Towards an Understanding of the Social Learning Dynamic in the Advancement of Organic Farming in South Africa

by

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Abstract

There is growing evidence that the way that the world produces and consumes food needs to change. There is growing public awareness of serious environmental threats (e.g. global warming, loss of biodiversity and pollution) as well as social concerns (e.g. poverty, inequality and food security). It is necessary for global agriculture to rethink its approach to food production and to find new ways of producing food that can meet the demands of the growing world population and at the same time reduce the environmental degradation caused by farming. So called green revolution technologies, resulting in high intensity, high input agriculture are damaging the very resources on which agriculture depends; soil and water. Research reveals current conventional practices to be unsustainable. There is a growing recognition, arising from the creation of new knowledge and the development of deeper understanding, that this change is necessary and urgent.

Organic (or ecological) farming has emerged as a more beneficial way of producing food from a social and environmental perspective. Demand for, and production of, organic food grew steadily in the second half of the twentieth century and has increased dramatically in the twenty first century. This can largely be ascribed to social learning processes. This growth is not yet reflected in South African agriculture. Given the advantages of organic agriculture, it is necessary to consider how to accelerate its expansion. Understanding the social learning processes of organic farmers and using learning histories are useful tools to create a better understanding of how this can be achieved.

The objective of this dissertation is to make use of four social learning frameworks to enhance the understanding of the social learning dynamic of organic farmers by:

- Using existing baseline data from a survey of the organic farming sector to draw out the learning histories.
- Developing an understanding of four social learning frameworks.
- Combining the learning histories and the understanding of social learning frameworks to form a deeper understanding of the social learning dynamics in the South African organic agricultural sector.

A literature review of the organic sector and of four learning frameworks (profound change, conversion of knowledge, deeper learning, and the pedagogy of adult social learning) is used to develop an understanding of the essence of organic agriculture and how people learn. Information from a survey of organic farmers in South Africa, is used to impregnate the learning frameworks in order to develop an understanding of how organic farmers in South Africa are learning

Open-ended questions from the survey are analysed and interpreted based on the understanding of learning frameworks. Selected statements that reflect social learning are highlighted, incorporated into the learning frameworks and discussed to better understand how organic farmers are learning.

The analysis indicates that a high proportion of organic farmers are social learners. The four frameworks demonstrate that many organic farmers see their role as more than just providers of food. They also see themselves as custodians of the land with a deep concern for the environment. Fewer organic farmers demonstrate an understanding of social issues. Those that did showed a clear understanding of the need to integrate social considerations into food production. Networking and sharing of learning are important methods of knowledge creation among organic farmers as a result of the limited research and support for organic farmers in South Africa. Recommendations to accelerate and understand the learning by organic farmers and consumers are provided.

Future research is suggested in order to investigate how to assist organic and conventional farmers to better understand learning, identify how learning can be enhanced or retarded, and actively engage in learning that facilitates knowledge creation.

Declaration

I, Jon Stuart McCosh, declare that:

i. The research reported in this dissertation, except where otherwise indicated, is my original work.

ii. This dissertation has not been submitted for any degree or examination at any other university.

iii. This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other researchers.

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JON STUART MCCOSH Date

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LIST OF ACRONYMS

BBBEE	Broad-Based Black Economic Empowerment
BDAASA	Biodynamic Agricultural Association of South Africa
BDOCA	Biodynamic and Organic Certification Authority
CH_4	Methane
CO_2	Carbon Dioxide
DEAT	National Department of Environmental Affairs and Tourism
DoA	National Department of Agriculture
DTI (thedti)	National Department of Trade and Industry
EU	European Union
FAO	Food and Agriculture Organisation
GM / GMO	Genetically Modified / Genetically Modified Organism
GNH	Gross National Happiness
GNP	Gross National Product
ha	Hectares
IFOAM	International Federation of Organic Agriculture Movements
N_2O	Nitrous Oxide
NGOs	Non-Governmental Organisations
OSA	Organics South Africa (previously OAASA - Organic Agriculture Association of South Africa)
PGS	Participatory Guarantee System
UK	United Kingdom
UNCTAD	UN Conference on Trade and Development
USD	United States of America Dollars
USDA	United States Department of Agriculture
USDA - NOP	United States Department of Agriculture's National Organic Programme

1 INTRODUCTION

1.1 Background

> *"Agriculture is being faced by what may be its greatest challenge yet. In a nutshell, global agricultural production must be increased substantially to meet rising demand, but it must be achieved with a decreasing impact on the natural resources and environment at a time when the cost of energy will continue to rise."* (Williams and McKenzie, 2008, p4)

This statement captures the essence of the problem of world food production. The manner in which food is produced to meet global demand is coming under increased scrutiny. The so-called 'green revolution' and associated high levels of chemical inputs and latterly the development of genetically modified organisms for use in agriculture have raised deep concerns about the sustainability of world food production. In addition to this, the ethical and moral concerns of how food is produced, particularly for future generations (intergenerational equity), underpins the notion of sustainability. Throughout this document, moral and ethical issues are implied in the use of the terms organic farming and sustainability.

Williams and Mackenzie (2008) stress that there is an urgent need to invest in research that can balance the needs of the environment and food production. This new learning should evolve to understand agricultural production systems as a whole. Historically, the focus has been on on-farm production and efficiency, with the true cost of production being externalised to the environment. It is now necessary to take a more holistic view to better understand soil-plant-water dynamics and the agro-ecological interaction between agriculture and the environment. Sustainable agriculture requires integration of social and environmental values into production to make the production system more resilient and to internalise the social and environmental effects. It is necessary to develop new solutions based on a deeper understanding of the system.

There is a resonance between the need to develop new, holistic methods of food production with the way social learning and change occurs. Both stress the dynamic

interaction of different processes and of the loops linking these dynamic interactions. Generic frameworks for understanding social learning are closely aligned with models of ecological dynamics and are valuable tools for understanding how people learn and change. We need to 'learn' to learn better and faster to balance the urgent needs of food production and the environment.

Organic agriculture has emerged as a system of production that has a range of environmental benefits, as well as social and health advantages over 'conventionally' produced food. The rapid growth in organic agriculture has been facilitated by a combination of factors, but mainly by growing consumer awareness and deepening concern by farmers and consumers relating to how food is produced. The growth in organic agriculture worldwide is not yet reflected in South Africa. A deeper understanding of how farmers learn and change is one component of developing interventions for the advancement of organic agriculture in South Africa.

1.2 The Green Revolution, Organic Agriculture and Social Learning

The green revolution as we know it today is generally agreed to have begun with the Haber – Bosch process. Perfected prior to World War 2 as a result of the need for nitrates to make explosives, the process converts atmospheric nitrogen to ammonia, which can then be converted to nitrate (Smil, 2000; cited in Trewavas, 2004). The Green Revolution was seen as a solution to meeting the world's food needs by using high external chemical inputs with productive seed cultivars, and has been the dominant form of agriculture for the last 50 years. However, there is growing evidence that the productivity of green revolution (or 'conventional') systems of food production are not sustainable, causing resource degradation, pollution and the build up of pests and weeds that are developing resistance to pesticides (World Bank, 2007, cited in Williams and McKenzie, 2008; El-Hage Scialabba, 2008, IRRI, 2008; Rosset *et al.* , 2000). From a consumer perspective, food safety and the risks of pesticide residues in food, as well as the environmental and social implications of conventionally produced food are receiving increasing attention (Vermeulen and Beinabe, 2007; du Toit and Crafford, 2003; Finn and Louviere, 1992; Brewer and Prestat, 2007).

In the last decade organic agriculture has experienced rapid growth worldwide. Today, over 31 million hectares are currently managed organically (Willer and Yussefi, 2006). In China, between 2005 and 2006 land under organic management increased an order of magnitude - from 0.3 million hectares to 3.5 million hectares (Paull, 2007). In the United States alone, the organic market has grown from USD13 billion in 1998 to USD25 billion in 2005 (Koekoek, 2006), while Willer *et al.* (2008) note that between 2002 and 2005, sales of organic food and drink worldwide increased by 43%, from USD23 billion to USD40 billion. Markets in the EU are estimated to be growing at about 15 to 20% per annum (Vossenaar and Wynen, 2004).

There is a global shift towards the production and consumption of organic and more sustainably produced food. Growing awareness of the impact of the food we eat on the environment as well as the social conditions under which food is being produced are increasingly informing the choices of both growers and consumers of food. This growing awareness is a result of social learning. Social learning is the process by which people learn and develop knowledge through observation of, and interaction with, other people (Ormrod, 1999).

To better understand why more people are choosing organic food, it is helpful to understand what organic farming is. While it is commonly recognised as a farming system that excludes the use of synthetic fertilisers and pesticides, this is a simplistic view. Organic farming differs from other farming systems around the management of the entire system. It is a more holistic approach to food production, considering the entire farm as an ecological unit (FAO, 1998). While the word 'organic' is the commonly used English term to describe this farming system, a far more appropriate term is 'ecological', which is the name used to describe this system of agriculture in many European languages. In this document, the terms 'organic farming', 'organic agriculture' and 'organic production systems' are used interchangeably and all mean the same thing – a sustainable agricultural production system described in detail in Section 3.5.1.

Central to the organic farming system, in terms of physical production, is the understanding and management of the soil – plant – environment interactions in a

holistic manner (FAO, 1998; Scottish Agricultural College, 2005). However, organic farming is not only about food production, it also has environmental, food quality, human health, animal welfare and socio – economic aims. As a result of these principles and philosophies, organic food has a strong brand image in the eyes of the health, environment and socially conscious consumer (Scottish Agricultural College, 2005). The inclusion of these principles governing organic production reflect a move away from understanding farming as a simple input – output system to a deeper awareness of the dynamic interactions between farming, the environment and society.

Organic agriculture has therefore grown as a result of two streams of improved knowledge. Firstly, as farmers' understanding of agricultural systems and their interaction with society and the environment deepen, their perception of the part they play in sustainable production changes to consider the wider implications of agriculture for society. Secondly, as consumers become more aware of the environmental and social implications of the food they eat their consumption habits change to reflect this, resulting in an increased demand for organic and more sustainably produced food.

Yussefi and Willer (2006) note that only 0.05% of South Africa's land area is certified organic. Other studies report that there are approximately 200-250 certified organic farms (Parrott and van Elzakker, 2003; Mead, Undated; Van Zyl, 2003). According to Statistics South Africa (2002), there are 45 818 farming units in South Africa. This translates to 0.4 to 0.5% of farms being certified as organic farms. Given the global growth in organic agriculture and the benefits of this system of food production, with multiple positive outcomes for environment and society, it is necessary to speed up the learning process to accelerate the growth of organic agriculture in South Africa. Understanding social learning and change dynamics are key elements in facilitating this growth.

1.3 Motivation for Research

There is a need to accelerate the adoption of organic agriculture in South Africa. This requires two important elements to work together (1) to enhance and assist those aspects that promote the process of acceleration and (2) limiting the effect of

aspects that retard the process. Understanding the role and dynamics of social learning and its relevance to organic agriculture can help to distinguish these two elements and can help to facilitate deeper learning by farmers in South Africa. This research seeks to better understand these processes and how they can be managed to advance the sector in South Africa.

1.4 Problem Statement

One aspect of understanding and addressing what is limiting the wider adoption of organic agricultural practices is to understand the dynamics of social learning and change. With only 200-300 organic farmers in South Africa, these farmers can be considered pioneers of organic agriculture and they have undergone profound change in both their production system and at a personal level. These farmers have learnt numerous lessons and have deepened their understanding of the many facets of organic agricultural production. In effect, these pioneers have changed from a high input based production system, towards a high knowledge input system. This concurs with Nonaka (2004) who asserts, through citing number of authors, that society is becoming a knowledge society (Drucker, 1968, cited in Nonaka, 2004; Bell, 1973, cited in Nonaka, 2004; Toffler, 1990, cited in Nonaka, 2004).

Farmers who have successfully converted to organic agricultural production have undergone a series of learning cycles. It is likely that farmers who have been successful can recall a series of discrete events and outcomes which have contributed to their success, but have not considered their growing understanding in the context of social learning processes. Such farmers are learning within a fluid and dynamic system, from production through to processing and marketing.

There is a need to better understand the pedagogy of adult social learning in the context of conversion from conventional to organic agriculture, in order to apply this learning on a wider scale. Finding ways to speed up and widen the social learning process is important and necessary to accelerate the adoption of this farming system with multiple benefits, which are described in Chapter 3. Social learning and knowledge creation that enhances the understanding of the linkages between the environment, agriculture and truly sustainable food production needs to be

accelerated. Understanding the social learning dynamic of organic farmers and their perception of agriculture will help to design interventions that promote social learning and hence accelerate change.

1.5 Research Question

The question this research seeks to answer is to understand whether or not certified organic farmers in South Africa are social learners and, if so, what can be done to enhance and amplify this learning.

1.6 Research Aim and Objectives

The aim of this research is to make use of four social learning frameworks to enhance understanding of the social learning dynamic of organic farmers. The following are the objectives of the research:

1. To provide a context for the research by describing how the organic sector has developed and grown and highlight some of the benefits of organic agriculture.
2. To develop an understanding of four social learning frameworks by reviewing relevant literature.
3. To make use of the existing baseline study of the organic farming sector to draw out the learning histories.
4. To use the learning histories and understanding of social learning frameworks to form a deeper understanding of the social learning dynamics in the South African organic agricultural sector.

Using this understanding it will be possible to understand the underlying perceptions that lead to the choice to be an organic farmer (the evolution and influence of perceptions), understand the dynamics that influence these perceptions (financial, social, environmental, and philosophical), revealing the major challenges these dynamics generate for organic farmers and how they are addressed. This understanding should enable recommendations to be made to enhance social learning processes in organic agriculture to advance the development of the sector in South Africa.

1.7 Dissertation Structure

The structure of this dissertation includes a review of literature (Chapter 2 and Chapter 3); a description of the methodologies used for the research (Chapter 4), an analysis of data gathered in questionnaires and selected literature pertaining to organic agriculture and social learning (Chapter 5). The results of this work are then discussed and a conclusion has been drawn in Chapter 6. Finally, recommendations for future research are suggested in Chapter 7. These elements are expanded on in the sections below.

1.7.1 Theoretical Context: Social Learning Frameworks

Two main streams of literature are reviewed in this dissertation: literature on social learning processes and literature on organic agriculture. A summary of literature reviewed of social learning frameworks is provided below. This is followed by a review on organic agriculture, which is outlined in the next section.

To better understand how organic farmers learn, it is first necessary to understand learning processes, particularly how learning occurs through social interaction (i.e. social learning). A better understanding of learning processes will assist in developing linkages and parallels between organic production, farming and social learning. Four learning frameworks are reviewed in this document. The main elements of the learning process that are considered integral to the learning processes of farmers, particularly organic farmers, are expounded from this literature to provide an understanding of the social learning progression. These will be used to move towards an understanding of organic farmers' formation of perceptions and learning.

1.7.2 Context to Study: Organic Agriculture

In terms of literature on organic agriculture, the history of the development of organic agriculture is first reviewed to understand how and why the sector developed. The definition, principles and practices of organic agriculture are then used to develop an understanding of what organic agriculture *is.* An overview of the regulatory and trade environment in which organic agriculture occurs provides an understanding of the global trade in organic agriculture, as well as supply and demand, and trends impacting on the sector. The benefits of organic agriculture are

reviewed to demonstrate the potential of organic agriculture to address key environmental issues facing the planet. Finally, literature that provides a consumer perspective of organic agriculture and reasons for purchasing organic food is used to provide insight into consumer motivations for purchasing organic food.

1.7.3 Methodology

The basis for this research emerged from a project commissioned by the Department of Trade and Industry (DTI) which aimed to understand the current status of the organic sector in South Africa. The author of this dissertation, a Senior Scientist at the Institute of Natural Resources led this research project and was responsible for drafting the project proposal, implementing the research and overseeing the production of reports and other project deliverables.

These activities provided a richness of experience that resulted in the development of the research objectives for this dissertation. What emerged from the commissioned study was recognition of the need to better understand social learning and the potential to use this understanding to transfer skills and knowledge to other farmers who may be considering organic agriculture. Consequently, this document seeks to expand on the available information to understand the social learning dynamic in terms of four frameworks, which are described briefly below.

1. *Profound change* - the evolution of new business practices leading to results and credibility to develop an understanding of the process of investment in change, its challenges and results (Senge *et al.* , 2005).

2. *Deeper learning* – understanding how deeper levels of learning result in an increased awareness of the whole. This framework reveals how repeated cycles of thinking and acting increase both the individuals understanding of the whole (‘the bigger picture’) and at the same time this understanding increasingly contributes to supporting ‘the bigger picture’ (Senge *et al.* , 1999).

3. *The conversion of knowledge* – understanding epistemological and ontological relationships in knowledge conversion. This framework reveals how individual learning (explicit knowledge) is spread to, or shared with, others to become implicit knowledge (i.e. the socialisation of knowledge) (Nonaka, 2004).

4. *Pedagogy of adult social learning* – investigates how reflection on and application of natural experience and learning from others builds increased understanding and meaning (Mintzberg, 2004).

Linking this understanding with information from the commissioned study was used to provide an analysis of social learning.

1.7.4 Analysis

Results from a stakeholder survey, a component of a project commissioned by the Department of Trade and Industry, are analysed in the context of the understanding developed through the review of social learning frameworks. The social learning theories reviewed in this dissertation are applied to the survey results and represent a new approach to analysing the data.

Selected literature is used to impregnate the learning frameworks with information to illustrate the current use of recognised social learning processes, and demonstrate that they are actually occurring in the context of organic agriculture. This may be occurring at a subconscious (implicit / tacit) level. The primary purpose of the analysis is to understand whether learning is indeed occurring and to better comprehend the social learning dynamics of organic farmers and use this understanding to make learning process more conscious (explicit).

1.7.5 Discussion and conclusion

The results of the analysis are discussed with the purpose of identifying specific interventions that can be implemented to assist in accelerating the learning process among organic farmers. The expected outcome of this discussion is that better ways of sharing and disseminating information and knowledge to accelerate learning among organic farmers will be revealed. In so doing, learning by organic farmers, organic stakeholders and organic networking organisations can be enhanced to advance the organic sector in South Africa.

1.7.6 Recommendations for future research

It is anticipated that during the research process, a number of questions will be identified that are beyond the scope of this research, but are nevertheless valid.

These research questions will be captured in this section of the document and recommended as possible future research.

2 THEORETICAL CONTEXT: SOCIAL LEARNING FRAMEWORKS

2.1 Introduction

The world is changing rapidly, with advances in technology, natural sciences, medicine, societal values, demography and the environment. Senge *et al.* (1999) point out that in such times of change, people concerned about and facing these challenges are engaging in "a great venture of exploration, risk discovery and change, without any maps for guidance" (Senge *et al.* , 1999. p3).

These 'voyages of discovery' are essentially social learning processes. The question of how people learn (pedagogy – the science of teaching) and understanding knowledge creation (epistemology – the theory of knowledge) are critical to facilitate the growth of knowledge and learning. Learning frameworks, or systems to better understand learning, make it possible to better comprehend how social learning occurs. Improved comprehension makes a better teacher, and allows for the design of interventions that will facilitate and accelerate knowledge creation.

How food is produced and consumed in the face of increasing environmental degradation is a journey of discovery that farmers and other actors in the agricultural sector are embarking on. Williams and McKenzie (2008) note that substantial increases in global production are necessary to accommodate growing demand, however it is critical that this increase is accomplished with a decreased impact on the environment and natural resources and is probably the greatest challenge yet to face agricultural science. Change and learning are key to meeting these challenges and it is therefore helpful to understand how learning occurs.

To better understand learning and change, four learning frameworks are reviewed and discussed in this section to develop an understanding of how learning occurs and knowledge is created. Section 2.1 discusses profound change, which relates how investment in change and the development of learning capabilities produce results (Senge *et al.,* 2005). Section 2.2 reviews, deeper learning and shows how the iterative processes of thinking and doing result in deeper understanding and

progressive change (Senge *et al.* , 1999) Section 2.3 investigates how the conversion of knowledge creates understanding of how knowledge and understanding is developed, externalised and amplified (Nonaka, 2004). Finally, in Section 2.4, the pedagogy of adult social learning articulates the integration of processes of reflection, experimentation and learning from others to develop knowledge (Mintzberg 2004). In addition to these four frameworks, the concept of learning histories is also described. This outlines a research method actors in change can employ to critically evaluate themselves by understanding and learning from their role in the process of change.

The understanding that is developed from these frameworks and learning histories is applied in Chapter 5 to shed light on the social learning dynamics of organic farmers. Many of the concepts of learning, socialisation and knowledge creation used in these frameworks are similar at a generic level and as a result, there is more focus in Section 2.2 to develop understanding of the concepts.

2.2 Profound Change

Williams and McKenzie (2008) highlight the urgency of changing the way the world views food and the production of food by pointing out that demand for agricultural produce is soaring and global food reserves are plummeting and that food riots are not uncommon. This, coupled with high energy prices and climate change indicate that a worldwide food crisis is looming, if not, in fact, has already arrived. The productivity of the 'Green revolution' cannot be sustained. Yet, in the context of rising population growth and rising affluence, resulting in the demand for high value agricultural products, more food needs to be produced. And it needs to be produced in a manner that protects and improves the natural resources on which farmers rely to produce food. It is necessary to look at ecological systems as an integrated whole to understand the full implications of the effects of food production on the natural resource base. Science and technology systems that enhance sustainability while maintaining productivity are urgently required (Williams and Saunders, 2005; cited in Williams and McKenzie, 2008).

