternative to hegemonic modernist development theory and a method “for illuminating some of the key characteristics of contemporary capitalism, and the dynamics of change which have emerged in the age of globalisation” (Raikes et al., 2000:18). Friedland (2001:85) comments on the evolution of commodity studies as follows:

Growing interest in commodity studies and commodity chain analysis has, in all likelihood, been a consequence of two major developments: the industrialization of agriculture and the globalization process. The past decades have witnessed a growing literature in various aspects of commodities although there has not been much of a focus on methodology.

Commodity Chains become Global Commodity Chains
Pioneers Hopkins and Wallerstein (1986:159) coined the term ‘commodity chain’ as “a network of labour and production processes whose end result is a finished commodity” utilising a “historical analysis of commodity chains” (Friedland, 2001:89) that focused on economic ‘turning points’ to observe changes in the commodity chain. They developed the notion of a ‘commodity chain’ from Wallerstein’s World Systems Theory (Raikes et al., 2000:3) aiming to “differentiate their understanding of capitalism’s territorial scope from the orthodox way of thinking about globalization” (Bair, 2005:155). By utilising the commodity chain analysis approach, Hopkins and Wallerstein (1986:159) attempted to interrogate “whether and to what extent a capitalist world-economy was an organizing force and structural reality during the sixteenth, seventeenth, and eighteen centuries.” A particular characteristic of this method is that the chains are analysed in reverse. The segment analysis commences with the final production operation and finishes with the raw material inputs. Constructing these chains backwards rather than forward aided Hopkins and Wallerstein (1986:160) “in seeing the loci of the sources of value in a finished product and not the multiple uses to which raw materials are put.”
Another paradigm of commodity chain analysis, other than the world-systems theory approach, was put forward by Gereffi and Korzeniewicz in 1994 with their publication *Commodity Chains and Global Capitalism*. Within this context, the commodity chain “refers to the whole range of activities involved in the design, production and marketing of a product” (Gereffi, 1999a:1). Gereffi and his colleagues were in agreement with Wallerstein, Hopkins and other world system theorists that “the commodity chain concept is a useful construct for thinking about the international division of labour characteristic of capitalist production” (Bair, 2005:155). However, they believed that more weight should be contributed to “competition and innovation as crucial world-economic components of historical shifts in the organisation of global commodity chains” (Gereffi and Korzeniewicz, 1994:2) focusing largely on industrial commodity chains. As a result, within this approach the focus is on “the emergence of a new global manufacturing system” and increasingly overlooks the historical and cyclical framework (Raikes *et al*., 2000:3). With their global commodity chains (GCC) approach, they contributed to the reformulation of “the basic conceptual categories [that are] needed to analyse new patterns of global organisation and change” (Gereffi and Korzeniewicz, 1994:2). The GCC approach has close similarities to Michael Porter’s value chain approach (Raikes *et al*., 2000:5) that also derives its value from breaking a production process or activity “into discrete segments” in order to identify “innovative organizational and managerial practices” (Gereffi and Korzeniewicz, 1994:6) that aid to improve the overall functioning and effectiveness of an organisation. Collins (2005:13) argues that with the GCC approach, Gereffi combined world systems theory (Hopkins and Wallerstein’s model of commodity chains) with institutional economics, which results in commodity chain analysis accommodating “a variety of different theoretical agendas” (Collins, 2005:14).

Within the GCC approach, Gereffi (1999a, 1999b) distinguishes between the producer and buyer driven commodity chains (Figure 1). Producer-driven commodity chains define the powerful manufacturer as the key economic agent (Gereffi, 1999b:2) who controls the capital flow and supplier activities within the chain (Bair, 2005:159). This form of GCC applies mostly to large, multinational, capital and technology intensive industries with the “the automobile industry offer[ing] a classic
illustration of a producer-driven chain, with multi-layered production systems that involve thousands of firms” (Gereffi, 1999a:41).

Buyer-driven commodity chains apply to lighter manufacturing and labour-intensive industries such as apparel, house wares and consumer electronics “where far-flung subcontracting networks are managed with varying degrees of closeness by designers, retailers and other brand-name firms” (Bair, 2005:159). As opposed to the producer-driven chain, the manufacturer of the product is not playing the pivotal role but the “large retailers, marketers, and brand manufacturers”, as pointed out by Gereffi (1999b:1), are predominantly responsible for setting up the production networks in the Third World. This pattern is defined as “trade-led industrialization” (Gereffi, 1999a:42, 1999b:1) whereby the so-called power brokers “call the shots for the many firms involved […] they control, although they may have no equity relation to the firms actually producing the goods made on their behalf” (Bair, 2005: 159). Raikes et al. (2000:7) talk about the “producers without factories” that locate production and most value-added activities in poorly developed countries with the lowest wages. Such buyer-driven structures also characterise many agricultural commodity chains (Raikes et al., 2000:7). Bair (2005:160) further notes within these agricultural commodity chains the large retail supermarkets are identified as most powerful key economic role players.

Given the dynamic nature of global commodity chains functioning within a governance framework that is constantly influenced by “technological, institutional, and organisational innovations, as well as changes in regulatory environments” around and within them, such as industry structures or the power of firms, Gereffi (2001:30) posits a shift in governance structure beyond producer-driven and buyer-driven commodity chains. With the rapid expansion of the Internet in the mid-1990s “a third form of governance began to emerge” (Gereffi, 2001:30): the Internet-orientated value chain. According to the literature, the power relations characterising this type of chain governance are transferred from the manufacturers and retailers to the consumers. It is acknowledged that this third type of chain will probably not replace buyer-driven and producer-driven chains, but certainly transform them. Gereffi (2001:35) argues that the Internet’s “ability to create markets on a scale and with a level of efficiency” will cause “the shift from manufacturer ‘push’ to consumer ‘pull’ “ focusing on consumer convenience and satisfaction.
Limitations to the current GCC approach

Ciccantell and Smith (2009) suggest that in order to maximise the potential of GCC, a few shortcomings require attention and rethinking in a conceptual manner. Additionally, Raikes et al. (2000) add to this literature by presenting possible limitations attached to the GCC approach.

GCC analysis usually focuses on one or two segments of a chain only and seldom focuses on the entire chain. Raikes et al. (2000:10) problematise the “looseness of definitions” related to the GCC approach pointing out that it is unclear “where [GCCs] are seen to start and finish, and how they are divided up.” Debates concerning the discontinuous analysis of the chains include examples where researchers find it crucial to “include every process and transaction from primary commodity to
consumer good” and others prefer to only select certain segments within the chain or even single processes (Raikes et al., 2000:10-11). Gereffi et al. (2001:3) acknowledge that the approach is lacking “a well-defined theoretical framework” and clarity on the different types of possible chain types is required. Ciccantell and Smith, (2009:362) argue that “new insights into contemporary globalisation” could be gained by lengthening the chains. They emphasise that the “beginning of the chain” should not be ignored and that it might be beneficial to approach the chain analysis with the complexity originally put forward by Hopkins and Wallerstein.

Raikes et al. (2000:6) criticise the rigid manner in which the governance of the commodity chains has been limited to being either producer or buyer-driven. Although Gereffi (2001) made an attempt to expand the governance structure by responding to technological changes in the globalised context, the distinctions remain rather fixed. A major concern is about other relevant agencies if key agents within a chain are limited to being either producers or buyers. What about governments, regulatory institutions and other relevant agencies that also hold substantial power within contemporary chains? Raikes et al. (2000:8) wonder whether there could be a “multi-polar driving” effect, meaning “could there be more than one driver in a GCC.” They suggest treating the producer-driven versus buyer-driven division between the chain governance as “a general guide” as otherwise it “seems too rigid and uncontextualised time-wise” (Raikes, et al., 2000:19).

A further point of critique is in relation to commodity chains being predominantly developed for the industrial sector. Raikes et al. (2000:19) argue that especially with regards to agricultural commodity chains “some aspects of the GCC approach need significant adaption.” It is discussed that by including “some of the insights gained in the filière tradition” (explained below) the approach is deepened (Raikes et al., 2000:19). As a result broadening the context of the chains by paying “more systematic attention to regulatory change” presents an alternative to ‘limiting’ it to the elements of power (Raikes et al., 2000:19). In addition, Ciccantell and Smith (2009:363) argue that there should be an increased effort to “build on existing work in the world-systems tradition that focuses on the relationship between long-term changes in the world-economy and the natural environment.” Although GCC are often analysed in an industrial context, the social and natural processes that are incorporated throughout a wide range of industries require more attention.
Difference between the GCC and the filière approach

As mentioned above, commodity chain studies were originally developed for the industrial sector in a rather general and rigid manner and were primarily concerned with “the location of profits within a chain” (Raikes et al., 2000:13). For studying agricultural commodities the more elastic filière approach was preferred to this rather inflexible approach.

Raikes et al. (2000:13) define the filière approach as “a loosely-knit set of studies with the common characteristic that they use the filière (or chain) of activities and exchanges as a tool and to delimit the scope of their analysis.” This method is particularly used to study agricultural commodities and food systems. In fact this tool originates from the field of technocratic agricultural research and presented an analytical framework for the former French colonial states corresponding with their agricultural commodity orientated development policies (Raikes et al., 2000:2). Bernstein (1996b:120) adds:

The original inspiration of the filière approach […] was to uncover and analyse price formation in the journey of a commodity from raw material to final product, through its various stages of physical transformation (processing, manufacturing), transport, storage and so on.

A filière study aims to explore the various steps from farm to fork and according to Bernstein (1996b:120) is conducted in six stages: (i) how the conditions of production are established, (ii) farm production, (iii) marketing, (iv) processing, (v) distribution and finally (vi) consumption. When analysing the various filières throughout these stages, filière analysts are less concerned about “getting the prices right than about getting the institutions right” (Raikes et al., 2000:14). As a result, this approach allows theorists to view commodity chains through a political economy lens instead of limiting it to conventional economics, which often overlooks “the social relations and institutions that structure economic life and markets” (Bernstein, 1996b:121). Commodities that have been studied utilising this method include rubber, cotton, coffee and cocoa (Raikes et al., 2000:13). With his publication “The Political Economy of the Maize Filière” in 1996(b), Henry Bernstein was the first to apply a commodity chain analysis, and in particular a filière approach, to study a key agricultural industry in South Africa: the maize sector.
The filière approach is outlined by three key concepts: the empirical research tradition, the quantitative tradition and the anthropological tradition (Raikes et al., 2000:14-15). The former’s purpose is the mapping out of “actual commodity flows and to identify agents and activities within a filière” (Raikes et al., 2000:14) by establishing a “product system” which assists the researcher to concentrate on the structures as a whole as well as the relationships of power among the commodity agents. The quantitative filière is mostly utilised as a measuring tool of all the inputs, outputs, prices and value-added activities throughout the chain. Raikes et al. (2000:15) also describe it as “an accountancy framework [...] known as the méthode des effects, a variant of input-output analysis in which economic behaviour is taken as a given, but in which non-price incentives are given greater attention.” As opposed to the empirical filière, the quantitative approach lacks inclusiveness regarding the agents and totality of structures within a filière. As stated by Raikes et al. (2000:15), the anthropological tradition within filières is closest to the GCC approach. It dates back to the 1970s and “focuses on markets and power in a ‘real world’ sense” and proves to be a more flexible and adaptable approach to analysing a chain. The origin of this tradition is directly related to the work on the “dualistic model of post-liberalisation food crop filières in Francophone Africa” (Raikes et al., 2000:15) paying specific attention to the changing power relations of the different agents, labour forces and institutions. Bernstein (1996b:121) adds that the concept of the “real markets” are closely linked to the overall understanding of power as well as the “social differentiation of class and gender, and how it defines the characteristics of particular categories of groups of producers/consumers, sellers/buyers, in given markets.” Markets in this sense are part of the political landscape: the activities that are involved and connected in different markets require consideration (Bernstein, 1996b:122).

Linking Globalisation and Commodity Chain Analysis

With the end of the Cold War, the global expansion of capitalism was peaking, and the closely related idea of a free market system and international trade were priorities for the leading nations in Europe and North America. These northern countries strived to install this system in as many nations as possible, aiming through the implementation of ‘neo-liberal’ policies to limit governmental regulation throughout the economic sector. In this view, competition should “take its course
throughout the economy and across borders with very little state interference and regulation” (South African Centre for Rural Legal Studies, 2003). This era of deregulation and market liberalisation is often discussed within the framework of globalisation.

**Defining globalisation**

As Friedland puts it (2004:5), “globalisation has many meanings” referring to “changes in the financial organisation […], manufacturing and distribution of commodities from automobiles to clothing, software, and labour […], and cultural change (Coca-Cola-nization, McDonaldization).” Goodman (1997:664) views globalisation as “a paradigm shift in the structure and organisation of world economic activity and spatial divisions of labour” and what Gereffi et al. (2005:78) term the “globalization of production and trade” are features of the contemporary economy. It is described as a more complex and integral process and, as stated by Gereffi et al (2001), “implies functional integration between internationally dispersed activities.” It is an axiom “that nations have become more interdependent through the flows of goods, services, and financial capital” over the past three centuries.

During the 1960s, the term became relevant in the social science field, especially concerning the impact of concepts of space and technological communication. As stated by Dicken (2000:315), globalisation signalises a world in which nation-states are no longer significant actors or meaningful economic units; in which consumer tastes and cultures are homogenized and satisfied through the provision of standardized global products created by global corporations with no allegiance to place or community.

At this stage, it is essential to emphasise that the concept of globalisation is not a new phenomenon but rather, as described by Jackson (2004:166), a process “that previous generations have witnessed equally.” He continues to describe globalisation as another social transformation experienced by society “following capitalism’s earlier expansionary phases.” An example is the history of potatoes (Salaman and Hawkes, 1985). Also, in the 1860s, British economists already bragged how “the plains of North America and Russia are [their] cornfields, Chicago

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2 In his book *The History and Social Influence of the Potato* (1985), Salaman does not only provide a detailed synopsis about the development of the potato as successful crop popular for cultivation amongst farmers but also analyses its influence on social and economic structures globally, with particular focus on Europe and Ireland.
and Odessa [their] granaries; Canada and the Baltic [their] timber forests; Australia contains [their] sheep farms and in South America are [their] herds of oxen; the Chinese grow tea for [them], and [their] coffee, sugar, and spice plantations are all in the Indies” (Belasco and Horowitz, 2009:11).

**Globalisation and changing food chains**

In this paper, globalisation is predominantly viewed through the lens of changing commodity patterns and the effect globalised structures and networks have on agrifood studies and processes. Literature suggests a link between the restructuring of the agricultural chains and the global industrial restructuring through the history of capitalist expansion (Goodman and Watts, 1994:3). After World War II, organisations such as the World Bank (at the time the International Bank for Reconstruction and Development) and the International Monetary Fund (IMF) were established and they positioned North America as the leader of the world economy’s revival (Nester, 2001:352). As a result, trade relations expanded and were increasingly regulated by arrangements such as the General Agreement on Trade and Tariffs (GATT) (1947), which became the World Trade Organisation (WTO) in 1996 (Nester, 2001:369).

The first phase of the post-World War II global economic order could be characterised as Keynesian, given the regulations on finance capital developed in order to stall the emergence of a world economic system similar to that of the 1920s, and Fordist. Goodman and Watts (1994:6) define the latter as:

> the macro-social conceptualisation of the capitalist ‘epoch’, or mode of development, which prevailed roughly between the 1930s and early 1970s. The characteristic features of Fordist development, […] are identified as a regime of intensive accumulation and an ensemble of institutional forms capable of ‘matching’ or dynamically balancing mass production and mass consumption, […], to ensure rapid and stable economic growth.

This period from World War II until the early 1970s is described by Goodman and Watts (1994:3) “as an intensive or Fordist regime of accumulation” in which “the restructuring of agro-food systems is seen as a mirror image of current transformations in the technical and social divisions of labour […] in the advanced capitalist states.” The components that experienced a major shift within a globalised food system included land, labour and capital (Friedland, 2004:5) alongside changing social norms, production structures and global/local relationships.
Agriculture and food production have been integrated in this global capitalist driven model – the agro-export model.

Globalisation changed the core of the agricultural sector and food chains (McMichael, 1994; 2009). The expansion and merger of transnational food companies “into an ever smaller number of key conglomerates” underline the “organisation of production in the south and consumption in the north” model which characterises the notion of globalisation from above (Barndt, 2008:68). This newly globalised food system is recognised for benefiting only a limited group of larger producers and distributors while not meeting the needs of the “mass of farmers or the environment, nor does it ensure a plentiful supply of food for all people” as pointed out by key food analysts Magdoff, Buttel and Foster (2000:19). As put in a report by the Food and Agriculture Organisation of the United Nations (FAO), globally “there is currently plenty of food – too much sometimes – but the poor are still food insecure” (FAO, 2003:33). Figure 2 underlines the issue of unequal food distribution across the globe. Limited food supplies are not the cause of this growing food insecurity as large agricultural surpluses are still produced in the global north whereas countries in the global south struggle to secure sufficient food for their citizens (FAO, 2009:1). In 2008, the recommended daily intake of dietary energy (kcal) per person was calculated to be 2414 kcal (FAO, 2008:4).

In practical terms, the globalisation of the food system has various impacts on its component elements. One example is the fresh fruit and vegetable (FFV) industry
that experienced changes within its chain after World War II. Friedland (2004:12) explains that the change in FFV consumption is due to the “changing structure of labour forces in advanced capitalist countries.” Initially, people from Western Europe and North America obtained their FFV supply from local, regional and national sources. During the 1970s, the trade was expanded and by the early 1980s, “extended filières from Chile and South Africa were producing table grapes and other FFV for North America and Western Europe so that there was year round supply for FFV which had previously been seasonal” (Friedland, 2004:12). Describing the globalisation of the tomato chain, Barndt (2008) highlights several changes within the life cycle of the tomato since increased globalisation processes (especially from above). In relation to the production and consumption of food within a globalised system, Barndt (2008:69) observes that “we have become increasingly alienated from the land and the people who provide our sustenance.” This correlates with the concept of ‘distancing’, defined by Kneen (1993:11) as the separation of people “from the sources of their food and nutrition with as many interventions as possible.”

The increased monocultural and homogenised production of food within this new globalised food system has an essential impact on the biodiversity and cultural diversity elements within the food chain. Barndt (2008:70-71) argues that the growing fragmentation and uniformity that is also supported by the current economic system causes a global mental homogenisation. Shiva (1994:6) explains that the development of ‘monocultures of the mind’ “destroy(s) the living forces which arise from relationships within the ‘web of life’ and the diversity in the elements and patterns of these relationships.” This leads to the decrease in biodiversity and cultural diversity “as people who maintained biodiversity for millennia lose their knowledge and relationship to disappearing ecosystems” (Barndt, 2008:71).

The introduction of new technologies and the surging demand for “a new corporate flexibility of labour” also have a visible impact in the new global food system. Barndt (2008:71) explains that the work sector in this new system is completely restructured, placing emphasis on “just-in-time production, […] greater mobility of capital and the decentralisation of production.” The aim is to maximise the efficiency of the workplaces through a “quantification of all aspects of the work routine and production process” (Barndt, 2008:103). This efficiency has an impact on the worker
who in the process also becomes quantified and dehumanised. The technologisation is mainly driven by multinational corporations that subscribe to the so-called ‘technological package.’ As explained by Barndt, this package comprises (2008:71), “biotech seeds, pesticides, machinery, and [food] production practices.” The increased use of technology has a further impact on the elements of health and environment. In this context “the natural world is mediated by technology as an extension of human intervention” (Barndt, 2008:71) which directly affects human as well as ecological health.

Clark (2006:16) argues that it was “the institutionalization of neo-liberal principles in the global trading system and the involvement of corporations in the agro-food system” that picked up the pace “at which agro-foods are produced and the speed in which they are transported around the world.” Although neo-liberal theory posits that increased competition increases global prosperity, critics worry about increased inequality and poverty. This divergence is accentuated by the models of “globalisation from above and globalisation from below.” Globalisation from above describes the “collaboration between leading states and the main agents of capital formation.” Globalisation from below “consists of an array of transnational social forces animated by environmental concerns, human rights, hostility to patriarchy, and a vision of community” (Barndt, 2008:65). Both ‘types’ of globalisation take place simultaneously and are intertwined. For example, globalisation from below seems to be reactive to the globalisation from above. Barndt however also draws attention to “the other globalization” - people criticising and at the same time feeling ‘trapped’ in a system imposed by the globalisation from above. It is people who are “forced to work within a system that benefits but also exploits them” which gives them motive to form allies and jointly resist a system that does not seem to acknowledge social justice and environmental sustainability (Barndt, 2008:66). This movement perceives globalisation from above as the “continuation of deeply rooted colonial and imperialist practices” (Barndt, 2008:67) underlining the concepts of domination and hegemonic control. Mies and Shiva (1993:9) put it as follows:

The ‘global’ in the global order means simply the global domination of local and particular interests by means of subsuming the multiple diversities of economies, cultures, and/or nature under the control of a few multinational corporations, and the superpowers that assist them in their global reach through ‘free’ trade, structural adjustment programs, and, increasingly, conflicts, military or otherwise.
The companies and governments who are said to control this modern ‘free market’ are settled in Western Europe, North America or Japan. These countries were initially joined in the ‘Group of Seven’³, and after Russia’s inclusion known as the G8.⁴ According to Gorostiaga (1993:68), collectively, these nations have “eight hundred million inhabitants, control more technological, economic, informatics, and military power than the rest of the approximately four billion people who live in Asia, Africa, Eastern Europe and Latin America.” In 1974 the less powerful Third World countries formed the “Group of 77” coalition and demanded a New International Economic Order that would allow these nations to equally benefit from international trade and improve their “access to technological and financial resources” (Barndt, 2008:67). Unfortunately since then, acknowledged by the rich, powerful and poor nations alike, “inequalities have deepened not only between but also within countries of the so-called north and south” creating a growing gap between the richest and poorest 20 per cent of the world’s people (Barndt, 2008:67). This era of world-wide neo-liberalism promotes privatisation, deregulation and the removal of legal barriers which allow for free trade. According to Barndt (2008: 68), institutions such as the World Bank and the International Monetary Fund (IMF) “have replaced governments as decision makers” which led to a deepened debt crisis caused by the conditionalities of these institutions’ loan programmes, often referred to as Structural Adjustment Programmes (SAPS). Gibbon (2001:64) states that on a micro-level these policies also had an impact on the restructuring of the food chains:

As a result of the implementation of structural adjustment policies, most producer country markets have been liberalised and former state marketing monopolies commercialised, privatised or liquidated.

In this context Hamilton (2009:21) refers to the “dissolution of government-erected barriers to ‘free trade’ along with the proliferation of transnational corporations willing to build factories and employ workers almost anywhere in the world.” As pointed out by the South African Centre for Rural Legal Studies (2003), the form of globalisation from above can also be understood as “a new international consensus, particularly a Northern consensus” on the efficiency and effectiveness of the economic system.

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³ The Group of Seven (G7) includes the United States of America, Canada, Great Britain, France, Germany, Italy and Japan.
⁴ Given the recent developments in the Ukraine, Russia has been suspended from the G8 group in March 2014 after having violated various bilateral and international agreements, including the United Nations charter (Rampton, 2014).
Previously, it has been indicated that this ‘system’ refers to the liberalisation of markets or ‘free trade.’

It has been emphasised that “the gains from globalisation are very unevenly distributed within, as well as between, societies”; however, another view is that it is “virtually synonymous with development for a number of nations” (Gereffi et al., 2001). Ross (2003:440) directly links this notion of inequality to the global agricultural sector and believes that “peasant agriculture,” found in the global south, and “widely regarded as backward and unproductive in the context of a modern market economy”, has been subjected to function more profitably, commercially and as a “capital-intensive mode of production.” This compares to the findings of the South African Centre for Rural Legal Studies (2003) that describes the difference in the power held by the farmers in the global north versus the global south, as the ‘downfall’ of globalisation. In the case of the agricultural sector, it includes a reduced protection of farmers on the subject of price-hikes and changing conditions caused by the global economy. It is however known that farmers in the global north “are a powerful political force and they often manage to avoid agricultural liberalisation in their home countries” (South African Centre for Rural Legal Studies, 2003:3). Subsequently, their counterparts in the south have to solve emerging issues without government support, which includes tariffs or subsidies.

South(ern) Africa: Are things falling apart or into place?

By ‘imposing’ the Northern rule (once again) on the Southern countries, the latter’s economies were forced to participate in a rather one-sided game. Institutions such as the World Bank and the IMF believed that development in Africa should be accelerated by rapid economic growth, which would be attainable through trade liberalisation. The loans and support offered to Third World countries were and are, however, tied to so-called ‘conditionalities’. Stipulations, as discussed by Riddell (1992:53), are formulated by the global north for the global south, and include methods such as currency devaluation, reduction/removal of state intervention, and the elimination of state subsidies. Those Structural Adjustment Programmes (SAPs) were regarded as ‘formula for advance’ and a solution to Africa’s debt crisis.

“Most democratic industrial countries claim to have liberal economies, yet all – including the Unites States – have rejected pure market Darwinism, or complete
absence of regulation or welfare, as disastrous for economic development and political liberty” (Nester, 2001:326). In a free market system, as stated in the WTO Agreement on Agriculture, nations disapprove of state subsidies directed at farmers. In spite of this, as the South African Centre for Rural and Legal Studies (2003:4) has found, many countries in the global north are practising the opposite: “the European Union, together with other industrialised countries, spent US$360 billion on supporting farmers in 1999” and for that reason is regarded as “the biggest domestic supporter of all.” Brandon (2008) explains that “this unfair competition has resulted in long term negative effects for poverty, food security and the environment” in the global south. This biased contest for economic power and freedom is not on the side of previously and currently disadvantaged nations. The liberalisation project dictates minimal involvement of governments regarding support in various sectors, including the agricultural sector. However, industrial subsidies and support of local farmers are no exceptions in the global north (Brandon, 2008 and South African Centre for Rural Legal Studies, 2003), and consequently make it impossible for the already struggling nations to compete on an equal scale. Witt (2003:101) suggests that the adoption of the neo-liberal approach by emerging economies, including South Africa, “brings with it enormous social, economic and political costs”, such as “social tensions including violence against women, the marginalised, the poor, and ultimately, the earth.” He argues that neo-liberal advocates will put forward solutions to these problems by strengthening the processes of de-regulation, privatisation and “the imposition of a global corporate hegemony.”