It is possible to create such production systems, but the current direction of agricultural science is not likely to achieve this. A reform of agricultural science

(Kiers *et al.* , 2008; cited in Williams and McKenzie, 2008) as well as a considerable increase in investment in new directions for agricultural science (Mackenzie, 2008; cited in Williams and McKenzie, 2008) are necessary to achieve this.

Williams and McKenzie (2008) conclude that business as usual is not an option. In other words, change is necessary; not just minor adjustments to the dominant input – output conventional system of production which is revealing serious shortcomings in its ability to feed the burgeoning global population; radical change is necessary, or what Senge *et al.* (1999) refer to as profound change. Profound change is defined by Senge *et al.* (1999) as "organisational change which combines *inner* shifts in people's values, aspirations and values with *outer* shifts in processes, strategies, practices and systems" (p15). Critically, profound change requires *learning new things*. The inner shifts and outer shifts and the process of learning new things are recurrent themes, in all the frameworks described in this section. These dynamics are an apt description for the change necessary in world food production and consumption.

2.2.1 Elements of the profound change framework

Senge *et al.* (1999) note that there are three key elements in the trajectory of achieving and sustaining profound change. These elements are (1) investment in change initiatives, (2) the development of learning capabilities which result in (3) business results. Learning the dynamics of such change is important and these elements are presented schematically in Figure 1.

Essentially the framework recognises three cyclical growth processes which interact to result in profound change. The change process can be likened to the arc of a spaceship trying to escape an orbit. The elements of the trajectory outlined in the paragraph above are components of the outermost 'orbit', yet there are 'subroutines' operating at lower 'orbits'. As investment in change and enthusiasm and willingness to commit 'accelerate', so the change trajectory moves into the next 'orbit' of improved personal results; with improved personal results, further 'acceleration' allows the change trajectory to move into the outermost orbit, providing business results. This is, however, not a singular process; the cycles are

dynamic and continue repeating and interacting. The separate elements of this framework are discussed in more detail in the sections below.

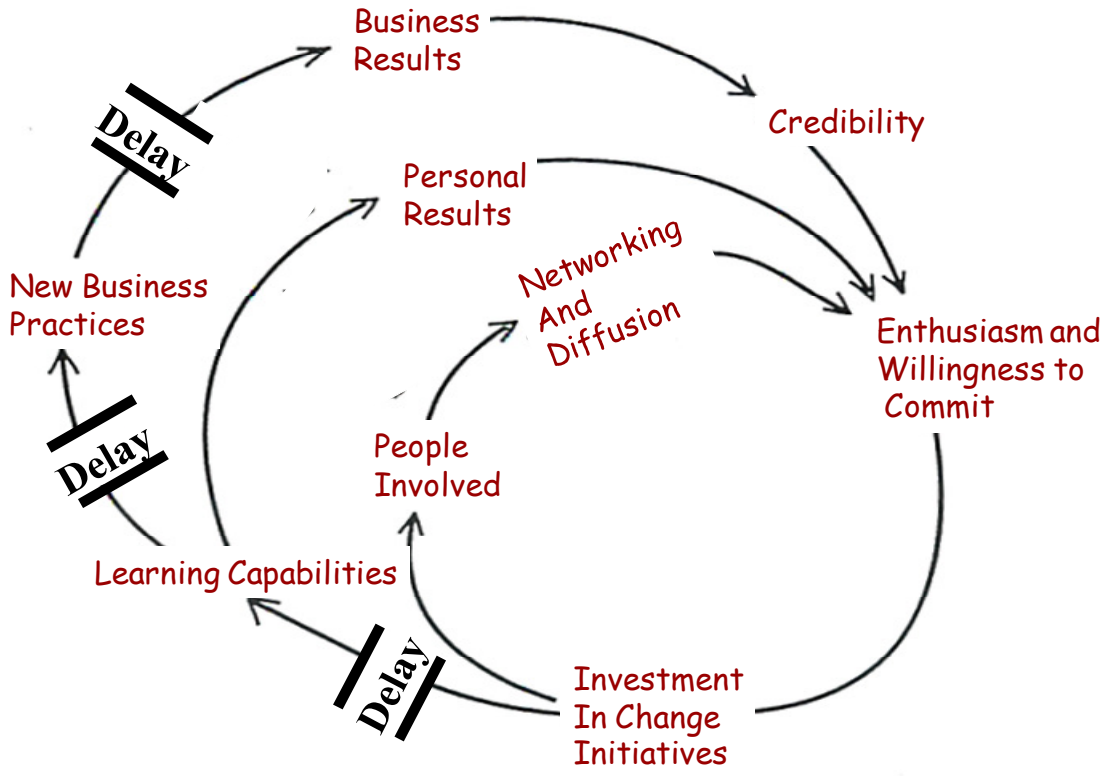

Figure 1: Processes of profound change (after Senge *et al.,* 1999, p 54)

2.2.1.1 Investment in change initiatives

Investment of time, resources and energy, and importantly, the 'space' to think and reflect, are necessary for change and learning to occur. Profound change does not come from an individual problem that requires a solution (e.g. repairing a tractor tyre), but from enterprise problems being symptomatic of deeper issues (e.g. declining production per unit area). The immediate problem is not the one that needs to be addressed, but is a symptom of a deeper problem. The real issue is factors that have prevented an individual or an operation from critically assessing the symptom and recognising it as a system wide problem. To objectively assess the symptom requires an investment in undertaking change.

2.2.1.2 The development of learning capabilities

Learning capabilities can be defined as skills and proficiencies that among individuals, teams and larger communities, enable people to consistently improve their capacity to produce results that are of value to them. Learning capabilities enable people to learn, and nurturing learning is important for enabling change. Senge *et al.* (1999) recognise three components of learning capabilities and describe them as follows:

- Aspiration – being able to orient towards what we truly desire rather than *reacting to circumstances.*
- Reflective conversation – being able to communicate in ways that nurture reflection and enquiry to build *shared understanding and collective action.*
- Understanding complexity – to understand the relationships of underlying problems and understand the *consequences of actions* in the short term and the long term.

In other words, to learn *self reflection* is necessary and to know what is wanted, *communication and sharing* is required to develop common visions and actions and based on this, *develop understanding* of the bigger picture (or systemic problem).

2.2.1.3 Business results

The effective application and implementation of the above two processes should result in the establishment of new business practices that put the change into practice and will provide business results. It is important to note that these are results, not necessarily successes as measured by traditional business measurements, such as profit margin.

2.2.2 Other dynamics

However, the trajectory outlined in Figure 1 is not as simple as that. There are a number of other dynamics that influence learning. Senge *et al.* (1999) add another two elements to the process that sustains profound change and learning (1) enhancing personal results and (2) developing networks of committed people. Notably the achievement of enterprise outcomes occurs only towards the end and

only this element is concerned with actual enterprise outcomes explicitly, however, to achieve and sustain change, all these elements are necessary.

Achieving *personal results* is considered to be the first step in learning and change. Personal results are what drive people; if a change or learning something new brings about personal results, this creates satisfaction and importantly, enthusiasm. Enthusiasm increases as people benefit personally from change and a new understanding of an issue or concept. As a result, people want to share their learning. This gives rise to the next step in the change process – networking and sharing information.

Senge *et al.* (1999) point out that a number of studies emphasise the importance of informal *networks* in the diffusion of innovation and learning. Informal networks are more important than formal management structures and hierarchical learning systems and are almost always superior to formal structures in developing and nurturing new ideas. This has a lot to do with credibility. Informal networks are used every day when going about doing your business and solving everyday problems. As a result, relationships of trust, collegiality and sharing develop. When a new idea comes from management or an authority, it may be treated with scepticism – the farmer (or other actor) may ask "what does this person know of my work / responsibilities / challenges?" Whereas, from a counterpart, with whom you *choose* to share information with on a regular basis to achieve common objectives, the seed of a new idea is much more likely to germinate. Finally, the freedom to experiment, make mistakes and learn is much more likely to occur through trusted peers.

2.2.3 Discussion

So, investment in change must nurture development of learning capabilities (resulting in enhanced personal results); enhanced personal results create enthusiasm, which enhances networking and sharing of new ideas. But, this must still translate into business results. This is achieved primarily through new business practices. As the new business practices yield practical results, credibility in the change process is increased and more people are willing to commit to changes.

Importantly, Figure 1 shows that there can be delays from the time that new ideas are generated and shared and when they are implemented and, in turn, between implementation and results. In some cases circumstances may initially change for the worse during implementation, as will be shown in the case of many organic farmers (Section 5.2.4). This is often where change can be halted. People are trying out new ideas and they do not seem to be working and so they give up. Furthermore, demonstrated tangible indicators are often elusive, particularly when measured by common business indicators such as efficiency and bottom line.

Learning and associated change takes time and practice. All people hold certain assumptions that are taken for granted – “this is the way the world is”. It is often difficult to let go of commonly held views or beliefs. Such resistance to change is common. As Fulmer and Keys (2004) note from an interview with Chris Argyris, considered one of the founding fathers of organisation learning, resistance to change is not taught, but is naturally learnt, which is a social learning process. It is influenced by people who we choose to spend time with, and by personal interpretation of events, creating fixed mental models of the world which are difficult to change.

Eliminating the use of pesticides on a farm can be used as an example to understand the processes described in this section. There are methods available to control pests without chemicals, but they are complex, require a detailed understanding of pest / plant / environment interactions and are not immediately as effective as conventional pest control measures. Consequently, a significant shift in mindsets and management practices is required. Indeed, outbreaks of pests and disease usually increase significantly after eliminating the use of pesticides. Seeing this short term business ‘result’ the farmer may quickly revert to the use of pesticides and share the negative story with others, reinforcing commonly held views that may be erroneous. Had the farmer followed the profound change process, invested in change, showed willingness to commit and, by learning and enduring a business result would have been achieved. The farm would have moved beyond the short term pest infestation and a new dynamic in the farm ecology established. Pesticide costs would be eliminated, poisoning risk of farm workers

would be reduced and the farmer would not have to worry about managing and storing toxic pesticides. This 'freedom' gives the farmer space to reinvest in change. The credibility of the business result is achieved and the process continues.

2.3 Deeper Learning

According to Senge *et al.* (2005), people's actions revert to the habitual when they are in a state of anxiety or fear. In today's rapidly changing world, confusion, uncertainty and stress are the norm, and this results in people and communities returning to tried and tested modes of thinking and operating. This limits the opportunity to learn new ideas, although it does not mean that no learning occurs. Reactive learning is the term used to describe this learning (see Figure 2). Reactive learning reinforces habitual ways of thinking in spaces which are comfortable and familiar. This learning disregards other versions of reality that are different from what is known and trusted. As a result, people act to defend their own interests and so reinforce existing mental models. It is still learning; at best people learn to do the same thing better in this situation; at worst, a flaw is perfected.

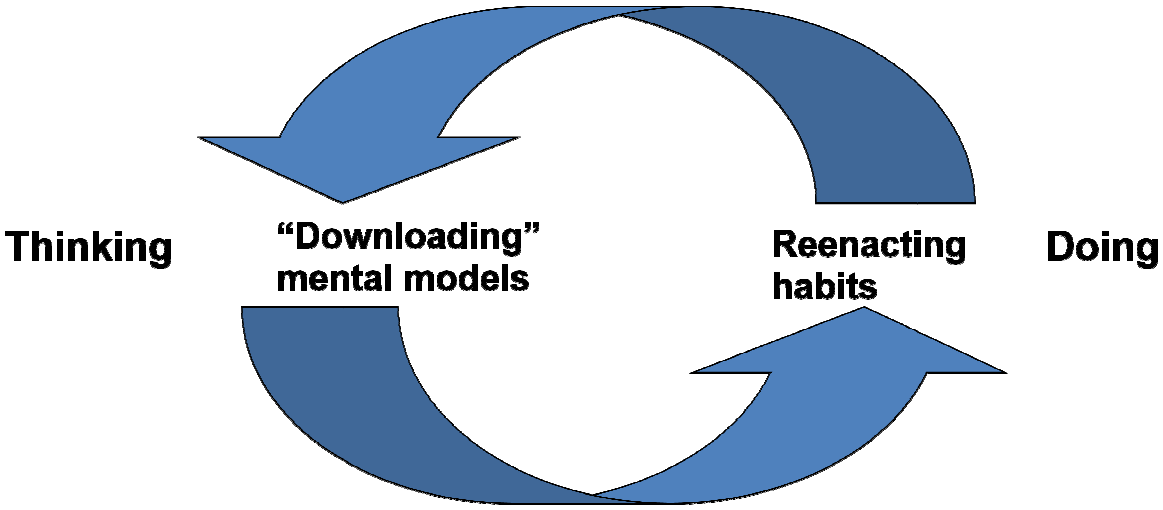

Figure 2: The process of reactive learning (Senge *et al.,* 2005, p 10)

Different kinds of learning are, however, possible. All learning involves the process of thinking and doing, but what differs is the depth of the learning that takes place, and how it helps us to understand the bigger picture. If awareness does not evolve beyond an individual or community's current view of the world, reactive learning

prevails. On the other hand, deeper learning is an iterative process of thinking and acting that increases understanding and modifies actions, as shown in Figure 3.

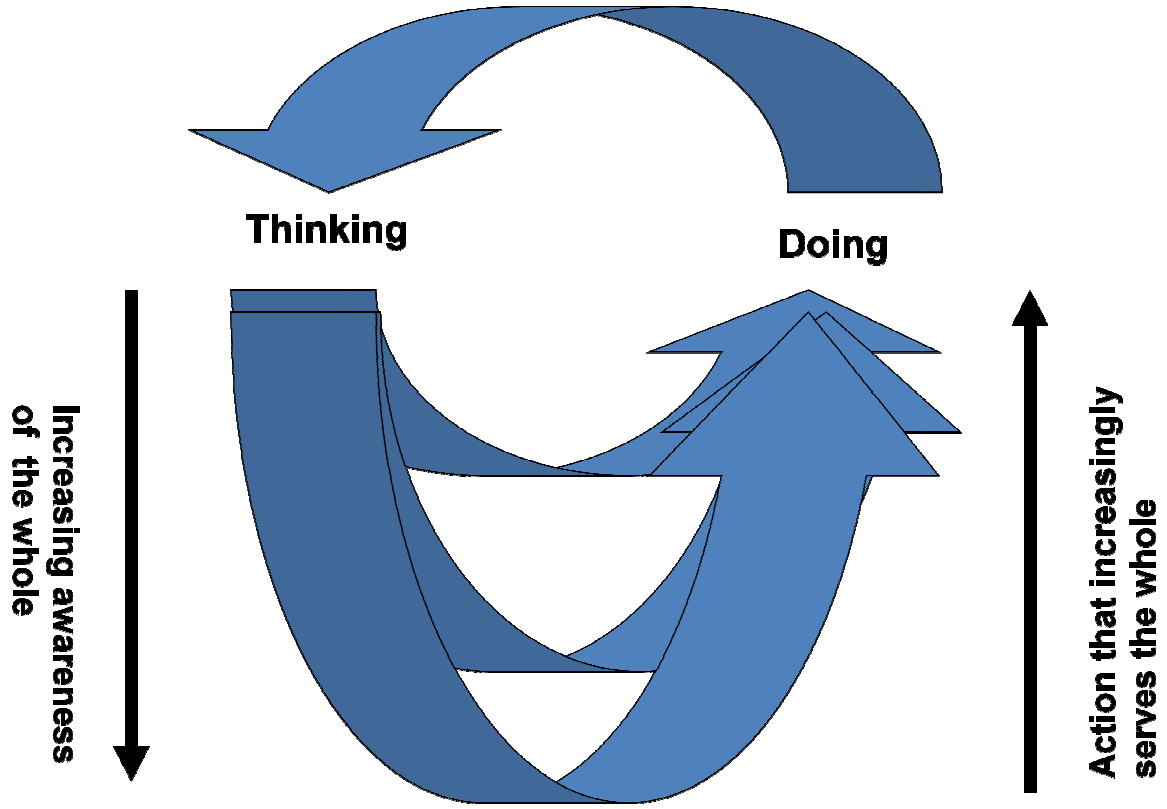

Figure 3: Deeper levels of learning creating awareness of the larger whole (Senge *et al.,* 2005, p 11)

Deeper learning involves two fundamental processes (Senge *et al.*, 2005). Firstly, as learning and understanding deepens, an increasing awareness of the whole develops. Secondly, as the increasing awareness of the whole develops, our actions are in turn modified to increasingly serve the whole. In turn, these cycles of learning reinforce each other and further learning and understanding emerges.

The application of the learning process pictured in Figure 3 evolved from organisational learning research in mainly corporate settings. However, the process is equally valid in other settings where complex situations occur in communities,

small groups of people or even with individuals. The challenge is to recognise and 'learn' the learning process and apply it in a particular situation. Senge *et al.* (2005) also note that at personal level, fundamental changes in thinking are required to facilitate change. Each deeper level of learning or 'U' has within it a series of processes that are necessary to achieve deeper learning and, ultimately change. This process is referred to as the 'U movement' and is illustrated in Figure 4.

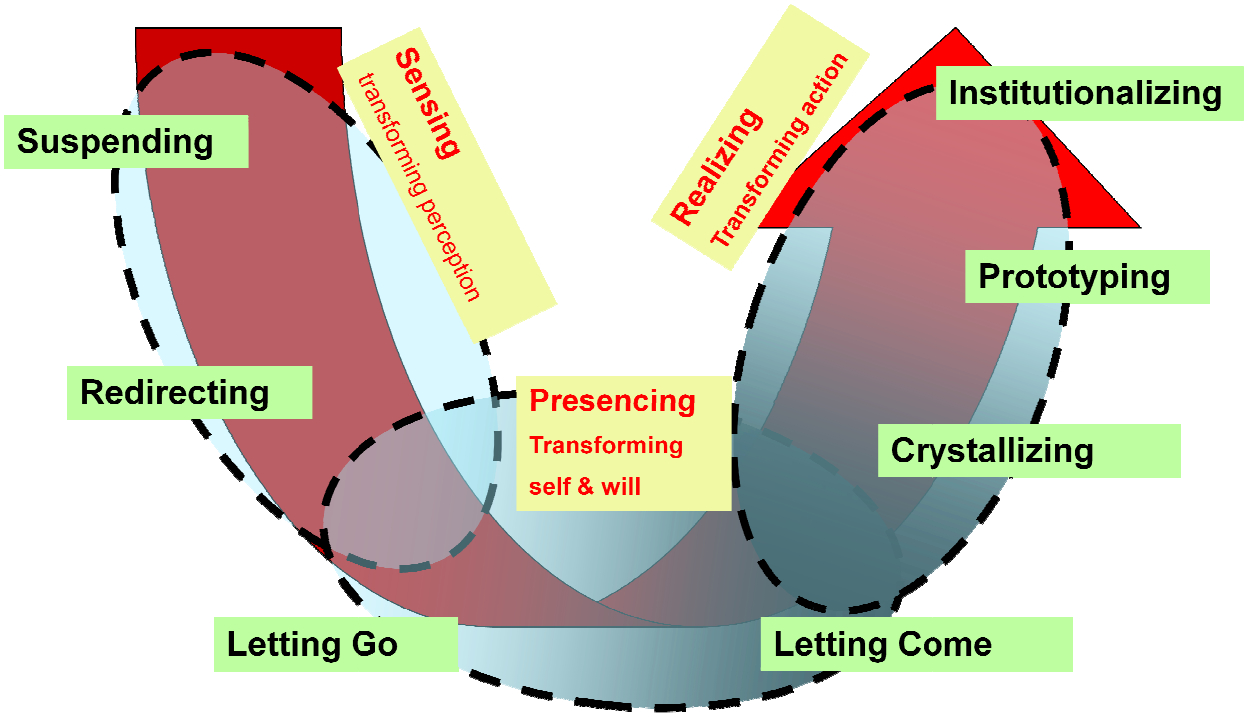

Figure 4: The U movement of transformation (Senge *et al.*, 2005, p 219)

Senge *et al.* (2005) use this framework to illustrate the process of transformation. This can also be viewed as the conversion of thinking into action from Figure 3. The U movement consists of seven core capacities occurring in three areas: (1) Sensing (transforming perception), (2) Presencing (transforming self and will) and (3) Realising (transforming action). Only with the achievement of the preceding capacity will the next capacity be achieved. For example, suspending defensive routines and world views enables new perspectives to be seen and new thinking is redirected and shifted through the U movement. Only when all capacities are developed is movement through the whole process possible and transformation (or change) achieved.

What this process points out is the need to reflect and 'think out of the box' in the sensing area. It is here that the fixed world views are suspended, allowing other possibilities to emerge. Investigating and exploring these possibilities is the capacity to redirect. Allowing new ideas to emerge as old ideas diminish, or hybridise with new ideas makes up the letting go and letting come capacities. This can be considered the thinking part of profound change. Crystallising, prototyping and institutionalising bring out the action of change, or the 'doing'.

2.4 The Conversion of Knowledge

Nonaka (2004) identifies four different patterns of interaction between tacit and explicit knowledge, representing ways in which existing knowledge can be converted into new knowledge and thus facilitate learning. The framework of the interactions of these types of knowledge is provided in Figure 5 and discussed in subsequent paragraphs.

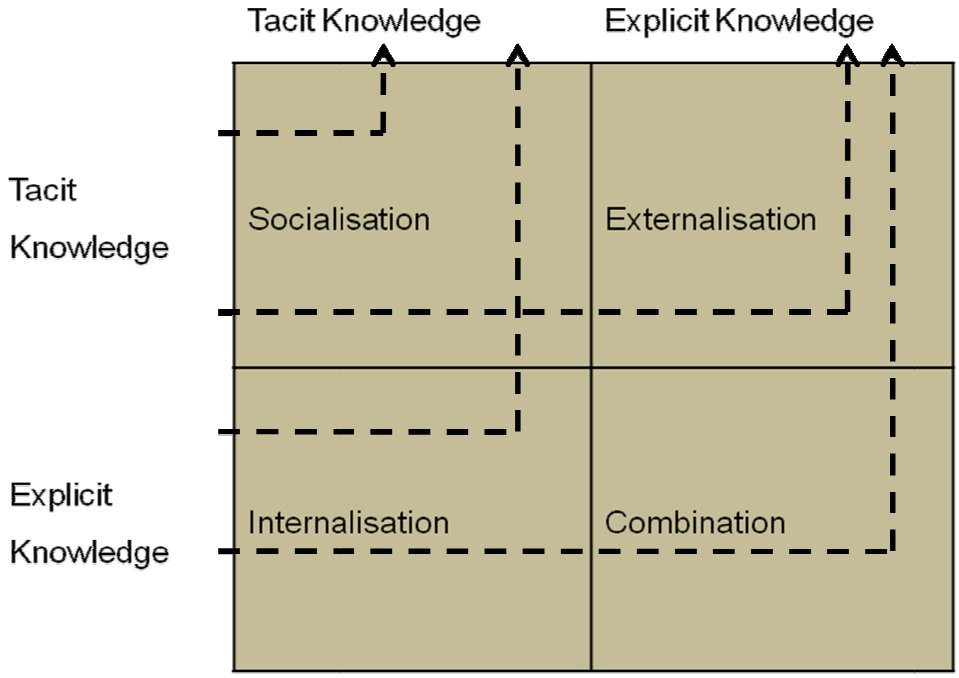

Figure 5: The four modes of knowledge creation (after Nonaka, 2004, p 173)

Nonaka (2004) points out that social interaction (sharing knowledge) creates the ontological (socialisation) dimension of expanding knowledge (social learning). The

four modes of knowledge conversion are (1) from tacit knowledge to tacit knowledge (2) from explicit knowledge to explicit knowledge (3) from tacit knowledge to explicit knowledge and (4) from explicit knowledge to tacit knowledge, which are elaborated below.

Mode 1: Tacit - Tacit Knowledge. This is achieved from interaction between individuals and can be acquired without language, such as through observation, imitation and practice. The key to acquiring tacit knowledge is experience. The process of creating tacit knowledge through shared experience is referred to as '*socialisation*'.

Mode 2: Explicit - Explicit Knowledge. This conversion uses social processes that combine different bodies of explicit knowledge. For example, an accountant familiar with spreadsheets interacting with a researcher who understands word processing sharing their explicit knowledge would fall under this mode of exchange. The process of creating explicit knowledge from explicit knowledge is called '*combination*'.

Mode 3: Tacit – Explicit Knowledge. This draws out hidden knowledge or knowledge which is difficult to articulate and is known as '*externalisation*'

Mode 4: Explicit - Tacit Knowledge. Sharing hidden knowledge which has been drawn out (or crystallised) and creating new knowledge from this is known as '*internalisation*'.

Mode 3 and 4 work together in dynamic interaction. The two modes are complementary and can expand over time through mutual interaction.

Nonaka (2004) points out that each of the interactions above do create new knowledge, but that sustained knowledge creation, from the individual through to communities, requires constant interaction between the different modes. In particular, the interaction between tacit and explicit knowledge is important. As these two modes combine, deeper understanding is created though progressively deeper cycles of socialisation and combination which result in the creation of knowledge.

Communal knowledge creation, as opposed to individual knowledge creation occurs when the four modes of knowledge creation are managed to form a continuous cycle. In terms of the four modes described, this would occur generically as follows:

Socialisation – usually starts with interaction around a common problem.

Externalisation – successive rounds of meaningful dialogue where metaphors can be used to enable people to articulate their perspectives revealing hidden tacit knowledge that is usually difficult to express to understand the true nature of the problem and create new knowledge to solve the problem.

Combination – occurs through the coordination between people directly involved, other stakeholders and some form of documentation of the existing and new knowledge.

Internalisation – concepts are developed through an iterative process of discussion from a common and shared understanding into tacit knowledge.

The use of metaphors and analogies is highlighted by Nonaka (2004) as a tool for converting tacit knowledge into explicit knowledge. Metaphors can be seen as a creative, cognitive process that brings together concepts which are disconnected in an individual's memory. Analogies reduce ambiguity by highlighting the commonness of two different things. Metaphors are powerful tools to unite an experience in one field with experiences in another field. Consequently, Nonaka (2004) argues that tacit knowledge can be converted into explicit knowledge by firstly recognising contradictions through metaphors and secondly, resolving them through analogy. The metaphor and analogy are also good tools to overcome resistance to change and defensive routines as they highlight paradoxes or flawed thinking in a manner that is less threatening and more constructive than direct confrontation.

Nonaka (2004) notes that while tacit knowledge of individuals lies at the heart of knowledge creation, the broader benefits of the knowledge rely on its *externalisation* and *amplification.* The interactions between tacit knowledge and

explicit knowledge will increase in scale as more actors become involved in a widening spiral process as shown in Figure 6.

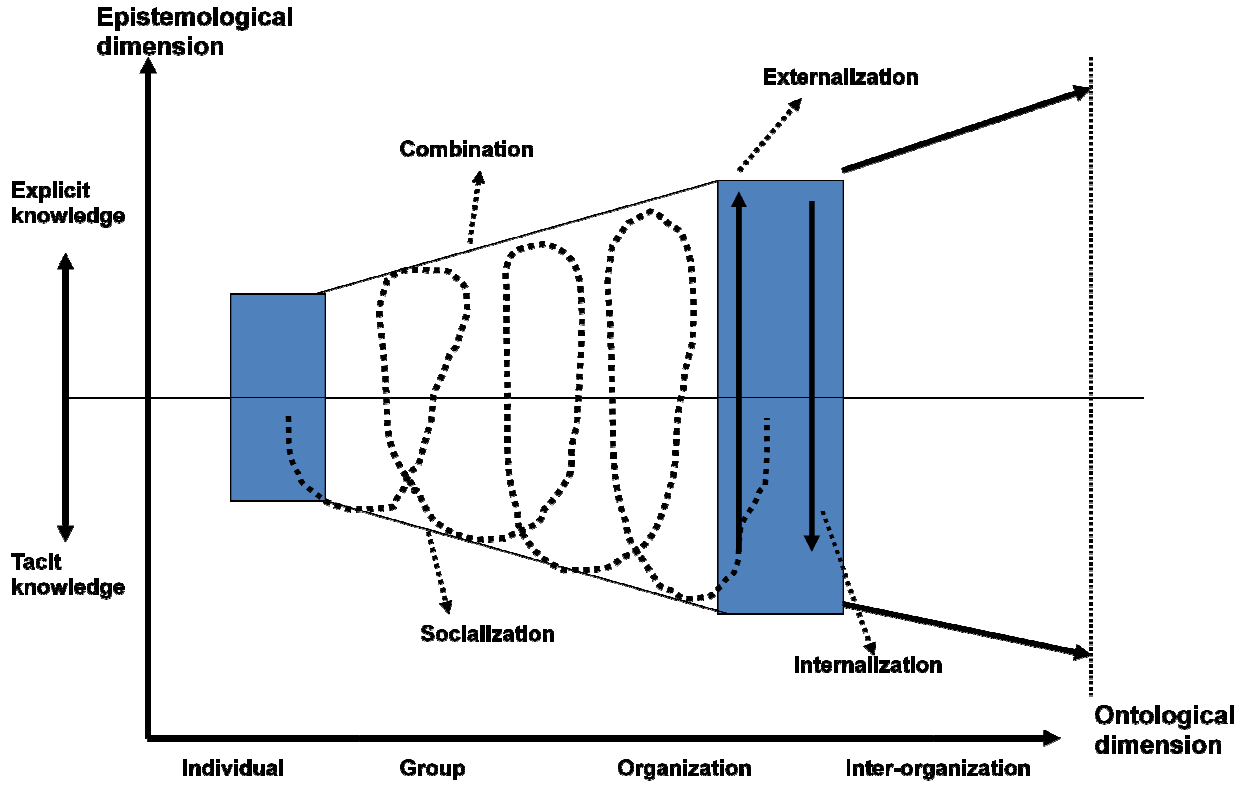

Figure 6: Spiral of knowledge creation (after Nonaka, 2004, p175)

In the epistemological (theory of knowledge) dimension, the dynamic interaction of the two types of knowledge (tacit and explicit) is occurring through the four modes of knowledge creation (internalisation, externalisation, combination and socialisation) creating new knowledge. In the ontological dimension (social learning / knowledge creation) the dynamic interaction is increasing. In other words, knowledge is deepening (see 5.3 – Deeper Learning) but is also extending to others (amplifying). The driving force of the knowledge expansion or the knowledge 'front' that is advancing knowledge is the dynamic process of internalisation and externalisation. Combination (the 'documentation' of explicit knowledge) and

socialisation (such as institutional knowledge and experience) can almost be seen as 'by products' of the internalisation / externalisation dynamic that is driving knowledge creation and it is this process that should be encouraged and developed to facilitate the continued externalisation and amplification described in the framework.

What can also be seen in the conversion of knowledge framework is that without much difficulty, the modes (externalisation, internalisation, combination and socialisation) could be removed and replaced with the frameworks of profound change or deeper learning into the knowledge creation spiral. The different frameworks discuss internalisation and externalisation to create knowledge; thinking and acting to deepen knowledge; or developing learning capabilities and achieving personal results through change. The fundamental principle is that learning is achieved through reflection, action and socialisation. These components make up the framework that Mintzberg (2004) uses to describe how learning occurs.

2.5 The Pedagogy of Adult Social Learning and Natural Experience

Mintzberg (2004) shows the value of natural experience and its interaction with learning processes. Figure 7 illustrates this learning process.

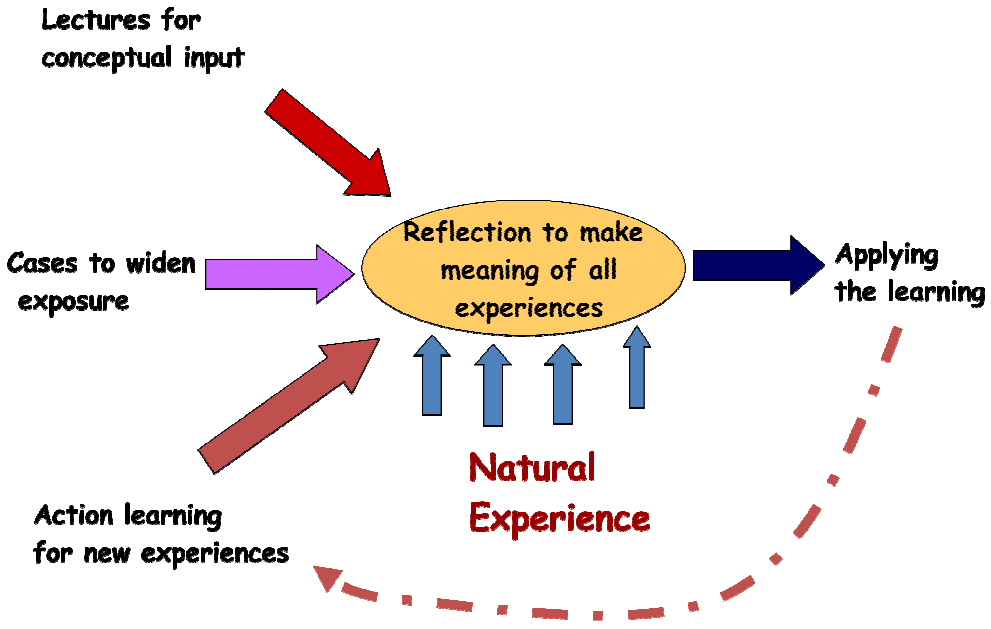

Figure 7: Natural experience, learning and sharing processes (after Mintzberg, 2004, p 267)

Combining natural experience with outside inputs, such as practical case studies to widen exposure to a particular idea, and formal theoretical information in a process of reflection, creates meaning and understanding, resulting in new learning. Applying the learning increases natural experience and creates action learning for new experience. Feedback loops and external inputs create a cycle of improved natural experience. In other words, combining external information (lectures and cases) with action learning is occurring through social interaction processes. Bringing these experiences together and reflecting on them creates meaning (learning or knowledge creation). Applying the learning (the 'doing'), in turn enhances natural experience, which will grows as the process progresses, as shown in Figure 8.

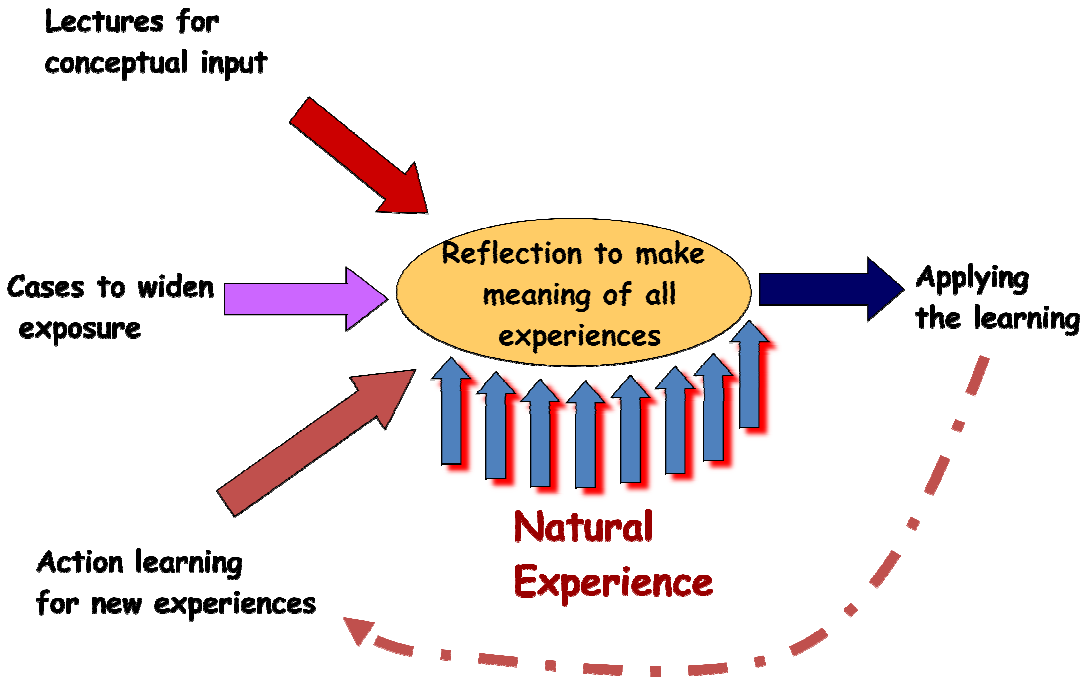

Figure 8: Growth in natural experience through reflection, action and socialisation (after Mintzberg, 2004, p 267)

Farmers in general are action learners. Using natural experience gained over time, they are often experimenting with small changes in their production systems in an attempt to improve them. Discussions with other farmers and other sources of information bring in new ideas and learning that further facilitate learning.

2.5.1 Learning histories

A ‘learning history’ is a method of learning from change initiatives. Instead of structured forms, or evaluation sheets, learning histories are developed by conducting reflective interviews in a conversational setting. Learning histories document the processes, problems and successes experienced within an organisation or community over a particular period of time, usually during a time of change. All actors are included and relevant comments are documented, but remain anonymous to promote honest, reflective responses. Learning histories present actors’ experiences and as they see them to facilitate understanding of what they have really learnt from the change efforts. Learning histories endeavour to understand the underlying assumptions and reasoning that has resulted in certain actions during the change process (Roth, Undated).

A learning history aims to (1) develop the capability of actors in change to evaluate the progress of change, (2) understand how the change is occurring and (3) develop materials that will assist in diffusing learning to other interested parties. Combining these processes creates a feedback cycle through constant evaluation of the process and results in actionable knowledge (Argyris, 1993; cited in Roth, Undated). Actionable knowledge represents both the "know-how" and "know why" that guides people's actions so that the results they set out to produce are achieved consistently. Learning histories are captured and disseminated generically in the following seven steps (Roth, Undated):

1. Planning – Who will participate and what the learning history aims to assist.
2. Insightful interviews.
3. Distilling the information gathered.
4. Documenting the learning history.
5. Validation of the learning history.
6. Dissemination of the learning history.
7. Review of the learning history process.

2.6 Towards a synthesis of the four learning frameworks

The understanding developed through reviewing the four frameworks and learning history concepts has created a useful guiding structure to inform thinking and approach to the analysis of learning in South Africa organic agriculture. Looking at events and observations of organic farmers in the context of the learning frameworks the exploration of the social learning of organic farmers can be accomplished through documenting the learning histories. Summaries of the four frameworks are provided below.

Profound change teaches us that learning and change are not a singular event, but a continuing process, a journey. Often the destination is not clear, nor is the change required, or the learning that will take place, but it starts with recognition that something is 'wrong' and change is necessary. Investment in change requires commitment and enthusiasm, interaction with people for networking and diffusion of information. Developing learning capabilities is crucial to the process and requires reflection, communication and sharing to deepen understanding, which needs to facilitate the achievement of personal results for momentum to be sustained. Combining these activities ultimately produces results; however it is important to recognise that such results do not occur immediately and require continuous investment. Often, the short term result is not the one that is expected; that is the nature of the journey of change.

Reactive learning and deeper learning show that anxiety and fear prevents us from learning new things and can reinforce 'bad' or 'flawed' habits. If awareness cannot evolve, true learning cannot occur. Deeper learning frameworks show that as knowledge or understanding deepens, it increasingly serves both the individual in increasing awareness of the whole, and results in actions that increasingly serve the whole.

Knowledge conversion focuses on the social learning process and reveals how knowledge transfer is facilitated. The main method of knowledge transfer in this framework is highlighted by different forms of social interaction between individuals (and groups and communities) that achieve transfer through socialisation, combination, externalisation and internalisation. These learning processes usually

occur through individual interaction, but widening the benefits of shared knowledge relies on the process of externalisation (where tacit knowledge is externalised as explicit knowledge) followed by amplification from individuals to groups to communities and between communities.

Natural learning demonstrates that the value of combining natural experience (known as tacit knowledge in the spiral of knowledge framework - Figure 5) with experiences from others through activities such as case studies and conceptual input, that learning and understanding through sharing is important.

Learning histories are also highlighted as a process to understand the effect of change through reflective conversations. The purpose of learning histories is to assist those involved in change to evaluate the change, understand how the change is occurring and to find ways to diffuse the 'learning about change' to other actors and interested parties. Learning histories assist actors to understand how change occurs.

What is clear from the section above is that to facilitate change, learning must occur and, to facilitate learning, change must occur and that these are dynamic and related processes. Learning is a social process, and only through interaction and sharing can learning capabilities be developed and understanding deepened. Learning is therefore not about information *per se*, but about people and how they interact, allowing information and knowledge to evolve. We all have knowledge which we often do not understand to be 'knowledge' and therefore cannot share it. The learning frameworks show that there are processes that can be understood and applied to specific situations to enhance and accelerate the transfer of knowledge and deepening of understanding. The different frameworks discussed have clear fundamental similarities and can be likened to different peoples' interpretation of the learning process. Finally, it also clear that developing knowledge is not necessarily easy to achieve. It is a long term process characterised by delays and can result in unforeseen changes. For learning to occur it is necessary to embrace change and honest enquiry and to reduce naturally learnt defensive routines that inhibit learning.

Some characteristics of a good learner (and changer), drawn from the review of the four frameworks, are highlighted below.

- They recognise the importance of formal and informal networks
- They are open to widening exposure to new ideas
- They like to operate in, or establish environments in which exposure, networking, conversations, incentive, information and knowledge is prevalent
- They seek to gain experience and show a willingness to experiment (experi*ment* leads to experi*ence*)
- They are open minded, open to criticism and not afraid to be exposed to criticism
- They learn not to be afraid of asking or receiving questions and to ask wise questions
- They take responsibility for failure and see it as an opportunity to learn, instead of ignoring or blaming others for failure.

2.7 Discussion

Chapter 2 investigated four learning frameworks to develop an understanding of what social learning and change are. The fundamental elements of learning and change are recognising a need to change, investment in and commitment to change and, importantly, the pedagogy of adult social learning.

The social learning processes reviewed show how change can occur and how the development of our ability to learn can facilitate and accelerate change. This is not necessarily easy, or rapid. Ideas developed 60 years ago of farming ecologically are only now reaching fruition, with the growth in demand and production of organic produce. Yet, today with an impressive figure of over 30 million hectares of land under organic management, this represents a mere 0.65% of the total share of agricultural land worldwide (Willer *et al.,* 2008).

3 CONTEXT TO STUDY: ORGANIC AGRICULTURE

3.1 Introduction

This chapter provides an overview of organic agriculture and provides the context in which the social learning frameworks will be analysed. It is necessary to understand organic agriculture and its development as it is a farming system that has specific technical requirements as well as a unique philosophical approach to production, which differentiates it from conventional agriculture. As this research seeks to understand whether social learning has been a factor in farmers choosing this production system it is necessary to understand the origin, the essence and benefits of organic agriculture.