Although South Africa had already adopted the globally dominant neo-liberal agenda with the NEM, the complete structural adjustment of the market economy only took place in the mid-1990s or, to be precise, December 1993 (Habib and Padayachee, 2000:245 – 250). It was then that the soon to be elected African National Congress (ANC) accepted the IMF’s proposition and assumed the Reconstruction and Development Programme (RDP). The main priority of this project was to reconstruct and develop the nation under the principles of trade liberalisations, tariff cuts and the creation of a competitive environment. The neo-liberal economic policy direction was strengthened over time with “cuts in social spending” and a “commitment to the sale of state assets” (Habib and Padayachee, 2000:252); supporting South Africa’s undertaking to follow in the shoes of the capitalist global north. However, unlike the
global north, South Africa is currently not a thriving state that can fulfil the socio-economic needs of its population. Rather, it is a country that is in need of building its capacity for skill and knowledge development and the eradication of corruption and mismanagement. The success of these neo-liberal reforms is questioned since “increasing unemployment and economic inequalities […] pushed even more of South Africa’s population into the poverty trap” (Habib and Padayachee, 2000:259).

**What does this mean for the agricultural sector in South Africa?**

According to Wilson (1999), the agricultural revolution “is part of the broader transformation of South African society.” As stated by Van Schalkwyk et al. (2012:20), “many countries in Africa have since the 1990s been dismantling government controls and converting to market-based food systems, believing that market reforms would enhance farm profitability through their positive effects on prices, investment levels, and commercialisation.” Through the adoption of neo-liberal reforms, the post-1994 South African government supports rapid trade liberalisation and privatisation as part of an overall deregulation of the South African economy.

However, this process of capitalising the South African agricultural sector did not start in 1994. Various changes in the political, social and economic environment in South Africa signalled a new approach to agricultural policy in South Africa during the 1970s. Vink and Van Rooyen (2009:4) summarise the framework of the South African agricultural sector throughout the apartheid regime:

> The state supported farmers through legislation such as the Cooperative Societies Act (1925) and the Marketing Act (1968), through investment in research and development, infrastructure, extension services and the settlement of farmers, and through protection of domestic markets from international competition. At the same time, a range of measures, such as the Land Act (1913) and the creation of the homelands, were put in place to suppress black farmers, both in the commercial farming sector and the communal areas of the former homelands.

During the apartheid regime, the ruling National Party (NP) strongly promoted a state-interventionist economic approach with heavy subsidies and support structures available exclusively to the white population. Up until the 1990s, “white commercial farmers […] received financial support and subsidies to the value of R3 912 billion to purchase land, for debt consolidation; to purchase implements and livestock; to improve infrastructure; for emergency drought schemes; [and] to convert marginal
lands” (Genis, 2012:1). The 1937 Marketing Act (later revised in 1968) gave the power of agricultural regulation to so-called Control Boards, e.g. the Maize Board. The goal of these boards was to keep “the domestic price above the world market price” by creating what Vink (1999:103) terms “a single channel fixed price scheme.” This meant that the Maize Board was the only buyer and seller of maize in South Africa at a fixed price. It established co-operatives that held monopoly powers by purchasing, storing and distributing the maize on the government’s behalf (Vink, 1999:103). Vink et al. (2002:2) explain that “a multitude of tariff lines, a wide dispersion of tariffs and various forms of protection such as formula, specific and ad valorem duties and surcharges” characterised South Africa’s trade regime during apartheid whereby “quantitative restrictions, specific duties, and a maze of price controls, import and export permits and other regulations in many cases eliminated any foreign competition.” Bernstein (1996a:11) describes this period as the “golden period of apartheid” when the government aimed at strengthening its political stability in order to attract “the return of foreign capital in the global economic boom of the 1960s.” This, however, was implemented at the expense of the non-white workers whose wages were kept “at depressed levels” through exercising state terror and crushing “the mass resistance that flourished in the 1950s” (Bernstein, 1996a:11).

Towards the end of the 1970s, with increasingly political unrest in South Africa, there was a realisation that these “discriminatory and price-distorting practices and policies could not be sustained” and, as stated by Genis (2012:2), “pressure started to mount to remove state support to agriculture and open up South Africa’s markets to international competition.” One event that highlights these political, economic and social changes in South Africa was the labour unrest and mass strike in the town of Durban during the early 1970s organised by the emerging and growing militant, black trade unions (Bernstein, 1996a:14). The late 1970s signify a clear shift within the South African agricultural sector. Vink and Van Rooyen (2009:4) observed a stronger focus on the deregulation of the financial markets, which, in turn initiated a process of deregulation in the agricultural sector that was partially completed by the early 1990s. However, with the advent of democracy in 1994, and the appointment of the first African National Congress (ANC) Minister of Agriculture in 1996, change started to take place much more rapidly.

With the change in government in 1994, the security for white farmers was no longer guaranteed. It was in fact completely withdrawn with the passing of the new
Marketing of Agricultural Products Act in 1996. The South African government “cut agricultural subsidies and stopped regulating the prices of agricultural products,” which included the abolition of all 16 control boards (Wilson, 1999; South African Centre for Rural Legal Studies, 2003). Combined with the reduction of domestic support, South Africa removed export subsidies and lowered barriers to trade in agricultural products in order to improve market access and contribute to the “further liberalisation of global markets” (Mokoena, 2003:7). In fact, together with Australia and New Zealand, South Africa belongs to the countries with the lowest state support for farmers (Vink, 1999:111), which is often seen as a major setback for the industry. While competing farmers in North America and Europe “continue to enjoy the fruits of protectionism” (Wilson, 1999), countries such as South Africa impose subsidy cuts and minimal government control in countries. The South African Centre of Rural Legal Studies (2003:5) explains that small-scale farmers especially are affected as they struggle to survive being unable to compete with cheap imports. Consequently, many farm workers are retrenched and are now “having trouble maintaining their living standards”, a true barrier to realising socio-economic rights in the ‘new’ South Africa. The South African National Planning Commission (n.d.) observes that agricultural employment in South Africa is declining over the years and predicts that by 2050 “80 per cent of South Africa’s population will be urban.” Additionally, regulatory bodies revised, drafted new and passed laws and regulations, such as the Extension of Security and Tenure Act; the Labour Relations Act; the Basic Conditions of Employment Act; the Employment Equity Act; the Skills Development Act; the Integrated Programme of Land Redistribution and the Agricultural Development Programme post-1994 in order “to destroy the paternalism on the farms, which is regarded as a relic of apartheid and even of ‘feudalism’ “ (Boehm and Schirmer, 2010:249-270). With the introduction of democracy and modern laws aiming to equalise South Africa’s society, the family-like paternal relationship between the white farmer and the black labourer was replaced “by a more impersonal, or capitalistic, boss-employee relationship” (Boehm and Schirmer, 2010: 250).

While the agricultural sector post 1994 is characterised predominantly by deregulation and privatisation, Genis (2012:2) points out that “the state increasingly regulated other aspects of the agricultural economy through labour and land reform
The introduction of minimum wage for farm workers was implemented in 2002 through the Sectoral Determination for Agriculture Act aiming to eliminate poverty through addressing “past inequalities and injustices associated with agricultural employment” (Murray and Van Walbeek, 2007:117). The act regulates the manner in which the wages have to be paid out and what percentage they have to be raised annually. Research conducted on three farms in the North West Province by Boehm and Schirmer (2010:267) reveals that “minimum wage did little to improve the income that the farm workers who remained employed actually received.” Boehm and Schirmer (2010:267) as well as the Bureau for Food and Agricultural Policy (2012:5) indicate that the act has “resulted in a decline in employment opportunities.” Another negative after-effect of the minimum wages, perhaps directly linked to the job losses and increased vulnerability of farm workers, was the increased crime rate. Boehm and Schirmer (2010:268) discovered that in the 10 years after the introduction of the minimum wage in the area of their research the police recorded the highest increase in criminal activities in 10 years. The police believe that many people lost their jobs with the introduction of the minimum wage, which made them desperate and prone to commit a crime.

Furthermore, the revised agricultural strategy post-1994 minimised government spending on agricultural extension and research (Mokoena, 2003:1). The establishment of provincial agriculture departments signified a fundamental structural change as priorities were no longer defined by central government. The Agricultural Research Council lost many researchers during that time. This in turn affected the research and development capacity, which “dwindled and in some cases ceased” (Mokoena, 2003:5). The creation and distribution of knowledge remains poor in South Africa. This is because of a critical underfunding of “technologies and production methods that can provide sustainable increases in agricultural production and improved management of natural resources” (Department of Agriculture, 8th Draft: 10).

Organised Agriculture in South Africa
Agri South Africa (AgriSA) is South Africa’s federation of agricultural organisations. It has been described as the “mouthpiece for all farmers at national level, with the purpose of ensuring the best possible financial and social position for the farmer within the national economy” (Department of Agriculture, Forestry and Fisheries,
It was established in 1904 and currently comprises of nine provincial and 28 community organisations. AgriSA’s mission is to promote “the development, profitability, stability, and sustainability of commercial agriculture in South Africa” on behalf of their members, which includes a diverse group of individual farmers (AgriSA, 2013) and agricultural cooperatives “by means of its involvement and input on national and international policy level” (Department of Agriculture, Forestry and Fisheries, 2006).

Other South African farmer’s organisations, representing mainly the smallholder’s sector include the National African Farmer’s Union (NAFU) and the African Farmer’s Association of South Africa (AFASA). The former was established in 1991 “with the aim of creating a ‘home’ for thousands of black farmers who had previously been excluded from the mainstream of agriculture”, as pointed out by the Department of Agriculture, Forestry and Fisheries (2006). However, the organisation had been under scrutiny regarding its functionality. Mashala (2010) explained that despite its existence for several years, NAFU lacks competent leadership and has no operating offices and staff members. He calls for a strong reorganisation of the organisation into a “strong, viable and well-run union” (Mashala, 2010) to represent the best interests of black, emerging and previously marginalised farmers. However, Mashala (2013) claims that by 2013, NAFU was “getting its house in order” by presenting its revised business model and strategies at a federal council meeting in Pretoria. One key focus of the union is to increase the market access for smallholder farmers as this directly contributes to greater profits and competitiveness for the farmers. AFASA was formed by former NAFU members in 2011 with the objectives to a) create a sustainable united body of African farmers with capacity to influence policies through lobbying and advocacy in favour of African farmers, b) facilitate development of competencies of African farmers in order for them to participate meaningfully in formal and informal markets and c) to mobilise resources for the benefit of African farmers (AFASA, 2011). There seems to be merit to the concern of having these two unions operate parallel within the same sector. The split may amount to a waste of resources due to political problems.

Due to the relatively young history of the two smallholder farmer’s unions mentioned above, AgriSA seems to be the primary commentator on the agricultural framework and government policies related to the sector. As mentioned before, farmers in
emerging countries struggle to compete with farmers in the advanced capitalist world. According to Hills (2008) AgriSA shares this sentiment and shows concern that “even with competition, first-world economies get more support and protection than the local market” in developing countries. This is said to cause “difficult economic circumstances and perceptions about how they [South African farmers] are valued by the government and other role players in society” with the result of many farmers, an estimated one third, having left the farming sector during the past 10 years (Hills, 2008).

There has also been extensive debate about land reform policies in South Africa. AgriSA (2010) has shown that the national farming organising body would like to increase their cooperation with government on this issue with the urge to restrain government from implementing a ‘drastic’ land reform that, according to AgriSA President Moller, is “dangerous and unworkable” (in Qalam and Lurnet, 2012). The land reform was part of the 1994 Reconstruction and Development Programme’s policy framework and was aimed at a) strengthening tenure rights for the rural poor, b) restitute land to those who could prove that their or their family’s land had been taken away under Apartheid and c) redistribute 30 per cent of agricultural land to the rural poor (Qalam and Lurnet, 2012). As the timeline to achieve these goals by the year 2000 could not be met, it is argued that the land reform has been hampered or even failed. The ruling party is currently engaging in a great deal of discussions around the topic of land reform investigating possible solutions that suit the previously disadvantaged farmers while not neglecting the power of the market.

What about organic farming?
As the previous sections highlight, globalisation viewed in a broader framework, especially since the 1980s, has increased the commodification of society together with the agricultural sector. Yet as Guthman (2002:295) observes, there has been a reaction to this – a “shift in consumption trends”, especially with reference to the organic market, due to increased industrialised globalisation. It is suggested that a change in consumption preference will directly impact the production patterns and, as a result, a further change in the food chain structures. Assuming there is a link between production and consumption, agricultural chains within an organic framework can be expected to experience a shift in production practices, marketing and distribution systems, as well as a change of agencies including grower
organisations and regulatory bodies (Guthman, 2002:296). Moreira (2011) also observed a change in consumer behaviour due to globalisation. New concerns related to various outcomes of globalisation lead to the adoptions of new types of diets, including consumers being “ethically or environmentally concerned” motivating them to consume organic produce as well as local produce in the light of fair trade (Moreira, 2011:138).

**Terminology and Statistics**

Organic farming and agriculture do not only reflect a change in consumer behaviour but a revised method in farming practices focusing on the preservation of the earth. The International Federation of Organic Agriculture Movements (IFOAM) provides a universally adopted definition of organic farming (IFOAM, 2013b):

> organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

The Minister of Agriculture and Livestock of Zambia, Honourable Emmanuel T. Chenda (cited in Auerbach et al., 2013:5), describes organic agriculture as one of the best practices in ensuring environmental sustainability. It sustains the fertility of soils, ecosystems and sustains the health of people. It relies on locally adapted improved ecological processes and cycles, and natural biodiversity rather than the use of synthetic inputs and genetically modified materials. It is therefore, important that our farmers are encouraged to practice organic farming [...]. I have no doubt that organic agriculture has potential to contribute to food security, increased incomes and generation of employment for our people.

In the 1950s, scientifically conducted experiments on organic agriculture were the beginning of a new development and institutions were established to support this movement. The now globally recognised International Federation of Organic Agricultural Movements (IFOAM) was founded in 1972 and has experienced immense growth over the past 40 years (Lockeretz, 2007:3). During the 1990s, the member states grew from 5 to 100 and in 2013 IFOAM counted 800 affiliates in 120 countries (IFOAM, 2013c). The growth of this organisation also represents the spread of organic agriculture on a global scale. Whereas in the beginning until the mid-1980s, IFOAM conferences were exclusively held in Western Europe and North America, Lockeretz (2007:3) states that since then conferences have been held “in
countries as diverse and dispersed as Burkina Faso, Australia, Hungary and Brazil, among others.”

In 2010, 37 million hectares account for organic agricultural land globally compared to 11 million hectares in 1999 (Willer and Kilcher, 2009:25). As demonstrated in Figure 3, “organic agriculture is developing rapidly, [...] its share of agricultural land and farms continues to grow in many countries” while the global demand increases steadily with a sales increase by over US$5 billion annually (Willer and Kilcher, 2009:19-20).

![Figure 3: Growth of Organic Agricultural Land by Region (Source: Fibi-IFOAM Survey 2012)](image)

Remarkably, with 97 per cent of global revenues for organic products derived from the United States of America and Europe (Willer and Kilcher, 2009:19), “almost half of the world’s [certified] organic producers are in Africa,” especially in Uganda and Ethiopia. Nevertheless, the organic market in Africa remains small; the produce grown on the approximately 900,000 hectares of organically certified land in Africa is predominantly for export to Europe.

**Organic benefits – Reality or Myth?**

Petrescu-Mag and Petrescu (2010:121) claim that organic farming is an important component of sustainable development. It helps to protect the environment, creates jobs, assists with food security and enhances rural development. They describe how the development of the organic sector in Romania helped the country to compete in European markets, increased their exports substantially, and therefore improved the
overall condition of the east European country. Klink (2009:1-19) has defined multiple reasons why organic farming and the development of the organic agriculture sector benefits not only the environment but also social and economic development. The absence of pesticides and preservatives leads to a decrease in greenhouse gases and lower environmental pollution, which contributes to the solutions for climate change. With the utilisation and increased consumption of regionally produced foods, the industry develops the local economy and reduces long distance transportation (Klink, 2009:3).

Halweil (2006) informs us of “studies from around the world showing that organic farms can produce about as much, and in some settings much more, than conventional farms.” He acknowledges that in its initial stages, organic farming may yield less produce than conventional farms as “it may take several seasons for farmers to refine the new approach.” Halweil (2006) believes that the argument regarding organic farming yields being much lower than conventional yields is “based on biased assumptions and lack of data.” Recent information shows that in fact “organic yields were about 80 percent of conventional yields” while many studies show an even narrower gap (Halweil, 2006). Also, the yield production depends on the type of crop that is produced. Gilbert (2012) explains that while conventionally farmed cereal and vegetable crops still yield more, organic approaches can increasingly compete with conventional farming practices “when producing fruits such as strawberries” by boosting the “yields of less-productive crops through land-management practices, such as planting them in rotation with leguminous crops that fix nitrogen into the soil.”

Key development challenges, such as food insecurity, issues pertaining land use and climate change have been analysed from an agricultural perspective in a recent Trade and Environment Review published by the United Nations (UNCTAD, 2013). The report acknowledges that an increase of deteriorating ecosystems, advanced erosion and climate change results in food security “especially for the most vulnerable, is becoming more uncertain” (UNCTAD, 2013:12). It is suggested that organic farming, together with agroecology “and some other sustainable production methods that are respectful to nature show the way towards producing more and better quality food” (UNCTAD, 2013:12).
There are critics who disapprove of the general hype created around the global organic movement. Compared with conventional mass farming, in the current organic sector the “relationship between commodities and social relationships remain obscured” (Saleh, n.d.:1), which calls for a revision of the ‘organic saga’ and a new solution to the real issue of sustainability. Authors speak of fetishising – basically industrialising – the organic sector. Saleh (n.d.:1) poses the question whether “this growth [that] spurs is that of sustainability.” The capitalist nature of today’s economy has created the “industrial organics,” meaning that large retailers have “adopted the grocery industry’s standard regional distribution system” (Pollan, 2006:138), which makes supporting small farms impractical. Miller (2004) argues that organic is a myth – a food movement that “makes a pest of itself” and states that there is a lack of evidence to support the idea that organic food is healthier than chemically grown produce. Environmental expert Rob Johnston (2008) supports the notion of the organic myth and explains that organic foods “are not healthier or better for the environment.” He refers to a study sponsored by the British Department for Environment, Food and Rural Affairs that has found that “a litre of organic milk requires 80 per cent more land than conventional milk to produce, has 20 per cent greater global warming potential, releases 60 per cent more nutrients to water sources, and contributes 70 per cent more to acid rain.”

Also, it is argued whether organic farming is truly more sustainable as opposed to non-organic practices, as it also uses pesticides. Johnston (2008) notes that organic potatoes “need more fossil fuel for ploughing”, while still producing fewer potatoes per hectare than conventionally farmed potatoes. He further disagrees with the notion that organic pesticides are better for the soil than synthetic pesticides. Johnson (2008) says “organic farmers can treat fungal diseases with copper solutions” and “unlike modern, biodegradable, pesticides copper stays toxic in the soil forever” creating a hazard for the soil in the long-term. Savage (2013) identifies these copper based organic pesticides as “high-use rate products that require frequent re-application and which are quite toxic to aquatic invertebrates.” He suggests that there are synthetic pesticides that are less damaging for the soil as they, “unlike copper, break down into completely innocuous materials.”

Additionally, organic farming is perceived as a more inefficient farming method as it produces lower yields and requires more land. Borlaug (2002:222) is concerned
about the fast growing world population. The U.S. Census Bureau (2012) confirms that “the world population increased from 3 billion in 1959 to 6 billion by 1999” and will continue to grow to nine billion in 2042. The 7 billion mark had been reached in 2012 (World Bank, 2012). In order to avoid global starvation, with currently 842 million people in the world suffering from chronic hunger (FAO, 2013), establishing methods to increase yields and overall production seems inevitable. Improved seeds, crop protection chemicals and synthetic fertilisers have, as Borlaug (2002:227) strongly affirms, contributed to economic development in the Western world and will protect humanity from “major problems like overpopulation, starvation, and worldwide diseases.” Walsh (2012) argues that conventional farming has up to 25 per cent higher yields per hectare than organic production can achieve. Savage (2013) adds that due to “limited pesticide options, difficulties in meeting peak fertilizer demand, and in some cases by not being able to use biotech traits”, organic farming yields fewer crops per hectare than conventional methods. As a result more agricultural land is required to grow food “destroying forests and other wild habitats” to create more agricultural farmland seems more straining on the environment than to “produce more food on less land” through conventional, more efficient methods (Walsh, 2012).

Borlaug’s argument that modern biotechnology is a response to the growing world food supply and the opportunity to develop “resistance to diseases and insects” (2002:224) directly challenges the organic concept. Although Witt is not in favour of biotechnology, he recognises that in the South African context, agribusiness and the state view “the adoption of genetically engineered crops by smallholder farmers [as a] substantial benefit” to the farmers (2010:299). Witt (2010:300) describes the last decade of the 20th century as a time in which there was “the commercial advance of the biotechnology revolution and the promise of a new age in agricultural productivity.” Biotechnology and its development can be directly linked to solving global malnutrition, undernutrition and world hunger. Those problems are, as indicated by Witt (2010:301), “due to insufficient inputs and a lack of technology transfers” and could be addressed by the introduction of new technologies. The New Partnership for Africa’s Development (NEPAD) is following the biotech industry’s offer to view biotechnology as a tool to improve agricultural production which would
lead to the development of “Africa’s rich biodiversity and indigenous knowledge base” – a progress that Witt critically calls “a developmental ‘fix’” (Witt, 2010:301).

South Africa in particular has voiced strong support for biotechnology, opposing many other African countries that have expressed concern regarding this matter. According to Monsanto (2013), “South Africa was one of the first developing countries to commercially approve transgenic crops” and to develop a Biotechnology Strategy led by the Department of Science and Technology. It is also recorded that “South African farmers have responded to the new technology and adoption appears to be doubling every year. Currently 85% of all cotton planted in South Africa is transgenic, 20% of the maize and an estimated 40% of the soybeans.” This is confirmed by Witt (2010:302) who recalls South Africa always having had “a relatively well-developed biotechnological sector.” A brief overview of the development and growth of biotechnology is provided by Monsanto (2013):

**Pre 1994** - South Africa Gene Experimentation (SAGENE)\(^5\) established (handled applications)

1995 - Cotton seed for first commercial release of Bollgard (insect protected cotton) in USA produced by Delta Pine in South Africa (1995) and exported to US for sale

1997 - First Biotech crop commercialised and launched (Bollgard) in Africa

1997 - GMO Act promulgated - first for Africa

1998-2002 - Biotech crops shown to be scale neutral - Makhathini cotton project

1998 - YieldGard (insect protected maize) launched, and first licensee signed up (Pannar)

1999 - AfricaBio launched in Oct 1999, and registered as section 21 company in Feb 2000

2000 - The GMO Act was finally put into place in November

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\(^5\) SAGENE was formed in the late 1970s by university and private research institutions that had begun doing microbial-level biotechnology work, and had already developed guidelines patterned after those in the United Kingdom.
2001 - First Roundup Ready crops commercialised (RR Cotton, RR soya –Roundup herbicide resistant)

2003 - RR Maize commercialized

2004 - Farmers spend more than R40 million on transgenic technologies etc. according to an article in the *Landbou Weekblad*

2004 - Bt 11 (Syngenta) maize approved

Following global debate around the advantages and disadvantages of biotechnology, many African countries, excluding South Africa, question the overall “economic, developmental, social and environmental impacts of the new wave of biotechnological innovations” (Witt, 2010:301). The ethical implications of this new technology and the question around ownership are also areas of concern.

In common with Adams and Miller, Borlaug does not believe that organic farming will be able to feed the ever-increasing world population. These critics demand a more sceptical outlook on organic as it “may have a good image, but it takes up more land for the same yield as crops.” Adams (1990) believes that “an organic farm could never become a net exporter of produce without running down soil fertility.” Van Tine and Verlinden (2003:1) confirm that with the increase of world population, “growing organically was no longer a feasible way to feed society.” What is presently known as conventional farming is the solution to “produce greater yields for the larger population.” Cambridge chemist John Emsley (in Halweil, 2006) goes so far to say that “the greatest catastrophe that the human race could face this century is not global warming but a global conversion to ‘organic farming’”- and he estimates that two billion people would perish.

The assessment of the environmental impacts of organic farming by Shepherd *et al.* (2003) undertakes a thorough analysis of the factors that determine whether organic is in fact better for the environment than conventional farming. The overall conclusion states that “organic farming can deliver positive environmental benefits” (Shepherd *et al.*, 2003: 65). Figure 5 provides a visual summary of the assessment.
Alternative farming methods

A key pillar of organic agriculture that up until now has only been vaguely mentioned includes the standardisation and certification processes related to organic farming. IFOAM (2013b) defines organic standards as “sets of requirements applicable to organic operators (including farmers, processors, and traders). Operators who want to sell their products as organic must, in many cases, comply with at least one organic standard, and be verified against this standard.” These standards are regulated by either government bodies or private frameworks – some standards are internationally applied and some localised. Rigby and Cáceres (2001:25) describe these regulating standards as “one of the aspects of organic production which separates it from many of the other alternative agricultural movements”, such as integrated pest and crop management, low input (sustainable) agriculture, agroecology, permaculture and biodynamic farming. Barndt (2008:308) names the Slow Food Movement found in 1989 as another undertaking countering the “fast food and fast life” promoted by commercial, inorganic agricultural practices. This movement places particular emphasis on the protection of traditional production methods and scrutinises the “relationship between the plate and the planet” (Barndt, 2008:308), especially the access of traditional products to the market. According to the Slow Food Movement (Slow Food Movement, 2013) it further “opposes the standardization of taste and culture, and the unrestrained power of the food industry multinationals and industrial agriculture.”