Section 3.1 and 3.2 review and compare the history of the green revolution and the organic sector to highlight the difference between the two production systems. Section 3.4 describes the recent trends in the growth of the organic sector worldwide. Section 3.5 explains the essence of organic agriculture (i.e. what organic agriculture *is*). Section 3.6 and 3.7 detail the environmental, social and economic benefits of organic agriculture and Section 3.8 draws the reviewed information together in a summary of organic agriculture; what it is and what it means.

The benefits of organic agriculture are each dynamic in their own right and have assisted social learning, resulting in the growth of the sector. The values and benefits of organic agriculture resonate with a growing number of consumers, business people and producers and it is through this resonance that social learning has occurred.

3.2 A Brief History of the Green Revolution

That the ability to manufacture nitrates heralded a new era in agriculture was introduced in Section 1.2 (Smil, 2000; cited in Trewavas, 2004). This important macronutrient could be applied to the soil in high concentrations increasing the productivity of crops. This green revolution was hailed as the solution to meeting global food demands. New varieties of plants were bred that would respond better

to the higher nutrient status of the soil. This came at the expense of other plant characteristics such as resistance to disease and pests and other environmental factors (e.g. drought). What this also meant was that large areas could be planted to single crops (monoculture) as a result of mechanisation and fertilisation. A change to monoculture created the opportunity for crop-specific pests to proliferate. This increase in pest activity necessitated the use of increasing quantities of pesticides. In turn, resistance to many of these pesticides has developed (Rosset *et al.,* 2000). While nitrates may be manufactured in large quantities, this is not the case for phosphorus. At current rates of usage, phosphorus reserves may become depleted in as little as 50 years (Lewis, 2008, cited in Williams and McKenzie, 2008). However, Trewavas (2004) cites Simon (1996) in stating that there is sufficient rock phosphate to last another 1000 years. Even so, it is hoped that the human race intends to sustain itself beyond the next 1000 years. This highlights that the availability of such nutrients is finite.

Importantly, most agricultural production systems fail to account for the true environmental cost of production. Close to 2 billion hectares are affected by significant levels of land degradation (IAASTD, 2008; cited in Williams and McKenzie, 2008). Natural resources are degraded as a result of the need to produce more food with higher intensities of fertilisers and pesticides, but productivity is being undermined by escalating pollution, salinisation, soil degradation and the proliferation of pests and weeds (World Bank, 2007; cited in Williams and McKenzie, 2008).

Awareness of these concerns is growing. As our understanding of the impact of agriculture on the environment increases, so new externalities are considered in the production system that should be internalised. The notion of paying for environmental services is a concept that has developed from this increased understanding. Importantly, paying the true cost of production can facilitate increasing awareness of externalities and can further increase awareness in deepening cycles.

While the green revolution has increased global food production, this has come at considerable environmental and social cost. It is in this context that new options have to be considered to sustain human life on this planet.

3.3 A Brief History of Organic Agriculture

To understand the current state of the international organic agriculture, it is helpful to first understand how the 'organic movement' evolved into the industry it is today. It could be argued that all farming prior to the green revolution was organic, which it was, in as much as no artificial chemicals were being applied to the land, section 3.5 will show that there is more to organic agriculture than simply not making use of agro-chemicals to produce food and that organic production systems take an holistic view of food production, considering environmental, social and economic factors.

Organic farming has developed through a combination of pioneer farmers and scientists and the formation of organic organisations and associations. In the beginning, several scientists including Sir Albert Howard, Lady Eve Balfour, Rudolf Steiner, Hans Mueller and Hans Rustch formulated ideas and undertook various research activities (Heckman, 2006).

The organic farming concept as it is known today is generally agreed to have been pioneered by Sir Albert Howard. In the early 1900s Howard conducted a variety of notable experiments at agricultural research centres in India. He observed the reaction of properly grown varieties of plants subjected to insect and other pests and found that the most important element of soil management was the maintenance of soil fertility. He believed that crops grown on land treated with a consistent supply of fresh humus prepared with vegetable and animal wastes resisted common pests and that this resistance was passed on to livestock who fed on these plants. His conceptualisation of soil fertility emphasised the connectivity of the health of crops, livestock and mankind. He also felt it better to adapt species through breeding to the local conditions of the area, than to supplement a western strain with chemicals to encourage growth. In 1940 he published a landmark book, *An Agricultural Testament*, in which he argued that relying on fertilisers was unwise as it could not maintain farmland indefinitely. The system of agriculture advocated

by Howard was coined ‘organic’ and was used in reference to a system ‘having a complex but necessary interrelationship of parts, similar to that in living things’ (Heckman, 2006).

Lady Eve Balfour was one of the first women to study agriculture at a UK University in 1919. In 1939, she launched the Haughley experiment, the first long term scientific experiment comparing organic and chemical based farming. In 1943, she published ‘*The Living Soil*’, a book which combined her research and initial results on the Haughley experiment. Three years later she co-founded and became the first president of the Soil Association, an international association promoting sustainable agriculture that is well known to this day (Balfour, 1977).

In 1924 Rudolf Steiner, an Austrian philosopher and founder of anthroposophy (A movement based on the concept that there is a spiritual world accessible to pure thought through a path of self-development), established the spiritual foundation of farming later known as Biodynamic agriculture (BFGA, Undated). Biodynamic agriculture recognises the basic principles at work in nature and takes these principles into account to bring about balance and healing. Although biodynamic agriculture differs from organic agriculture in that it is spiritual, mystical and astrological, it was prophetic in its criticism of industrial agriculture. In his courses, Steiner considered the farm as a living organism and proposed that the ideal self contained farm should include just the right number of animals to provide manure for fertility and that these animals should in turn be fed by the farm. As a result of Steiner’s actions, the first organic certification and labelling system, ‘Demeter’ was developed (BFGA, Undated; Kristiansen *et al.,* 2006).

In the 1940s and 1950s, interest in organic farming grew slowly but steadily through informal local markets in Europe. In the 1960s and 70s there was a proliferation of organisations and associations promoting organic agriculture and in 1972 a number of organisations joined to form the International Federation of Organic Agriculture Movements (IFOAM) (Fersino and Petruzzella, Undated).

The modern organic movement is generally recognised as originating in Europe in the first half of the twentieth century. Internationally, however, growing interest in organic farming also developed during this time.

In Africa, organic agriculture as it is known today dates back to 1898 when the first organic garden was established at Peramiho in southern Tanzania. Since that time, the garden has been fertilised only with compost, wood ash, stable and latterly green manure thereby maintaining the soil fertility (Taylor, 2006). Latterly, in the 1980s and 1990s, export driven organic production began to develop. Notably, countries such as Kenya, Tanzania, Uganda and Cameroon have developed well established export markets supplied by both large scale commercial and small scale rural producers (FAO, 1998; Taylor, 2006). Cooperation and coordination between export packhouses and small scale farmers have been successful in these countries, resulting in a number of small scale farmers providing certified produce for export markets.

In South Africa, the number of certified producers grew from less than 100 in 1995, to about 250 in 2001, and to about 300 in 2003 (with over 200,000 ha certified organic). Participation by small scale farmers, however, remains limited (Institute of Natural Resources, 2008). The formalisation of the sector in South Africa can be considered to have begun with the establishment of the Organic Agriculture Association of South Africa (OAASA), which is now known as Organics South Africa (OSA) in 1994, (Jackson, pers. comm. 15 October 2007). According to Mead (Undated), organic sales remained relatively low until 2003, after which rapid growth was experienced in both local and export markets. There are a number of different estimates of the value and extent of the sector in South Africa (Mead, Undated; Van Zyl, 2000; Parrott and van Elzakker, 2003), which range from 200 to 250 farmers cultivating between 45 000 and 515 000 ha of land.

3.4 Recent Growth in Organic Agriculture

Section 1.2 highlights the growth of organic agriculture worldwide. Over 31 million hectares are currently managed organically, and certified as such, in approximately 120 countries, involving at least 623 174 farms (Willer and Yussefi, 2006). At present, Australia accounts for the greatest area under organic management (12.1

million hectares) followed by China (3.5 million hectares) and Argentina (2.8 million hectares). Much of the growth in organic production can be ascribed to increased networking, growing consciousness, and social learning processes that are occurring in relation to food production and its effect on social and environmental considerations. The distribution of area under organic management for each continent as at 2004 is indicated in Figure 9.

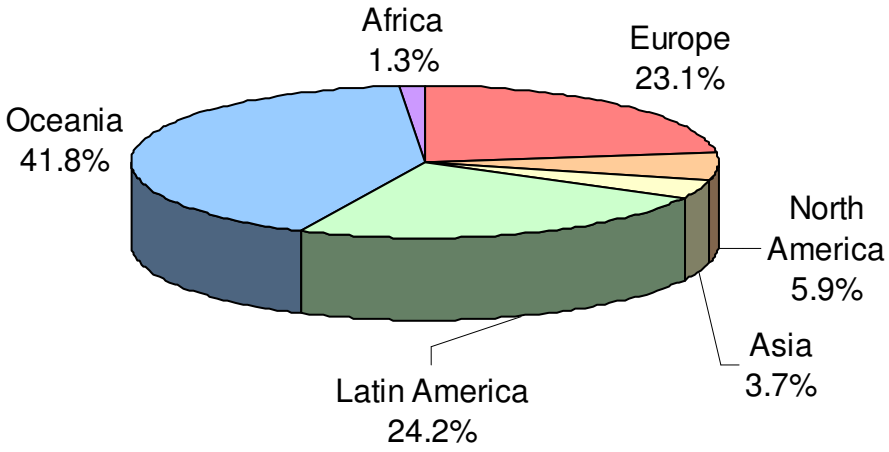

Figure 9: Total area under organic management – share by continent (after Willer and Yussefi, 2004, p 19)

Oceania (Australia, New Zealand and other Pacific countries) has the largest share of certified organic land, some 41.8%. Since no distinction is made between areas under extensive livestock and those for more intensive forms of production, this figure can be misleading. Nevertheless, this is still a significant quantity of land. The growth in Australia can be ascribed to growing awareness of the need to produce food in a more holistic and sustainable manner and has, for the most part, emerged from farmers.

China has experienced huge growth in organic production in recent years. Between 2005 and 2006 land under organic management in China increased from 298,890 hectares to 3,466,570 hectares (Willer and Yussefi, 2006). As a result China had the second highest total area of agricultural land under organic management in 2006, compared with sixteenth in 2005. Notably, the county with the greatest area of land under organic production is Australia and a large proportion of this area is

sparsely stocked extensive grazing lands under organic management. This growth has largely been state driven as the Chinese government has seen organic farming as a mechanism to overcome international trade barriers for food (Paull, 2007).

Argentina, like Australia, has a large proportion of extensive livestock land certified organic. However, like many other Latin American countries, there is a robust domestic market for organic produce sold at weekly fairs which are supplied by numerous small farmers. Around these fairs, farmers networks have evolved, notably the Ecovida Network in Brazil, which consists of over 2,400 small family farms (approximately 12,000 individuals) organised into 270 groups, associations and cooperatives. These networks account for total local and foreign markets and sales in 2003 of USD 14 Million (Lernoud, 2006). Such growth has largely been grass roots driven, supported by Non-Governmental Organisations (NGOs).

As a continent, Africa has the smallest percentage of area certified organic, only 1.3%, indicating that there are opportunities for expansion of certified organic agriculture in Africa.

The increase in organic production worldwide can be attributed to the increasing demand for organic produce, which has grown steadily since the 1960s and increased significantly in the last ten years. Notably, organic product sales are concentrated in the developed countries of Europe and the United States, which account for 97% of organic sales to consumers worldwide (Schneider *et al.,* 2005; Willer and Yussefi, 2004). Denmark has the highest market share in the world, followed by Sweden, Austria and Switzerland. The single biggest market is the USA, followed by Germany and Japan (Rundgren and Lustig, 2002). Markets in the EU are estimated to be growing at about 15 to 20% per annum and are attractive markets for organic producers in developing countries (Vossenaar and Wynen, 2004).

The increase in demand and recent rapid growth of organic agriculture can be ascribed to social learning processes on the part of both producers and consumers. As consumers become more aware of the effect the choices they make can have on the environment (in its broadest sense), they modify their choices as a result of

this awareness. One of these choices is to consume organically produced food as it is perceived to be healthier, have fewer negative environmental impacts and is a more socially responsible way of producing food, when compared with conventional agriculture. The producers of organic food follow a similar process of increased awareness resulting in the choice of organic agriculture as more responsible way of producing food, but are also drawn by the demand created by conscious consumers. The increased awareness resulting in conscious choices is a social learning process.

3.5 The Essence of Organic Farming

Central to the organic farming system, in terms of physical production, is the management of the soil. Organic management seeks to optimise soil health by enhancing the biological processes in the soil, which in turn improves plant health. Crop combinations and rotations are also managed in such a way as to improve plants' competitive ability and create a favourable environment for the presence of natural predators of crop pests. In livestock, animals are managed to enhance natural resistance to pests and diseases through good nutrition and management practices such as interrupting host / pathogen relationships. These practices reduce the need for external inputs to manage disease and fertility (FAO, 1998; Scottish Agricultural College, 2005).

Organic farming is not only about managing the ecology of the farm to produce food sustainably. Principles of organic agriculture reflect environmental, food quality, human health, animal welfare and social considerations. As a result of these principles and philosophies, organic food has a strong brand image in the eyes of the health, environment and socially conscious consumer (Scottish Agricultural College, 2005). This means that the link between farmers' philosophical approach to sustainable production and markets are important, and may give a competitive edge over conventionally produced agricultural goods.

This was certainly the case in the infancy of organic farming in Europe and the USA. In the 1960s the organic sector consisted mostly of small independent farms selling at local organic markets to like-minded consumers. Guarantee of 'organic' production was a matter of trust between the farmer and the consumer. In the late

1970s, organic certification programs started to develop for a number of reasons. Firstly, the growth in demand for organic produce meant that the direct relationship between the producer and the consumer was being lost. Secondly, it was recognised that the term 'natural' had lost its meaning in the marketplace and producers and consumers were concerned that term 'organic' would have a similar fate. Thirdly, fraudulent organic claims were increasing as unscrupulous individuals saw an opportunity to take advantage of a lucrative market opportunity. In the 1980s, private organisations, comprised mostly of farmers, developed standards for production, inspection and certification in response to these developments. Many governments took over this task in the 1990s (Willer and Yussefi, 2004). The number of certification bodies has continued to grow and in 2003 the Organic Certification Directory published by Grolink (2003), listed 364 bodies offering organic certification services. By 2007, this had increased to 468 (Grolink, 2007).

3.5.1 What is organic farming? Definitions, principles and practices

The section above provides a sketch of what organic farming is. To better understand what organic agriculture is, this section looks at the definitions, principles and practices of organic agriculture. There are numerous definitions of organic farming, which are based on a similar set of fundamental themes, although there is no universally recognised definition or description of organic farming. Many organic organisations have proposed definitions, but no single definition has been adopted (FAO, 1998). A good working definition is provided by the International Federation of Organic Agriculture Movements (IFOAM), the worldwide umbrella organisation of the organic agriculture movement with 760 member organisations and institutions in 105 countries (IFOAM, 2005, p1):

> "Organic agriculture includes all agricultural systems that promote the *environmentally, socially and economically* sound production of food and fibres. These systems take local soil fertility as a key to successful production. By respecting the natural capacity of plants, animals and the landscape, it aims to optimise quality in all aspects of agriculture and the environment. Organic agriculture dramatically reduces external inputs by refraining from the use of chemo-synthetic fertilisers, pesticides, and pharmaceuticals. Instead it

allows the powerful laws of nature to increase both agricultural yields and disease resistance."

To better understand what organic agriculture means in practice, IFOAM (2005) provides four fundamental principles on which organic agriculture is based, which are summarised below:

The principle of health

- Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible. The *health of individuals and communities* cannot be separated from the environment.
- The role of organic agriculture is to *sustain and enhance the health of ecosystems* and organisms. Organic agriculture aims to produce high quality, nutritious food that contributes to preventive health care and well-being. It should avoid the use of fertilisers, pesticides, animal drugs and food additives that may have adverse health effects.

The principle of ecology

- Organic agriculture should be *based on living ecological systems* and cycles, work with them, *emulate them and help sustain* them. It is rooted within living ecological systems and production is to be based on ecological processes and recycling.
- Organic farming, pastoral and wild harvest systems should fit the cycles and ecological balances in nature and organic management must be *adapted to local conditions, ecology, culture and scale*. Inputs should be reduced by reuse, recycling and efficient management of materials and energy in order to maintain and improve environmental quality and conserve resources.
- Organic agriculture should attain ecological balance through the design of farming systems, establishment of habitats and maintenance of genetic and agricultural diversity. Those who produce, process, trade, or consume organic products should *protect and benefit the common environment* including landscapes, climate, habitats, biodiversity, air and water.

The principle of fairness

- Organic agriculture should build on *relationships that ensure fairness* with regard to the common environment and life opportunities
- Fairness is characterised by *equity, respect, justice* and stewardship of the shared world, both among people and in their relations to other living beings.
- This principle emphasises that people in organic agriculture should conduct human relationships in a manner that ensures fairness at all levels and to all parties, should provide everyone involved with a good quality of life, contribute to food sovereignty and reduction of poverty. Animals should be provided with the conditions and opportunities of life that accord with their physiology, natural behaviour and well-being.
- Fairness requires systems of production, distribution and trade that are *open and equitable and account for real environmental and social costs*.

The principle of care

- Organic agriculture should be managed in a *precautionary and responsible* manner to protect the *health and well-being of current and future generations and the environment*.
- Organic agriculture is a living and dynamic system that responds to internal and external demands and conditions. Practitioners of organic agriculture can enhance efficiency and increase productivity, but this should not be at the risk of jeopardising health and well-being. Consequently, new technologies need to be assessed and existing methods reviewed. Given the incomplete understanding of ecosystems and agriculture, care must be taken when introducing new technologies.
- This principle of care views precaution and responsibility as important concerns in management choices, development choices and technology choices in organic agriculture. *Science is necessary* to ensure that organic agriculture is healthy, safe and ecologically sound. *However, scientific knowledge alone is not sufficient*. Practical experience, accumulated wisdom and traditional and indigenous knowledge offer valid solutions, tested by time. Organic agriculture

should prevent significant risks by adopting appropriate technologies and rejecting unpredictable ones, such as genetic engineering. Decisions should reflect the values and needs of all who might be affected, through transparent and participatory processes.

3.5.2 Certification and organic guarantees

As organic agriculture grew, systems had to develop to ensure the integrity of the organic claim, as outlined in 3.3. In the 1980s, private organisations, comprised mostly of farmers, developed standards for production, inspection and certification. the European Union, USA, Japan, Canada and Brazil and many of them offer their services in developing countries. Africa has only seven home-based certification organisations (Willer and Yussefi, 2004). South Africa has two local certification bodies and there are seven bodies that provide certification services in South Africa. Five of these have offices in South Africa.

The process of certification is intended to assure quality, to assist organic producers in identifying suppliers of products approved for organic operations and to provide consumers with assurance that the goods have been produced organically. Organic standards detail the minimum requirements of the farming system in order to ensure that the definition of organic farming is upheld. Independent third party assessments are required to ensure that the farming system adheres to the given standards (FAO, 1998).

3.5.3 Standards and regulations

Organic certification is based on standards. Standards are used, in part, to establish an agreement within organic agriculture about what an ‘organic’ claim on a product means. Regional groups of farmers and supporters began developing standards as early as the 1940s. The organic market today is comprised of numerous private sector standards, national standards and two international standards for organic agriculture, IFOAM and The Codex Alimentarius (commonly known as ‘Codex’). Figure 10 illustrates the general organisation of accreditation, certification and standards.

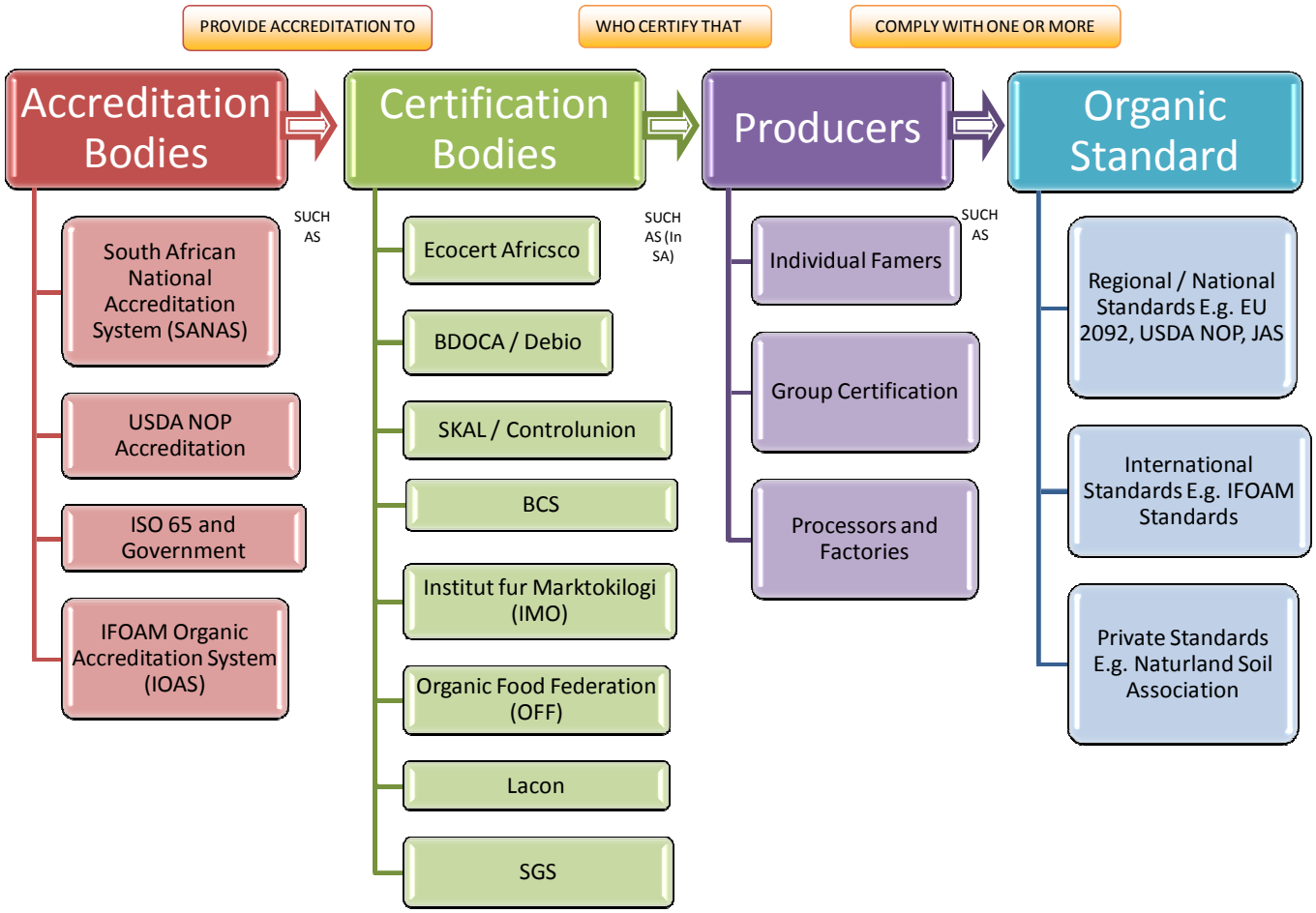

Figure 10: General organisation of organic certification systems (after FAO, 1998; Institute of Natural Resources, 2006)

3.5.4 Alternative organic guarantee systems

Organic certification is a formal and highly structured system (illustrated in Figure 10) for ensuring the integrity of organic claims. It is necessary particularly for international trade in organic produce and requires the producer to have proper systems in place to ensure appropriate records are kept and that *all* the requirements of a given organic standard are adhered to (FAO, 1998; Grolink, 2003). This form of certification is costly and requires high managerial and administrative inputs and is often not appropriate for smaller growers and those supplying to local markets This is a constraint and serious barrier to entry for small farmers, and resource poor farmers (Khosla, 2006). Consequently, two alternative models for certification are also used and recognised.

One is the group certification model, which is still a third party certification system, which offers certification to smallholder groups with the aim of reducing individual certification costs. In this model, group of farmers monitors their own performance against a given standard. The certification body ensures that the organic claim is valid by checking the record keeping system that has been established to monitor the farmers' practices and only needs to inspect a sample of the smallholders to ensure what the records are showing is reflected on the farms (Callear, pers comm.,7 October, 2008; Jackson, pers comm., 7 October, 2008)

The participatory guarantee system (PGS) is a first party certification model. IFOAM (2005) recognises that any system of agriculture complying with the Principles of Organic Agriculture can be regarded as 'organic agriculture'. Where produce is sold domestically and within a relatively small geographic location it is not necessary to have costly independent third party certification, however some form of organic guarantee is necessary. PGS offers an alternative method of certification for these circumstances.

The PGS is a form of *first party* certification whereby a group of producers agree to uphold a given set of publicly documented standards. It is, in effect, a system similar to the trust system used in the early days of organic agriculture, but has stated standards to which participants in the scheme all agree to abide to. This system is becoming increasingly popular and more widely recognised with large numbers of

small farmers in Latin America, India and the USA utilising this system. It is also the organic guarantee system being used by the Bryanston Organic Market in Johannesburg, South Africa (Khosla, 2006; Callear, pers comm.7 October, 2008*;* Lernoud, 2006).

3.5.5 Summary of the essence of organic agriculture

The principles of organic agriculture provide guidance on what an organic farmer should be taking into consideration when farming organically. They are based on the three pillars of sustainability (social, economic and environment) and have a strong resonance with farmers who choose this system of agricultural production and consumers who are becoming increasingly aware these issues.

Standards and certification, on the other hand are market instruments to ensure compliance and facilitate trade in organic produce. The principles do not easily translate into standards and certification may be seen as a mechanistic response to a philosophical approach to farming as a result of market requirements. Consequently, the principles of organic agriculture are often not reflected in the standards.

A farmer who believes in the principles of organic agriculture can farm organically. However, to sell organic produce in formal markets, certification is required. If a farmer chooses organic production simply to access lucrative markets for their produce, they can farm organically by adhering to the standards without necessarily believing in philosophy behind organic agricultural production. Farmers who believe in the philosophy of organic agriculture on the other hand may be opposed to certification and perceive it to debase the principles of organic agriculture as merely another mechanism to control world food markets.

Of particular concern to some farmers is that standards do not take local production conditions into consideration. In the case of the EU standard, producers must comply with this standard to access the EU market. However, these standards were developed for EU production conditions, and in some situations are not compatible with South African conditions. This is in spite of the IFOAM principles (on which the EU standard was originally based) clearly stating that “Organic farming systems

should fit the cycles and ecological balances in nature and organic management must be adapted to local conditions, ecology, culture and scale" (IFOAM, 2005).

3.6 Environmental Benefits of Organic Agriculture

Williams and McKenzie (2008) make the point that agriculture is more than simply an extractive process of putting seeds and inputs into the soil and harvesting them. The possibility of agriculture sustainably feeding eight to nine billion people depends increasingly on environmental and social considerations (Williams *et al.,* 2008). The sections below review the environmental and socio-economic benefits of organic agriculture and consider the interactions and deepening understanding of the connection between social and environmental benefits.

3.6.1 Biodiversity

Biodiversity provides critical ecosystem services, such as nutrient cycling, water production, flood mitigation, carbon absorption and oxygen production. Efforts to preserve biodiversity have, until recently, focussed on natural (undisturbed) ecosystems, which is important, but these only account for 10% of the earth's surface whereas 37% of the earth's land surface is under some form of agricultural production (Stolton, 2002). As understanding of the possible role agriculture can play in enhancing biodiversity deepens, the social learning of the farmer or landholder should come under increasing focus as there exists a significant opportunity for agricultural systems to contribute to biodiversity conservation and management.

Hole *et al.* (2005) undertook a literature review of scientific papers that explicitly compared the impacts of organic and conventional systems in terms of biodiversity. Seventy-six individual studies were identified, and qualitative reviews of these were undertaken. This research found that the majority of studies demonstrated that species abundance and / or richness, across a wide-range of taxa, was higher on organic farms than on locally representative conventional farms. It further found that many of the positive differences were for species that have experienced declines as a result of agricultural intensification, some of which are now protected through biodiversity conservation legislation.

Other detailed or long term studies that show similar biodiversity benefits include: El Hage Scialabba (2000); The Soil Association (2000) and Randerson (2004)

3.6.2 Soil

Soil is the most important physical asset of a farming enterprise. Pfiffner (Undated) confirms this assertion and points out that improved soil management is a key objective of organic farming. Organic farming was found to conserve soil fertility better than conventional systems, indicated by a higher richness and quantity of soil life in organically managed soils. These soils usually have a higher organic matter content, which drives the richness of soil biodiversity. Most organic farming practices were also found to have high erosion control potential.

Organic soil management has been reported to increase soil aggregate stability due to increased soil organic matter and macro fauna that build soil structure. Studies have shown soil organic carbon to be 14% higher in organically managed soils and the labile fraction is 30 to 40% higher, with important positive implications on plant nutrition. (El-Hage Scialabba, 2007) Enhanced microbial biomass improves soil physiological functions, such as faster phosphorus supply for plant growth (Horticultural Research International, 2002).

3.6.3 Climate change and carbon

Global climate change is an urgent and real environmental problem. According to El-Hage Scialabba (2003), agriculture contributes 20% to the total anthropogenic sources of greenhouse gas emissions which consist primarily of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). El-Hage Scialabba (2003) also notes that while carbon dioxide is present at much higher concentrations in the atmosphere than the other gases, methane and nitrous oxide have a much higher global warming effect.

Pfiffner (Undated) found that CO_2 emissions were 40-60% lower on organic farms, although emissions on a per unit output of production basis, may be higher than on conventional systems. El-Hage Scialabba and Hattam (2002) state that CO_2 emissions per hectare of organic agriculture systems are 48 to 66% lower than in conventional systems. Similar findings were recorded by the Rodale Institute

(Sayere, 2003). El-Hage Scialabba (2007) notes that 33% less energy per ha is required for organic maize and 56% less is required in biodynamic systems in temperate areas. Irrigation requirements are also reduced. Energy consumption in organic systems were found to be 10 to 70% in European countries, and by 28 to 32% in the USA when compared to high-input systems, except for difficult crops such as potatoes or apples where energy use is equal or even higher.

Reduced soil erosion and increased soil carbon also increase the capture and storage of carbon, particularly in degraded soils. The carbon sequestration efficiency of organic systems in temperate climates is almost double (575-700 kg carbon per ha per year) as compared to conventional soils, mainly due to the use of grass clovers for feed and cover crops in organic rotations (El-Hage Scialabba, 2007).

3.6.4 Water use efficiency

The higher content of organic matter in organically managed soils has positive effects on soil drainage and water-holding capacity. El-Hage Scialabba (2007) noted improved groundwater recharge and decreased runoff, with 100% water capture in an organic plot during torrential rains. In Pennsylvania, USA, organic maize yields were found to be 28 to 34% higher than conventional yields in drought seasons. In India, biodynamic soils were reported to decrease irrigation needs by 30 to 50% (El-Hage Scialabba, 2007).

3.6.5 Water pollution

Water pollution through nitrate leaching is generally lower in organic agriculture. Trials from the late eighties showed that with organic farming practices, nitrate leaching was up to 50% less on organically managed farms. Improved nitrogen management on conventional farms has decreased this difference, and leaching rates were found to be, on average, 20% lower on organic farms (Pfiffner, Undated; El-Hage Scialabba and Hattam, 2002). Organic agriculture also poses no risk of ground and surface water pollution through synthetic pesticides (El-Hage Scialabba and Hattam, 2002; Pfiffner, Undated).

Pfiffner (Undated) does, however, note that ploughing in of legumes at the wrong time followed by the incorrect crop (one that does not have high nitrogen demands,

for example) as well as using compost or manure on freely draining soils can potentially cause significant nitrogen leaching in organic systems.

El Hage Scialabba (2007) points out that organic production systems improve the availability of clean water, reduce eutrophication from phosphate pollution and groundwater may be enhanced by as much as four times less nitrate leaching when compared with conventional production systems. Shepherd *et al.* (2003) found a similar range of benefits.

3.6.6 The paradox of conventional farming

To provide a local context for awareness of the environment and changing to organic agriculture, a local case study illustrates how the change to organic agriculture can occur. Discussion with a farm owner in KwaZulu-Natal of a recently converted farm revealed that organic production was chosen due to a dramatic decrease in yield. Maize production had decreased from 10 tons/ha to 6 tons/ha and potatoes had decreased from 35 tons/ha to 30 tons/ha. The drop in yields was ascribed to the death of soil organisms caused by the use of the pesticide Temic (Institute of Natural Resources, 2008). The active ingredient in Temic is aldicarb. It is a highly toxic insecticide that is used mainly for the control of soil nematodes, which attack the roots of many crops, especially potatoes. Aldicarb has an LD_{50} (Lethal Dosage, 50%; or the dosage at which 50% mortality occurs) of 7mg/kg in its diluted granular form which is used in agricultural applications (Extoxnet, 1996). This means that 0.4 grams of the granules can kill a 60 kg human being. The drop in yields highlights the role that soil organisms play in recycling nutrients and facilitating nutrient uptake by plants. Even thought the 'correct' applications of fertilisers were being made, based on soil 'analysis'; the plants could not use them effectively.

The farm began producing organic broccoli and cauliflower (winter) in rotation with green beans (summer) after applying soil conditioning microorganisms to restore some of the soil biota. The farm noticed no drop in yields during conversion. It should, however, be noted that production was maintained on an input substitution basis. Inorganic fertilisers were replaced with organically certified fertilisers, which may not be fully aligned with the principles of organic agriculture, but is allowed in certification. Nevertheless, soil life is being restored and obviously, the use of

pesticides, such as Temic no longer occurs. The farm is moving towards a more sustainable system of production and is enjoying access to markets in the USA where beans are fetching a price of R14.75 /kg as organically certified beans. This is in contrast to the South African market, which offers the farm R7.50 / kg, sold as conventionally produced. The farm is seeking to expand production by encouraging other farmers to convert, in order to attract and capture larger markets. Many farmers show initial interest, but do not complete the process of conversion. This is because the farmers consider the short term cost to be too risky and are sceptical of long term viability (Institute of Natural Resources, 2008).

'Gif smouse', or 'poison peddlers' in English, is the rather disparaging term used often in the organic sector to describe sellers of agrochemicals, but is used in this context to describe a systemic flaw. The case above highlights the paradox. The paradox is that the chemicals we apply to grow the food that sustains us is destroying the broader environment which sustains us.

3.6.7 Summary of environmental benefits

Organic farming has a number of environmental advantages over conventional agricultural production systems. While the benefits above have been listed separately, there is a clear interaction between the environmental components identified, which result in landscape scale benefits. For example, improved soil organic matter means better nutrient availability, increased water holding capacity, and reduced erosion on the farm. Reduced erosion means less eutrophication of water sources from phosphorus and carbon sequestered in the soil which are benefits for all. There is therefore a direct on-farm benefit as a result of organic farming practices as well as wider benefits to the whole. It is important that both on-farm considerations which may be the focus of the farmer and the wider benefits to society are integrated when learning to view the interactions as a whole. As understanding deepens, farmers, on the one hand will become more aware of the broader benefits of the farming system on the environment. Consumers, in turn, will have better understanding of the positive implications of organic production on the environment in general. These are both social learning processes which are discussed in the description of learning frameworks in Chapter 2.

3.7 Socio-Economic Benefits of Organic Agriculture

As indicated in the principles of organic agriculture, there are both environmental and socio-economic benefits associated with organic agriculture. To a large degree, the socio-economic benefits are closely linked with the environmental benefits reviewed in the section above. It is therefore important that that when considering the socio-economic benefits that they are seen part of the same framework of benefits as an integrated part of the whole system. For example, limiting leaching of nutrients and pesticides reduces water pollution. This reduces the cost of cleaning polluted water as well as health risks associated with drinking polluted water. This in turn can reduce healthcare costs, which can instead be spent, perhaps, on education. It is in understanding the linkages between these separate components that learning occurs.

3.7.1 Food security

According to the FAO (2003), food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern.

El-Hage Scialabba (2007) notes that while there has been great progress towards achieving food security in the last 60 years, the World Food Summit target of halving the number of hungry people by 2015 will not be met. While there has been a reduction in the percentage of undernourished people, the number has remained virtually unchanged since the early 1990s.

Global agricultural production is sufficient to feed the current world population, but food security is influenced by many complex factors, such as technologies, human capacities, policies, prices, trade and infrastructural context (UNCTAD, 2008; Rundgren, 2002). Furthermore, there is increasing evidence of diminishing returns on grains despite increased chemical pesticide and fertiliser applications. For example, between 1978 and 2003, statistical yearbooks show the decrease of grain harvested per tonne of chemical fertilisers in China, decreasing from 34 to 10

(Sanders, 2006 cited in El-Hage Scialabba 2007). The result of this is that food becomes more costly, which compounds food security problems.

Conventional agricultural systems, through the use of chemical inputs try to be independent of natural systems, are capital intensive and reduce biodiversity. In developing countries, where low input rural systems occur, it is often the case that conventional systems are not appropriate due to limited on-farm resources and access to inputs. A conventional seed with a genetic potential for high yields requires the necessary inputs of fertiliser, irrigation and pesticides to achieve this potential; without these the yield is poor or even a failure and consequently the farmer has not only spent money on the purchase of the seed, but has received nothing in return. Parrott and van Elzakker (2003) point out that the median rate of fertiliser use in Africa is 10kg / ha and that many African countries are water scarce (less than 1000 cubic metres per person per year) or water stressed (up to 1 699 cubic metres per person per year). Consequently, it may be argued that conventional production is not appropriate in these circumstances.

To address food security, Rundgren (2002) considers it is most appropriate to increase productivity in developing countries as these countries are the most food insecure, and stand to benefit the most from improving food production, particularly if this can be achieved with low cost, locally available technologies and inputs.

Trewavas (2001; 2004) argues that organic agriculture results in lower yields and that at a time when demand for food is increasing, productivity and efficiency should be increased to meet the demand. It is argued that large scale conversion to organic agriculture would result in more land being required for production and have a greater negative impact on the environment.

Badgley *et al.* (2006) conducted a theoretical exercise on the possibility of organic production meeting the increasing worldwide demand for food. The study derived yield ratios by comparing organic yields (This included 'semi-organic' production – a full description of the methodology is provided in the source document) against non-organic yields for a given crop. If, for example, a given organic crop was found to yield 96% of the yield of a conventional crop, the yield ratio would be 0.96.

Conversely, if an organic crop yielded more than a conventional crop, the yield ratio would be greater than one. A total of 293 comparisons were used in the study. These yield ratios were then used to derive comparisons of global food production under organic and non-organic. Of significance is that the average yield ratio for the 133 examples from the developing world was found to be 1.80 (Table 1).

Table 1: Average yield ratio (organic: non-organic) and standard error (S.E.) for selected individual food categories recognised by the FAO (after Badgley *et al.,* 2006, p 88)

	(A) World			(B) Developed countries			(C) Developing countries		
Food Category	**N**	**Av.**	**S.E.**	**N**	**Av.**	**S.E.**	**N**	**Av.**	**S.E.**
Grain products	171	1.312	0.06	69	0.928	0.02	102	1.573	0.09
Starchy roots	25	1.686	0.27	14	0.891	0.04	11	2.697	0.46
Sugars and sweeteners	2	1.005	0.02	2	1.005	0.02			
Legumes (pulses)	9	1.522	0.55	7	0.816	0.07	2	3.995	1.68
Oil crops and veg. oils	15	1.078	0.07	13	0.991	0.05	2	1.645	0
Vegetables	37	1.064	0.1	31	0.876	0.03	6	2.038	0.44
Fruits, excl. wine	7	2.08	0.43	2	0.955	0.04	5	2.53	0.46
All plant foods	266	1.325	0.05	138	0.914	0.02	128	1.736	0.09

Table 1 indicates that the conversion of developed countries from conventional to organic production would result in a slight reduction in yield, with an average yield ratio of 0.914 for all plant foods. Importantly, in developing countries, it was found that conversion to organic agriculture would result in an increase in yield, with an average for all plant foods giving an average yield increase of 1.736 over conventionally produced food. The results of applying these ratios on global food production are provided in Table 2.

Table 2: Actual (2001) food supply and estimates for Model 2 (Badgley *et al.,* 2006, p 89)

Food Category	**Actual World Food Production**	**Actual World Food Supply After Losses**	**Estimated World Organic Food Supply after Losses**
All food groups	**1000Mg**	**1000Mg**	**1000Mg**
Developed Countries	1,868,620	620,683	573,222
Developing Countries	4,173,073	2,106,836	4,247,602
World	6,041,693	2,727,519	4,820,825

Table 2 indicates that the estimated food supply could actually increase if developing countries (where a large number of people grow food on a small scale, and a large proportion of food production occurs) converted to organic agricultural production.

Badgley *et al.* (2006) conclude that the organic agriculture can contribute substantially to a more sustainable system of food production. They suggest not only that organic agriculture, properly intensified, could produce much of the world's food, but also that developing countries could increase their food security with organic agriculture. The results are not, however, intended as forecasts of instantaneous local or global production after conversion to organic methods, nor do they claim that yields by organic methods are routinely higher than yields from green revolution methods. The research is intended to show that there is potential for alternatives to conventional agriculture as the dominant mode of food production to be seriously considered (Badgley, *et al.,* 2006).

The report finally recognises that there are numerous challenges to the widespread adoption of organic agriculture, including agronomic, economic and educational. It also recognises that the practice of agriculture on a wide scale requires support from research institutions, a strong extension system and a committed public. Nevertheless, the study concluded that the debate on whether or not organic agriculture can make a substantial contribution to food supply should be put to rest. The authors suggest that the debate should now focus on how to allocate resources for research and create incentives for farmers and consumers to encourage more sustainable production systems (Badgley *et al.,* 2006).

The global analysis indicates that while there are decreases in production when moving from conventional production methods to organic production, these may not be severe, and therefore should not impact negatively on national food security. Other studies have had similar findings for increased food production under low input agricultural production systems (Rundgren, 2002; Rosegrant *et al. ,* Undated; El-Hage Scialabba, 2007; Halberg *et al.* , 2006; Jiménez, 2006; UNCTAD, 2008; Bolwig and Odeke, 2007).