A farmer who wants to label his products organic has to undergo a rigid certification process. IFOAM (2013a) confirms that in order to call products ‘organic’, the products usually “must be certified to a particular standard or government regulation.” As a result, many farmers choose to farm sustainably instead of organically and label their products as natural, farmed naturally or biological. Rigby and Cáceres (2001:22) explain that “the word sustainable is derived from the Latin, sustinere, meaning to keep in existence, implying permanence or long-term support.” Sustainable agriculture is defined by Ikerd (1993:30) as “capable of maintaining its productivity and usefulness to society over the long run […] it must be environmentally-sound, resource-conserving, economically viable and socially supportive, commercially competitive, and environmentally sound.”
It is crucial to emphasise that “organic farming is one type of alternative agriculture” among many, as pointed out by Bowler (2002:209). Although the alternative farming methods mentioned above are spared the stringent regulation framework that defines the certified organic farming processes, all methods and approaches fall under sustainable farming methods. The tables below (Figure 4 and 5) highlight the key differences between conventional and alternative agriculture, the latter including organic farming.

![Figure 4: Characteristics of conventional and alternative agricultures (Source: Curry-Roper, J. 1992)](image)

This paper will not further expand the discussion on alternative farming methods. However, a slightly more in-depth discussion around sustainability is in Chapter Six, Interpretation of Research Findings, with a specific focus on the ecological, economic and social dimensions of sustainability.

*Organic Sector in South Africa*

In spite of weak government support, Bouagnimbeck (in Willer and Kilcher, 2009:118) acknowledges that due to a growing middle class, the domestic market for organic produce is expanding in South Africa. Major retailers, such as Pick’n’Pay, Shoprite/Checkers and Woolworths are increasingly promoting organically grown products (Du Toit and Crafford, 2003; Rundgren, 2008; EPOPA, 2006). However, the development of an organic sector, thereby following the global trend, does not seem to be a priority of the South African Department of Agriculture. Many policies support chemical and commercial agriculture: as noted by Thamaga-Chitja and Hendriks (2008:317), “this country does not have legislated organic standards to govern the industry.”
A study commissioned by the South African Trade and Industry Chamber (2008) to develop a value chain strategy for sustainable development and growth of organic agriculture states that "the international growth of organic agriculture is not necessarily reflected in South Africa." However, it also considers this farming method as promising and having great potential for the country's agricultural sector. It is potentially large losses from ploughed leys, but smaller losses, on average, from other points in the rotation. Insufficient information. Few pesticides used in organic production. Insufficient information – work ongoing.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Assessment of impact</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biodiversity</td>
<td>☑️</td>
<td>Organic principles encourage a wide variety of habitats.</td>
</tr>
<tr>
<td>Soil Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organic matter content</td>
<td>☑️</td>
<td>Potential benefits from organic farming, depends on organic matter inputs on individual organic and conventional farms.</td>
</tr>
<tr>
<td>Biology</td>
<td>☑️</td>
<td>Literature tends to support a benefit, but not always.</td>
</tr>
<tr>
<td>Structure</td>
<td>☑️</td>
<td>Literature tends to support a benefit, but not always.</td>
</tr>
<tr>
<td>Erosion susceptibility</td>
<td>☑️</td>
<td>Few direct measurements, but organic practices should decrease risk.</td>
</tr>
<tr>
<td>Water Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrate leaching</td>
<td>☑️</td>
<td>Potentially large losses from ploughed leys, but smaller losses, on average, from other points in the rotation.</td>
</tr>
<tr>
<td>Phosphorus loss</td>
<td>☑️</td>
<td>Insufficient information.</td>
</tr>
<tr>
<td>Pesticides</td>
<td>☑️</td>
<td>Few pesticides used in organic production.</td>
</tr>
<tr>
<td>Human pathogens</td>
<td>☑️</td>
<td>Insufficient information – work ongoing.</td>
</tr>
<tr>
<td>Air Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonia</td>
<td>☑️</td>
<td>No direct studies. Assessed from what is known about processes.</td>
</tr>
<tr>
<td>Nitrous oxide</td>
<td>☑️</td>
<td>Insufficient information.</td>
</tr>
<tr>
<td>Methane</td>
<td>☑️</td>
<td>Most data relate to dairy systems. Lower emissions on an area basis due to lower livestock densities.</td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>☑️</td>
<td>Main energy input relates to fertiliser manufacture.</td>
</tr>
<tr>
<td>Resource use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy efficiency</td>
<td>☑️</td>
<td>Depends where boundaries are drawn when comparing systems, but main energy input into conventional is fertiliser production.</td>
</tr>
<tr>
<td>Nutrient balance</td>
<td>☑️</td>
<td>Smaller surpluses. OK if not over-depleting soil fertility.</td>
</tr>
<tr>
<td>Controlled wastes</td>
<td>☑️</td>
<td>Emphasis on recycling. Less packaging and no agrochemical waste.</td>
</tr>
</tbody>
</table>

Key:
- ☑️ Organic is better than conventional
- ☑️ No difference between organic and conventional
- ☑️ Organic is worse than conventional
believed that issues such as “poor infrastructure, lack of government support, lack of technical knowledge, and stringent management requirements such as record-keeping” (2008: 2) slow down the development of a strong organic sector and demand the establishment of a sector body as well as “a clear and inclusive policy and regulatory environment” (2008: 8-9). The National Policy on Organic Production (Department of Agriculture, Forestry and Fisheries, 7th Draft: 4) envisions organic farming becoming “the mainstream form of agriculture to comply with agendas such as Sustainable agriculture, the Clean Development Mechanism and the proclaimed Green and Clean Economy.” By comparison, the Policy on Agriculture in Sustainable Development (Department of Agriculture, 8th Draft: 27) commits to creating an environmentally-friendly agricultural sector with emphasis on sustainable farming methods for which “a ten-year implementation plan needs to be developed.”

Conclusion

This literature review focused on the conceptualisation and contextualisation of commodity chain analysis on a macro-level by incorporating the linkage between globalisation and changing food chains throughout the discourse. The approach has further been narrowed down focusing on changing patterns to the South African agricultural sector and outlining differences regarding alternative versus conventional farming with a focus on organic practices.

The Commodity Chain Analysis approach has been identified as a fitting method to explore numerous segments within a chain. Overall, utilising this approach, the researcher “seeks to identify and illuminate the individuals, institutions, technologies, forms of knowledge, and forms of capital involved in transforming raw agricultural products into consumable foods” (Hamilton, 2009:17). According to Friedland (2001) many social scientists also use the chain analysis to identify the social, political, or cultural aspects of commodities. Bernstein (1996b) conducted a commodity study of the maize filière in South Africa aiming to explore the industry’s production conditions, how maize is produced, marketed, processed, distributed and finally consumed. Most importantly, the approach assisted him to identify agents, institutions and regulations that control and transform the chain.

Changing structures in societies, transformation of economic models and political views are other aspects that relate to changing commodity chains. Over the years,
various commodity chain analyses depict different actors that hold power and control the changes within a chain. Trade liberalisation and free market models have replaced the manufacturer with big retailers and brand marketers as drivers of the chains. Also, technological advances contributed to a further transformation of commodity chains regarding the role of the internet and more consumer-driven models being at the centre of debate.

The impact of a globalised world order on food chains seems two-fold. On the one hand, the decline of trade barriers has improved global trade relations leading to growing participation of Third World countries. Foods are available beyond their seasonality and often at cheaper prices than before. Governments have changed in their role of regulator to becoming observers. On the other side, globalisation has fuelled mass-commercialisation removing the food from its producer so it is evolving into a distant object of profit. Globalisation has imposed an economic model on Third World countries and emerging economies that does not seem to be to the latter’s benefit.

Structural Adjustment programmes and the pressure by the First World to adopt neo-liberal reforms and open up the market has had an immense impact on South Africa’s agricultural sector post-1994. Many farmers struggle to access the market and fail to compete with farmers in Europe who are supported by their governments. South Africa is committed to the idea of a free market and does not promote state support for farmers, whether they are commercial or alternative (organic). Policies and draft documents are in place. However they lack appropriate and dedicated enforcement.

The debate on conventional farming versus alternative and organic farming has opinions on both sides. While experts from various fields question the defined benefits of organic produce, others describe it as the most appropriate alternative and sustainable method. Internationally recognised organic bodies together with governments in numerous countries are developing a strong and rigid framework that defines organic production with set standards and regulations. Although this outline of standards aims to serve as a check and balance for farmers and consumers, many feel that it limits a farmer’s efficiency and productivity. Although many farmers follow the sustainable and organic farming concept, their inability to
conform to these confined regulations does not allow them to label their produce as *organic*. As a result, many move from farming organically to sustainably utilising alternative methods, such as permaculture and agroecology, amongst others. South Africa acknowledges the importance of growing the organic sector that is currently still relatively weak and unsupported. Evidence suggests that policy development in this sector strives towards the strengthening of sustainable farming methods rather than building the organic industry.
CHAPTER THREE – HISTORY OF THE STRAWBERRY

Introduction

It is one of the fastest growing crops over the last 30 years, with an annual consumption estimated at about seven billion pounds, produced around the globe in 75 or more countries.

This is how Ben Safronovitz (2011:56) summarised the successful growth and spread of strawberries on a global scale. This chapter aims to provide a brief overview of the history of the strawberry. This study entails the analysis of the strawberry chain on two farms in the Magaliesberg. A better understanding of the strawberry fruit in a global context will assist understanding of the chains being analysed in later chapters.

Starting at the earliest records during Roman and Greek times, the journey of the strawberry is outlined as it develops from being a wild garden strawberry to one of the most versatile fruit cultivars amongst farmers. Darrow (1966:314) confirms that the strawberry “in all its parts is one of the most changeable of all crop plants, and for this reason it is one of the most widely adapted and widely cultivated of all crops.”

The section below assists with gaining some general insight into the historical and technical aspects of strawberry production in South Africa, in its global context. The crop is said to have arrived with Jan van Riebeeck (Karsten, 1955) in 1656 and was extensively grown and cultivated in the Western Cape. There are also records that strawberries were favoured crops amongst farmers in the former Transvaal region (now Limpopo) as this industry flourished in that area during the 1970s. This was also the time when agricultural research centres across South Africa managed to develop ideal strawberry cultivars that adapted well to the climate conditions in South Africa and produced large and tasty fruits. Currently the strawberry industry is dominated by a few large farm organisations that supply mainly to the local retailers. Smaller growers believe the costs and risks involved with farming the fruits are too large given the current economic conditions and policy framework of the South African agricultural sector (Bourbon-Leftley, 2013; De LaPorte, 2013; Safronovitz, 2013).
Origin and Earliest Records of the Strawberry

The origin of the *Fragaria ananassa*, the botanical term for the modern strawberry species mostly cultivated today, dates back to the “small-fruited strawberry types native to woods and fields of Europe and England” (Wilhelm, 1974:264) in the Northern Hemisphere. This form of wild strawberry was already known to “the Romans and perhaps even the Greeks” (Darrow, 1966). According to Wilhelm (1974:264), Cato the Elder (234-149 B.C.), a Roman statesman, allegedly “raised strawberries and supervised his patch personally” as he was especially fond of this fruit. Wilhelm and Sagen (1972:20) recite an anonymous report which states that he preferred them “soaked in wine or sprinkled with salt and spices”, which however was not confirmed in any other writings of that time. On the word of Wilhelm and Sagen (1972:21), Pliny the Elder, a Roman author and naturalist, “gave us the description from which we derive the botanical name *Fragaria*, mentioning the strawberry “*Fraga*” in his book as a natural product of Italy (Darrow, 1966).

During the Roman times and presumably earlier, the strawberry was popular for its medicinal purposes and therapeutic use. The authors of the Latin Herbal of Mainz (*Herbarius Latinus Moguntiae*, 1484) depict what is to be believed “the first illustration of the plant in printed work” (Figure 6) and alongside the picture recommended to prepare the fruit, leaves and roots from the strawberries “for ailments such as throat infections, kidney stones, headaches, skin blemishes, bad breath, fractures and bruises” (Wilhelm, 1974:264). Darrow (1966:17) confirms that botanists and strawberry growers “discovered its [the strawberry’s] supposed medical uses” in as early as the 1500s. These early records of the wild strawberries, as described by the Romans and Greeks (and possibly earlier), are however far removed from the type of modern strawberry that is known to us today. One of the first strawberry varieties was the Alpine Strawberry that was found in the Alpine village of Bergemon in France and “in its original, unimproved
form […] produced small, misshapen fruit” (Wilhem and Sagen, 1973: 32). Botanists termed the wild strawberries as “not so good as those that are manured in gardens” (Venner 1638 in Wilhelm and Sagen, 1972:30) which motivated growers during those times to start cultivating these wild types in order to stretch the bearing season and to increase the fruit size of the strawberries (Wilhem, 1974:265).

First Varieties and Beginning of Cultivation

While literature acknowledges the wild strawberry types native to Europe as the origins of the ‘modern strawberry’, Wilhelm (1974:265) states that the strawberry of today “did not materialize through long cultivation of select wild types of Europe” but rather as “something entirely new” through what Bailey (1894:328) describes as the “evolution of a new type of plant.” It was the crossing of the North American Fragaria virginiana and the South American Fragaria chiloensis that instituted the cultivation of the strawberry on a global scale. The Virginian strawberry (Fragaria virginiana) was known to be exceptional flavoursome and sweet with fruits ripening early but also being more perishable than other kinds (Wilhelm, 1974:266, Wilhelm and Sagen, 1972:60). This was confirmed by later authors who claimed that the plant “runnered excessively, bore poor crops, and developed powdery mildew, particularly on the fruit” (Wilhelm, 1974:266). Notwithstanding, the English colonists came to appreciate the wuttahimneash, or ‘heart seed berries’ as they were known to the North American Indians, and it became “the first foreign strawberry to reach Europe” (Bailey, 1894: 294). Records in 1624 show that this strawberry type was firstly imported as a seed to England by the scientific advisor Thomas Hariot in 1586 (Wilhelm, 1974:266). After its first introduction to Europe, growers considered this ‘new world strawberry’ as “only marginally superior to the native European wood strawberry” with small and soft fruits (Hancock and Luby, 1993:143). This led to a limited distribution of the variety in Europe, except in England where people were particularly appreciative of the Scarlet of Virginia (Figure 7). According to Wilhelm (1974:266):
The fruit ripened in England three weeks before any other strawberry, and its pronounced flavour and acidity made it particularly desirable for jams and confections.

The second foreign strawberry species to reach Europe was the *Fragaria chiloensis* from Chile in 1712. The Spanish priest José de Acosta described this species as followed (in Wilhelm and Sagen, 1972:86):

The fruit called Strawberry of Chile is very pleasant to eat and approximates the flavour of cherries... they are white when ripe, more pointed and larger than mulberries. It is said that in Chile the strawberry is found growing naturally in the fields. I have seen it so, luxuriating and spreading like other garden plants.

The Mapuche and Huilliche Indians from Chile, who called it *quelghen*, were known to already grow and cultivate this strawberry for centuries until the mid-1500s (Darrow, 1966:25).

Lieutenant Colonel Amédée Francois Frézier, who worked as an engineer for Louis XIV of France, arrived in the coastal region of Concepción in Chile in 1712. The large fruited strawberry that grew in this territory drew his attention. He named it *Fragaria chilensis fructu maximo, foliis carnosis, hirsutis, vulgo frutilla* – Chilean strawberry with largest fruit, fleshy, pubescent leaves, commonly called *Frutilla* (Figure 8) (Wilhelm and Sagen, 1972:88). Frézier returned to Marseilles with this strawberry in 1714, where he gave two of the *Frutilla* plants to Antoine de Jussieu, director of the Jardin des Plantes in Paris (Wilhelm, 1974:266). Although this new plant was known to bear fruits “as big as a walnut and sometimes as large as a hen’s egg” (Wilhelm, 1974:266), the popularity of this new strawberry species remained limited. The plant “developed great hairy runners over a foot long” bearing deformed fruits and was not able to fertilise itself (Wilhelm, 1974:266, Bailey, 1894:296). This great disappointment was the result of Frézier unknowingly bringing back “only female plants and no males to fertilize them” (Hancock and Luby, 1993:143). Around 1750 the Chilean strawberry was introduced at the

![Figure 8: Fraise du Chili or Frutilla as described by Frézier in 1712 (Source: Wilhelm and Sagen, 1972)](image-url)
Botanical Garden of Brest in Brittany where farmers started experimenting with the new varieties aiming to improve the plants. They discovered that “its barrenness was due to lack of pollen” (Wilhelm and Sagen, 1972:102) and successfully identified the *Fragaria virginiana* as a successful pollinator (Hancock and Luby, 1993:143). As Wilhelm explained (1974:267):

> With an eye for the development, they [Breton farmers] devised a planting system in which rows of the Chilean strawberry were alternated with rows of the Virginian, and in this way produced excellent crops.

With this successful method of strawberry cultivation, the Brest region “became the centre of commercial strawberry production in Europe” (Hancock and Luby, 1993:143) supplying the markets of Paris and London with fresh strawberries from 1750 onwards for over 100 years. By 1857 “nearly 500 acres of the Chilean strawberry were cultivated near Brest […] and over 2,500 in all of Brittany (Wilhem and Sagen, 1972:102-103).

By interplanting the female plants of *Fragaria chiloensis* with the males of *Fragaria virginiana* the first *Fragaria ananassa* hybrids were developed, also called Pine strawberry (Hancock and Luby, 1993:143). The first to describe this new species was Philipp Miller in 1771 (in Wilhelm, 1974:267) as a plant with “large, oval, crenate leaves with prominent veins, and the large flowers borne on upright trusses were distinguished by large spreading calyces” (Figure 9). Antoine Nicolas Duchesne was also amongst the first to document the Pine strawberry in 1766 in his *Histoire Naturelle des Fraisies*. He described it as “a cross between the Scarlet strawberry [*Fragaria virginiana*] and the Frutiller [*Fragaria chiloensis*]” which were pollinated at Brest (Wilhelm and Sagen, 1972:122). The fruit is described as “shaped like a flattened oval” with “the first fruits "monstrous" in size, and the color a dull red and very pale on the underside” (Darrow, 1966: 55).
With these newly discovered hybrid cultivars, formal strawberry breeding on a large scale began in the early 1800s. Thomas A. Knight and Michael Keen were amongst the first popular large scale strawberry breeders in Europe who contributed significantly to the development of many modern cultivars (Hancock and Luby, 1993:143). Bailey (1894:298) writes about the “various interesting and successful crosses amongst the Scarlet or Virginian strawberries” made by Knight and about the Keen’s Seedlings from which “the present English strawberries have largely descended.”

**Strawberries in the natural world**

Belonging to the rose family, *Rosaceae, genus Fragaria*, “strawberries are not really berries or fruit in the ‘botanical’ sense”, but are actually “aggregate” fruits (Safronovitz, 2011:56). The red-fleshed object that is often perceived as the strawberry fruit “is actually an enlarged receptacle” and the actual fruits, as explained by Safronovitz (2011:56) “are the objects we think of as the ‘strawberry seed’ […] which are fruits in the same way that a raw sunflower seed with its tough shell is a fruit.”

According to Darrow (1966:314) the strawberry in all its parts is “one of the most changeable of all crop plants, and for this reason it is one of the most widely adapted and widely cultivated of all crops.” Wilhelm (1974:271) describes the strawberry as a plant with a “rare genetic make-up” that “more than any other fruit, thrives in many different climatic regions.” The characteristic to adapt easily to various climate conditions makes it possible to grow this fruit widely. Darrow 1966:355-356) explains that the plant can survive in the irrigated desert as well as in areas receiving 100 inches of rainfall; from sea level to elevations of 10,500 feet; from cold areas with -50°F. to the semi-tropics; under the continuous light of summer in the Arctic to the twelve-hour day under the Equator; in glass houses and under glass or plastic covers, with concrete blocks, and with plastic ground covers as mulches; as a six month crop, and as a crop occupying the same soil for hundreds of years.

Research shows that strawberries “can be grown on a variety of soils provided it is fertile enough and drains well” (Du Preez and Welgemoed, 1976:11). The plant however prefers sandy loams as the nutrients and moisture are retained to a maximum under these conditions. The strawberry’s shallow root system requires
constant irrigation in a light soil and as a result “sufficient moist at root zone is essential at all times” (Safronovitz, 2011:56) in order to prevent a loss in vitality and yield. If strawberries are grown in “heavy loam and clayey soils [that] usually drain poorly” (Du Preez and Welgemoed, 1976:11), the plants could grow a weaker root system. As pointed out by the Department of Agriculture, Forestry and Fisheries (DAFF, 2010:3), “the health status of the plant” is detectable by “the colour and consistency of the vascular systems of the roots.” The whiter and more flexible the central vascular strands of the roots are, the healthier is the strawberry plant.

The strawberry plant is also considered prone to pests and diseases, “which vary widely in their destructiveness and their distribution” (Darrow, 1966:366). A major pest recorded amongst strawberry growers is the red spider mite (Du Preez and Welgemoed, 1976:47; DAFF, 2010:12). They can destroy the entire crop “by sucking the sap from the leaves”, especially from those “which are exposed to direct sunlight” (DAFF, 2010:12). Other insects like crickets, cutworms, bollworms and carnation worms pose a threat to the strawberry plant and, as recommended by experts, can be fought with insecticides, safe agents, such as Cathane and Omite (Du Preez and Welgemoed, 1976:47) or, as described in DAFF’s strawberry production guideline (2010:13), “by spraying the affected plants with a diluted sugar or soap solution.” Botrytis, a grey mould that attacks the strawberry fruits and flowers is another disease known to many strawberry farmers. According to DAFF (2010:13) and Du Preez and Welgemoed (1976:50), humid and hot weather conditions facilitate the outbreak of this disease that in the end will lead to the entire strawberry plant being covered “with a dense grey blanket of mycelium” (DAFF, 2010:13). This fungus growth can be treated with weekly sprayings of fungicides (DAFF, 2010:13; Du Preez and Welgemoed, 1976:51).

**Strawberries in South Africa**

As mentioned above, the strawberry plant is native to the Northern Hemisphere and is therefore not indigenous to South Africa in the Southern Hemisphere. Strawberries could be classified as a niche crop in South Africa and have been planted and produced in South Africa on a commercial basis since the beginning of the 20th century. Local breeding programmes have contributed to the development of cultivars that are suitable for the climate conditions in South Africa and reinforced the development of the strawberry industry in the country. A brief outline of the history of
strawberries in South Africa is provided below. I attempted to review the development of the strawberry industry in South Africa historically\(^6\) and on a geographical scale. Furthermore, a brief summary of cultivation practices provides further information about strawberry production in South Africa.

**Brief overview of the history of strawberries in South Africa**

It is assumed that strawberries arrived in South Africa with the Dutch colonial administrator and founder of Cape Town, Jan van Riebeeck. He is said to have mentioned the berries in his diary entry on 11 October 1656 in which he mentioned that “… currants and strawberries are also striving well …” in South Africa (Karsten, 1955). This is believed to be the first reference to strawberries in South Africa.

There seems to be little literature documenting the development of the strawberry production in South Africa. As a result, it is difficult to establish a clear timeline regarding the history of strawberries in the country.

A Memorandum of Agreement from 1915 (see Appendix 2) indicates that Mendel Zetler was amongst the first farmers to commercially produce strawberries in South Africa. In an interview with the author, Mendel Zetler’s grandson Jeffrey Zetler explains that Mendel Zetler emigrated from Belarus to South Africa in 1904, when he started a small food plantation near Stellenbosch, only growing a few rows of strawberries (Zetler, 2013). Over the next years, the Zetler farm and its strawberry production would increase substantially. In 1915, as per the Memorandum of Agreement, Mr Zetler commits himself to provide 4000 pounds (approximately 1.8 tonnes of strawberries) to H. Jones & Co. (S.A.) of Paarl during the period of October 1915 and February 1916. An article in the Paarlpost (2012) indicates that in the Jones and Co. factory, the fruits were processed into jams and preserves, as this market was booming in South Africa at the time. Even later, during the 1950s, strawberry production in South Africa mainly served the canning industry, with 445 tons of strawberries being harvested and supplied during the 1957-1958 season (Darrow, 1966:311). Literature confirms that in the Western Cape, the province in which also Zetler started growing his strawberries, approximately 80 per cent of the

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\(^6\) Due to the shortage of literature on the topic of strawberries in South Africa, the author acknowledges possible gaps in the historical outline provided.
crop is processed whereas in other South African provinces “85 per cent of the crop is marketed fresh” (Human, 1989:757).

In 1922 the Royal Society for the Encouragement of Arts, Manufactures, and Commerce (Journal of the Royal Society of Arts, 1922:369) listed strawberries amongst others as “principal fruits grown upon a commercial scale” in South Africa.

Later references suggest that strawberry production also flourished in the northern region of the former Transvaal Province. Mr W. J. van Eck produced strawberries in the former Warmbaths region (now known as Bela Bela) since 1945 followed by Mr and Mrs Solomon who began growing strawberries near Onderstepoort in 1966 (Du Preez and Welgemoed, 1976:6-8). Experts familiar with the South African strawberry industry (De LaPorte, 2013; Safronovitz, 2013; Zetler, 2013) suggest that there are also several successful strawberry farmers in the Kwazulu Natal region. Du Preez and Welgemoed (1976:9) confirm that by the mid-1970s “strawberries were also planted on a fairly large scale in Natal.”