According to El-Hage Scialabba (2007) the FAO Special Programme for Food Security shows the following lessons learnt from national food security programmes in 105 countries:

1. Water management is a limiting factor to better agriculture and livelihoods and the range of water technologies must also consider improved soil management and agro-forestry options for sustainable water supply.
2. Sustainable intensification of crops through organic agriculture can provide higher yields with a minimum dependence on external inputs but this requires linkage to markets and building marketing groups and farmers' skills.
3. Diversification of income sources comes with improved management skills and access to new assets. Even where markets are not strong, household nutrition levels can be improved with indigenous crops and home and school gardens.
4. People are central but their knowledge and organisational capacity must be improved to achieve better use of available resources or to identify new opportunities. Building community organisations includes marketing groups, savings groups, multipurpose cooperatives or contract farming of various types.

What is clear from the information above is (1) that organic agriculture has the potential to enhance food security, particularly in developing countries and importantly (2) to achieve this, social learning processes need to be enhanced for all actors to achieve this.

3.7.2 Health and nutrition

El-Hage Scialabba (2007) indicates that the nutritional benefits of organic foods, as compared to food produced with high external inputs, includes generally higher vitamin C, less nitrates, higher plant secondary metabolites and conjugated fatty acids in milk. Organic tomatoes and apples in Poland were found to have higher beneficial antioxidants, such as vitamin C, lycopene and flavinoids (Rembialkowska *et al.,* 2007; Hallmann and Remialkowska, 2007). Studies have shown organic milk to have more beneficial fatty acids and amino acids than conventional milk (Butler *et al.*, 2007).

Worthington (2001) found that organic crops in general were found to contain significantly more vitamin C, iron, magnesium, and phosphorus and significantly less nitrates than conventional crops. In some cases, lower concentrations of harmful heavy metals and a higher content of nutritionally beneficial minerals were detected. El-Hage Scialabba (2007) points out that the main benefit of organic diets stem from the diverse diet resulting from organic crop production rather than the nutritional value of individual organic foods consumed.

One of the main reasons for purchasing organic food by consumers is the perception that it is healthier and more nutritious and this is linked to premiums consumers are prepared to pay. Many studies have found in favour of organic food, however few studies are unanimously considered to be scientifically sound (Magkos *et al.*, 2003; Liefert *et al.*, 2007). Magkos *et al.* (2003) point out that organic does not automatically mean safe and argue that a well balanced diet can equally improve health regardless of whether it is conventional or organic. Rundgren (pers comm.12 July 2007) points out that many studies devoted to organic agriculture often use a systems perspective, investigating a number of parameters at the same time. In contrast, the scientific community prefers to isolate a single parameter in their investigations. All parties seem to agree that additional research is necessary to develop adequate comparative data, better understand the processes influencing chemical composition of foods, undertake factorial studies isolating individual production system components and cohort studies with methods stringent enough to allow the trends and tendencies to be scientifically verified or rejected (FAO, 2007; Brandt and Molgaard, 2006; Magkos *et al.*, 2003; Soil Association, 2002; Liefert *et al.*, 2007). The need to share perspectives related to research and learning experiences is therefore important to develop answers to the question of the nutritional benefits of organic produce.

Apart from nutritional considerations, there are several other health benefits of organic agriculture affecting people, directly or indirectly, through carrying out the farming practices associated with organic agriculture. The hazard of handling pesticides and chemical fertilisers on-farm represents a health risk especially in less literate communities. This concern does not exist for organic farmers. The WHO has

estimated that 3,000,000 persons are exposed to single and short term pesticide poisoning resulting in 20,000 deaths every year. Another 735,000 persons suffer from chronic effects of long-term exposure. In addition an unknown number of ordinary people are affected by long-term, low-level exposure through foods and 'background' pollution (WHO, 1992; El-Hage Scialabba, 2007).

Poisoning due to pesticides is a notifiable condition in South Africa. Between 2001 and 2005, a total of 1462 cases and 72 deaths were notified to the South African National Department of Health. The Department does acknowledge, however, that these figures are a substantial underestimation of the true rates, as many of these cases go unreported (Department of Health, 2005).

Organic food is found to contain substantially lower levels of pesticide residues than conventional food (Brandt and Molgaard, 2006; Magkos *et al.*, 2003; Baker *et al.,* 2002). With increased organic farming, the problems of chemical fertilisers and pesticides polluting drinking water and environment are reduced (Jiménez, 2006). Organic animal production aims at reducing the need for antibiotics as they are never used as a preventive or a growth promoter. Several studies show that the restricted use of antibiotics in organic agriculture reduces the widespread problem of antibiotic resistance (Brandt and Molgaard, 2006).

3.7.3 Employment and workers rights

It is generally accepted that organic farming operations offer greater social benefits than conventional agricultural systems. For example, IFOAM's basic standards for organic agriculture include consideration of "quality of life conforming to the UN Human Rights Charter to cover their basic needs and obtain an adequate return and satisfaction from their work, including a safe working environment" as well as consideration of "the wider social and ecological impact of the farming system". Chapter eight of the IFOAM Basic Standards is dedicated to worker rights.

However, it is questionable whether social rights are adequately enforced in many organic standards. In a survey of 188 organic and mixed farmers in California, Getz *et al.* (2005), found that there was little support for adding social certification requirements to the current US national certification requirements, with more than

half being opposed to the proposal. Although organic farmers might philosophically agree with ideas of social considerations, some felt that organic certification was not the best way to address this. It was found that others, who believed organic agriculture should ensure fair and healthy working conditions for farm workers, felt it was not economically viable given 'market realities'. Most respondents felt that inclusion of these criteria would create an unacceptable financial burden. It was concluded that while the definition of organic agriculture under the United States Department of Agriculture's (USDA) National Organic Programme (NOP) excludes certification criteria concerning farm workers' rights or working conditions, the broader international organic community, including many in the US, is moving closer to addressing these needs to ensure that organic agriculture is socially as well as environmentally and economically sustainable.

According to FAO (1998) the following general social benefits are associated with organic production systems:

- The site specific nature of organic agriculture means that indigenous plant species and indigenous knowledge are important. Further, farmers may welcome a management system more aligned to their own traditions and not driven by the production paradigm (i.e. maximising yields through the use of artificial inputs).
- Relying on local knowledge of complex interactions and variations of conditions from place to place tends not to favour large production areas. With the tendency for reduced farm size, equitable access to land may be enhanced.
- Consistent labour requirements associated with crop diversity can provide income stability.
- Fair trade, where buyers demonstrate a concern for social justice by buying fair trade products, is part of the ethic of organic agriculture.
- Improving the situation of women in agriculture is an important issue, particularly availability of work, gender distribution of labour and positions of greater responsibility.

- Using local inputs can potentially bring benefits to the community through stimulating the local economy and reducing the need to purchase external inputs on credit.

El-Hage Scialabba and Hattam (2002) indicate that in changing to organic farming practices, many aspects of the operation, including labour demand, social structures, and decision-making processes, change. They also point out that organic systems often require more labour input to replace the external energy and capital inputs. Further, as a result of crop diversification, different planting and harvesting schedules associated with crop rotation practices distributes labour demand through the season. These practices stabilise employment and farm turnover, and reduce problems related to migrant labour, as well as spreading the overhead costs per employee more evenly over the year. Finally, diversity in agricultural production and value added products can increase income-generating opportunities and spread the risks of failure over a wider range of crops and products.

Lohr (Undated) found in the US, that even in small numbers, organic farmers are influencing mainstream agriculture to shift toward greater sustainability. From a study of the more than 3,000 counties in the US, it was concluded from a social perspective that:

- Counties with organic farms have stronger farm economies and contribute more to local economies through total sales, net revenue, farm value, taxes paid, payroll, and purchases of fertiliser, seed, and repair and maintenance services.
- Counties with organic farms have more committed farmers and better support rural development with higher percentages of resident full-time farmers, greater direct-to-consumer sales, more workers hired, and higher worker pay.

3.7.4 Consumer perspectives

Consumers are becoming increasingly aware of health, social and environmental issues surrounding the food they purchase, and a number of factors may influence the purchase of organic foods. Du Toit and Crafford (2003) reviewed international trends and surveyed consumers in Cape Town and found that on the whole, perceptions of Cape Town organic consumers were similar to those internationally:

- Health - more people are focusing on health and well-being. Food has become more integrated with health considerations and consumers are more informed about nutrition. There appears to be a widespread belief that organically produced crops and animal products have a higher nutritional value and healthier than conventionally produced foods.

- Food Safety - concerns have increased in recent years. Consumers are more aware of the possible health hazards of processed food and food from intensive farming systems. They also ask more questions and express greater concerns about food quality and safety than they used to.

- Environmental Concerns - consumers with these concerns have a greater regard for organic agriculture. Surveys in the United States showed respondents rated environmental concerns as being equally important as health reasons for consuming organically produced food. They consider organic foods to have higher ethical values and are turning to organically produced food because out of concern for the intensive rearing of animals and to support local farmers.

Vermeulen and Bienabe (2007) found that health was a major motivation for consumers in South Africa and abroad and note that in Britain, environmental concerns are mentioned as the main justification for purchasing organic food. These figures are presented in Table 3.

Table 3: Drivers of consumer choice of organic (ACNielsen, 2005 cited by Vermeulen and Bienabe, 2007, p 700)

Purchase reason:	**% of respondents in country / region:**		
	South Africa	**Europe**	**North America**
Healthy for me	53	41	57
Healthy for my children	16	1	19
Better for the environment	17	19	11
Kinder to animals	8	12	2

As Table 3 illustrates, consumers are becoming more concerned about the food they eat, not only in terms of intrinsic factors (e.g. chemical residues and nutritional content) that affect health, but also with regard to broader environmental issues such as the impact on the environment (biodiversity and climate change) and the welfare of animals.

3.7.5 Summary of social benefits

The social benefits of organic agriculture are not as clear cut as the environmental benefits of organic agriculture, particularly; it appears, on large commercial organic farms in the US. Nevertheless, the literature shows significant social benefits in the form of improved food security, reduced chemical hazards associated with production, and a growing body of research suggesting superior nutritional benefits of organic food. Social learning arising from improved understanding of the environmental and social benefits of organic agriculture can help to deepen our knowledge and balance the needs of the environment, people and production in an integrated manner.

From a consumer perspective, choice of organic food seems to be primarily for personal and family health reasons (more nutritious, less pesticides residues) and to a lesser extent, environmental and ethical reasons, such as animal welfare. The social conditions under which food is produced does not appear as a major consideration in choosing to buy organic food.

3.8 Discussion

Chapter 3 provided a broad overview of organic agriculture, investigating in particular the history of the development of the organic farming sector, understanding what organic farming is, and a review of the benefits associated with organic agriculture.

From an agricultural production perspective, organic agriculture originated from recognition over 60 years ago that relying on fertilisers may be unwise and probably would not maintain farm productivity indefinitely. Rather, the development of an understanding of the principles of ecology, and recognising the connectivity between the health of the environment, health of crops and health of people, was necessary to achieve long term sustainable agricultural production.

Interest in organic foods began to grow steadily in the 1970s, from informal networks of likeminded people to a more structured and wider system of production and consumption. As production and distribution became more widespread, certification systems for organic foods began to emerge in the 1980s and 1990s to guarantee to the consumer the organic integrity of the product and provide the producers with an even playing field. In the last decade, organic production and consumption has increased rapidly with the production and distribution of organically produced food occurring worldwide. However, demand for organic food is predominantly in the more developed countries of the north.

The principles of organic agriculture show that organic agricultural production is not concerned only with environmental considerations, but also has socio-economic and human welfare aims. A review of the benefits or organic agriculture reveals that there are indeed both environmental and socio-economic benefits associated with organic production, including particularly, improved biodiversity, reduced environmental pollution, possibilities for mitigation of adaptation to climate change as well as enhanced food security, health and nutrition and employment.

The recognition of possible flaws in conventional production systems over 60 years ago have manifested themselves over time, resulting in a growing recognition that there is an urgent need to change the way the world views food and the production of food. It is clear that food production needs to be considered in the context of the ecological system that supports food production. Land degradation and loss of productivity increasingly point to the need to reform agricultural science and invest in new directions and technologies for agricultural science that take a broader and more inclusive view of agriculture and ecology; we need to learn new ways of producing food that maintains and improves the ecology of agricultural production systems. This learning needs to be accelerated and amplified to achieve this change. In South Africa, this is particularly important as the trend in growth of organic agriculture reflected worldwide and with our African counterparts is not reflected here.

4 METHODOLOGY

4.1 Introduction

This chapter details the methodological approach used to understand social learning dynamics in relation to organic farmers in South Africa. This exploratory research was not a classic research case. It sought to explore whether it was possible to reasonably describe organic farmers' learning processes in terms of the models of learning. The review of relevant learning frameworks and organic agriculture provided the basis to understand the topics in detail. This was followed by a quantitative and qualitative analysis of survey data from the commissioned project using the new understanding developed from the literature review. Through further reflection and iteration, and the use of the authors own natural experience, the survey data was again examined and the results of this assessment used to inform the analysis. The conceptual framework of the methodology is illustrated using Mintzberg's (2004) natural learning processes in Figure 11 and is detailed in the subsequent sections of this chapter.

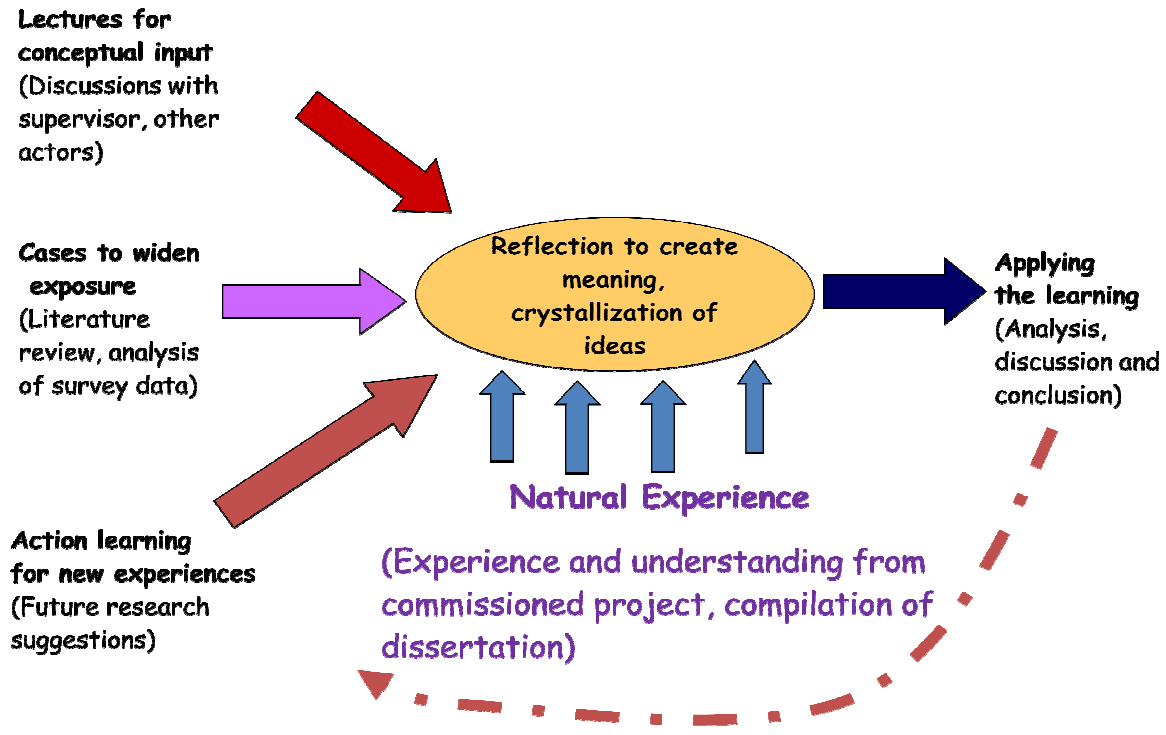

Figure 11: Description of methodology using natural experience framework (after Mintzberg, 2004, p267)

The natural experience gathered during the commissioned project (described in Sections 1.7.3 and 4.2) provides the basis on which this dissertation evolved. Cases to widen exposure, in the form of a literature review and analysis of survey data is and as lectures for conceptual input, in the form of discussions with the dissertation supervisor and other role players, is used to supplement the natural experience. Bringing these different forms of knowledge together in a process of reflection and crystallisation created new knowledge and understanding. This new knowledge is applied in the analysis, discussion and conclusion of the dissertation, further enhancing natural experience. Action learning for new experience takes the form of recommendations for future research in the final chapter of the dissertation. The purpose of the future research recommendations is to sustain the momentum of the learning process, not only for the author, but for others who wish to create new knowledge in the advancement of organic agriculture in South Africa.

This chapter firstly describes the baseline study and how the research objectives emerged (Section 4.2). This followed by a description of the literature reviewed in this research (Section 4.3). Section 4.4 describes the survey data from the baseline study that was used. The process of analysing the data is described in Section 4.5 and Section 4.6 outlines the concluding chapters of this dissertation.

4.2 Description of the Baseline Study and the Emergence of the Research Objectives

The idea to use the four learning frameworks to understand the social learning dynamics of organic farmers evolved during a project commissioned by the Department of Trade and Industry (DTI). The purpose of the project was to develop a value chain strategy for the sustainable development and growth of organic agriculture in South Africa. The Institute of Natural Resources (INR) was appointed to undertake the study and the author, a senior scientist at the INR, was the project manager. The terms of reference were quite specific and are summarised as follows:

1. To investigate demand, supply and distribution of organic produce from a domestic and export perspective
2. Investigate the regulatory environment in which organic agriculture occurs

3. Evaluate the potential of organic agriculture to benefit the environment and for social development, looking specifically at Broad-Based Black Economic Empowerment (BBBEE), skills development, job creation and social transformation
4. Conduct primary research to understand the current status, challenges and opportunities for the sector in South Africa
5. Develop a strategy to address identified challenges and problems and take advantage of identified opportunities.

The methodology employed to achieve the terms of reference was to undertake an extensive literature review, conducted primarily by the author, to understand the emergence of organic agriculture, what organic agriculture means in practice and the current status and local and global trends in the sector. Based on this understanding and discussions with key stakeholders, a survey was compiled to understand the status of organic agriculture in South Africa. The survey questions were compiled by the author, with input from project team members and the DTI-appointed project steering committee. The main findings of the review and survey were presented at three multi-stakeholder workshops as the basis on which a strategy for the organic sector was developed. These workshops were organised by the author and took place at the following locations and dates:

- Cape Town - 27 November 2007
- Johannesburg – 29 November 2007
- Pietermaritzburg - 30 November 2007

The draft strategy that emerged from the workshops was submitted to stakeholders for comment, finalised and submitted with the final reports for the project in December 2008. The total duration of the project was two years; from January 2007 to December 2008 (Institute of Natural Resources, 2008).

What emerged during the project was the realisation that there is a largely untapped wealth of knowledge and experience among organic farmers, particularly those who had been farming for some time. At the same time, many stakeholders expressed

concern and frustration that there was very little formal support for organic agriculture and, in particular, that access to information was a major constraint to the growth of the sector. The question arose as to how the knowledge resources of experienced organic farmers could be shared firstly with other organic farmers, secondly with other farmers considering organic agriculture and finally, making this information available to the general public.

Coupled with this was the recognition that the sector is growing in South Africa, which means that people must somehow be learning and obtaining knowledge on organic agriculture in South Africa. Based on these considerations, it was decided to revisit the survey using a fresh approach to attempt to understand what learning resources are available to organic farmers and how they learn. If learning can be enhanced, this will help to facilitate the advancement of the organic sector.

In summary, the research in this dissertation evolved through a richness of experience gathered from the commissioned study, and recognition of the need to better understand social learning and the potential to use this understanding to transfer skills and knowledge to other farmers who may be considering organic agriculture. Of particular interest to the researcher was the question of "how do organic farmers learn?"

4.3 Literature Review of the Organic Sector and Learning Frameworks

An extensive literature review was undertaken of organic agriculture, in particular to highlight the growth of the sector, as well as the benefits of organic agriculture to environment and society. This is a lengthy review considering that this is a mini-dissertation; however, the literature used captures the essence of social learning in an implicit manner. The sector is growing as a result of increasing awareness, firstly of fundamental environmental and social problems that exist in the world and secondly, because of a recognition that choices are made can have an effect on these problems. These are social learning processes.

The other stream of literature reviewed aimed to develop a better understanding of how people learn. This literature came from recognised experts in the field of organisational learning and development and explored how change occurs. The

focus from these sources of literature was to understand the four frameworks provided by the authors in order to discover how people and organic farmers in particular, learn.

4.4 Survey Data Used

The survey used for the commissioned research focussed on methods of production, volumes of production of commodities, markets, certification and challenges and opportunities, consisting of both quantitative questions, such as hectares under production and types of crops grown and qualitative (open-ended) questions. The survey template is provided in Appendix 1.

Organisations providing organic certification services in South Africa were approached and asked to provide contact details of the producers that they certified. Some did not provide contact details of producers due to concerns regarding confidentiality, in spite of an undertaking by the researcher to keep the information confidential.

Based on the information provided by certifiers, there are at least 279 certified organic producers in South Africa. This includes processors and packhouses who are also required to be certified to ensure the integrity of the organic claim along the value chain. Contact details of 165 organic producers were obtained to which questionnaires were administered using the instruments of email and fax in June 2007. Thirty-two responses were received from the 165 surveys distributed. Despite a number of follow ups being made, no more detailed surveys were returned. In order to gather additional production and market information for the DTI study, a simplified version of the survey was conducted telephonically, which focussed on quantitative information.

The information from the quantitative surveys was not relevant to this dissertation and consequently the 32 responses to the more detailed survey were used to facilitate understanding of social learning among organic farmers in South Africa. Consequently, one of the limitations to this research is the low response rate to the qualitative survey questions. In addition, within the 32 responses, there was a low response rate to some of the survey questions. However, as this was exploratory

research, it was more important to understand what respondents were saying in answering the open-ended questions than having a statistically representative sample of the population. Nevertheless, 32 responses from an approximate population of 279 certified organic producers represent 11.5% of the population and can be considered a reasonable sample.

Only open-ended questions from the survey were re-evaluated as the author sought to use data where respondents had critically evaluated their answers to understand the emergence of learning among organic farmers. The open-ended questions were assessed using new knowledge developed from the literature review of learning frameworks, to determine whether or not organic farmers are social learners. It was found that the following open-ended survey questions contained references, statements or information that could be interrogated to shed light on social learning by organic farmers in South Africa:

1. Have you recently or do you anticipate expanding your organic production? Please you provide at least one reason why.
2. Some producers suffer significant crop losses or rejection at markets due to product quality in the first few years following organic conversion (selling to either organic or conventional markets). Did you experience this problem? How did this impact on the cash flow of the organic production system, and how did you deal with it?
3. How long did it take for your cashflow to become positive after conversion?
4. Water usage - in your experience, has organic production improved your water use efficiency? If yes, please give figures / examples to substantiate.
5. Has the skill levels of your employees increased due to conversion to organic farming practices? Please explain.
6. Please list the three biggest challenges you experience in terms of primary production.
7. What support do you need to address these challenges?
8. Where do you obtain / seek advice from for problems related to organic farming (.e.g. other farmers, input suppliers, consultants, internet, extension services).

9. How has organic production assisted you in terms of being able to market your produce?
10. Please list what you consider to be the three main strengths/advantages and three main weaknesses/challenges of organic farming in South Africa
11. What do you think, as an organic producer, should be done to support and grow the organics industry?
12. Please add any additional information you feel is relevant to supporting the growth and development of the organic sector in South Africa.

The responses to these questions were used in conjunction with the frameworks to develop an understanding of social learning among organic farmers.

4.5 Iteration, Crystallisation and Analysis

Qualitative, or ethnographic, research consists primarily of describing what emerged a research process and then interpreting what this means (Welman *et al*., 2005). Using a case study approach, the author sought to understand the "uniqueness and idiosyncrasy" (Welman *et al*., 2005, p 193) of organic farmers as a group and how they learn.

The understanding acquired from the review of learning and change created a new perspective with which to assess the survey. Reverting to the original data from the survey the selected questions were interrogated in a different manner; not just to understand general statements, but to understand the comments made by respondents in the context of the learning frameworks in order to identify patterns emerging and to develop rich pictures that reflect social learning. This was done by considering each response in depth and deciding if it showed whether or not social learning was taking place. The responses were then categorised according to different themes that reflected social learning.

For example, using the profound change framework (Senge et al, 1999), responses by farmers were interrogated to understand how they had invested in change (Refer to Figure 1). If they had, then how did they draw other people into the conversation and what kinds of networks did they use to gather and share information? Further, how were learning capabilities developed and what statements reflected the

achievement of personal results. In addition to this, what statements reflected the development of new business practices and results; what delays and difficulties were experienced and how were they overcome? Finally, had the emergence of results enhanced enthusiasm and willingness to commit and resulted in further investment in change?

Each response was then captured within a thematic area (e.g. people, networking and diffusion) and counted to distil the information using Microsoft Excel spreadsheets. Firstly, the information was described quantitatively, in terms of the number of responses that reflected a certain type or category of learning using the spreadsheet. Secondly, the information was described qualitatively by drawing out the meanings of what farmers were saying, looking for emerging patterns and linking this with the learning frameworks.

Using the example of Appendix 3, which sought to understand where farmers get information and advice, the data was collated at three levels. Actual responses were considered and allocated to broad categories which were further condensed into distilled categories, shown in Table 4, Table 5 and Table 6

Table 6. These are then presented and discussed in the analysis chapter to understand organic farmers as a group and how they learn.

Table 4: Distilled categories – sources of information and advice

Source of Information	No of Responses	Percentage
Networks (other farmers, certifying body, consultant, extension services, cross visits)	21	66%
Natural Experience / Action Learning (own research, common sense, experimentation, observation)	5	16%
Internet / Literature / books	4	13%
Training	1	3%
Implicit Knowledge	1	3%
	32	100%
No of Respondents	33	

Table 5: Broad Categories– sources of information and advice

Source of Information or advice	No of times recorded	Percentage
Networks / Other Farmers / Associations	13	39%
Internet / Literature / Books	4	12%
Certifying Body	3	9%
Consultant	3	9%
Experience / Observation / Common Sense	2	6%
Own Research / Experimentation	2	6%
Cross visits	1	3%
Extension Services	1	3%
Fruit Industry does not take organic farming seriously	1	3%
Hands on Experience and observation	1	3%
Natural way of parents from childhood	1	3%
Training Courses	1	3%
Total	33	100%
No of Respondents	33	

Table 6: Actual Responses– sources of information and advice

Category	Specific Answer
Certifying Body	Ecocert office
Certifying Body	If it is necessary from the certifying body
Certifying Body	Afrisco- ecocert, the company that certifies our farm as organic other famers
Consultant	Consultant
Consultant	Consultant /in house researcher
Consultant	Consultants
Cross visits	Visiting organic production in Europe and USA
Experience / Observation / Common Sense	Experience
Experience / Observation / Common Sense	Common sense
Extension Services	Extension service
Fruit Industry does not take organic farming seriously	The fruit industry does not really take organic farming seriously enough to provide advice / information
Hands on Experience and observation	Own hands on experience and observation
Internet / Literature / Books	Internet
Internet / Literature / Books	Overseas literature
Internet / Literature / Books	Books
Internet / Literature / Books	Internet
Natural way of parents from childhood	Natural way of life by parents from childhood
Networks / Farmers	Other participants in the organic scene, customers, suppliers, farmers alike
Networks / Farmers	BDASA-Biodynamic Association of South Africa
Networks / Farmers	Other farmers
Networks / Farmers	The BDOCA and Tim Jackson
Networks / Farmers	OSA
Networks / Farmers	Other farmers

Networks / Farmers	Group of organic farmers
Networks / Farmers	Customers
Networks / Farmers	Australia very advanced in organic industry and knowledge about organic farming and organic practices
Networks / Farmers	Input Supplier
Networks / Farmers	Input Suppliers
Networks / Farmers	We phone Tim Jackson of BDOCA, and find him very helpful and supportive. Other than this there is very little help, what happens when Tim Jackson passes on
Networks / Farmers	Hundreds of phone calls received and made
Own Research / Experimentation	Own research
Own Research / Experimentation	Own experimentation
Training Courses	Training courses

These emerging patterns were compared against the understanding of learning, reflected upon and discussed in successive rounds with the dissertation supervisor. The purpose of this process was to draw out the author's personal implicit knowledge. In effect the author endeavoured to journey personally through the frameworks to better understand the learning process through the research and creation of this dissertation. This enhanced the ability to apply the learning frameworks to better understand the social learning processes of organic farmers in South Africa.

The analysis sought to impregnate the learning frameworks with data and stories from the original survey to show learning processes by organic farmers. The intention of this was to give meaning to the frameworks in real terms using practical examples relevant to organic farmers. Contextualising the learning frameworks using cases that are locally relevant makes it easier to understand the process of knowledge creation.

An understanding of learning histories assisted in facilitating the analysis process. While the methodology did not follow the classic learning history research method, it had a number of the generic elements. Three components of the learning history research method are contained in the analysis. Firstly, insightful interviews in the form of analysing survey data are used. Secondly, distilling the information gathered was achieved by reflecting on the survey in the light of the four learning frameworks. Finally, this reflection was used in documenting the learning history (Roth, Undated).

Implicit in the learning history is the understanding that the research method involves understanding changes over time. The survey essentially provides a snapshot instead of progression over time. In the context of this mini dissertation, progression over time was not captured explicitly. Most of the stories do have an implicit timeline because they are about change. Where interrogation of and reflection on the survey data did provide an idea of time progression, this was captured.

4.6 Concluding Chapters

The final sections consider what has emerged from the analysis. The discussion and conclusion summarise the chapters of the dissertation and then provides the author's reflections on the outcomes of the research in the context of the learning frameworks. These reflections consider the social learning processes of farmers, particularly from the perspective of the environmental and social benefits of organic agriculture. Finally, the research considers methods through which social learning can be enhanced among both organic and conventional farmers and the role various actors, such as educational institutions and government, can play in helping to facilitate this learning process.

4.7 Discussion

The methodological approach to this research is not a classic case of qualitative research. The author sought explore whether it was possible to reasonably describe the learning process of organic farmers in terms of the learning frameworks. The organic sector in South Africa is growing and learning must be taking place for this to occur. Analysing responses to open-ended questions from a survey of organic farmers sought to understand if, and how, social learning was occurring among organic farmers. Using new knowledge created from a review of literature on learning frameworks, the data was interrogated to determine whether patterns emerged which reflected social learning on the part of organic farmers. Chapter 5 discusses the outcomes of the interrogation of the data using the four learning frameworks discussed in Chapter 2.

5 ANALYSIS OF THE SURVEY IN THE CONTEXT OF THE FOUR LEARNING FRAMEWORKS

5.1 Introduction

Padel (2008) points out that organic management is a knowledge-based approach, requiring an understanding of agro-ecological processes. Access to knowledge is the major constraint when converting to organic agriculture. Inexperience and a lack of extension and training for knowledge-intensive management systems, and the need for location-specific knowledge, requires continuing investment in developing learning capabilities for knowledge creation. To create a critical mass and the need to learn in settings where few learning opportunities exist, Padel (2008) notes that many organic communities have adapted by establishing shared learning mechanisms to become innovators and ecological entrepreneurs. In other words, farmers are learning in social settings to develop new knowledge in relation to the farming system they are using.

The four learning frameworks described in Chapter 2**Error! Reference source not found.** are analysed using selected questions from a survey of organic farmers in South Africa and presented in sections below. Firstly, the profound change (Senge *et al.*, 1999) framework is used to analyse the survey (Section 5.2), followed by the deeper learning (Senge *et al.*, 2005) framework in Section 5.3. The conversion of knowledge (Nonaka, 2004) in organic agriculture is analysed in Section 5.4 and Mintzberg's (2004) pedagogy of adult social learning is used to draw the learning frameworks together to better understand social learning processes among organic farmers. The analysis chapter ends with a discussion of the results of the analysis.

5.2 Profound Change

The discussion and diagram of profound change shows us that a series of investments and the development of learning capabilities are necessary to achieve change, culminating in business results as a consequence of the change process (Figure 1). The processes described in profound change and the extent to which

profound change is occurring among organic farmers in South Africa are discussed and analysed below.

5.2.1 Investment in change

For investment in change to occur, there should be some form of motivation. In the case of the organic farmers surveyed, reasons distilled from the survey are summarised in Table 7 (see Appendix 2 for further details):

Table 7: Reasons for adopting organic farming practices

Reason	Number of responses	Percentage
Growing markets, improved marketing of produce and prices premiums	31	35%
Environmental Reasons	22	26%
Healthier food and improved personal / family health	17	20%
Philosophical reasons	9	11%
Knowledge and innovation reasons	4	5%
Social reasons	2	2%
Minimising inputs	1	1%
Total Responses*	**85**	**100%**
No of Respondents	**22**	

**(Note: the tables in the analysis have both a total number of responses and number of respondents. In some cases, respondents provided more than one answer to a question, resulting in a higher number of responses than the number of respondents)*

Growing markets and price premiums are the main motivation for choosing organic farming by respondents to the survey. While these may be simple business-motivated decisions, what this does reflect is that a preference for organic food is growing in the market. This growth is following a social learning path as people engage increasingly in conversations about the merits of organic food. The growth of certification highlighted in Section 3.5.2 is also a feature of this development; consumers are choosing to buy organic food for a reason and want to be assured that the food they are eating is indeed organic. The resistance by some consumers to certification mentioned in Section 3.5.5 may, be self defeating as certification needs to be considered in the light of producers who make fraudulent organic claims. This can negatively affect both consumer trust, if such fraudulence is found to exist, as well as the supply and demand balance that improves marketability of the produce. The price premium that appears necessary to offset higher production costs is also affected.

However, these distilled reasons do not capture the essence of what some of the respondents were actually saying, which recognise a need for change. Some used phrases such as “making a difference”, “a better way to farm”, while others refer to learning and change, such as “organic farming is a learning curve” and “organics has a marketing value, an environmental value and a skills advantage”. From an environmental perspective, phrases such as “balances life”, “a more diverse basket of products; ecologically sound”, “wholesome; sensitivity and awareness of the environment” are used to describe the reasons behind the choice.

The words used here reflect a variety of viewpoints that have evolved as a result of learning. As stated above, the primary reason for choosing organics by most respondents has been for expanding market opportunities; this makes sense as the farming operation must remain financially sustainable. However, it is usually referred to as market opportunity or market advantage; a simple motivation for business reasons. Other motivations, such as environment, health and philosophy, described with more depth and more descriptively, which possibly reflect the outcome of improved personal results from undergoing a process of profound change.

5.2.2 People, networking and diffusion

Organic producers make extensive use of networks for sharing and obtaining information and knowledge. The sources of information on organic agriculture provided by farmers from the survey are distilled in Table 8 (see Appendix 3 for further details):

Table 8: Sources of information and advice for organic farmers

Source of Information	No of Responses	Percentage
Networks (other farmers, certifying body, consultant, extension services, cross visits)	21	66%
Natural Experience / Action Learning (own research, common sense, experimentation, observation)	5	16%
Internet / Literature / books	4	13%
Training	1	3%
Implicit Knowledge	2	3%
No of responses	**33**	**100%**
No of Respondents	**33**	

Sixty six percent of respondents used networks, which included mainly other farmers or groups of farmers, certifying bodies, input suppliers, organic associations and international networks. Others used experience and knowledge gained through experimentation and various literature sources. One respondent commented that the fruit industry does not take organic agriculture seriously and therefore does not provide advice. This indicates (1) that new ideas and learning are not being obtained from existing hierarchies, but that likeminded individuals are communicating and sharing to develop common visions and understanding and (2) that existing structures and hierarchies are showing resistance to change. The use of networks for learning by organic farmers is elaborated in Section 5.4.

5.2.3 Developing learning capabilities and personal results

The development of learning capabilities is an important component of profound change. To understand the development of learning capabilities, the survey asked respondents to provide observations of how the skill levels of employees had changed as a result of the conversion to organic farming. Table 9 summarises respondents' observations of change in the skill levels of farm employees as a result of conversion (see Appendix 4 for further details).

Table 9: Respondents observations of skill development due to organic conversion

Has the skill levels of your employees increased due to conversion to organic farming practices? Please explain.	Number of responses	Percentage
Investment in training	6	19%
Learnt composting and other organic skills	6	19%
Increased observation and awareness	5	16%
Increased communication and sharing has created an understanding of the value of organic farming	5	16%
Increased awareness of hygiene and quality	1	3%
Learning about organic farming	1	3%
No – more training is required	1	3%
Greater understanding of pest and disease biology needed	1	3%
Don't know	1	3%
Have developed skills in computers and public speaking, some represent us abroad	1	3%
No new skills established	1	3%
Greater understanding of the harm of agrochemicals and how we need to save our soils	1	3%
Packing and processing has introduced new skills and new levels of responsibility	1	3%
Increased understanding of green issues and global warming and the role they can play in saving the environment	1	3%
Total Responses	**32**	**100%**
No of Respondents	**32**	

While these noted improvements are separate responses from different respondents, the four main learning related observations of farmers of learning fit well into the two 'inner orbits' of the deeper learning process, as illustrated in Figure 12, albeit in a slightly different format to that of Figure 1.

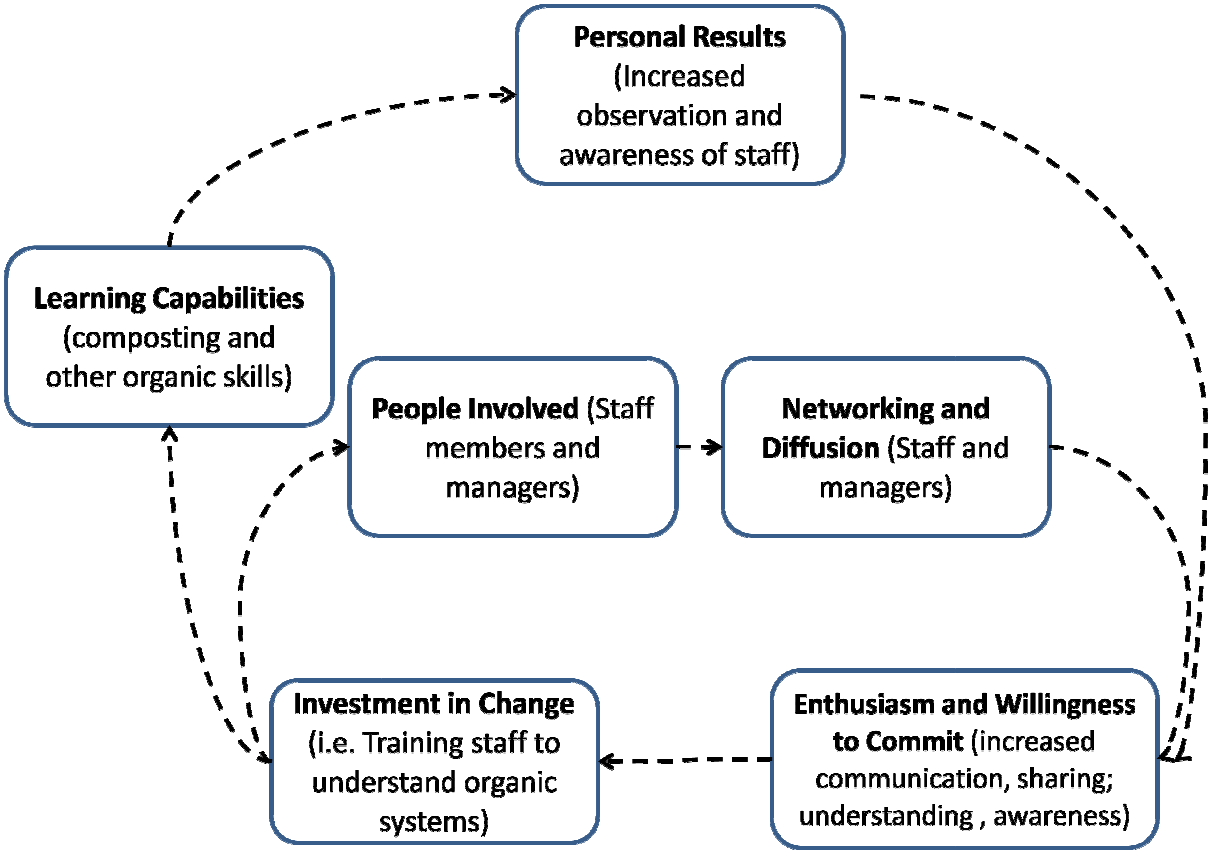

Figure 12: Social learning processes of employees on organic farms (after Senge *et al.*, 1999, p 54)

In other words, respondents are observing different parts of the learning process, but have perhaps not integrated them fully in their understanding of how farm employees have learnt. It is clear that these outcomes did not occur immediately, but happened over time, which is reflected by the arrows in the diagram.

Importantly, in the actual descriptions provided by respondents in the open-ended questions, a number of notable words and phrases were used that reflect components of the learning process and demonstrate that farmers have an implicit understanding of the learning process (See Text Box 1).

Text Box 1: Comments by respondents reflecting deeper understanding and personal results

"A move away from simply following spray programs to understanding nature and farming better and we had to *develop a sensitivity for the complexity of our actions*. Agriculture as opposed to agribusiness"

"*a better understanding of* the needs of the plant and how to combat problems without chemical use"

"gained skills in computers and public speaking as some of them now represent us abroad"

"actions are explained and monitoring is much more extensive, therefore *a close feel and understanding* for organic agriculture"

"We make a point to educating them on every process that occurs on the farm and we also *rely on their past experience* to add value to the work done on the farm"

"They are starting to notice articles/ news items about being 'green' and global warming and *understand the role they can play* in making it better"

"The staff are trained to be vigilant in looking out for pests or diseases. They *participate in deciding* how to deal with the problems"

"We feel it is a right thing to do, and feel good about it"

These statements reflect the development of learning capabilities and indicate that farmers have a tacit knowledge of learning processes. They show that farmers are promoting improved learning by facilitating the development of sensitivity *for the complexity of their actions* to facilitate a *better feel and understanding,* while recognising employees' *past experience* (tacit knowledge) and *participate in deciding* on actions based on their knowledge and understanding of the farming system. These statements indicate (1) that respondents recognise the need for developing new capabilities in their employees and (2) that the development of learning

capabilities and creating new knowledge are critical for the advancement of organic farming in South Africa.