During the mid-1970s, South Africa, especially the summer rainfall area in the former Transvaal around Rustenburg, Brits, Pretoria, Johannesburg and Krugersdorp experienced an increase in strawberry production. Literature suggests that prior to the mid-1970s, only selected farmers (mentioned above) produced the crop on a smaller scale whereas in 1975 the Horticultural Research Institute predicted “that strawberry production is going to reach saturation point in the Transvaal” (Du Preez and Welgemoed, 1976:7). The experiments carried out by the research institutes and the Department of Agriculture at the time led to an improvement in the cultivars, particularly in the area of disease control, and a progress in the cultivation methods, which resulted in higher yields per hectare. Du Preez and Welgemoed (1976:7-9) explain that this raised the interest in strawberry production immensely and propose that “in some areas it [was] regarded as one of the prime horticultural crops.”

In the late 1990s, about 300 hectares of strawberries were farmed in South Africa, led by the Western Cape with 180 hectares followed by the former Transvaal Province with 120 hectares (Human, 1989:757).
Breeding Programmes and Cultivars

At first, cultivars were imported from overseas with the Tioga cultivar being the most successful amongst more than 200 cultivars that were evaluated (Human, 1989:757). However, these imported cultivars adapted poorly to South African conditions and thus were not grown for very long (Human and Louw, 1991:42). Strawberries are grown predominantly in two regions in South Africa: the summer-rainfall area (regions of the former Transvaal Province) and the winter-rainfall area (Western Cape). Given that different cultivation methods are applied in the two regions (Du Preez and Welgemoed, 1976:4) cultivars must be suitable for the climate and soil conditions in the respective areas. However, as Du Preez and Welgemoed (1976:7) noted, the imported varieties did not fit these conditions and were not really suited.

In the 1940s, P.A.L. Steyn initiated the first local breeding programme in Stellenbosch at the Western Province Fruit Research Station. In 1969, the Strawberry Plant Improvement Scheme of the Department of Agriculture and Technical Services was established in order to provide the growers with disease free plants from registered nurseries (Human and Louw, 1991:43). Another pioneer in strawberry research was E.P. Evans, who headed a successful breeding programme at the Horticultural Research Institute in Roodeplaat7 from 1959 onwards. The farmers called him “the ‘King’ of strawberries in the Transvaal” for “the tremendous advance of the strawberry industry over the last few years” he initiated (Du Preez and Welgemoed, 1976: 6).

Since 1945, 14 cultivars have been released to the market from the Department of Agriculture’s Western Province Fruit Research Station and the Horticultural Research Institute Roodeplaat.(Human, 1993:37), namely the Bien Donné No 1, 2 & 3 (1954); Klaradyn and Festival (1960), Robyn (1964); Karmyn (1966); Parfaite (1969); Selekt (1973); Tiobelle (1978) and Rolinda, Rolissa, Rorine and Rovelle in 1983 (Human and Louw, 1991:43). The two most successful locally bred cultivars were the Selekt and the Tiobelle. The former cultivar produced a large fruited strawberry that was mostly produced in the former Transvaal Province and the latter “a high yielding” plant that “is preferred in the Western Cape” (Human, 1989:757).

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7 Approximately 25km north of Pretoria
According to Du Preez and Welgemoed (1976:28-29) the Selekta cultivar was “the biggest of all marketable strawberries” characterised by its exceptional taste, quality and long shelf life. Alongside the newer cultivar Chandler™, the Selekta remains the most popular cultivar throughout South Africa. Rowles (2012:10) reported that she harvested perfect strawberries of the Selekta cultivar in 2012 “with hardly any irrigation or fertiliser applied to the beds.” The Department of Agriculture, Forestry and Fisheries (2010:5) describes Selekta cultivars as follows:

The fruit is long and wedge-shaped, red in colour, has an attractive glossy shine and with a high sugar content. This cultivar is particularly suitable for the fresh market. The flesh in the centre of the fruit has a white colour. […] This cultivar is reasonably resistant to leaf diseases, grows vigorously but is sensitive to late planting.

The development and release of these two cultivars during the late-1970s, contributed largely to the successful growth of the South African strawberry industry as mentioned above. Human and Louw (1991:44) explain that after these new cultivars were introduced “production was increased six-fold and the quality of the fruit was greatly improved.” In 1989, the value of the annual strawberry crop was estimated at 25 million rands with yields of 20/30 tons per hectare (Human, 1989:757).

Cultivation Practices
Strawberries have been grown in open fields for about the last century (Safronovitz, 2011:56). Farmers plant strawberries in rows of two or three on slightly raised beds (DAFF, 2010:9; Du Preez and Welgemoed, 1976:32; Human, 1989:757). In order to protect the plants from weeds, dirt and cold, the beds are covered with plastic mulch (Human, 1989:757) or alternatively with straw (DAFF, 2010:10), veld grass hay, groundnut chaff or broken maize stover to keep the fruit clean and to stop soil moisture evaporation (Du Preez and Welgemoed, 1976:36). The use of straw or other natural materials as ground covers is cheaper than using plastic and also proves to be more environmental friendly than the plastic mulch. As pointed out by DAFF (2010:10), “straw provides a habitat for spiders which predate on other harmful insects […] and] is also an excellent source of compost, which will ensure long-term improvement of the quality of the soil.”
In order to overcome challenges such as prolonged cold periods or heavy rains, many farmers grow the strawberries in tunnels. Safronovitz (2011:56) describes this as a “permanent feature used to maintain soil temperature during the cold period or protect crops during heavy rains and hail storms.” In South Africa, the farmers in the summer rainfall region especially grow strawberries in tunnels. This protects the plants from the often extreme weather conditions and extends production time from May until mid-December (Human, 1989:757). Farmers in the former Transvaal region were reported to cultivate in tunnels “to establish a market and maintain continuity in production” as the tunnels prolong the season (Du Preez and Welgemoed, 1976:15).

**Strawberries Today**

South Africa is not a global market leader in strawberry production. Farmers grow the crop as a niche product mostly for the local market. As shown in Figure 10, the United States of America produces the most strawberries in the world.

![Figure 10: Overview Global Strawberry Production in 2011 (Source: FAOSTAT, 2013)](chart)

As mentioned, strawberry production in South Africa experienced a steady growth since its cultivation from the early 1900s. The graph below (Figure 11) illustrates an above average growth in strawberry production during the 1970s. The support of the agricultural department explains this great growth during this time: it carried out extensive research and experiments to develop better cultivars.
With an increasing number of farms planting strawberries during the 1970s, it becomes evident that the crop gained popularity amongst farmers and was regarded as a fruit bearing great potential in the agricultural sector.

Figure 11: Strawberry Production in South Africa (Source: FAOSTAT, 2013)

Yet, as Figure 11 also illustrates, since early 2000, strawberry production in South Africa is declining. This however does not reflect the global development of strawberry production (see Figure 12), which continues to grow steadily.

Figure 12: Global Strawberry Production (Source: FAOSTAT, 2013)

Billy Bourbon-Leftley (Interview, July 2013), the chairperson of the South African Strawberry Growers’ Association, explains that strawberry farming in South Africa is continuously losing popularity amongst the farmers. At the moment, between 350 –
400 hectares of land are farmed with strawberries by 15 – 20 farmers in total. However, there is a concern that this number will further decrease as many farmers either reduce their farming scale or discontinue strawberry farming altogether.

Bourbon-Leftley gives several reasons for this discouraging outlook. Firstly, strawberry farming is not viable in South Africa. The farmers invest too much in the production process of the crop and in return get paid too little for their produce. Bourbon-Leftley (2013) explains that “the large retailers are dictating the market price, which has not increased in years.” Yet on the other side, prices for plastic (to cover plants), chemicals (for fertilising) and packing materials have steadily increased (up to 20 per cent) over the past ten years, which caused many farmers to fail to break even at the end of the production season. Secondly, retailers are demanding a prolonged supply time stretching beyond the natural production season of strawberries. If a farmer tries to meet the demands of these large retailers for 12 months supply, tunnels are required in order to secure these quantities. As explained above, strawberries grown in open fields are exposed to natural climate conditions which does not allow for a production time of 12 months. These tunnels, as pointed out by Bourbon-Leftley (2013), are very cost-intensive; thus only large-scale farms can afford them. Moreover, farmers are dependent on these retailers because “farmers are prohibited by government regulations […] to supply their produce directly to the public” (Richardt, 2012:10).

Another factor described by Bourbon-Leftley (2013) as a “downfall for strawberry farmers” is the revised policy environment within the South African agricultural sector, especially with regards to wage regulations. Since strawberry farming requires a large amount of manual labour, wages are among the biggest costs for the farmer. However, it is argued that the rising costs of labourers (having to pay them higher wages) is not reflected in higher productivity or growing outputs as the labour force remains largely unskilled. Also, local producers are competing with strawberries from Zimbabwe, which seemed to have caused tumult in the South African strawberry industry (Legg, 2013). Retailers are increasingly importing strawberries from Zimbabwe as they are cheaper than South African ones. Legg (2013) says that Zimbabwe does not have a minimum wage law or labour

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8 Reference is made to the large South African retailers, such as Woolworths, Checkers and Pick’n’Pay
regulations comparable to South Africa’s. Thus “Zimbabwean farmers produc[e] strawberries at a fraction of the cost of their South African counterparts.” South African farmers feel that they are forced to play an unfair game by competing against someone who does not have to play by the same rules (Legg, 2013).

Conclusion
The strawberry’s journey from being a wild forest berry mainly used for medicinal purposes by the ancient Greek and Romans to the modern cultivated fruit that is “one of the most widely adapted and widely raised of all crops” (Darrow, 1966:314) has been well documented. The evolution of the *Fragaria ananassa*, the modern strawberry species, took centuries and owes much of its success to strawberry pioneers like Antoine Duchesne, Amédée Francois Frézier, Thomas A. Knight and Michael Keen. They were either explorers who brought the fruits from far places to Europe and North America or dedicated botanists who diligently raised and developed cultivars that could be farmed on a large-scale in different climate conditions.

Today, strawberries are prominent crops worldwide as they are adaptable to various regions and relatively easy to grow. Although the plants are easily infested with pests and diseases, farmers can keep their crops healthy and reap high yields throughout the season if appropriate treatment strategies are followed.

Strawberry cultivation in South Africa dates back to 1656 (Karsten, 1955). Similar to Roman times, strawberries are grown as a niche product with two to three farms dominating the market. A breeding programme in the 1940s developed 14 cultivars which were “released for commercial cultivation” (Human, 1993:37) in South Africa as they were better adjusted to South African climate conditions than the previously imported plants. This breeding process was predominantly conducted in Stellenbosch at the Western Province Fruit Research Station and “has continued there on a limited scale to the present” (Darrow, 1966:311). Better suitable cultivars and strong government support for research raised the interest of many South African farmers to start growing strawberries. Statistics show that the popularity of the fruit reached its peak during the 1970s. During early 2000, strawberry production in South Africa declined, and this has continued until today. Poor economic conditions (global and local), continously rising prices and the remaining power of
the large retailers are contributing factors for the decline in strawberry farming in South Africa. Small-scale farmers are struggling to remain profitable and it appears that only large-scale farms continue to realise revenues with strawberries as they are able to meet the demands of the retailers. As a result, the competition in South Africa amongst strawberry farmers remains limited as the market is dominated by two to three large-scale farms. They make profits that can be reinvested in tunnels or other means ensuring improved strawberry quality and the required quantities throughout the year.
CHAPTER FOUR – RESEARCH DESIGN

Introduction
This dissertation appertains to the field of agricultural research that is carried out by social scientists. Agricultural research is mainly conducted by non-social scientists and environmentalists on a quantitative basis. However, various researchers such as Bernstein (1996b), Well (1996) and Barndt (2008) have engaged in agricultural research (and commodity chain analyses) to highlight social, political and cultural aspects in commodities and to explore the role of non-consumers and external influences, such as historical circumstances and government regulations, on the agricultural commodities studied.

The following chapter will discuss the research methodology applied in this research. A wide range of literature finds that the commodity chain analysis approach is often found in the context of agricultural research. Also this study utilised a commodity chain analysis approach of a qualitative nature in order to examine steps and agents involved in the processing of strawberries on two farms in the Magaliesberg region in South Africa. Furthermore, the case study approach was applied as two separate analyses were carried out at two different farms.

Based on the qualitative nature of this research, data-gathering methods as reviewed below include in-depth interviews, telephonic interviews as well as secondary research. The latter assisted to deepen the insights into the topic and to strengthen the argument put forward. The data was collected on two farms located in the Magaliesberg region in the North West Province in South Africa. The two farms were not selected randomly but based on pre-determined criteria, including availability, location, size, and farming method.

Furthermore, as with all qualitative research that includes interviewing and personal interactions, ethical considerations had to be taken into account. It will be explained carefully how ethical conduct was applied throughout this study. This includes the importance of a consent form, the establishment of a trust relationship between the respondents and the researcher as well as the acceptance of ethical values, such as honesty, privacy and accountability.
Another point discussed in this chapter is the limitations of the research. Questions around validity and relevance arise in the broader sense of the overall scope of the research. I would have preferred to analyse the strawberry chain through different lenses, such as the farmers and workers perspective. Regrettably, the focus remained with the farmers which had a direct impact on the research scale. This view as well as possible language limitations will conclude the research design section.

**Commodity Chain Analysis**

In the literature review the concept of commodity chain analyses was discussed on a broader level. It was explained how chain analyses evolved as a research tool over time, potential strengths and weaknesses were identified and a more specific chain analysis, the *filière* approach was discussed. At this stage, the commodity chain analysis will be discussed as a research tool specifically in relation to this research. As mentioned before, the terms commodity chains and *filières* will be used interchangeably.

A commodity chain analysis has many advantages when attempting to explore strawberry production on differing farms in South Africa. Ribot (2005:5) defines commodity chain analyses as a “series of interlinked exchanges through which a commodity and its constituents pass: extraction or harvesting, production, transformation, transport, distribution, wholesale, retail and end use” and “seeks to identify and illuminate the individuals, institutions, technologies, forms of knowledge, and forms of capital involved in transforming raw agricultural products into consumable foods” (Hamilton, 2009:17). A chain analysis is further used to investigate the “relations of farmers large and small to workers, […], consumers, the state and the environment” (Friedland, 2009:18) in the different links within a chain.

This study in particular was based on the French *filière Approach* (*filière*-chain). *Filière* studies, as highlighted in the literature review, are used as a method to study agricultural commodities and food systems. Raikes *et al.* (2002:2) explain that this tool originates from the field of technocratic agricultural research and presented an analytical framework for the former French colonial states corresponding with their agricultural commodity orientated development policies (Raikes *et al.*, 2000:2). *Filière* studies “map out actual commodity flows and […] identify agents and activities
within a *filière* (Raikes *et al.*, 2000:14). This approach was best suited to examine the differences and similarities between the two strawberry farms. Standing as an objective analysis, this study is used, as defined by Raikes *et al* (2000:13), as a “neutral, practical tool of analysis for use in ‘down-to-earth’ applied research.” According to Friedland (2001) many social scientists use chain analysis to identify the social, political, or cultural aspects of commodities. This forms part of the definition by Faße *et al.* (2009:1), which explains that the one form of commodity chain analysis “consists of methods with a more descriptive and qualitative emphasis.” Wright (1999:13) reiterates the importance of analysing the non-consumers within a chain, which has been omitted in traditional approaches. The latter simply explored the grower-buyer relationship, whereas the revised methods include agents like the state, labour relations, economic growth, cultural differences, retailer policies and the environment.

This study is inspired by the perspective of commodity chain analyses as well as the *filière* approach. Commodity systems, as stated by Friedland (2009:17), usually examine 1) production practices in modern agriculture, 2) grower organisations, 3) labour supply and labour practices, 4) scientific research in agriculture, and 5) marketing and distribution beyond farm gate. The chains in this study have been narrowed down and only the differing production practices, labour supply and practices on the farms and the state of the agricultural sector in South Africa – pre- and post-1994 were studied given the limited scope of this dissertation as well as time and budget constraints. Marketing and distribution processes were not included in the scope. Also, the chains have been examined from a single perspective, the farmer’s perspective; hence workers have not been interviewed. The analysis of the strawberry production process on the two farms in this study has followed certain principles and steps present within a commodity chain analysis, however it does not reflect a traditional and complete commodity chain analysis.

It further provides an understanding of the differences and similarities between non-commercial and commercial farming in numerous aspects. As was mentioned above, this study was not of extensive nature and represents no more than an objective analysis of strawberry production in South Africa utilising certain tools provided by commodity chain analyses in order to explore external factors and agents that are
present within the chain of strawberry production on two differing farms in the Magaliesberg in South Africa.

Methods

Qualitative Research
This research was designed in a qualitative framework utilising methods such as in-depth and qualitative interviews. As proposed by Strauss and Corbin (1990:19), qualitative research “can be used to uncover and understand what lies behind any phenomenon about which little is yet known.” Following the research question that aimed to explore the links in the strawberry chains combining social, economic and environmental aspects, the necessity for qualitative methods as opposed to quantitative research was apparent. The former explores in-depth experiences in the form of words, pictures or objects whereas the latter involves an objective measure of research focusing on statistics, numbers and research width. In quantitative research the variables are already determined and therefore control the study within certain boundaries. Qualitative research on the other hand, “does not want to place this understanding within the boundaries of an instrument that we designed beforehand because this will limit the data to those very boundaries” (Henning, 2005:4).

Case Study
Case study research has been acknowledged as a suitable research tool in the field of social science and has been defined by Yin (1984:23) “as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.”

The case study as a research tool “has broad research application and epistemological, ontological and methodological flexibility”, and as stated by Luck et al. (2006:103) “provides a delineated boundary for inquiry, and a structural process within which any methods appropriate to investigating a research area can be applied.” Miller and Salkind (2002:163) further define it as an “in-depth description of a process, [...] or an activity” aiming to explore a case (or multiple cases) over time by collecting in-depth data from various sources. Additionally, it enables the
researcher “to go beyond the quantitative statistical results and understand the behavioural conditions through the actor’s perspective” (Zainal, 2007:1).

The cases in this research were Farm A and Farm B. Applying the case study method assisted me to gather information about both farms with different conditionals (mentioned below), and to examine their differences and similarities in the processing of strawberries. Farm A and Farm B presented individual complex entities that “as a whole […] need[ed] to be comprehended” (Rihoux and Lobe, 2009:4) in order to gain further insight into the topic on hand (Miller and Salkind, 2002:164).

The complexity in my research is reflected in the different links that have an effect on the commodity chain analysis of the strawberry farming at the individual farms. The insights include information on different farming methods and procedures distinguishing organic and non-organic farms. I focused on general themes, such as planting, maintaining and harvesting. By implementing the case-by-case and cross-case type of interpretation I was endeavouring “to identify similarities (or contrasts) across the ‘thick’ case narratives” (Rihoux and Lobe, 2009:26) in order to generally be able to “formulate propositions that we can then apply, with appropriate caution, to other similar cases – that is, cases that share a reasonable number of features with the cases” (Rihoux and Lobe, 2009:27) chosen in my study.

**Personal Interviewing**

Throughout the research, two types of interviews were conducted: the face-to-face interview and telephonic interviews. The advantage of face-to-face interviews is the personal interaction between the researcher and the respondent. Opdenakker (2006:7) states that “social cues, such as voice, intonation, body language etc. of the interviewee can give the interviewer a lot of extra information that can be added to the verbal answer of the interviewee on a question.” In comparison, during a telephonic interview, the interviewer is not able to observe all the social cues as described above and limited in creating a good interview atmosphere, however several advantages turn it into a convenient tool for researchers. The interviewer is given wider access to participants who would otherwise be difficult to engage with on a face to face basis as they are located far from the interviewer (Opdenakker,
As a result, telephonic interviews are often cheaper and less-time intensive as the researcher does not have to physically meet the respondent.

In the course of this research, I arranged for eight face-to-face interviews in total. I conducted 18 hours of intense research on Farm B and six on Farm A that included personal interviews, an inspection of the farms and general participant observation. Also, the author’s personal relationships and links established among the farmers in this area prior to the formal research process served as informal field research. During the field work conducted over one year, observations into the farms’ operations and daily routines assisted to extend the knowledge pool about growing fruits and vegetables utilising organic principles. Furthermore, the challenges faced by Farm A, including financial problems and difficulties to supply consistently were observed in comparison to the pressures Farm B is confronted with.

One personal in-depth interview was conducted in February 2012 at Farm A with Hendrik, the owner of the farm as respondent. In terms of our personal history, it was an informal setting and I did not find it difficult to gain access to Hendrik. He openly discussed his farm, its history and the ins and outs of organic farming. It was a situation as described by Johnson (2001:6) in which the “informant would be a kind of teacher and the interviewer a student.” A two-hour conversation with Hendrik, prior to my initial research field work, provided me with information about Farm A’s operation as well as with helpful insights and knowledge about the agricultural sector in general. This proves that in-depth interviewing is not limited to “common sense perceptions, explanations, and understandings …” but aspires “to explore the contextual boundaries of […] perception, to uncover what is usually hidden from ordinary view or reflection …” (Johnson, 2001:7).

Six interviews were held at Farm B with various stakeholders over two days in May 2012. The first meeting was with two of the three farm owners, Marius and Pieter, at their office and pack-house on the farm plot. I explained the research rationale in detail and explained their role in the process. As previously mentioned they were helpful and agreed to show me all the different stages of strawberry production on their farm. As stated by Willis (2007:21) “some tension or conflict between the three

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9 Name changed
10 Name changed
11 Name changed
contexts of the interview: life world, interview situation, and analytic framework” may occur, however it is perceived as a deeper form of conversation. In this case, attempting to build a relationship with the farmers, accommodating them in the comfort of their office, and having a chat over a cup of coffee afforded me the trust and information gathering that I would have not achieved with a structured guide in my hand, working from point to point.

A more structured and formal approach was taken during the other interviews. Spending an entire day on the farm and visiting the farm nursery afforded me the opportunity to actively witness the processes on the farm, operations in the pack-house and observe the women picking in the field. Respondents included the farm’s quality assurance manager, the grower and two employees who manage the spraying and irrigation system. These interviews were conducted in a Q&A style, “with the emphasis on researchers asking questions and listening, and respondents answering” (Warren, 2001:2). Nonetheless, qualitative interviewing (the method used for interviewing these respondents) is based on interactions between the researcher and the participants seeking “to understand the meaning of respondents experiences and life worlds”, as stated by Warren (2001:2).

Malebo¹², the quality assurance manager, informed me in detail about her responsibilities and in particular about the course of action from the time the strawberries arrive in the pack-house from the field. In order to shed light on the process she showed me a DVD compiled by a leading food retailer that captured the steps – similar to this research’s objective – from planting to distribution. The retailer documented this process for their employee training sessions when their staff are taught about the origin and production of the produce sold.

A more interactive approach was taken when interviewing Jan¹³, Farm B’s plant grower. He gave me a guided tour of the farm, the nurseries and the pump house. I spent approximately two hours with him, which helped me gain a thorough understanding of the steps taken in the processing of strawberries. For the duration of the tour I recorded our conversation so that I could pay full attention to what I experienced.

¹² Name changed ¹³ Name changed
On Farm B, various individuals are employed for specific tasks and procedures that are implemented on the farm. For gathering more information about the organic experiment that was carried out on Farm B, two employees that are responsible for the spraying and irrigation systems on the farm were interviewed. They had worked at Farm B longer than the grower (who was not there when they implemented the trial) and they were actively involved in this project. Again, the respondents were very co-operative and took almost an hour to answer my questions. I did not plan to interview these respondents and was therefore grateful for their co-operation as my visit was unannounced. During the impromptu interview, I, as the interviewer, had to adapt to the setting as I was not prepared for this specific interview and I had to remain “attentive to the variety of meanings that [could] emerge as the interview progress[ed]” (Willis, 2007). Diplomacy and objectivity was crucial to conduct the interview in a professional manner considering that the respondents were emotionally invested in the topic of discussion.

Another face-to-face interview was conducted in July 2013 with Ben Safronovitz, an expert in strawberry growing in South Africa with specific focus on hydroponic cultivation. The information gathered in this interview added to the data I collected on a secondary basis. He has been involved in strawberry production in South Africa since over 30 years and is not only familiar with the development of the industry in South Africa over the years, but is especially experienced in the biological adaption of the fruit and helped developing methods most suitable to grow strawberries in South Africa. His input was particularly valuable for chapter three of this dissertation: History of the Strawberry.

I tape-recorded all my face-to-face interviews after the participants signed an informed consent form (see Appendix 1). Recording the conversations was extremely helpful to capture the large volume of knowledge communicated to me. After transcribing all the audio files, I then had easy and immediate access to the data gathered without having to listen to the tapes again. This form of data organisation ensures that nothing is lost and that all the collated information drawn could be utilised to formulate research outcomes. According to Opdenakker (2006:9), this is the great advantage of tape-recording: “the interview report is more accurate than writing out notes.”
In addition to the face-to-face interviews, I conducted three telephonic interviews for this study. As stated before, this method is particularly convenient if the respondent is located far from the researcher. In my case, I interviewed three respondents who are not located in close proximity to Gauteng (my current location): Armand de LaPorte in Limpopo and Jeffrey Zetler and Billy Bourbon-Leftley in the Western Cape. As I could not afford to travel to their locations, the telephonic interview method was convenient. As aforementioned, there is little written acknowledgement and documentation of the strawberry industry in South Africa. Besides Safronovitz, these three respondents provided me mostly with information about strawberry production in South Africa. De LaPorte is a strawberry grower in Limpopo and is an expert in this field since the early 1980s. He also provided me with the book *Strawberries-Cream of the Crop* by August du Preez and André Welgemoed. Jeffrey Zetler is one of the well-known Zetler brothers, who are amongst the biggest strawberry producers in South Africa. He is managing director of Zetler and Sons, the business started by his grandfather Mendel Zetler in the early 1900s. Bourbon-Leftley is the chairperson of the South African Strawberry Growers Association and the source who provided me with up-to-date information regarding strawberry growers in South Africa.

Overall, the techniques I used to connect with the respondents assisted in the overall interviewing process. I made an effort to build a trust base through listening, understanding and remaining objective to the research at hand. The farmers felt they could be honest with me and shared their knowledge, experiences, and opinions openly without being judged. The respondents assisting me with their expert knowledge on strawberry production in South Africa even agreed to use their real names throughout this study.

**Data collection**

My fieldwork took place on two farms in the Magaliesberg region, North West Province, South Africa. The participating farms were chosen according to the following criteria:

- Farming Method
- Size
Availability
Location and Accessibility

I have distinguished and classified both farms for the following chapters. Farm A refers to the small-scale, alternative farm. Farm B signifies the large-scale, conventional farm.

Farming Method
IFOAM (2013d) considers “any system that uses organic methods and is based on the Principles of Organic Agriculture as 'Organic Agriculture' and any farmer who employs such practices and such systems as an “organic farmer” regardless of whether the products are marketed as organic or not.” Yet, this paper refers to the small-scale farm as alternative instead of organic, because even though Farm A grows its produce following organic principles, the products cannot be legally labelled as organic due to non-certification. IFOAM (2013d) confirms that if a farmer wants to call his or her products organic they “must be certified to a particular standard or government regulation.” Thus Farm A can be considered an organic farm for the purposes of this research since organic agriculture methods and approaches are implemented (non-chemical fertilisers, natural farming) but cannot be legally called an organic farm given that Farm A is not registered with an accredited certification body. The second case in this study is the large-scale, commercial Farm B. I refer to commercial farming based on factors of commercial farming, which include a) the acreage cultivated is 20 acres or above, b) the labour force extends the family unit, c) the application of mechanical aids and d) the continuous production of crops for sale (Richards et al., 1973:9). Farm B is cultivating 90 hectares of land, employing 150 permanent workers, apply synthetic fertilisers and produce strawberries for sale on a continuous basis.

This study seeks to explore how different production methods (alternative versus conventional) have an impact on the links within the complete strawberry production chain (filière).


Size

Besides the different farming methods, another key intention was to establish differences and similarities between a small and a large-scale strawberry farm. This research focuses on two categories classifying the farms according to their size:

- Large-scale
- Small-scale

In a South African context, as discussed by Kirsten and Van Zyl (1998:552), the definitions for large-scale and especially small-scale farming are often misleading. They found that large-scale farming is often associated with modern, efficient farming with high technology input done predominantly by white farmers (Kirsten and Van Zyl, 1998:552). Small-scale farming on the other hand “is often equated with a backward, non-productive, non-commercial, subsistence agriculture that we find in parts of the former homeland areas” and is “generally associated with black farmers” (Kirsten and Van Zyl, 1998:552). This study shows (using Farm A as an example), concurring with Kirsten and Van Zyl’s (1998:558) findings that firstly small-scale farming is not reserved for black subsidence farmers in the former homelands and secondly has the potential to be an efficient and profitable farming alternative to large-scale commercial counterparts given “the neutrality of the policy framework facing farmers” (Kirsten and Van Zyl, 1998:558).

The Ministry for Agriculture and Land Affairs (1998) acknowledges large scale farmers as employment-providers who contribute “to social stability and safety in rural areas.” Small-scale farmers play an essential part in innovation by utilising “improved inputs” and providing the local market with produce.

The grower on Farm A operates his farm on a small scale, cultivating less than one hectare of strawberries and sells his produce mainly to the local consumer. He employs one permanent worker and up to six seasonal workers. Farm B plants strawberries on a large scale, cultivating almost 90 hectares of land and providing the country’s leading retailers with strawberries. According to the South African Strawberry Grower Association (Bourbon-Leftley, 2013), Farm B is currently the biggest strawberry grower in South Africa. Its labour force consists of 150 permanent staff and close to 2000 seasonal employees.
It has been argued that alternative farming methods, such as organic farming does not present a realistic alternative for the future, as it is only sustainable on a small scale. Leu (2004) quotes Malthus and Ehrlich’s population theory which states that the massive increase in world population will lead to world hunger and as a result more effective farming methods than organic are required as well as new approaches that manage to “feed the world” (Leu, 2004). As a result, an important dynamic in the commodity chain analysis in this research project was to examine the validity of this concern and attempt to interpret the meaning of the size of farm and its relevance to the farming methods applied.

Availability
During my past working experience which entailed distributing produce from the Magaliesberg region to Johannesburg, valuable contacts with farmers who could facilitate access to the chosen research subjects were established. In respect of Farm A, the setting up of a formal farm visit and interview was unproblematic; however, initial attempts to make contact with Farm B were challenging and required endurance and patience. Another contact agreed to help me approach the conventional farm as it was considered inappropriate to appear unannounced at the farm. I felt that a rushed meeting would have harmed my research as the farmers might not be willing to open up to me and show active co-operation. After months of polite phone calls, informal chats and continuous reminders to the contact to connect me with the relevant farm, in May 2012 I finally received Farm B’s email address and permission to call the farm owner. It took two weeks to arrange a formal visit. Surprisingly, considering the difficulty to reach the farm, the owners showed great interest in my research and were more than willing to co-operate.

Location and Accessibility
Both farms are situated in the Magaliesberg region of the North West Province in South Africa. One distinction would be that Farm A is located on the southern slope of the mountain range whereas Farm B operates on the northern slope. The weather conditions fluctuate on these slopes, with the southern slope being slightly colder and more prone to frost during the winter months.

Initially, the key reason for choosing farms in this area was the ease of access. During the course of my proposal writing and secondary research, my interest in
conducting research in the North West Province and specifically the agricultural sector within this region as relevant to my research, grew. With its proximity to Johannesburg, the economic hub of South Africa, and boasting agricultural opportunities (National Development Agency, 2010), such as its suitable climate conditions and proximity to a potential market and distribution channels, it could be anticipated that this region would experience thriving agricultural development. However, various reports suggest otherwise. The province’s unemployment rate lies at 28 per cent (Statistics South Africa, 2010) and 60 per cent of the population live below the poverty line (National Development Agency, 2010). Statistics South Africa in 2007 confirms that the province’s development in certain areas is out of sync with the national trend. An example is the proportion of people living in formal settlements, which decreased from 2001 to 2007 in the North West, whereas nationally that number increased. In addition to this, the infrastructure, which includes the road network, remains inadequate and fails to connect the province to major economic centres, such as Johannesburg. The National Development Agency (2010) has pinned agriculture as the key development focus of the North West Province – thus this research may be relevant with its findings discussed in the following chapters.

**Ethical Considerations**

Subjects’ names were used for communication purposes only during the interviews but this study was conducted on an anonymous basis, meaning that the identity of the participants is protected throughout the paper by replacing their real names with pseudonyms; however, their position held on the farm has been mentioned. By request, the identities of the experts who were interviewed have been revealed in this research paper. The respondents could withdraw from the conversations at any time in case of discomfort. Respondents were made aware that they were participating solely on a voluntary basis, and no form of remuneration was given to them. Furthermore, absolute privacy was assured with regard to the provided information. Records during the interviews would not be shared with other respondents under any circumstances. Nonetheless, it is important to note that the student’s supervisor from the University of Johannesburg had limited access to the collected data as he assisted throughout the process of analysing the research. In spite of this latter access, the identities of the participants remained unknown.
Recordings were made with the participant’s approval. The footage is stored safely and will not be accessible to any person not associated with the university. If the recordings are applicable and relevant to other studies, they may be used or analysed at a later stage for different projects within the tertiary institution. The master’s dissertation is published as an academic paper and remains the property of the University of Johannesburg. Accordingly, it forms part of the institution’s knowledge platform, which is accessible to the public. Nonetheless, as already promised, the participants’ dignity will be protected and their identity remains protected all the way through the study.

Johnson (2001:2) proposes that “in-depth interviewing offers great advantages, but it also entails some risks and dangers as well as some distinct ethical considerations.” In my research one obstacle was that the respondents were asked to share the following information: information that dealt with the process of handling strawberries, personal questions relating to the treatment of the workforce, defining their role in the ‘new’ South Africa in comparison to the past, and to give their opinions on the current government. In general, participants were asked to share “personal feelings and reflections as well as their perceptions of others”, which according to Johnson (2001:19) could be problematic for both, the interviewer and the interviewee. Consequently, Johnson states that the researcher is “obligated to take whatever steps are necessary to protect the individuals who have cooperated in the research from any misuses of the information they have shared” (Johnson, 2001:20). I have attempted to do this by protecting the identity of participants throughout the study and handling the recording with care so they are not subjected to any misuse. Furthermore, I ensured that before signing the consent form (see Appendix 1), the respondents were familiar with the research and fully aware of the implications of the study.

Limitations of the study
Findings derived from qualitative research are dependent on the participant’s information and the individual skills of the researcher to conduct such a study. Therefore the accuracy of the research findings is contingent upon the honesty of the farmers and accuracy of the information provided by them. Their main role is to plant strawberries and sell them for a profit. At times, Hendrik (Farm A) glamorised his way of alternative farming slightly as he communicated little in the way of self-critique.
and problems encountered. Farm B’s labour relations could be different than the owner/manager asserted. They seemed irritable when the history of the labour union that had been on their farm was queried. Indeed they refused permission for interviews with the labourers and their leadership: thus this crucial component of the commodity chain has been neglected in this paper. A follow up study that scrutinises these agents and links in more detail is unquestionably recommended.

Furthermore, the overall validity of this research might be compromised by its scope. The concept of validity has been defined as "the trustworthiness of inferences drawn from data" (Eisenhart and Howe, 1992:644). This highlights the importance of producing acceptable research conclusions that are based on correctly collected data and the truth. Only researching two farms in the same region might have produced findings that cannot be applied further. However, by conducting case studies, the outputs could show ways ahead for wider strategies. By expanding the research and including more farms in the research scope, the research findings would have more in-depth and allow for a broader conclusion.

I anticipated that the language barrier might prove to be a hindrance in my research. Afrikaans, rather than English, is the mother tongue of my respondents, and I am not conversant in Afrikaans. Although the respondents all had a good comprehension of English, at times they might have preferred to communicate in Afrikaans. This situation may have potentially positioned me as an “outsider” in my research as suggested by Liamputtong (2010:136). Hennink (2008) argues that language is “a fundamental tool which allows qualitative researchers to understand human behaviour, socio-cultural processes and cultural meanings”, which supports Liamputtong’s (2010) view of language as allowing “the research participants to identify meanings in the world.” Consequently, when researcher and respondents do not speak the same language, “misreading” could be a possible obstacle during the interviewing processes and the interpretation of research findings. I did consider involving a translator in order to help with concepts that might be difficult for the respondents to explain in English. When I mentioned the possibility of bringing an interpreter to the interviews, the respondents politely declined the offer saying that this was unnecessary. I was therefore satisfied that they were comfortable communicating in English and decided to not pursue the matter further.
Conclusion
The key research method employed in this study is the commodity chain analysis. It has been established that this approach has many advantages with regards to the problematic of the research problem on hand. A large body of literature indicates that other social science researchers have employed this method to engage with the examination of an agricultural commodity within a social, economic and ecological framework. Furthermore, particularly in agricultural research, it has been established that the French filière approach is most suitable as it assists to identify and examine commodity flows, agents and a variety of activities within a commodity chain. In this study, the researcher also used the perspective of a commodity chain analysis (filière approach) of a qualitative nature to examine all the steps and ‘agents’ involved in the processing of strawberries. It is acknowledged that a large body of literature deals with the theorising and conceptualisation of global commodity networks. The chain analysed in this research is however much more localised than most commodity chain analyses. Researchers have recognised that these system frameworks can differ. Friedland (2004:7) confirms that “a few are globalized, at least in some segments whereas others are much more regional, national or local.”

Furthermore, the research design implied a case study approach as two separate analyses of two separate ‘cases’ were carried out, namely one examining the links within the strawberry chain at a large-scale, commercial farm and another one at a small-scale, alternative farm that follows organic agricultural principles. Describing the activities within these two different chains (cases) assisted the researcher to illustrate differences and similarities of strawberry production of two differing farms in South Africa. These farms were not chosen at random, but selected according to defined criteria: employed farming methods, size, availability and location.

As the commodity chain analysis during this research was carried out in a qualitative manner, qualitative methods for data collection, such as in-depth interviews and observation strategies were utilised. A total of eleven personal interviews were conducted, ranging from face-to-face interviews to telephonic interviews. The respondents were co-operative and assisted the researcher to gather substantial information about the process of strawberry farming in South Africa during the course of this study. Having said this, ethical considerations, such as an informed
consent form and the professional conduct of the researcher ensured that the respondents felt respected and comfortable during the interviews.

Limitations of this study revolve around the discourse of relevance and validity. The limited amount of interviews conducted limits the scope of the overall research. However, the collection of in-depth knowledge of two very different farms growing the same product (strawberry), in the same region in South Africa (Magaliesberg), can help to construct a wide-ranging overview of the general state of agriculture in South Africa. The data gathered in this research is by no means sufficient to formulate such a generalisation – but it can serve as a base, a stepping stone to conduct more such research, that the design of efficient and suitable policies can assist in building a sustainable South Africa.
CHAPTER FIVE – PRESENTATION OF FIELD WORK

Introduction
This section aims to establish a broad narrative presenting the commodity chains of Farm A and Farm B. A logical framework was followed summarising the steps of strawberry production on the different farms. To begin with, an overview of each farm provides relevant background information related to the farms, starting with their location, size, forms of ownership, etcetera. Thereafter, the farms are compared within the chain’s links: plant origin, planting, growing and maintenance, harvesting and packaging and distribution. The illustration of the links and value chains following this introduction depicts the various links within each chain.

Figure 13: Geographical location of farms (Source: Google Maps)
Figure 14: Illustration of commodity chains of two case studies
Presentation of the two cases: small-scale, alternative farm versus large-scale, conventional farm

Overview of the farms

Farm A is situated on the southern slope of the Magaliesberg region in the North West Province in South Africa. It is operated as a small-scale, non-certified organic farm and referred to as an “alternative” farm in this paper. IFOAM (2013b) states that there are many small-scale farmers in developing countries that comply with all the organic farming principles yet remain uncertified. They further explain that:

non-certified organic agriculture refers to organic agricultural practices by intent and not by default; this excludes non-sustainable systems which do not use synthetic inputs but which degrade soils due to lack of soil building practices.

Farm A complies with the principles of organic agricultural farming as defined by IFOAM (2013e), which include principles of health, ecology, fairness and care. Most importantly, the farm is following the organic farming philosophy that prohibits the use of synthetic fertilisers in order to preserve the soil structure, natural cycles and prevent overall environmental pollution. Alternatively, mulching and the use of organic matter are methods utilised to preserve and restore the soil.

Farm A comprises of 50 hectares arable land in total, of which one hectare is dedicated to strawberry farming with the farmer hoping to expand it to a maximum of five hectares. Besides strawberries other produce grown on this farm include lettuce, cabbage, tomatoes and herbs. The strawberry plants produce for up to three seasons and are not removed after every harvest. After three years the strawberry plant will no longer reap a good yield or quality fruit as the plant is weak and its root-system is old. The plants are then replaced with new seedlings.

The farm was purchased by an English Trust Fund at an auction in the mid-1990s and offered to Hendrik without the expectation of compensation. The title deed affirms that no rent has to be paid under the condition that the land will be farmed following organic principles. The communication with the Trust members is infrequent – he has not seen them in four years. It states on the title deed that no

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14 “Mulching is a method of using cut leaves, straw, leaf litter etc. to cover the bare soil while still farming and growing crops on it” (Nepali, 2001:1).
15 “Organic matter is a term that refers to any natural material that is added to the soil and allowed to decompose. It adds nutrients to the soil and also fibrous material that helps promote soil structure and provides ‘food’ for the insects and microbial organisms that are present in healthy soils” (Soil Association, 2013).
land claim and debts are registered against the land, which makes it possible for Hendrik to remain ‘uncommercial.’ He stated that if he “would have had to pay rent and develop the farm at the same time, [he] would have had to go semi-commercial in order to afford the process.”

Before being purchased by the Trust Fund, the land was owned by local farmers who worked the land chemically and non-organically. As a result, Hendrik had to recover the soil in order to be able to cultivate it organically. After twelve years, the soil has fully recuperated and meets organic standards. In spite of this, the farm is not legally registered as organic. Hendrik complained that it is very complicated and expensive to be organically registered as a farmer in South Africa and he does not regard this procedure as worthwhile. This limits his labelling claiming the products as ‘naturally grown’ instead of ‘organic.’

The farm does not receive any type of support or subsidies from the South African government and Hendrik is responsible and liable for all operations carried out on the farm. According to the Basic Conditions Employment Act 1997, the farmer is obliged to pay his permanent workers a minimum wage. The sectoral determination has “set minimum terms and conditions of employment, including minimum rates of remuneration”, which at the moment amount to R 1375.94 per month for farm workers (Department of Labour, 2011). Hendrik currently employs one permanent staff member.

Farm B is situated on the northern slope of the Magaliesberg Mountains. It is operated as a large-scale, conventional venture, cultivating close to 90 hectares of land with strawberries only. Aldrich (1977) describes commercial farming as “the use of fertilizers to increase crop yields, [and] pesticides to protect crops.” Through a more critical lens, Poulton et al. (2008:9) view commercial agriculture “as being production primarily for market.” In their definition of commercial agriculture, they further differentiate three farming systems: family farms, small investor farmers and large-scale commercial farms (Poulton et al., 2008:10). The letter is referring to a farm “where family labour is exclusively or predominantly managerial, there is permanent staff of full-time hired farm workers and these hired farm staff are to some degree specialized” (Poulton et al., 2008:10). Applying this definition in the context of this study, Farm B can be classified as a large-scale commercial farm. Farmers on
Farm B apply chemical fertilisers and other artificial substances during the production process in order to achieve maximum yields and fruit quality. On this farm, strawberries are only used as ‘year-plants’ as they would not produce maximum yield and quality in the second season.

The farm land that currently belongs to Farm B was purchased gradually. The farm was established as a family business until Marius and Pieter, two of the three present owners, took over in 1991. They started off with 4.5 hectares of land and gradually expanded the farm. In 22 years the farm’s land devoted to strawberries has expanded by a factor of 22. Farm B cultivates strawberries on 90 hectares, all the arable land on a 200 hectares farm. Its strawberry production is 90 times larger than on Farm A, with its single hectare of strawberries. Farm B’s owners purchased another piece of land recently, indicating further expansion of the company. Four different varieties of strawberries are planted on the farm to enable the harvesting season to be prolonged: different strawberry varieties produce fruit at different times. The so called ‘early varieties’ are ready to be harvested at the end of April while the ‘late varieties’ bear strawberries only during the main harvesting season in August.

The farm is established as a large-scale, commercial farming business supplying large retailers and Fresh Producer markets in Pretoria, Johannesburg and Durban. It is worth noting for the purposes of this paper, given its concern with the issue of the sustainability of organic farming, that in 2007 Farm B’s owners carried out an experiment, initiated by one of the large retailers, in which four hectares of land was cultivated according to organic principles. Requirements, such as no application of synthetic fertiliser and chemical spraying were followed. However the experiment failed and the cultivation of the organic section was stopped after one season and the land incorporated into the conventional section. However, albeit still using chemical fertilisers, Farm B is implementing an active soil recovery programme ensuring that the soil is restored with all natural nutrients needed to avoid degradation. Farm B’s planters refer to their way of growing as ‘sustainable farming’; given that they try to minimise the use of chemical additions in order to protect the soil for future cultivation. However, the research respondents on Farm B insist that by applying chemical fertiliser, they are able to produce higher yields and provide produce to a large number of consumers, which would not be possible if they employed pure organic farming methods without chemical fertilisers.
Farm B employs 150 permanent workers including management staff, controllers and people working in the fields and pack-house. During harvest time, the farm hires approximately 1,800 additional seasonal workers for picking, packing and distribution. Strict labour laws, including the minimum wage salary, are followed, ensuring that a legally recognised remuneration scheme is in place. Stringent quality control measures are enforced and regular quality and safety control visits are carried out. The government does not subsidise this business in any way and the farmers are financing their own research, plants and trial activities (such as breeding different varieties).

Plant origins
Hendrik, owner of Farm A, received a plant from a friend ten years ago that turned out to be a very good strain of strawberries. He describes the variety of his plants as disease resistant, producing big and tasty fruits. He suspects the plant origin might be the *Selekta* variety, a variety from the plant breeding programme at the Roodeplat research station in Pretoria. Another advantage of this variety, according to Hendrik, is that it “bears its fruit in the air,” as he puts it. This means their fruits do not lie on the ground, accessible to insects and close to dirt. Hendrik opposes the technique of using plastic as a groundcover to protect the strawberry fruit, stating that “a lot of the big commercial farms do that.” Based on his satisfaction with this strain of strawberries, Hendrik is planning to expand the cultivation of strawberries. However, he made it clear that he wants to expand slowly, and not beyond five hectares. If the expansion took place on a larger scale and over a quicker period, the plants that he produces with his runners\(^\text{16}\) from the mother plants would not be enough to cultivate the land and more plants would have to be brought in. As mentioned above, Hendrik’s variety of strawberries seems ideal for his conditions and he is not considering trying another cultivar. In recent years plants have been patented and a grower needs to obtain the permission to grow the strawberry, which Hendrik believes can cost up to R300 000. After that growers can purchase plants from the Agricultural Research Council for R5/R6 a plant, so all in all it is a very costly practice to buy in plants.

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\(^{16}\) Every *mother plant* (plant of origin) produces so-called runners. The runners are cut off and rooted in a certain way to produce more plants, *the daughter plants*. This process is extensive as daughter plants also produce runners to make more plants. On Farm A, one plant can produce approximately 20 runners.
On Farm B, the process from plant origin to the production plant in the field can take up to two years. The plants undergo an *in vitro* process – meaning that they are cultivated in a laboratory. The farm contacts relevant strawberry breeders overseas, mainly from Spain, Florida (USA) and Israel. After having received the permit to grow a specific variety from the authorities who supply the *in vitros* and the license to import them into South Africa from local government, the tissue cultures (not plants yet) are sent to a quarantine laboratory in South Africa. There, the strawberry tissue cultures are hardened and grown to mother plants before they are finally released to the farm.

The farm developed its own nursery section of approximately 4.5 hectares. The nursery is divided into three different units: the nucleus house, the foundation house and the hanging nursery. Within these subdivisions the farm produces all its own plants. At the moment there are nine million plants over 90 hectares in the fields. Jan, the grower, started producing these plants in September 2010 from 90 mother plants. Firstly he received the mother plants from the laboratories and placed them in the nucleus house to nurture the plants and produce runners. Various trials and experiments were necessary to grow the correct plant that eventually will produce the most runners. During these horticultural trials, one can separate the good clones from the bad ones. Faulty clones may be prone to disease or else the plants may not grow successfully. After that, the runners are rooted (daughter plants) and put in the foundation house. Jan plants them in big buckets in coco-peat, a very good soil medium imported from the Netherlands – but earlier grown on large fields in Sri Lanka and Mozambique and shipped to Holland where it is transformed and packaged into units of fine, coarse or compressed blocks.

The fully grown daughter plants from the foundation house are trimmed and packaged into plastic bags before they are stored in a refrigerator for approximately six weeks. This is a method to prepare them for the next season. Because the plants originate from a different climate zone, South African commercial farmers have to manipulate the plants. Refrigeration deactivates their growth as the plants are set to winter season. After removing them from the refrigerator, they are rooted in small pots and planted in the hanging nursery. When the plants leave the refrigerator their growth pattern is activated and they ‘switch’ to summer season. In the hanging nursery, the daughter plants multiply quickly, producing runners close to two meters
long. This makes approximately 150 plants per daughter plant. Every runner then gets rooted and is finally ready to be used as a production plant in the field. The young plants are supplied with water and chemical fertilisers for the entire growing procedure in the nursery. The plants are strengthened this way and the farmer can plan how many plants can be planted in the fields that season. Jan believes that since organic farming prohibits the use of artificial, synthetic fertilisers, this alternative farming practice would not be viable for the large-scale farm. Firstly, the application of synthetic fertilisers makes it possible for the farmers to predict their yields, which is pivotal when having to supply large retailers with agreed-upon quantities during a specific time period. Secondly, the plants would not be as strong nor would they bear fruits of such good quality if allowed to grow naturally.

The Planting Link
On Farm A, after acquiring the plant and producing runners, Hendrik plants his strawberries in the field annually. All the planting is done manually, with only the aid of basic tools. This takes place at the end of February until the beginning of March. In 2011, there were two rows of strawberries, each 150m long on Farm A. After a successful harvest, often reaping up to two kilograms a day, Hendrik decided to expand and plant one hectare of strawberry plants in 2012. He and his permanent worker were drawing the lines for the rows, putting down compost in the lines where they intended to plant the plants, and marking before they planted the rooted daughter plants straight into the mulch. There are no additions to the soil except for the organic matter, which is previously grown crop that is ploughed back into the soil. Hendrik has farmed organically for 18 years and has never experienced problems regarding diseases. He says his soil is healthy and nutrient rich – pre-requisites for pest-free growing. After having trial runs, Hendrik came to the conclusion that “the longer you grow the same crop on the same field, the better they will grow and if you practise crop rotation, the root structure of the plant is destroyed and consequently the relationship between soil and plant is compromised.” This method only applies if disease is not present.
Farm A: Small quantities, intensive manual labour and nature-driven farming characterise this farm. Hendrik breeds earthworms in the shed.

Once the daughter plants produced in the hanging nursery on Farm B have been rooted, they are ready to be planted into the fields in March. As mentioned above, the farm grows four different varieties which are planted in designated sections.

After the land has been flattened, the soil is formed into ridges in which the strawberries are planted on raised beds. The next step is to lay out the irrigation system, which is made of narrow pipes that are installed on top of, and between the ridges. This drip irrigation supplies the plants with water and fertiliser. After setting up the water supply, the ridges are covered with plastic which serves as a protection layer for the plants. The plastic reduces the evaporation of water as well as keeping the fruits clean and assisting in weed-control. Strawberries are planted into holes that are cut into the plastic. This process takes place every year.

On Farm B, the strawberry plant used is a one-year plant, as the plant weakens with time and is no longer able to produce the same quality fruit that it did in the first season. The ploughing done every December at the end of the production season is a way for the farmers to prepare for the next planting season. Besides chemical supplements, natural nutrients are added to the ground to avoid desertification. Jan emphasised that in order to grow strawberries for a long time, a maintenance programme has to be implemented in the growing process. This means that planting patterns vary each year. For example, in one year a specific section of land may not be cultivated with strawberry plants but with something, such as mustard seed, that enriches the soil. This piece of land will be left for a year to recover; after that the organic matter will be worked into the soil before it will again be used for strawberry
production. If this is not done on a regular basis, Jan strongly believes that “you will end up with sand.” However, it is also important to mention that this process is problematic for smaller farms, because they depend on all the land they own. They cannot afford to leave a section of their fields vacant as they depend on the income it would produce.

As for the organic experiment implemented on Farm B in 2007, the planting process was similar to that executed in the non-organic sections. The major difference was that the plants in the organic section were not provided with chemical fertiliser and synthetic supplements. So-called green manures like mustard and clover were planted in between the rows in order to serve as organic matter at a later stage. Organic matter, as described by the Soil Association (2013a), “refers to any natural material that is added to the soil and allowed to decompose” and is applied as a substitute for synthetic fertilisers in order to improve soil structure and quality. Prior to planting the strawberries organically, the land on which they were planted took around two years to be prepared. After being used for the usual non-organic, commercial production, the field (4 ha) was left vacant for two years and cultivated with green manures that were worked into the soil (process explained above). This preparation was stipulated by the organic certification board in order to fulfil organic standards. The plants also originated from the laboratory and were grown in the same nurseries, where they merely underwent a slightly different spraying programme than the commercial plants. The organic certifiers did not agree to this process, but could not intervene as South Africa does not have organic nurseries for strawberry plants. Farm B was not willing to convert their nursery for organic growing, especially since they only tested four hectares of their land. Christopher17, a farm employee who was actively involved in the organic trial runs, admits that the farm is “far away from that”, in the sense that it would be too expensive and risky to restructure the nursery for organic farming.

The Growing and Maintenance Links
On Farm A, the strawberries are grown over a period of approximately six months. Due to the temperature drop in winter in the summer-rainfall region in South Africa, the strawberries grow slowly. In the region of Farm A, the southern slope of the

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17 Name changed
Magaliesberg, temperatures can fall to below zero between the months of May and August. During this period, the plants remain dormant; this is a natural coping mechanism to survive the cold climate. As soon as it becomes warmer in the middle of August, the plants start flowering and grow rapidly to produce an early harvest. After the harvest in the beginning of December, the plants start to produce runners for approximately six weeks. They are then cut, rooted and planted during the next season. In Hendrik’s production line, each plant can produce up to 20 runners. For Hendrik, strawberry growing requires low maintenance, as in winter the plants are less likely to catch diseases and pests. Furthermore, weed growth is very minimal due to the low temperatures. Regarding irrigation, the plants are irrigated solely with borehole water sprayed via an overhead irrigation system.

On Farm B, the strawberries’ growth is enhanced by chemical fertilisers, which according to the grower on Farm B have various advantages. Firstly, the growing and harvesting process can be planned in advance. The farmers know exactly how many strawberries from which variety can be harvested at a specific time. The early variety is ready for first production at the end of April. This concludes a growing period of two months. These plants, and other varieties, carry fruits up until December. Secondly, the quality of the fruits would be compromised without synthetic fertiliser treatment. According to Jan, the fruits would be smaller, uneven in size or tasteless without chemical fertiliser. Customers would reject these fruits, as they demand large, evenly-sized, red, sweet fruits. The fertiliser is purchased from Omnia in 25kg bags and dissolved in water tanks. In the pump house, the allocation and measurement of the fertiliser is calculated and monitored via computer systems before being released in the irrigation network.

Growing strawberries is, as stated by management and employees at Farm B, a high maintenance task. The climate is of major concern, as the plants are sensitive to frost and other extreme conditions. As is the case with Farm A, the plants on Farm B are grown during the South African winter when temperatures can drop dramatically. However, on the northern slope, where Farm B is located, temperatures seldom drop

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18 “Omnia Holdings (Omnia or the Group) is a diversified provider of specialised chemical products and services used in the mining, agriculture and chemicals sectors” operating in broader Africa, Australasia and Brazil (Omnia, 2013).
below the 0°C, and as a result the plants cannot be destroyed by frost. Strawberries are very soft fruits that can easily be damaged. According to Jan, hail will destroy the fruits: not even expensive hail covers would prevent damage entirely. In 2012, the area around Farm B was affected by increased hail storms; however water availability and good soil in the region as well as the uncertainty of hail storms have discouraged the farmers from moving elsewhere.

Furthermore, strawberry farming is labour-intensive on the large Farm B, and not only during harvesting season. Jan explained that the production plants in the field produce runners, flowers and fruits at the same time. In order to channel the plant’s energy to produce tasty fruits, the runners and flowers need to be cut constantly. This can only be done manually, and proves time-consuming considering that nine million plants require this treatment. The plants also need to be cut and trimmed frequently to reduce the density for spraying purposes.

The majority of plants on Farm B are planted in an open field, while a few are put under nets. The fields that are not netted were initially rented from another company and only acquired recently. Building greenhouses would not be financially viable as this “high tech would cost a fortune,” says Jan. A farmer pays to close to R1m per hectare for the plastic covered structures that resemble greenhouses. A greenhouse would be considerably more expensive.

The growing and maintenance of the organic section (at the time of its operation in 2007) turned out to be a great challenge for the large-scale, conventional farm. A major criterion for growing organically is the absence of chemical fertilisers and...
The farm could not act on any disease threats without the approval of the certification body. This turned organic farming into a loss-making practice. The organic strawberry plants and fruits were infested by red spider mites, which required a speedy response to avoid massive damage. The organic block was, according to farm staff, relinquished for two reasons: the inability of the farm to spray chemical fertiliser to avoid the development and outbreak of the red spider, and the inability to react independently from the organic certifier, who needed time to respond to the issue. As red spiders multiply daily, the risk of the spiders spreading to the conventional non-organic fields was too great, as it could have potentially cost the farm millions of rands. Farm B’s conclusion was that organic alternatives to chemical treatments are “not quick and efficient enough” to produce quality strawberry fruits grown on a large-scale.

On Farm B, the strawberry plant is a ‘one-year’ plant and there seems to be no concern that the root structure of the plant is compromised by taking it out on an annual basis. Every year strawberries are replanted as their yield and quality decreases per season, and the plant weakens every year. If the plant was planted for a second season, the strawberries would grow big and out of hand, and it would be impossible to prune them appropriately.

The Harvesting Link

Farm A’s harvesting season begins in September. This is the most labour-intensive and busiest part of the strawberry production process. As Hendrik stated: “harvesting is a back-breaking job” and picking the fruits manually from the ground requires constant bending down. This is when seasonal workers are employed. Hendrik estimates that he employs about five or six seasonal workers to assist with picking. He explains that it is very easy to find workers – “you just put out the word and they come to the farm.” Most of the workforce in the farm area is comprised of foreign nationals, mainly from Zimbabwe, Malawi and Mozambique. Hendrik feels that post-1994 South Africans do not like to work on farms and increasingly seek employment in the local mines. By contrast, foreigners accept low wages and are prepared to work harder for their pay than their South African counterparts. Hendrik does not

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19 In this case, the company Ecocert was appointed to oversee the implementation of organic standards
20 Tetranychus elarius Linn: A pest known for “puncturing of the tissues of the leaf from the underside, and the withdrawal of the liquid contents of the leaf cells”, and so damaging the plant (Ewing, H.E., 1914)
draw up formal contracts with the seasonal workers, but has ‘time sheets’ and usually pays them on a daily basis. Many of the seasonal workers do not hold valid working permits. Farmers also prefer to employ the seasonal workers without contracts as it allows them to employ fewer workers as operations go into seasonal decline, which is especially convenient in a relatively small operation. Frans, a permanent worker on Farm A, has worked there on and off for 42 years. Besides a contract, a minimum wage salary and an unemployment fund, Hendrik provided Frans with additional skills training on the subject of organic farming. Frans found it easy to adapt to this farming method as this is the way his ancestors cultivated the land traditionally.

After picking the strawberries they are washed in a neutral washing agent. As no plastic ground cover is used to protect the berries during their growth from storms and rain, the fruits might be dirtier than those harvested conventionally. The strawberries are blow-dried after washing and then packaged.

On Farm B, the first strawberry picking starts at the end of April. This harvest is called ‘early production’. These are the first fruits from the plants, but they are not the best quality produce achievable. The structured planting of ‘early’ varieties allows the farm to start harvesting early. The good quality fruits are harvested at the end of August and September; this is also when the farm reaps the largest quantity of fruits. Based on an estimate by one of the farm owners, between 4000 and 5000 tons of strawberries are yielded in one year. On an extremely busy day, the workers pick up to 70 tons of fruits and package approximately 45 tons into punnets for retail distribution. The remaining 25 tonnes are used for processed products such as jam and yoghurt base: there is little waste.

As indicated earlier, the company employs up to 1800 seasonal workers during the high season of harvesting. As with Farm A, the berries are picked by hand, a physically demanding and time-consuming task. It is not difficult to source labour as the personnel comprises 90 per cent local South African labourers (predominately Tswana and Sotho) from the neighbouring townships. The remaining 10 per cent are legal foreign nationals, mainly from Zimbabwe. Every worker requires a bank account and therefore a South African identification in order to comply with the banking rules governing the farm’s electronic payment system. The management
insisted that no illegal immigrants or nationals without required documentation are hired. When additional labour is required, especially during the busy picking season, supervisors, based in the townships, put the word out, and it is common for at least thrice the required workforce to arrive at the farm. Approximately 95 per cent of the picking workforce is female, whereas the men are employed to do the physical hard labour and drive the trucks. The average age of the women is 35, and many of them have children who are looked after by their grandparents while their mothers work. The job on the farm allows the mother to care financially for the children and to contribute a substantial amount to her family's income. It was also mentioned that many workers on the farm are employed as third generation employees, meaning that their grandparents and parents have worked on this farm before. Free transport is organised for the workers to the farm every day.

The workforce is motivated by a bonus-system. The owners believe that employees work more efficiently if a reward is offered. As a result a system was established that allows workers to earn more than their minimum wage salary. Many earn close to R3000 a month, and, as stated by Pieter, although it is still a small amount, “for an unskilled worker it is nice to work for us.”

The workers, permanent and seasonal, are trained how to handle the strawberries correctly during picking. They are taught how crucial it is to touch the fruit at the right spot, just at the top of the stem, so that no damage or soft spots are created.

After the berries are picked, they are transported to the pack-house where they are processed for distribution.

The harvest during the organic experiment was disappointing for the farm management. It was described as a ‘disaster’ as only 20 per cent of the normal production output was produced. The discouraging reality that the inputs and costs for this division were the same as those of the normal plants made this organic experiment a failure. The costs and intensive labour needed to sustain this farming method might be possible on a small scale, but not “with our quantities,” said Pieter.

The Packaging and Distribution Links
The fruits on Farm A are packed in plastic or polystyrene punnets. Despite having a longer life span than paper or cardboard punnets, plastic is a much cheaper
packaging alternative. In addition to the cost-effectiveness of the plastic punnets, customers are used to buying strawberries in a plastic punnet and might hesitate when offered in a cardboard punnet: as Hendrik states, it “all depends on what the market wants.”

Farm A’s limited volume of harvested strawberries does not provide it with sufficient stock to supply retailers: thus Hendrik is also a retailer. He is thinking of selling the strawberries to the Fresh Produce Market in Pretoria, for example, but the fruits are distributed directly to the consumer at the moment. He operates either on a ‘pick-up’ basis or sells his strawberries on local natural farmers markets. Hendrik is not sure whether he would be prepared to go into business with the big retailers, even if he could provide the required quantities. Hendrik does not have the support that developed countries often offer organic farmers, where “non-certified organic food is often sold directly to consumers through local community support programs such as box schemes, farmers’ markets and at the farm gate” (IFOAM, 2013b) which allows farmers such as Hendrik to interact directly with the customers and also save on transport costs. The growing demand for his strawberries has motivated Hendrik to expand his strawberry production line (as mentioned above).

The essential information about the packaging and distribution activities on Farm B was provided by the farm’s quality assurance manager Malebo. As soon as the strawberries arrive from the fields, they are checked according to strict quality standards by selected quality staff. Afterwards, they are taken to a refrigerator. Delivery time is crucial and must not take longer than 15 minutes otherwise the quality and shelf life of the fruits are compromised. Du Preez and Welgemoed (1976:66) reaffirm that “to promote the lasting capacity of strawberries, is its essential to get them out of the field temperature as soon as possible after they have been picked.” After refrigeration the fruits are placed in crates and brought to the packing area. A thin layer of plastic is placed at the bottom of the crates so that the berries never touch the ground. Every person entering the pack-house is required to wear an overall and hairnet as well as wash their hands with soap and sanitiser. Worker hygiene and the overall cleanliness of the area are taken seriously as quality and hygiene controllers visit the farm regularly after 48 hours’ notice.

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21 She works in the Control Room at the centre of the pack-house from which one has a clear overview of the pack-house.
Every packer is responsible for packing their own fruits. The workstation, a small table usually shared by two packers, is situated next to a conveyor belt. The packing routine consists of the following process: women handle the berries by the stem, check their quality, weigh them and place them into the designated punnets. Since most employees are uneducated or illiterate, Malebo initiated a plan for illustrating the procedure. A series of pictures are displayed in the pack-house to remind packers how to handle and pack the berries correctly. The workers wear overalls with individual numbers stitched on the front collar, making it easier for management and supervisors to monitor the efficiency of the workers. If for example worker No. 143 works slowly, a note will be added to the personal file so the appropriate action can be taken. A number is placed on the bottom of every punnet to facilitate tracing the packer if a problem is detected.

The punnets are made of plastic and purchased in bulk. After the punnets are packed, the women place them on the conveyor belt next to their packing table. At the end of the belt, a quality controller checks every punnet and filters out faulty punnets. After the punnets have passed through quality control, they are labelled. Each retailer has their own labels. The farm is not mentioned on these labels but is identifiable by a code. Besides the code, a sell-by-date indicates the shelf-life of the product, usually four days. Although the best grade fruits are dedicated to Woolworths, the quality and origin of strawberries only vary slightly. In the high picking season, it is often the case that the Woolworths graded berries are available in great quantities, and as a result also get delivered to Pick'n'Pay and other leading retailers.

After labelling, the punnets are put into crates and then loaded onto pallets. When one pallet is full, it is taken to the dispatch refrigerator, where the temperature has to be between zero and five degrees Celsius to ensure maximum preservation of the fruits. Before these pallets are loaded into the trucks, the temperature in the vehicle and the pallets is checked. If everything complies with the requirements, the products are loaded into the trucks. The farm has their own trucks that deliver the strawberries to the retailers. The only transport logistic that is externally sourced is the delivery to the Durban Fresh Produce Market.
Conclusion

A commodity chain based analysis illustrates that Farm A and Farm B’s production process(es) differ in some aspects. The illustration (Figure 14) of the respective chains indicates that there are marked differences in the process.

The chains were split into links, which were examined and analysed individually evaluating both cases, Farm A and Farm B. Overall, the two farms are principally different. Farm A is a single-managed, small-scale farm focusing on the utilisation of organic agricultural principles. The farm does not produce strawberries for the objective of achieving maximum sales but rather to supply a smaller target market with alternatively grown, high quality produce. In contrast, Farm B is a large-scale farm business owned and managed by three partners whose aim is to grow strawberries commercially with maximum outputs. Efforts are invested in research concerned with how to achieve higher yields, the development of better adapted cultivars less prone to diseases, and taste better. On Farm A however, the farmer devotes substantial time in conducting trials and experiments focusing on improving his farming practices, particularly with regards to the ecological footprint.

Given both farms’ fundamental differences, it came as no revelation that each commodity chain showed differences as well. The links making up the chains were evaluated in this study include plant origin, the planting, growing and maintenance, harvesting, and packaging and distribution process.

Regarding the plant origin, Farm A ensures that the plants obtained from nurseries have not been chemically treated. Farm B develops the plants cultivated on the farm in its own nursery. The plants originate from in vitro tissue cultures that are genetically modified in order to achieve better adaptability and quality. Both farms plant the strawberry plants in open fields at the beginning of March, which marks the beginning of the autumn season in South Africa’s summer-rainfall season in the North West Province. Prior to planting, the farmers need to ensure that the soil is healthy as the plant’s condition depends on the make-up of the soil. In both cases, farmers agree with the Soil Association’s (2013b) belief that “the plant's nourishment comes from the soil” and several steps need to be taken to ensure the preservation of the soil. The key difference observed within the planting link is the farms’ stance regarding the utilisation of chemical fertilisers. Farmer A rejects any use of synthetic
fertilisers or artificial substances to enrich the soil with nutrients. He draws on natural alternatives that assist restoring the soil, including the use of organic matter, green manure and smaller fields. Applying these chemical fertilisers would be defying the principles of Farm A’s organic agricultural system.

Farm B’s owners explain that they depend on the application of chemical fertilisers in order to guarantee their yields and good quality strawberries. Since strawberries are prone to diseases and pests, farmers on Farm B feel it is too big a risk to grow the fruits naturally. Additionally, an experiment growing strawberries according to organic principles on the farm was not successful as the yields were recorded as substantially lower and many plants were destroyed by red spider mite, a disease difficult to treat on a large-scale without chemical support.

The harvesting link in the chain illustrates that the strawberry season is longer on the commercial farm than on the alternative farm. Farm B harvests for approximately two months more than Farm A and are therefore able to supply retailers with ‘out-of-season’ strawberries. The ability to develop perfectly adjusted cultivars gives Farm B the competitive advantage. They are growing different cultivars, which bear fruit at slightly different times. By applying chemical fertilisers to the irrigation, the farmers state that they are also able to control the growth of the fruits, which makes it possible to plan when what amount of quantities are ready for harvest. Farm A cannot predict its yield, but depends on the natural process of strawberry growth. The farmer feels that this is necessary to produce a sustainable, good quality fruit that is healthy for the consumer as well as for the earth.

The packaging and distribution link was briefly mentioned, but is nonetheless not an area of focus for this study. Still, this link is crucial to the chain since it is where farmers are heavily exposed to external influences, such as the global economic landscape. Since prices for the packing materials as well as for petrol (distribution) have increased steadily over the years, this link indicates why strawberry farming has become more and more difficult over time. The next chapter will attempt to interpret these findings, evaluating the ecological, economic and social sustainability of the commodity chains and their links on both farms.
CHAPTER SIX – INTERPRETATION OF RESEARCH FINDINGS

Introduction
Sustainability is a broadly defined term that has gained ‘buzz-word’ status in the current development discourse (Callicott and Mumford, 1997:32). Scoones (2007:589) points out that development discussion calls for sustainability across all spheres, including “sustainable cities, economies, resource management, business, livelihoods – and, of course, sustainable development.” Yet, regardless what sustainability means to the individual the core philosophy of the term and practice is to “achieve a safe and sound society in the current generation and for future generations” (Khajuria et al., 2009:15).

This study is concerned with sustainable agriculture. According to Pretty (2008:451) agricultural systems can be termed as sustainable when their major aim is “to make the best use of environmental goods and services while not damaging these assets.” Four key principles provide further guidance regarding the definition of sustainability in the light of farming. Firstly, sustainable agricultural systems “integrate biological and ecological processes such as nutrient cycling, nitrogen fixation, soil regeneration […] into food production processes.” The second principle highlights the importance to “minimize the use of those non-renewable inputs that cause harm to the environment or to the health of farmers and consumers.” Principle three and four emphasise the need to strengthen human capital. Principle three states that the “productive use of the knowledge and skills of farmers” can improve farmers’ self-reliance. Principle four highlights the importance to make “productive use of people’s collective capacities to work together to solve common agricultural and natural resource problems” (Pretty, 2008:451).

The previous chapter provided an overview of the two farms researched in this dissertation. It was an objective presentation of the findings gathered by the researcher. This chapter aims to unpack these findings by examining and discussing the level of sustainability observed at each link in the chain within the two agricultural systems, namely a) the small-scale, alternative farming system and b) the large-scale, commercial system. The concept of sustainability, as pointed out by Khajuria et al. (2009:15), “is multidimensional” as it includes ecological, economic and social
dimensions. These three factors will be defined and examined in the context of this research by examining different levels of sustainability, focusing on environmental/ecological sustainability.

**Environmental / Ecological Sustainability**

Khajuria *et al.* (2009:15) define ecology as “the dimension of sustainability [that] is concerned with the natural environment.” In the broad sense it focuses on the impact a specific agricultural system has on the environment at large: it is about ecological integrity and the preservation of biodiversity. In view of the four principles of sustainability, the dimension of ecological/environmental sustainability is embodied in principle one, integrating biological and ecological processes into overall food production cycles, as well as principle two, minimising the use of non-renewable inputs that are harmful for the environment.

In many instances alternative agricultural practices, such as ecoagriculture and organic farming are characterised by environmentally friendlier methods than large-scale, chemical commercial farming. Produce that is grown organically is said to be healthier, whilst minimising damage and causing less harm to the local environment than conventional agriculture (Duffort, 2006; Crinnion, 2010). The UN Trade and Environment Review (UNCTAD, 2013:50) discusses the potential environmental benefits of organic farming, including, amongst others, reduced pollution, better soil structure and fertility and improved biodiversity.

The concept of ecological sustainability of agricultural systems gained importance during the 1950s and 1960s, when development practitioners and ecologists voice their concern regarding the impact of the increasing industrialisation of agriculture on the environment on a global scale. This era known as the Green Revolution (Harding and Peduzzi, 2012:157; Patil *et al.*, 2012:40) was characterised by maximised agricultural productivity through improved scientific achievements and technological advancements. As pointed out by Patil *et al.* (2012:40), agricultural productivity did increase on a global scale “due to advancements in science and technology along with increased investments in irrigation projects.” Thenceforth, farmers have operated increasingly within a more modern, mechanised agricultural systems whereby “machines replaced farm workers” (Harding and Peduzzi, 2012:157). These machines are used to “power tractors, machinery and irrigation,
and to transport, transform and package agricultural products” (Harding and Peduzzi, 2012:158) which automatically created a dependency on petroleum products, as they are needed to function these machines. Pretty (2008:447) states that since the 1960s, “aggregate world food production has grown by 145%”, which increased the impact of the human footprint on the Earth substantially.

*Ecological Footprint*

The increased demand for food in general, more consumption of meat products, the expansion of agricultural land, an increased use of irrigation systems and pesticides and a higher number of agricultural machines used in farming are directly linked to the growing human footprint and especially concerning for the ecological dimension of sustainability (Pretty, 2008:448). Lincoln (2005:621) explains that the steady agricultural expansion has “coincided with a rapid increase in atmospheric CO2 and other greenhouse gas levels and an approximately 0.6°C rise in global temperature.” Modern capitalist food production is more energy intensive, and thus dependent on fossil fuels that are harmful to the environment, due to the growing industrialisation of agriculture (Harding and Peduzzi, 2012:157). And although alternative renewable energy sources exist, in 2002 almost 80 per cent of global primary energy was provided by fossil fuels (Lincoln, 2005:621). The growing dependence on fossil fuels has been highlighted as follows:

> It can hardly be overstated how crucial petroleum is to our modern industrial society. Oil fuels the economy. It is the largest single traded product in the world. It provides about 95 per cent of all transportation fuels and 40 per cent of global energy. [...] Oil also supplies feedstock for thousands of manufactured products and is vital for food manufacturing. Some 17 per cent of our energy is used for producing food. Modern agriculture makes heavy use of oil in a variety of ways. We use oil for fertilisers, pesticides, and for the packaging and distribution of food.

Fossil fuels are fixed, non-renewable resources and with increased demand and dependency their reserves are declining. Harding and Peduzzi (2012:157) speak of the “dwindling” world oil reserves; Lincoln too (2005:622) is aware of the declining accessibly of fossil fuel reserves considering that “the world is depleting oil reserves at an annual rate of 6 per cent” while the demand is rising at an annual rate of 2.2 per cent (Past Peak Oil, 2011). This dichotomy of supply and demand in the context of fossil fuels (and particularly oil) causes the price of these resources to increase (Lincoln, 2005:622; Harding and Peduzzi, 2012:161). Food prices are directly linked
to the oil price as the costs for production (especially fertilisers), packaging, transport and distribution of a product increase with a growing oil price. This also indicates interdependence between the three dimensions of sustainability.

Examining fossil fuel consumption within an agricultural system opens discussion about the ecological as well as the economic sustainability of a farm. Considering the rising price of oil, the cost for synthetic fertilisers is anticipated to increase as well, thus increasing the overall costs - economic sustainability - to sustain a large-scale commercial farm.

The ecological dimension of sustainability, especially regarding fossil fuel consumption, can be observed throughout both farms’ links in the strawberry production chain. Considering the findings presented in the previous chapter, it is evident that Farm A is considerably less dependent on fossil fuels than Farm B. Following the previous discussion on fossil fuels and their negative impact on the environment, Farm A appears to be more ecological sustainable than Farm B.

<table>
<thead>
<tr>
<th>Links within the commodity chain</th>
<th>Farm A</th>
<th>Farm B</th>
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<td>Plant Origin</td>
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<td>Growing and Maintenance</td>
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<td>Low</td>
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<tr>
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<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Packaging</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Distribution</td>
<td>Medium</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Figure 15: Overview of ecological sustainability within the chain links**

Examining the plant origin link, Farm A demonstrates high ecological sustainability compared to Farm B. The small-scale, alternative farm sources its plants locally and thenceforth the farmer grows his own runners to be used for production. In the case of Farm B, *in vitro* tissue cultures are imported to South Africa from either Europe or the United States before they are developed in the farm-owned nursery. The process from developing tissue cultures in the foundation house to having the ready-for-
planting seedling uses a lot of energy and water (lights, heaters, irrigation, chemical fertilisers) and thus demonstrates low levels of ecological sustainability.

The treatment of the soil is crucial during the planting process. Bearing in mind ecological sustainability, the inputs used to work the soil should be minimised in order to a) preserve the soil structure and b) reduce the overall fossil fuel consumption. Harding and Peduzzi (2012:161) argue that the use of synthetic fertilisers (made from fossil fuels) requires a substantial amount of energy since “energy is required to manufacture, package, transport, and apply inorganic fertilisers.” Farm A does not use synthetic fertilisers but applies organic matter and natural minerals as substitutes for synthetic fertilisers. As Hartman et al. state (2012:8) “crop residues [...] are recycled and returned to the land, thus minimising the use of non-renewable resources.” With this low-input method, Hendrik (Farm A) aims to maintain and preserve his land “over time without loss or decline” (Dale et al., 2000:642). Therefore, soil fertility management plays a big role on Farm A, as it is crucial for successful natural and organic farming (Thamaga-Chitja and Hendriks, 2008:320). The concept of soil conservation for “future generation” purposes, the main pillar for sustainable development according to the United Nations (1987), is a key priority for Hendrik. Applying synthetic fertilisers and pesticides would intervene in the soil cycle and have a negative impact on the crop.

In contrast, Farm B follows the model of a modern, mechanised agricultural production system explained above. By increasing the use of technology, mechanical equipment and the application of synthetic fertilisers, the farmers aim to maximise their yields continuously and achieve maximum profits. At the same time, their fossil fuel use has increased drastically throughout the production process. With regards to the soil preservation, Farm B has recognised that the application of chemical substances is not ecologically sustainable in the long-term.

Farmers in the Brits area are growing a lot of wheat. After the season they burn the remains and by doing that they think they save. They think they will leave their farms to their children, but they will only leave them with a mess. (Jan, Farm B)

Farm B is currently implementing a soil maintenance and recovery plan that aims to conserve the land by exercising sustainable practices to avoid desertification. The sustainable practices are include constant crop rotation to enrich the soil and
planting green manures that will be utilised as organic matter in order to rebuild the soil structure. Natural supplements in addition to chemical fertilisers are put into the soil to improve its quality and fertility. The grower on Farm B said that “if you don’t put that back [the natural supplements], you are basically stealing from the soil.”

Ecological sustainability can also be assessed within the harvesting, packing and distribution links of the strawberry chain. Both farms use manual labour to harvest the strawberries, which reduces the use of fossil fuels since minimal machinery (that uses fossil fuels) is utilised. As a result, the harvesting of the strawberries is perhaps the most ecological sustainable step in the strawberry production since little machinery is used. Also, at this point the interdependence of ecological and economic dimensions of sustainability can be observed. While harvesting is perhaps the most ecological sustainable link within the chain, at the same time it is the least economic sustainable link. In both cases of the study, the farmers agree that strawberry farming, especially during harvesting season, requires a tremendous amount of labour. In their harvesting chapter on strawberries, Du Preez and Welgemoed (1976:68) also note that “strawberry production is very labour intensive.” The reason this is not economical is because the farmers have to pay the labourers wages. On farms the size of Farm B this is one of the biggest expenditures during the strawberry production cycle. Genis’s (2012) study of the changing nature of large-scale commercial farming in South Africa found that labour issues are third on the list of pressures faced by South African farmers, after climate and weather conditions and increasing production costs (Genis, 2012:7). Labour issues refer to the low productivity of the farm workers compared to the wages they have to be paid. Many farmers reduce the number of their permanent staff and replace them with seasonal workers (Genis, 2012:11). This is also the case on both farms in this study, nevertheless the amount of seasonal labour required to pick the strawberries is substantial, and an immense cost for the farmer. Discussion regarding South African labour regulations will explore these issues in greater detail at a later stage in this paper.

Links within the strawberry chain that are sensitive to ecological sustainability are the packaging and distribution links. Both farms package the harvested strawberries in punnets, made from plastic (a non-renewable resource). A more environmentally friendly alternative would be to use cardboard, which is predominantly used
overseas. However “in South Africa the problem is that plastic trays are much cheaper than cardboard containers” (Du Preez and Welgemoed, 1976:62) so most farmers, as observed in this study, use the less environmentally sustainable plastic punnets. Harding and Peduzzi (2012:162) add that although the “type of packing material can affect the amount of energy used […], recycling packaging and other management approaches to waste packaging also involves energy.” On Farm B, an additional plastic label is put on the punnet, specifying the name of the strawberries, expiry date, bar code, and other details regarding the strawberry origin. The labels are printed with an electronic printer and are stuck on the punnet manually. Yet again, based on the research findings, Farm B’s ecological footprint is larger than that of Farm A. However, it is questionable whether this is attributable to the different farming method (commercial) or rather the different size of the two farms. Farm B turns over a considerably larger amount of strawberries during peak season while Farm A harvests and packages limited amounts for private customers. Farm B supplies large retailers that impose strict rules and hygiene regulations on the farmers. The farm is dependable on energy (and thus fossil fuels) as large refrigerators are necessary to store the strawberries after the harvest (before they are packed) and before they are distributed (after they have been packed into punnets). Additionally, air-conditioning regulates the temperature in the pack house and a mechanically powered conveyer belt transports the punnets from the packer to the inspector (and then the refrigerator).

The distribution link is the last in the chain analysed in this study. Moving food from the farm to the consumer uses fossil energy and therefore the mode of transportation used to distribute the fruits has an immense effect on the ecological sustainability of a farm. Farm A sells its most of its strawberries to locals, which is more environmental friendly as the distance the food travels from the farm to the consumer is minimal. Farm B on the other hand supplies retailers nationwide, and the farm-owned trucks deliver the strawberries as far as to the Fresh Produce Market in Durban, approximately 700km from the farm. The farm’s ecological sustainability is compromised as large quantities of strawberries are transported across South Africa in order to sell their strawberries and maximise profits while a smaller, more regional target market could be served and the distance between the ‘farm and fork’ could be minimised.
Ecological Philosophy

According to the South African Department of Trade and Industry (2008):

Organic farming (also known as ecological or biological farming) is commonly recognised as a farming system that excludes the use of synthetic fertilisers and pesticides, but also includes holistic management of a system of agricultural production based on ecological principles.

Hendrik (Farm A) applies this “holistic management of a system”, referred to as a “closed farm cycle” (Hartman et al., 2012:1). It describes the interdependence of all input links and their surroundings during the production process. In that manner, soil, plant and human being are in harmony. Alternative farmers, as found in this study, seem to follow a moral philosophy that makes it their responsibility to farm more ethically than chemical farmers. Although profit making is often essential for survival, it does not seem to be the driving agent of organic farming.

You cannot think organically like you thought chemically. (Hendrik, Farm A)

This ‘organic thinking’ goes back to Northbourne’s idea of the “farm as an organism” (in Paull, 2006). Following this foundational philosophy, the farm is “a living whole” that should be fully self-sufficient without the application of fertilisers and pesticides. In fact, according to organic farmers, the fertilising and monoculture causes the outbreak of diseases, pests and loss of soil fertility. Farm A’s 18-year record of disease-free farming is attributed to the utilisation of organic methods, confirming Northbourne’s prediction that “systems that depend overly on chemicals, find eventually a hard packed soil unfriendly to soil organisms” (in Paull, 2006:17).

The owners of Farm B agree that organic farming is more than just leaving out the fertilisers. Interviewees on Farm B stated that “the small numbers of organic farmers have a different feeling about growing organically – it is also a mind-set and lifestyle and they go for it. But we don’t have this feeling.”

In the early 2000s, the commercial farm felt the “pressure to develop [their method of agriculture] as a more sustainable economic activity” (Bowler, 2002:205). As an experiment and following retailers’ demand (Woolworths), the farmers implemented organic principles mentioned above on four hectares of land. They replaced chemical fertilisers with natural substitutes and did not enhance the soil with chemical treatments. This resulted in, as affirmed by Adams (1990) and Miller
(2004), lower yields and a compromised fruit compared to the produce grown commercially and non-organically. This supports the argument of Miller’s ‘organic myth’, that there is no evidence that organically grown produce, in this case strawberries, results in better yields and tastes than commercially grown fruits. The farmers in Farm B found that their organic section reaped 20% of the normal production while requiring more attention and intensive labour than the conventional production. All in all, organic farming, according to commercial Farm B, is “not quick and efficient enough.” It becomes clear that the use of chemical fertilisers assists the farmers to plan their harvest, as they steer the growth of the plant with the addition of chemicals. Furthermore, the perspective that organic farming should be exclusively conducted on a small scale is in line with the critiques of organic farming. Consistent with theorists Borlaug, Miller and Adam, employees and owners of Farm B would agree with the statement that the “lower productivity per hectare” utilising organic growing methods accounts for the fact that this method “is unable to produce the volumes of food necessary to support the urban-industrial population” (Bowler, 2002:210), let alone the world population as a whole.

It would seem that Farm B compromises environmental sustainability for the economic benefits, such as higher yields and a predictable harvest. The findings derived from the research suggest that Farm B’s fossil fuel dependency is larger by some margin than Farm A. Throughout the links within the strawberry chain, practices and methods utilised on Farm A require less energy, technology and chemical fertilisers than Farm B. Consequently, if measuring ecological/environmental sustainability in the framework of fossil fuel consumption and its impact on the ecological footprint of a farm, based on the research findings, Farm A practices a more ecologically sustainable agricultural farming method than Farm B. Farm A follows the organic principle and exercises a moral commitment to the earth and future generations to farm with as little harm to the environment as possible. The quality of the produce overrides the quantity of the fruits grown, which might be an acknowledgement that being environmentally sustainable and organically committed might be more unproblematic (by no means limited to) on a smaller scale. Farm B, on the other hand gives the impression that it exercises environmental sustainability based on rational and profit-orientated reasoning. Although its owners do acknowledge the necessity to maintain the soil structures
through natural methods in order to avoid desertification, Farm B’s overall strawberry production proves to be weak with regards to the ecological dimension of sustainability.

**Economic and Social Sustainability**

The other two dimensions of sustainability include economic and social sustainability. Khajuria *et al.* (2009:16) link economic sustainability “with the assessment of return on investment” examining the economic feasibility of an agricultural system against pressures, such as low productivity levels, wage legislation, growing demand and rising prices. In the context of South African agriculture, the arguments around the policy environment and regulations of the labour market are crucial throughout the discussion of economic sustainability. The dimension of social sustainability will be briefly discussed in the context of “socio-cultural issues which influence sustainability” (Khajuria *et al.*, 2009:16), such as the overall welfare of humans involved in the chain process, cultural needs and personal preferences.

**Economic Sustainability**

As mentioned above, one factor determining the economic sustainability of a farm depends on its overall productivity. Based on the research findings, Farm B reaps considerably larger yields on an annual basis than Farm A. This could be due to different reasons, namely the impact of the farming methods utilised on Farm A versus Farm B as well as the different size of the farms. Firstly, the focus will be on the first possible explanation, the presence of different farming methods.

When examining the value chains of both farms, it is evident that the harvesting time on the commercial farm is prolonged by three months due to the application of chemical fertilisers and modified breeds. While early production takes place at the end of July on Farm A, Farm B starts harvesting by the end of April. With a three months longer harvest, the yields are higher on Farm B. Moreover, the planting of different varieties of strawberries makes it possible for Farm B to have a longer harvesting season. The fact that their plant seedlings are produced systematically in the farm’s nursery diminishes the danger of unfruitful yields and eliminates further danger of plants being prone to diseases and insects. Farm B works with *in vitro* plants, basically tissue cultures that are grown into plant seedlings in a protected
environment supplemented by chemical fertilisers. The advantage of these ‘lab plants’ is their resistance to disease and an improved taste and look. As a result, commercial farming supporters would argue that Farm B is highly economically sustainable. The farmers are following Borlaug’s model (2002:224) by using biotechnology to increase their yields, “stability of harvests, and [therefore] farm income.” Farm B’s main objective is to run a profitable and productive business by planting strawberries in order to feed the “urban-industrial population” as mentioned by Bowler (2002:210). Supporting the philosophy of the Green Revolution (Miller, 2004:37), it is believed that Farm B prioritises developing ways to continuously produce higher quantities of strawberries and to respond to the growing consumer demand as the population is steadily increasing.

The fossil fuel dependency of each farm is another point relevant in this discussion, and has already been broached in the section on ecological sustainability. It was suggested that the more intensive a farming system is dependent on fossil fuel consumption, the lower its dimension of ecological sustainability. It has also been established that within various links, ecological and economic dimensions were intertwined. The above discussion on the extension of the harvesting season through a) the use of laboratory-developed seedlings and b) the application of chemical fertilisers links to this argument. The farming system on Farm B is assumed to be more economically sustainable as it is more profitable and economically feasible compared to Farm A. However, at the same time, by utilising these methods, Farm B is more sensitive to the global price increases of fossil fuels, such as oil and coal. As a result, it can be assumed that Farm B’s costs for importing tissue cultures from overseas, growing them in their nursery using a substantial amount of energy, applying synthetic fertilisers and maintaining an overall 90 hectares of land will increase over-time and eventually be passed on to the consumer. In this light, Farm A might not be as economically sustainable as Farm B with regards to the lower predictability and overall quantity of its yields: yet at the same time this farming system is less receptive to the negative impacts attached to the increasing fossil fuel dependency of more modern, commercial farming systems.

As mentioned above, another point for debate is whether economic sustainability depends on the size of the farm. There is an argument that alternative farming methods (including organic) require more land for cultivation and are therefore less
economically sustainable. The employees interviewed at Farm B agree that organic farming is only realistic, and sustainable on a small scale basis, as it would require too much land and labour-intensity to be successful.

This whole organic thing is way out of boundary. If we want to feed the nations organically only, I think we need about 10 to 15 times size of land. (Jan, Farm B)

This conforms to theorists’ arguments defending the standpoint that natural wild habitats are destroyed because organic farming takes up more land for food production than commercial and chemical farming, and there is possibly less land available for wetlands and forests (Adams, 1990; Borlaug, 2002; Miller, 2004). This challenge to organic farming has been acknowledged by the agricultural sector. By using technology systems, commercial farms are able to grow more food on less land. According to Adams (1990) “only two-thirds of the land is needed for food production” compared to organic farming. It remains the task and challenge for the organic supporters “to figure out how to get more organic food from each hectare of land without losing the environmental advantages” (Gibson, 2009).

The impact and effects during the conversion from commercial farming to organic farming are also a further critical matter relating to the issue of land. The amount of land and associated costs required to convert previously chemically farmed land into organically usable land is perceived as high and intensive. Both farms studied in this dissertation demonstrate that one needs extensive access to land to switch from chemical methods to organic farming. As explained in the previous chapter, the land planned for organic cultivation requires at least two years preparation of enrichment with greens that add natural nutrients to the soil. For farmers with limited access to land this might be impossible as they need to work their land at all the times as its yield accounts for their income.

This side [the Brits area] you also have plenty of vegetable farmers. And for them to farm sustainably and profitably they have to have a strict crop-rotation and soil maintenance plan. This is difficult if you only have a small amount of hectares, because so often it is not possible to work one piece of land where you grow greens to recover the soil, as they would need that part to survive. As a result, they just keep on farming it and only see the problems in 15 years from now.

(Jan, Farm B)

Hendrik confirms that if he had to pay rent on his Farm A, he would have had to structure his farm semi-commercially from the beginning, and not fully organic. The
time, effort and costs involved to convert the land to organic earth would have not been economically sustainable for him and his family. According to the findings on Farm B, conversion to organic (for the experiment) was described as “very costly and risky” after all the existing structures are set up. Besides a transition period of approximately two years, the research findings correspond with what has been found by Van Tine and Verlinden (2003:2): the farmer who is converting is very likely to “experience a loss in profits since it has been found that crop yields and profits decrease while input costs increase” during times of conversion. It certainly takes a strong philosophical mind set and aspiration to grow alternatively and organically as the farmer often has to be patient and be able to live with failures before a possible success. It is often not a rational and productive process, but more an ideological race against the pressures of capitalist functionality and the constant need to make money.

Policies and legislation impacting on economic sustainability

South Africa follows the lead of the northern countries that continuously push the agenda for sustainable development and participates as signatory in international frameworks related to agriculture in the context of sustainable development, such as the Earth Summit in Rio, the Millennium Development Goals Declaration and the Convention on Biological Diversity. The implementation of so-called neo-liberal economic policies led to the deregulation of the agricultural sector in South Africa post-1994. Within this newly created agricultural space “market control, not state control, unambiguously best serves farmers, consumers, and the economy at large” while the goal to create competitiveness replaces the apartheid safeguards, such as subsidies and Control Boards (Vink and Kirsten, 2000; Mokoena, 2003; Centre for Rural Legal Studies, 2003). This shift within the agricultural framework is said to have helped decrease food prices and raise agricultural growth by stimulating the registration of new farm ventures (Vink and Kirsten, 2000; Wilson, 1999). However, it is also argued that this shift did not only produce “winners” but also “losers” (Genis, 2012:2).

The National Department of Agriculture (2001) affirms that the South African government is actively committed to establishing “a united and prosperous agricultural sector.” Frameworks, such as the National Policy on Organic Production, The Strategic Plan for South African Agriculture, the Policy on Agriculture in
Sustainable Development, the National Agricultural Research and Development Strategy and the study issued by the Trade and Industry Chamber to develop a value chain strategy for sustainable development and growth of organic agriculture support this notion. The Department of Agriculture’s Strategic Plan for South African Agriculture (2001:5) lists the changes in the South African agricultural sector that have derived from neo-liberal reforms and the liberalisation of trade:

- Deregulation of marketing of agricultural products
- Changes in the fiscal treatment of agriculture (among other things the abolition of certain tax concessions)
- Reduction in direct budgetary expenditure on the sector
- Land reform (restitution, redistribution and tenure reform programmes)
- Trade policy reform (among other things tariffication of farm commodities and general liberalisation of trade in farm produce)
- Institutional reform of the governance of agriculture
- Application of labour legislation to the agricultural sector.

The farmers in this study perceive the transition and present-day agricultural situation in South Africa negatively. They agree that the current South African government’s development strategy does not recognise the agricultural sector as a priority. They confirm Mokoena’s (2003) reflection regarding the deterioration of the agricultural support services. The collapse of almost all research facilities and the extension service delivery programme was, according to both farmers, brought about by the cut of government resources towards agricultural research and development. ‘Knowledge draining’ has also been detrimental to the sector, as this study and literature confirms the exodus of highly skilled researchers from the industry. With regards to strawberry production, the outcomes of this dissertation verify that a shortage of information and knowledge sharing exists. Hardly any educational material about the strawberry sector in South Africa is accessible for people not engaged in the industry. Other experts within the agricultural sector who were interviewed during this study (Bourbon-Leftley, 2013; De LaPorte, 2013, Safronovitz, 2013) conceive the current unsound agricultural policy environment in South Africa as major drawback for upcoming and existing farmers, regardless of the size of their farms. The following section concentrates particularly on the application of labour
legislation to the agricultural sector in South Africa, and how this is relevant to the economic dimension of sustainability of the two participating farms.

“Before 1993, South African farm workers were not covered by any labour protection or collective bargaining legislation”, Vink and Van Rooyen (2009:24) point out. Frameworks such as the Basic Conditions of Employment Act (Republic of South Africa, 1997 – amended 2002) and Sectoral Determinations (Development Policy Research, 2010), the South African government installed measures targeted at addressing pertinent issues, such as an underpaid workforce and labour relations. The farm worker sector falls under Sectoral Determination 13, which sets minimum wages, working hours, leave days and termination rules (Department of Labour, 2011).

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<td>284.23</td>
<td>303.84</td>
<td>317.51</td>
</tr>
<tr>
<td>Monthly</td>
<td>1231.70</td>
<td>1316.69</td>
<td>1375.94</td>
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</table>

The calculation of the minimum wages for the period 1 March 2014 to 28 February 2015 and from 1 March 2015 to 28 February 2016 are calculated as follows: Previous year’s minimum wage + CPI** + 1.5%.

**The CPI to be utilized is the available CPI for the lowest quintile as released by Statistics South Africa six weeks prior to the increment date.

At the time the research was conducted, both farmers paid their permanent workers the minimum wage for farm workers set at R1375.94 per month (Department of Labour, 2011). While at Farm B seasonal workers were also paid according to the minimum wage legislation, seasonal staff on Farm A were not working on a formal contract and were paid the amount that was set between the farmer and the worker. A study conducted by the Development Policy Research Unit (2010:7) found that “an increase in enforcement of the minimum wage resulted in a decline in poverty”. However, it also stated that “full compliance with the minimum wage is not enough to
completely eradicate poverty” and alternative sources of income are vital to sustain a livelihood. This issue is addressed by Farm B with a ‘bonus system’, a practice that aims to encourage workers to work more and earn additional money. Pieter, an owner of Farm B, estimates that based on this reward system many of his workers are paid close to double the minimum wage.

Hendrik (owner of Farm A) states that he “doesn’t mind paying as they need a living wage”, yet he is not pleased with the levels of efficiency the farm workers are attaining in relation to their “high” salaries. The owners of Farm B share similar sentiments and acknowledge that the laws should be enforced even though they might not approve of them completely. Moreover, the farmers echo Grub’s (2005:67) view that “workers as well were very unhappy about this new regulation” and in fact preferred the paternalistic system that was in place prior to the new legislation in 1994. Prior to the minimum wage legislation, housing, food subsidies, family support and medical expenses were part of the payment to the worker. Many workers appreciated this payment in kind, which is now being reduced. Conradie (2003:14) quotes a farmer who represents the view of the two farmers observed in this dissertation:

I’m now going to make them pay. I am not their father anymore. The government is their father. Mbeki can pay. But he won’t look after them. I will still have to do it. They will still come running to me if someone needs to be buried.

Hendrik criticises the minimum wage legislation and other “strict labour laws”, as they are detrimental to the “worker–farmer relationship”. Although, by law, Hendrik could charge his workers for rent, electricity and water, he decided to maintain the provision of these services free of charge for his one full-time worker. As an organic farmer he thinks that “a good relationship and how you treat your workers is very important”. He is of the opinion that workers are treated differently on big commercial farms. The motive to make profit and the rationalising of the workforce has changed the relationship between workers and farmers in the new South Africa.

They [the new South African government] wanted to break the relationship between the farmer and the worker, while previously it was like a big family. The white ‘boss’ replaced their tribal chief and they were used to having everything arranged for them. (Hendrik, Farm A)
The above quote confirms that the traditional farmer–worker relationship was based on a feudal system, and many (white) farmers, including Hendrik, would prefer this system even today. At Farm B, workers are not provided accommodation and food subsidies, as these payments in kind were abolished by law. However, as the research findings confirm, the owners of Farm B also value a good relationship with their workers. The ‘bonus system’ mentioned above counts as one method to show the workers that their efforts are appreciated. Furthermore, the farm exercises its right and moral duty of corporate social responsibility by operating a farm school, where attendance is free of charge for many children of the permanent staff. Also, on an annual basis the farm conducts free HIV testing for its employees. In 2011, 80 per cent of the workforce participated: 60 per cent tested HIV positive and received free counselling afterwards.

This thesis found that the two strawberry farmers in the North West Province are of the same opinion as Lal, who argues that the minimum wage legislation has done more harm than good. Lal (1998:31) pronounces that there is a growing “consensus amongst economists that the minimum wage is not an efficient instrument to deal with the problem it seeks to solve”, which is growing inequality and labourer exploitation in South Africa. The findings suggest that labour legislation, or the incorrect application thereof, affects farmers’ economic sustainability negatively, as they are increasingly vulnerable and cost-sensitive in the free market system. Firstly, the strong competition that many (and especially big commercial farmers) are faced with due to the open and liberalised trade agreements mentioned before pushes farmers to minimise their costs, which often results in the laying-off of workers. The Centre for Rural Legal Studies (2003:5) notes that:

> As a result [of the capitalisation of South African agriculture and the implementation of neoliberal reforms], farm workers’ employment has become increasingly insecure. Many workers have lost their jobs and among those who have kept their jobs, many are now employed on a contractual basis, as casual or seasonal workers.

Labour legislation affords another right, besides the access to minimum wage: the right of representation by a (farm workers’) union. According to Farm B, the involvement of workers’ unions unnecessarily disrupts the good relationship between the worker and the farmer.
After the workforce was unionised in 1994, every year they were crying for more and more and every second year they went on a strike. (Marius, Farm B)

Marius explains that especially in the flower-cutting industry many farms closed down in the Magaliesberg area after 1994, as the farmers could not “afford” to continuously deal with the striking workers. Alternatively, they closed down the South African branches and moved their operations to Zimbabwe and Kenya, where labour costs are lower and labour relations far less complicated than in South Africa. During that time, many locals have lost their jobs and continue to live in poverty. This does not seem much different for the strawberry industry in South Africa. The owners of Farm A and Farm B are convinced that the increasing cost of labour for the farmer has had a negative impact on the industry during the past years. It was elaborated that strawberry farming requires extensive manual work, which requires a big workforce. Consequently, only a handful of farmers are engaging in strawberry production in South Africa, as it can become too expensive very quickly. This is confirmed in Legg’s article (2013), which explains that South African farmers are increasingly struggling to compete with the cheaper strawberries from Zimbabwe. The reason the berries from the neighbouring country are sold at a lower price is that there is no legislation in Zimbabwe regulating workers’ wages and consequently they are produced at a much lower cost.

Considering the South African labour relation legislation briefly, it is questionable whether any kind of farming practice (small-scale, alternative versus large-scale, commercial) is sustainable in given the current pressures faced by the farmers. The farmers in this study feel weak in an environment of strict labour law adherence and believe that employing a lot of “expensive” workers will have an impact on their overall economic sustainability. Consequently, they are employing fewer workers to save costs. The legal environment, including the need for contracts and transparent payment methods assists the large-scale commercial Farm B to manage their remaining large workforce effectively. An example of efficient labour management is the electronic payroll system. On Farm B, all salaries are paid into bank accounts and no cash is handed over to workers. If an employee does not have a bank account, the farm assists to register and open a bank account so the worker can receive their payment. That way, workers, farmers and auditors have a clear overview of who is getting paid, how much and when. This safe and accountable
method of payment is not utilised on Farm A. The salary is paid in to the worker with minimal paper trail. Hendrik may not possess the financial resources as well as the skills to implement such as system. Also, the feasibility of this method on such a small farm could be questioned comparing it to the massive labour force that needs to be managed on Farm B.

**Social Sustainability**
The dimension of social sustainability will only be briefly introduced in this paper. Social sustainability is closely linked with the other two dimensions of ecological and economic sustainability. In particular, the discussion on job creation within the strawberry production chain raises the matter of social sustainability.

The South African Department of Agriculture (2001) acknowledges the social impact commercial farmers generate within the South African context. Almost 50 000 large-scale commercial farmers employ “about 1 million workers, which is 11% of total formal sector employment in the country.” It is further explained that by providing housing and education to the workers and their families, “commercial farms provide livelihoods […] to about 6 million family members.”

As was evident on both farms, strawberry production is labour intensive. Planting and picking is done manually, predominantly by seasonal workers. It is argued that organic farming requires more labour than a commercial, technologically advanced farm, and therefore contributes significantly to job creation in a country with a very high unemployment rate (Lewis, n.d.:11; Klink, 2009:4, Thamaga-Chitja and Hendriks, 2008:320). In 2006 it was found that “organic farms created 32% more jobs in England than the conventional counterparts” (Klink, 2009:4). The study makes clear that when applying organic farming methods, the increased need for monitoring the plants in order to maintain a “perfect system” requires more workers than on a commercial farm. This corroborates the information gathered on Farm B. The employees on Farm B believe that farming organically would require too many workers to maintain the production on a profitable basis. If strawberries are farmed organically, the use of chemical fertilisers is restricted. Alternatively, plants are treated individually by staff picking out leaves manually in order to ensure their health and growth. Thus Farm B, which cultivates 90 hectares of land, is a bigger job creator by employing 150 permanent workers and 1800 seasonal workers, of whom
the majority are locally sourced, unskilled South Africans. Although Hendrik only employs one permanent worker and six seasonal staff members for cultivating 1 hectare of strawberries, it could be assumed that if growing strawberries on a scale equivalent to Farm B, more workers would have to be employed than currently are hired at the conventional Farm B. This finding might be an inspiration to the South African Department of Agriculture to reconsider the value assigned to large commercial farmers. Although they seem to be the current job creators in the sector, support towards bigger scale organic farming might unleash more employment potential within the agricultural sector.

A further question around the issue of social sustainability involves the consumption of the produce. As stated in previous chapters, although the general demand for organic produce is increasing on a global scale, in South Africa, the consumption of organically grown food seems to remain a privilege for “consumers in higher wealth groups” (Vermeulen and Bienabe, 2007:10). Focusing on their health and well-being, many South Africans prioritise their quality of life whereas a bigger portion of the population continues to struggle with poverty and inequalities (DuToit and Crafford, 2003; Bowler, 2002). A study conducted by DuToit and Crafford (2003:9) gives an indication of who has access to organic food:

The typical profile of the respondent indicating an interest in organic foods was as follows: older (more than 36 years of age), English-speaking and with a higher level of education.

The main obstacle associated with the consumption of organic produce is that they “often fetch premium market prices” (Thamaga-Chitja and Hendriks, 2008:317). As analysed by Vermeulen and Bienabe (2007:12), the highest price premium is calculated for tea and coffee with 112 per cent, followed by salad dressing and mayonnaise with 110 per cent and bananas with 72 per cent. All in all, “price premiums typically range between 20 and 40%”, which positions organic produce as luxury consumption rather than a staple diet. It gives rise to Guthman’s (2008:433) theory that “whiteness inheres in the political practice of alternative food.” She explains that the notion of alternative food, including organic farming is a ‘white concept.’ The ‘whiteness’ discourse unfolds in a rather precarious nature and will not be examined further in this paper.
Conclusion

This study aims to examine the process of the strawberry production chain on two different farms and identify the dimensions of ecological, economic and social sustainability a) within the overall chain process as well as, where applicable b) within the various links of the chain.

This chapter started with and prioritised the ecological dimension of sustainability observed throughout the chain and within the links. In general, it was established that the small-scale, alternative farm is more ecological sustainable than the large-scale, commercial farm based on its lesser dependence on fossil fuel consumption, and therefore the absence of unnatural and chemical processes that have a negative impact on the environment in general. Another point discussed within the framework of ecological sustainability was the philosophy attached to alternative farming methods, such as organic farming. Both farms researched agree that organic farming is more than just leaving out the fertilisers; it is more about the idea of the “farm as an organism” (Northbourne in Paull, 2006).

The debate around economic sustainability focused on issues around farm productivity based on the farming method, the size of the farm and the current agricultural policy environment in South Africa. On the basis of the research findings and the discussion above, Farm B is regarded as productive-orientated and accounts for larger profits than Farm A due to the consistency and quantity of higher yields. As a result, Farm B’s farming system is economically more sustainable than Farm A. However, at this stage, the link to fossil fuel dependency should also be kept in mind since Farm B’s dimension of economic sustainability is conditional on external influences, such as the rising price of fossil fuels. Because Farm A’s level of dependency on fossil fuel consumption is minimal, the farm is less affected by these influences. Additionally, Farm B is conditioned by a larger workforce, to local and international suppliers (inputs for the production), to the government (trade and labour regulations) as well as to the retailers and consumers that expect strawberries to be delivered in a specific shape at a specific time. Hendrik (Farm A) is running a lower overall risk since the financial overheads to run the farm, including not having to pay rent and employing only one permanent worker, are substantially lower than those of Farm B.
Moreover, it appears that South African agricultural policies need to be revised and that government finally ‘walks its talk’. As mentioned in the literature, and confirmed in this study, the “international pressure and budgetary constraints” (Mokoena, 2003:8) created a highly fragmented and inefficient agricultural sector post-1994. This contradicts the vision of the government, which is to create “a united and prosperous agricultural sector” (The Strategic Plan for South African Agriculture, 2001: viii). The enforcement of policies clearly committing to sustainable agriculture is crucial in order to make farming feasible and sustainable for farmers in general. Whereas many theorists call for a stronger regulation of the agricultural sector (Bowler, 2002; Mokoena, 2003; Thamaga-Chitja and Hendriks, 2008; Klink, 2009; Lewis) to be able to compete with the protected and supported farmers from the North, others criticise the heavily regulated labour legislation in South Africa, especially around workers’ wages. With productivity levels of the workers remaining constant over the years, the prospect of economic sustainable farming in South Africa is declining with the minimum wage rates almost doubling over the past 4 years (Department of Labour, 2013).

Lastly, the social dimension of sustainability within the strawberry production chain was briefly outlined. Both farms are contributing actively to job creation in the South African agricultural sector since strawberry farming is considerably labour-intensive. However, the study confirms changing employment patterns due to the tighter labour and wage legislation over the years with both farms reducing the number of their permanent workers and preferring to hire seasonal staff instead.

Referring back to the four principles of sustainability introduced in the beginning of this chapter, the preceding discussion in the context of both farms researched in this study repeatedly emphasises the interconnectedness of all three dimensions of sustainability. It becomes clear that whatever process is ecological sustainable does not necessarily demonstrate economic sustainability. As a result the term sustainable farming may not be restricted to the ecological sustainability (as often) of an agricultural system but also its economic and social dimension of sustainability.
CHAPTER SEVEN – CONCLUSION

This study aimed to examine the process of the strawberry production chain on two different farms in the Magaliesberg region and identify the dimensions of ecological, economic and social sustainability a) within the overall chain process as well as, where applicable b) within the various links of the chain.

The beginning of this dissertation addresses the concept of sustainability in the context of the increasing demand to “meet the needs of the present generation without compromising the ability of future generations” as was defined by the United Nations (1987:37). In view of the research on hand, this paper was mainly concerned with the aspect of agricultural sustainability. It was explained that agricultural farming systems also changed with an increasingly globalised world system. Increasing demand for food demanded the farming systems to be more efficient, lower in outputs and consequently more mechanised.

As stated by Brandon (2008:26), Nester (2001:374) and Bradshaw and Wallace (1996), industrialisation, rapid economic development through trade liberalisation, the improvement of technologies and the trend of mass commercialisation created a society that strives for efficiency, rationality, growing demand and financial growth. With the end of the Cold War at the end of the 1980s, this concurrent societal shift was globalised and exported from the global north to the newly independent nations worldwide.

It is commonly believed that the moving away from the chemical conventional way of farming, often referred to as commercial farming, is necessary for the agricultural sector in order to ensure sustainability as defined by the United Nations. With this dissertation I followed policymakers and academics who demonstrated that “interest in food and its wider social, cultural, economic and environmental implications has flourished […] over the past 10 years” (Maxey, 2006:230). I agree with the theorists who believe that agricultural research should not be the exclusive preserve of scientific quantitative experiments but requires a more in-depth perspective by integrating research on food and the environment, following Ashby’s (2001) idea that “agricultural science is not the exclusive domain of scientists.”
As methods of research, I chose the commodity chain analysis and the case study approach. A commodity chain analysis “seeks to identify and illuminate the individuals, institutions, technologies, forms of knowledge, and forms of capital involved in transforming raw agricultural products into consumable foods” (Hamilton in Belasco and Horowitz, 2009:17). I applied it as an analytical tool to “probe the relations of farmers large and small to workers, manufacturers, bankers, processors, distributors, marketers, consumers, the state and the environment” (Friedland, in Belasco and Horowitz, 2009:18). It assisted me in establishing an objective step-by-step analysis of the chain of strawberry processing and gave insight into the various links and how they relate to each other. Additionally, this research study was conducted on a qualitative basis, gathering information through face-to-face and telephonic interviews. It was perceived that this method was ideal for this sort of study, as I established a relationship with the farmers, who in turn provided me with insightful information.

I came to the conclusion that analysing the overall sustainability of an agricultural system is more difficult and complex than I initially expected. The study found that there is a clear interconnectedness between various dimensions of sustainability like ecological, economic and social. This notion of sustainability being a “multidimensional” concept was put forward by Khajurua et al. (2009:15).

This study prioritised the ecological dimension of sustainability observed throughout the chain and within the links. In general, it was established that the small-scale, alternative farm is more ecological sustainable than the large-scale, commercial farm because it is less dependent on fossil fuel consumption throughout the production process of strawberries. Farm A, the alternative farm has proven to minimise its input throughout the links in the strawberry chain, starting from plant origin up until distribution. Farm B’s production methods, such as applying chemical fertilisers, automating many of their operations and cultivating a large amount of land for markets far from their farm makes their agricultural system heavily dependent on fossil fuel consumption. The harvesting link within the chain was identified as the highest ecological sustainable link in both cases as there are less energy-dependent, mechanised processes involved but more manual labour. Another point discussed
within the framework of ecological sustainability was the philosophy attached to alternative farming methods, such as organic farming. Both farms researched agree that organic farming is more than just about leaving out the fertilisers. The large-scale commercial farm has proven to be more viable and to function more efficiently in a free market system, as it is practised in South Africa. Within the different links that were analysed, namely the plant origin, planting and maintenance methods, harvesting times and packaging and distribution, the farmer has used a capitalist-driven model that aims to maximise profits and respond to the growing demand in an increasingly volatile and price-sensitive environment. Relating to the links in the chain, Farmer A, the owner of the small-scale, alternative plot that was researched in this study, is not solely driven by profits and growing demand pressures, but pursues the wider philosophy of improving quality of life and being in touch with the earth. The farmer treats the farm “as an organism”, just as Northbourne defined organic agriculture (Paull, 2006:15), and consequently places great emphasis on ecological sustainability.

The debate around economic sustainability focused on issues around farm productivity based on the farming method, the size of the farm and the current agricultural policy environment in South Africa. On the basis of the research findings, Farm B seeks to maximise production and accounts for larger profits than Farm A due to the consistency and quantity of higher yields. As a result, Farm B’s farming system is economically more sustainable than Farm A. Farm B’s dimension of economic sustainability is conditional to external influences, such as the rising price of fossil fuels. Because Farm A’s level of dependency on fossil fuel consumption is minimal, the farm is less affected by these influences. Additionally, Farm B is conditioned by a larger workforce, to local and international suppliers (inputs for the production), to the government (trade and labour regulations) as well as to the retailers and consumers that expect strawberries to be delivered in a specific shape at a specific time. Hendrik (Farm A) is running a lower overall risk since the financial overheads to run the farm, including not having to pay rent and employing only one permanent worker, are substantially lower than those of Farm B. As a result, the dimension of economic sustainability in the context of this research is two-fold. Although Farm B is regarded more economically sustainable, its dependency on external influences as result of its high fossil fuel consumption makes this agricultural
system also somewhat vulnerable. Consequently, the higher production costs of Farm B put its actual economic sustainability in question. Based on this, the research conducted coincides with the increasing demands to support alternative methods that are a) more ecologically and b) more economically sustainable. Pretty (2008:450) points out that “agricultural systems in all parts of the world will have to make improvements” in order to address the imbalances explained above.

Another part of this study examined the impact of current agricultural policies in South Africa on the various dimensions of sustainability of the different farms, especially economic sustainability. In 1994 South Africa held its first democratic elections, and with the ANC coming into power the economic landscape changed enormously in the country. The liberalisation of the heavily state-protected economic sector was a priority and measure of the newly elected party’s ability to increase development. The agricultural sector was also impacted, as farmers’ subsidies were cut and minimal state protection encouraged farmers to compete on a global dimension in a free market system, which, as shown in this research, was easier said than done. The “international pressure and budgetary constraints” (Mokoena, 2003:8) created a highly fragmented agricultural sector post-1994. This contradicts the vision of the government, which is to create “a united and prosperous agricultural sector” (The Strategic Plan for South African Agriculture, 2001: viii). The enforcement of policies clearly committing to sustainable agriculture is crucial in order to make farming feasible and sustainable for farmers in general. Whereas, many theorists call for a stronger regulation of the agricultural sector (Bowler, 2002; Mokoena, 2003; Thamaga-Chitja and Hendriks, 2008; Klink, 2009; Lewis) to be able to compete with the protected and supported farmers from the global north, others criticise the heavily regulated labour legislation in South Africa especially around workers’ wages.

The study finds that the small-scale, alternative farm seems more vulnerable within this weak policy framework and the competitive, market-driven economic sector. The lack of a strong and coherent policy framework enforced by the South African government increases the levels of vulnerability and the instabilities farmers are facing in the country, regardless of which farming method is utilised. It was established that South Africa’s implementation of neo-liberal reforms and trade liberalisation might have not been appropriate for the agricultural sector. Farmers as
well as organised farming organisations (e.g. AgriSA) demand a more inclusive and hands-on approach of the government in dealing with the agricultural sector in South Africa. While South Africa is following the conditions and requirements of the West, its farmers are at a disadvantage and struggle to survive, trapped as they are in the reality of a ‘working poor’ phenomenon that is “becoming increasingly common under the influence of neo-liberal globalisation” (Maxey, 2006:238). In such circumstances it would be wise to consider Vink and Van Rooyen’s (2009:36) suggestion that for farmers in South Africa to benefit in the longer run, they must be supported by the state with comprehensive farmer support programmes that include access to land held under private property as well as access to markets, farming requisites, and so on.

This thesis has reiterated consistently the argument that modern, commercial methods of farming call for alternatives to improve the sustainability of food production. Organic farming is often regarded as one form of a more sustainable method offering an improved model in contrast to commercial farming. After examining the policy environment on organic farming in South Africa, it is questionable whether this farming method has the government’s essential support. There are no indications that state policies have followed through the assertion that this is the best model for emerging farmers. The South African National Policy on Organic Production (7th Draft) states that the organic sector in the country is fragmented. On one hand, “organic agriculture is considered to be a viable solution” to growing health and environmental concerns, and is stipulated as the “best model for emerging farmers”. On the other hand, however, the formal, certified organic sector remains small in the country, with an enduring lack of knowledge of organic farming. More importantly, the organic sector in South Africa is perceived as niche, as certified organic products fetch premium prices compared to conventional grown products. A six-pack of extra-large free-range eggs at a local retailer costs R13.99, while conventional extra-large unbranded eggs are priced at R10.79. The price difference becomes even more apparent with Rooibos Tea. If a consumer decides to buy the organic option (at the same retailer), the price for 80 tea bags is R21.99 whereas the unbranded option amounts to just half, R11.58. It is not surprising that in spite of the health and environmental benefits, as stated in the South African
National Policy on Organic Production (7th Draft) mentioned above, many South Africans perceive “this sector [as] the preserve of the wealthy and the powerful.”

From a social perspective, it can be concluded that farming contributes significantly to job creation in South Africa. The growing of strawberries could especially contribute to higher employment, as it is known as a labour-intensive fruit to grow. However it can be argued that organic farming is only socially sustainable if it is affordable and accessible to all. Premium prices and limited access to organic produce limits consumption to a wealthy minority. As this study’s reflection on literature has shown, the good food, the produce claimed to be healthier and more nutritious, is mainly available to a minority that can afford it. I believe being socially sustainable reaches beyond the responsibility of being an employer, teacher, and tax payer.

The South African Constitution recognises a “sustainable environment and sustainable development” as a human right. This research, along with the arguments of many organic farming supporters, asserts that alternative farming methods are potentially more ecological as well economically sustainable than commercial agricultural systems. If sustainably grown food utilising methods such as organic and natural farming is said to be healthier, more nutritious and less harmful to the soil than chemically farmed products then it is necessary to make it a) easier to grow alternatively b) widen accessibility of the products and c) make them affordable to all. It is the constitutional duty of the state to ensure the fulfilment of socio-economic rights by protecting the society as well as conserving the environment. Kotze (2003:81) notes that the South African Constitution (1996) provides as follows:

- Section 24(a) provides for a right to an environment that is not harmful to people’s health or well-being. It be construed as a traditional, positively formulated fundamental right to which every person is entitled;
- Section 24(b) contains directive principles and therefore resembles the character of a socio-economic right that imposes duties on the state to protect the environment for present and future generations through reasonable legislative and other measures
Assuredly, the state has a key role to play in providing a coherent framework guiding sustainable development and consequently sustainable and organic farming. However, the farmer also plays a crucial role as it is ultimately he or she “who decides […] how much agrichemicals to use on his or her field” (Darnhofer et al., 2010:192). The definition of sustainable development that opened this research paper does not specify who is responsible for ‘meeting the needs of the present without compromising the ability of future generations to meet their own needs’. One answer could be: future researchers, farmers, consumers, policymakers, academics and scientists alike. As highlighted by Hansen et al. (2006:165):

The relationship between nature and agriculture is not solely of interest to farmers or biologists; the question of management of our common nature involves local communities in the rural areas, consumer groups, and outdoor organizations, and it also has potential political interest.

Due to various limitations regarding the research scope and research design (choice of farms), this study cannot propose whether Farm A or Farm B is more sustainable. Their dimensions of sustainability could be examined within each link of the chain; however a more-in depth analysis and further research would be required to come to such conclusion. Although not directly reflected within the analysis of the strawberry commodity chains, but rather drawn on the interviews with experts in the industry, this study suggests that the sustainability of strawberry farming in South Africa is decreasing regardless of the farm’s size or farming method. Poor economic conditions (global and local), continually rising prices, the remaining power of the large retailers as well as the lack of agricultural policies aiming to develop agricultural productivity are contributing factors for the decline in strawberry farming in South Africa.
REFERENCES


Lewis, M. (n.d.) *Agroecology and the commoditisation of nature in urban and peri-urban South Africa: an assessment of three food production projects in Johannesburg.* The Institute for Land and Agrarian Studies (PLAAS), University of the Western Cape.


LIST OF INTERVIEWS


Employee 1, Farm B (2012, February 29) Interview with Isabel Faller [Recorded]. Fertilizing and Organic Experiment on Farm B.

Employee 2, Farm B (2012, February 29) Interview with Isabel Faller [Recorded]. Fertilizing and Organic Experiment on Farm B.

Farmer A, Hendrik (2012, February 21) Interview with Isabel Faller [Recorded]. Farming methods and processes on Farm A.

Farmer B (1), Marius (2012, May 25) Interview with Isabel Faller [Recorded]. Farming methods and processes on Farm B.

Farmer B (2), Pieter (2012, May 25) Interview with Isabel Faller [Recorded]. Farming methods and processes on Farm B.

Jan (2012, May 29) Interview with Isabel Faller [Recorded]. Plant Growing and Nursery on Farm B.

Malebo (2012, May 25) Interview with Isabel Faller [Recorded]. Quality Assurance on Farm B.

Safronovitz, B. (2013, July 8) Personal Interview with Isabel Faller [Recorded]. Strawberry Growing in South Africa – Climate Conditions and Hydroponics. Perfect Grow Pty (Ltd), Krugersdorp West, South Africa.

Zetler, J. (2013, July 18) Interview with Isabel Faller [Telephonic]. History of Zetler and Sons’s strawberry business.
APPENDICES

Appendix 1
Informed Consent Form

I hereby ask you for your participation in my research conducted for my Master dissertation with the University of Johannesburg. Please be informed that the involvement is solely on a voluntary basis and you may stop participating at any time. If you choose not to take part or discontinue your participation, there will not be any negative outcomes or disapproval. If you would like to participate, please read the provided information and sign at the appropriate line below.

The Study

This study will compare the commodity chains of two strawberry farms in Magaliesberg region, North West Province, South Africa. I will analyse the social, economic and environmental aspects present at each link in the chain in order to identify similarities and differences. Being aware of the links within the chain and how they relate to each other, critical aspects for the farmer, workers, environment and the consumer may be identified. All in all, the research will present a micro examination of a niche economy, that of strawberry production, in the Magaliesberg region. Please be advised that this is a complete objective study in the field of social science. Therefore, the researcher is an objective observer who has no right to communicate any form of opinion/personal preferences within the study. There is also no interest in intellectual property or alike in relation to the science of the actual planting of the fruits. The researcher is solely interested in the 'surroundings' of the planting and the actually activities more than the technical side of things. Also, no sponsors have been approached with regards to fund this project. The scope of this study is not sufficiently sizeable to justify the prospect of funding.

Participating

As a participant of this project, the researcher will visit the farm and conduct the interviews on this property. The conversation will be mostly informal and on a quantitative basis. The respondent may withdraw from the conversation at any time in case of discomfort. Informants are made aware that they are solely participating
on voluntary basis, which insinuates that no form of remuneration will be given to them.

Confidentiality

This study will be conducted on an anonymous basis only. The researcher will ask for a person’s name for communication purposes only (during the interviews). However, the participant’s identity (and that of the farm) will not be revealed throughout the study. The researcher will choose false names, which will be used all through the paper. Furthermore, I assure absolute privacy with regards to the provided information. Records taken by the researcher during the interviews will not be shown to other respondents under any circumstances. Nonetheless, it is important to note that my supervisor from the University of Johannesburg will have access to my collected data as she is assisting me throughout the process of conducting research. Recordings will only be made with the participant’s approval. The footage will be stored safely and will not be accessible to any people not associated to the university. The participants’ dignity will be protected and identity remains veiled all the way through the study.

If any questions or discomfort arise, feel free to contact:

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<tr>
<th>Name</th>
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<tr>
<td>Prof David Moore,</td>
<td>011 559 2979</td>
<td><a href="mailto:dbmoore@uj.ac.za">dbmoore@uj.ac.za</a></td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Isabel Faller,</td>
<td>079 589 5168</td>
<td><a href="mailto:isabela.faller@gmail.com">isabela.faller@gmail.com</a></td>
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I read all the information and agree freely to participate in this project. I have also received a copy of this document.

Name:

----------------------------------                 ----------------------------------
Place, Date                                   Participant’s Signature
I, the researcher Isabel Faller, hereby insure that the information provided above complies with the truth and facts regarding the participants' rights and the conduction of the study.

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Place, Date                    Researcher's Signature
Appendix 2 (made available by Zetler, J., 2013)

Strawberry Memorandum of Agreement for Mendel Zetler in 1915

Memorandum of Agreement made and entered into by and between
H. Jones & Co. (S.A.) Ltd., of Paarl hereinafter called the Buyers
of the one part and, ... Zetler, ... of Stellenbosch
hereinafter called the Seller of the other part.

The Seller agrees to produce and deliver to the Buyers
from October 1915 to February 1916,...................
pounds of Strawberries at 2s.6d. (two and five-eighths pence) per
pound free on rail at Stellenbosch Station under the following
terms and conditions:

1. No sale whatsoever shall be made to any party or parties
other than the Buyers until the full delivery of quantities
under this contract shall have been delivered.

2. The Strawberries are to be delivered on the same day as
they are picked and to be ripe, free from adulteration or
added matter of any kind, properly bulked, in fresh condition,
clean and unfermented, and rendered free from dirt by
washing.

3. Delivery to be made during the aforementioned period each
Monday, Wednesday and Friday at Stellenbosch Station where
the Strawberries will be weighed and trucked and a receipt
given by the Buyers' representative to the Seller for the
amount of fruit purchased.

4. No delivery of fruit can be accepted by the Buyers except on
Wednesday during the weeks in which Christmas and New Year's
Day fall and neither of these two deliveries shall each
exceed seven tons.

5. This Agreement is subject to the Act of God, the interruption
of normal business conditions from any cause whatsoever or to
any other unforeseen occurrence that may arise to prevent either the Buyers or the Seller from carrying
out the provisions thereof.

Dated at Paarl this...[illegible] day of...[illegible]...1915

FOR H. JONES & CO. T.M. 133055

Buyers, M. Zetler

Witness, [illegible], [illegible]

11-6-1915