5.2.4 Delays, business results and credibility

When converting to organic agriculture, the dynamics of the production system change. The soil takes time to recover as organic matter is built up and soil biota populations increase, and new nutrient exchange cycles are established. Often there are infestations of pests and weed problems that have been suppressed by the use of herbicides and pesticides. Consequently, there is usually a decline in production, after which production stabilises at a higher level. From a business perspective, this change can have serious implications for farmers' cash flow and profitability. Table 10 captures farmers' responses to the impact of conversion on cash flow and crop losses (see Appendix 5 for further details).

Table 10: Respondents' responses to impact of crop losses on cashflow after conversion

How crop losses impacted on cash flow for organic production	Number of responses	Percentage
Negative cash flow	10	40%
Reduced yields	4	16%
Little/no impact	2	8%
Reduced shelf life	2	8%
Increased labour costs	2	8%
Production decreased	1	4%
Positive impact cash flow	1	4%
Not applicable	1	4%
Negative perceptions of organic quality	1	4%
Reduced production costs	1	4%
Total Responses	**25**	**100%**
No of Respondents	**25**	

In converting to organic agriculture, a large proportion of respondents (40%) experienced negative cash flows and decreases in production or reduced yields (20%). A further 8% experienced reduced shelf life of product and an additional 8% experienced increased labour costs. In total, 78% had initial negative financial outcomes as a consequence of change. Eight percent of respondents had positive outcomes as a result of change, manifested as reduced production costs and

improved cashflow. This highlights the time considerations and delays in achieving business results.

Table 11 shows the amount of time taken for cashflow to become positive after conversion (see Appendix 6 for further details).

Table 11: Time taken for cashflow to become positive

How long did it take for cash flow to become positive?	Number of responses	Percentage
3 years	6	40%
Can't say	3	20%
Did not become negative	2	13%
1-2 years	1	7%
4 years	1	7%
5 years	1	7%
7 years	1	7%
Total Responses	**15**	**100%**
Total Respondents	**15**	

Many farmers converting to organic agriculture experienced negative cash flows. Cashflow was negative for three years for the largest proportion of farmers who converted to organic agriculture (40%). The longest time for cashflow to become positive was seven years, while 13% indicated that cashflow did not become negative. These dynamics reveal that change is not instantaneous and that change occurs gradually over time. These are the reasons that investment in the change initiative and commitment to the change process is necessary to achieve profound change.

Farmers employed different strategies to deal with this. Some subsidised their income from other activities, while others loaned money. As one farmer states "cashflow reduced to 50%; went into debt, ate bread for two years and prayed a lot". Two farmers mention premiums and passing the cost on to the customer. Two farmers noted that while production declined, so did cost of production and as the system stabilised, production increased but the lowered cost of production remained stable. Another farmer noted that they conducted their own research to develop better production techniques, while another stated that production costs were one third of conventional production after conversion.

On the other hand, a respondent pointed out that they still struggle to make ends meet, but are dedicated to the principles of organic agriculture and felt that the government should show more support for organic agriculture. When considering the bigger picture of environmental and social benefits, it can be argued that there should be more state support for organic agriculture. Importantly, this support should not be considered as a subsidy, but recognition of the value of the contribution in providing environmental services and social benefits on behalf of the public. To achieve this requires the development of policy in support as well as mechanisms to implement the policy, and to attach a value to the services that are being provided. There is currently no policy for organic agriculture in South Africa (Klokow, pers comm., 10 June 2007).

Enduring these hardships is evidence of the commitment of respondents to the change process. What this also shows is that conversion is not a trivial undertaking and that the journey of change should not be taken lightly. On a positive note, in business terms, what this means is that conversion is a significant barrier to entry and helps to protect the market and maintain price premiums. If a farmer can successfully emerge from the profound change process, one of the business results is new markets and premiums.

Another positive business result that has positive implications for production and for South Africa in general, it being as a water scarce country, is the effect of conversion on water use efficiency, summarised in Table 12. Text box 2 provides selected comments by respondents related to water use efficiency (see Appendix 7 for further details).

Table 12: Effect of organic production on water use efficiency

Has organic production affected your water use efficiency?	**Number of responses**	**Percentage**
Has reduced our water usage / increased efficiency	12	67%
Can't Say	6	33%
Total Responses	**18**	**100%**
No of Respondents	**18**	

Sixty seven percent indicated that water efficiency had improved, while thirty three percent of farmers couldn't say. No respondents provided a negative answer to this question. Given the water scarcity experienced in South Africa, this outcome has relevance, not only for farmers, but for society as a whole.

Text Box 2: Selected comments on improvements in water use efficiency

> "water use was reduced by 25-30%; soil erosion never happens [*sic*]"
>
> "used to use 10cm of water a week; as the soil organic content improved I cut this down to 7 cm a week in summer and 5cm a week in winter"
>
> "in year one we had to water our vineyards weekly, now we only water every third to fourth week"
>
> "the increased humus in the soil has retained the water for much longer. This happened to such an extent that I'm now selling off water rights to my neighbour"

From a farmer's perspective, reduced costs of water and irrigation reduce the cost of production, and can provide an additional income stream through the leasing of water rights as one of the respondents above stated. Trading water as a commodity is likely to increase in the future as water becomes more scarce. In addition, more land can be brought into production, or irrigated, with the same amount of water. As one respondent stated, "I am now planting four hectares of winter pastures where previously it was two". Finally, soil improvements result in higher tolerance of drought conditions, as noted by El-Hage Scialabba (2007) in Section 3.6.4.

From the perspective of society, water is a national public resource of great economic and environmental value. Reduced water consumption frees water for other uses. In addition, there is reduced water pollution as a result of organic farming, as shown in the literature review.

Another business result was that farmers found that they could market their product better. These results are summarised in Table 13 (see Appendix 8 for further detail).

Table 13: Organic production assisting with marketing of produce

Has being organic assisted you in marketing your product?	Number of responses	Percentage
Yes	19	70%
No	3	11%
Not Clear	5	19%
Total Responses	**27**	**100%**
No of Respondents	**27**	

While a significant 70% or respondents indicated that being organic had assisted in marketing their produced, this was not necessarily linked directly to a price premium for their produce. Some pointed out that being organic made it easier to sell produce, which reduced marketing costs. Two farmers stated that organic production differentiated their product from other farmers selling the same product that was conventionally produced. Another noted that margins were not high, but that it "opened doors as few farmers can offer an organic version of what we are growing". This means that organic produce provides a competitive edge over conventionally produced goods. The demand for organic produce means not only that a good price is received but also, importantly, that all produce is sold at a good price. Another stated that being organic helped to get a lot of product on the shelf. Some farmers indicated that being organic assisted greatly with marketing, but did point out that that investment in developing new markets was necessary. These statements highlight the market advantages of organic produce; producers are enjoying product differentiation, and demand for products that are in short supply. This shows that there are both push (from farmers changing) and pull (from the consumer) forces that are influencing the change process.

In summary, when farmers invested in change, there were initially negative consequences as a result of the change manifested primarily as crop losses and negative cashflow. However, they continued to invest in change, made use of networks for information and developed learning capabilities in both themselves and their staff. The time taken for results to turn positive reflects willingness to commit; many endured serious hardships which demonstrate strong belief. In time, business results did occur, cashflow improved, water use efficiency improved, allowing one

farmer to double winter crop production. Personal results were not explicitly identified, however the farmers' choice of words, highlighted in 5.2.1, indicate a sense of achievement and pride, which are indeed personal results. Finally, while farmers invested in change, what this also indicates is that they are responding to changes in buyers' preferences and it can be concluded that buyers' preferences are also changing with regard to organic food.

5.3 Deeper Learning

Deeper learning is different from reactive learning in that it challenges conventional views through the process of *thinking and doing* in deeper cycles to develop increasing awareness of the whole. This deeper understanding, in turn, modifies actions to become more beneficial to the whole. The necessity for deeper learning in agriculture is stressed by Williams and Mackenzie (2008a) when they state that "today, farmers are seen simply as the providers of food and fibre, while tomorrow they will be seen as the custodians and managers of the life support systems for society as a whole" (p3).

Organic farmers in South Africa also see their role as much more than simply the production of food, as indicated by a respondent who says:

> "I believe in the organic philosophy. I am convinced that conventional farming is not sustainable, and is harmful to the natural environment. Organic production is sustainable, has made the marketing of my produce a lot easier, and the produce is of good quality. It also deals with issues of ethics."

This reflects a deeper learning process. Thinking deeply about agriculture and its role in society has resulted in an increasing awareness of the whole; converting to organic has had business results in the marketing of produce, while increasing awareness of sustainable production and producing food of good quality are actions that serve society (the whole). Finally, the ethics of production are also being considered – another action which serves the whole.

Deeper learning is not a mode of enquiry which all people will engage in. Selected questions in the survey were assessed to draw out responses that reflected deeper

learning. Statements which showed that enquiry or increasing consciousness of broader issues (the whole) was occurring were considered to be reflections of deeper learning. Comments, such as responding to market demand and accessing niche markets and labour problems, were considered not to reflect deeper learning. While these interpretations are, to a certain extent, subjective, the overall results are considered to be a good reflection of trends in farmers' thinking in terms of deeper learning.

5.3.1 Comments on skills levels of employees reflecting deeper learning

When asked about observations of change in skill levels after converting to organic agriculture, nineteen of the 32 (or 59%) respondents to this question had answers that contained elements demonstrating deeper learning, summarised in Table 14 and discussed below.

Table 14: Answers to the question of skills levels of employees reflecting deeper learning

Has the skill levels of your employees increased due to conversion to organic farming practices? Explain	Number of responses	Percentage
Answers Reflect Deeper Learning	19	59%
Answers Do Not Reflect Deeper Learning	12	38%
Indeterminate / Irrelevant	1	3%
Total Responses	**32**	**100%**
No of Respondents	**32**	

Respondents to this question whose answers reflected deeper learning showed an understanding that staff were an integral part of the production process and recognised the need not only to invest in skills and training, but also to make staff members understand the underlying reasons behind choosing organic agriculture. One respondent pointed out that staff had to "understand nature and farming better and… develop a sensitivity for the complexity of our actions", while another stated, similarly, that staff "work with us and they understand what we do and more importantly why we do what we do". These considerations help to facilitate a deeper understanding of the whole and promote actions that increasingly serve the whole. As another respondent stated, staff are "starting to notice articles/ news items about being 'green' and global warming and understand the role they can play in making it

better". This clearly shows an increasing understanding of the whole resulting in actions that increasingly serve the whole.

5.3.2 Comments on challenges experienced by organic farmers reflecting deeper learning.

In this particular question, a lower proportion of responses (43%) reflected deeper learning (Table 15). This is understandable, as many farmers would be considering the challenges experienced in their day to day farming operations, such as controlling pests and disease, marketing of produce and other general management issues. It is therefore expected that farmers would be inwardly focussed when considering this question.

Table 15: Answers to the question of greatest challenges experienced by organic farmers

List the three greatest challenges you experience	Number of responses	Percentage
Answers Reflect Deeper Learning	40	43%
Answers do not Reflect Deeper Learning	54	57%
Total Responses	**94**	**100%**
No of Respondents	**31**	

However, some respondents were thinking 'outside the box', recognising issues such as people's negative mindsets towards organic, scepticism of agricultural institutions, universities and government departments and getting people to understand the fundamental principles behind organic agriculture as major constraints to the development of the sector as a whole. These statements reflect that there is resistance to new ideas. This highlights the need for the 'letting go' and letting come components of Senge *et al*'s (2004) U movement.

There were also issues of social awareness and responsibility, as one respondent stated: "The majority of our staff are very dedicated and skilled but we do support some members out of loyalty to previous workers even though their productivity cannot justify the way we pay. This is a legacy of alcohol abuse of the parents". This demonstrates a strong ethical viewpoint of social responsibility.

Importantly, one respondent raised concern about the availability of information and courses on organic farming and that organic farmers are "all reinventing the wheel

and doing our own thing, and *not sharing our discoveries and successes or failures*. I give talks and courses and workshops and write articles for various organisations when I am asked to but it is a drop in the ocean compared to what is needed". This is typical of fragmentation of business organisations where departments are not communicating. This inhibits learning and ultimately has a cost implication. This recognition is important and links back to the discussion on networking in Section 5.2.2. To take Senge's (1999) metaphor of the journey of discovery further, there are a group of explorers who are looking for the same destination, but none are sharing their maps. A system of capturing the learning, such as using learning histories is of great value in showing organic farmers what has been learnt and what still needs to be learnt. The map fragments need to be integrated to 'show the way'.

5.3.3 Comments on support required to overcome challenges that reflect deeper learning.

In contrast to the challenges above in terms of overcoming challenges faced by organic farmers, the responses on support required were more outwardly focussed, with 63% providing responses which were considered to reflect deeper learning (Table 16).

Table 16: Answers to the question of support required to address challenges

What support do you need to address these challenges	Number of responses	Percentage
Answers Reflect Deeper Learning	36	63%
Answers do not Reflect Deeper Learning	21	37%
Total Responses	**57**	**100%**
No of Respondents	**31**	

It is apparent from some of the responses, that farmers thought that the question related specifically to support from government. The question intended to understand what can be done to address these challenges in a general sense. On reflection, the question should have been asked differently. A better wording may have been "what do you think is the best way to address these challenges". Nevertheless, those farmers that interpreted this question as government support specifically provided revealing answers.

On the one hand, two respondents felt that government support was not necessary. They showed characteristics of self reliance and independence that is typical of many farmers. The statements also reflected an understanding of learning. One stated that support was not necessary and that farmers do many things to improve their soil. The other statement indicated that all that is required to address these challenges is *knowledge and a willingness to learn*. This indicates that this farmer understands that addressing challenges is about learning new things.

On the other hand, some respondents highlighted the environmental goods and services provided by organic agriculture, although not in those specific words, and suggested that incentives from government, in recognising this, were necessary. For example, one respondent stated that incentives from government were necessary, as organic farming actually improves the soil and does not destroy it like conventional farming. Another noted that conventional inputs should be taxed, as it was unfair that consumers should pay a higher price for agricultural products that were produced more sustainably, while less sustainably produced conventional products are cheaper. These farmers are pointing out that their actions are increasingly 'serving the whole' and conventionally produced goods are not. They are proposing that this should be recognised by government.

Other respondents took a broader view, which reflects an understanding of learning processes. These farmers recognised the need for information dissemination and knowledge sharing, such as "Forums that support farmers in terms of knowledge and consultation" and "A central database and support group". These statements highlight the recognition that social learning through sharing is important for addressing challenges and creating new knowledge. The following statement by one farmer captures the essence of what many respondents were saying in terms of the holistic benefits of organic farming:

> "Organic farming makes a lot of sense for sustainable soil practices, nutritious healthy food, efficient water use, less chemical pollution, lower health costs, and one of the major factors is that one relies less on external inputs and other imported materials that enrich the first world that is just trying create a market [for their products]".

Here it can be seen that the farmer is considering on-farm practices (e.g. soil, water) and broader benefits (e.g. nutrition, health) as actions that serve the whole.

5.3.4 Comments on strengths and advantages of organic agriculture

Sixty three percent of respondents to this question provided responses that reflected deeper learning (Table 17). There was a strong leaning to the environmental and social benefits of organic agriculture highlighted.

Table 17: Answers to the question of main strengths and advantages

What are the main strengths / advantages of organic agriculture?	Number of responses	Percentage
Answers Reflect Deeper Learning	36	63%
Answers do not Reflect Deeper Learning	21	37%
Total Responses	**57**	**100%**
No of Respondents	**31**	

From a social perspective, a better working environment, reduced health risks and higher labour requirements and hence employment, were highlighted as strengths. As one respondent stated, “I'm combating weeds manually and putting money into unemployed people's pockets rather than purchasing poison from multinational companies”, which demonstrates understanding the bigger picture and also touches on the question of efficiency and how costs are externalised. A number of respondents raised concern regarding the productivity of farm workers and considered the higher labour requirements to be a disadvantage of organic agriculture. This is discussed further in 5.3.5.

From an environmental perspective, respondents used words such as “water saving” and “no burning of fossil fuels, except for deliveries”, which reflect practical environmental benefits as well as statements revealing deeper understanding, such as “ecologically sound”, “sensitivity and awareness of the environment”.

Other comments revealing deeper thinking at a more personal level include “self reliance”, “innovative thinking”, “we feel it is the right thing to do and feel good about it” and “re-educating people on all levels about what is really important and reconnecting with nature”.

Senge *et al.* (2008) refer to thoughtful people and the role they can play in creating innovation and change, particularly in the context of the sustainability (environmental and social) crises faced today. They point out that there are the following four common patterns in such people's thinking:

1. Thoughtful people see arising problems earlier than the rest of us
2. They begin to understand how severe the problems are
3. Deep concern and sense of the possibility for a better future causes them to think differently about problems and how they are interconnected
4. Different ways of thinking lead to different ways of acting; long term strategies take into account larger systems instead of fixing isolated problems.

Building on this recognition, Senge *et al.* (2008) distil three key elements of the learning capabilities of such people. Firstly, they can as individuals, and collectively, *see larger systems* of which they are part. Secondly, they recognise that it is critical to *collaborate across boundaries.* Thirdly, they focus on what is genuinely important to them; this allows thinking to evolve from a reactive thinking mode to *creating futures they truly desire.* In other words, seeing the problem, sharing the problem with others, and creating a vision 'beyond' the problem is how such thoughtful people (or innovators operate). The statements by respondents in the paragraphs above reflect this kind of thinking.

Another revealing statement was the observation that despite the lack of formal (state) support and infrastructure, the movement keeps on growing. The lack of state support for organic agriculture in South Africa is one that is often highlighted; stakeholders who were contacted telephonically point out that organic farmers perceive this to be a result of the massive resources that the GMO proponents use to lobby and promote the use of GMOs with national government (Klokow, pers comm., 10 June, 2007; Jackson, pers comm., 15 October 2007). There is great public debate about the merits of GMOs (Tait, 2001; Gaskell *et al.*, 1999; Hails and Kinderler, 2003; Aerni and Bernauer, 2006), and whether or not this is the case, is

not the focus of this dissertation, however, it is likely that significant financial resources support the lobbying of GMOs

South Africa has GMO (Act 15 of 1997) (South Africa, 1997) legislation, enacted more than ten years ago in 1997. The organic sector has been lobbying for the establishment of a South African organic standard since the since the late 1990s (Jackson, pers comm. 15 October 2007; Callear, pers comm. 7 October 2008; Klokow, pers comm.10 June 2007). The South African organic standard is in its final draft, having gone through three rounds of public consultation, the last round being in February 2008, after which the draft should be approved by the Minister of Agriculture and submitted to the World Trade Organisation (WTO) for vetting. As at October 2008, the draft had not been approved by the Minister (Erasmus, pers comm.15 October 2008). While the GMO legislation may be precautionary in focus, it does confer state recognition of GMOs. This is a recognition that the organic sector has yet to enjoy.

However, in spite of formal state recognition or support, the organic sector is growing of its own volition. Two organic certifiers, Ecocert (Callear, pers comm.7 October 2008) and BDOCA (Jackson, pers comm.7 October 2008) confirm this assertion by indicating that during 2008 the number of new farms certified as organic and under conversion has risen dramatically. Many of organic farmers who responded to the survey are also recording growths in sales and demand (see Appendix 9 for further detail). Personal observations at retail chain stores stocking organic fresh produce in June 2007 revealed some shelves for organic produce empty; at two stores, spinach of Kenyan origin was observed. Spinach is not a difficult crop to grow locally. These observations hint that demand is greater than supply.

Such growth and demand trends reflect deeper learning. Consumers are purchasing more organic food, making choices for healthier and tastier food that is more sustainably produced, which reflects social learning among consumers. As one respondent stated, “10-20 years ago we were seen as being a bit odd, but now our produce is sought after. People are much more aware and are very keen on our fresh and organic produce”. These observations highlight not only evolving

consumer perceptions, but also the delays in achieving results mentioned in the profound change framework.

Paradoxically, the evolution of consumer choices is one of the great strengths of such change. Senge *et al.* (2008) point out that the huge growth in the expansion of the industrial revolution was not from a particular government department or a single business that led the way. It was created by numerous individual enterprising and ingenious acts that, together, resulted in a critical mass of unstoppable changes. The industrial revolution, as with any great change was not planned, but innovated. It follows that other profound change processes will follow the same course. Senge *et al.* (2008) further note that people are increasingly making decisions based on how organisations are responding to the environmental and social challenges faced today. Ethical consumerism is growing and consumers are making their preferences known with their purchases. It is for the same reasons that the organic sector is growing of its own volition.

5.3.5 Comments on weaknesses and challenges of organic agriculture

Weaknesses and challenges associated with organic agriculture tended to be more inwardly focussed, with only 34% of answers reflecting deeper learning (Table 18).

Table 18: Answers to the question of main weaknesses and challenges

What are the main weaknesses / challenges of organic agriculture?	Number of responses	Percentage
Answers Reflect Deeper Learning	22	34%
Answers do not Reflect Deeper Learning	42	66%
Total Responses	**64**	**100%**
No of Respondents	**31**	

Some challenges highlighted were general challenges experienced by many farmers, such as weather and distance to market. Others were specific to organics, such as rigorous record keeping requirements and cost of certification.

Ignorance was a word used by two respondents to describe weaknesses of organic agriculture; ignorance of the dangers of pesticides on the part of the public and ignorance of both organic and conventional farmers about what organics is really all about. Another statement reflects similar sentiments: “Many organic farmers fail to

see the bigger picture and substitute the chemical addiction [for fertilisers and pesticides] with organic certified alternative [i.e. organic fertilisers and pesticides] without taking cognisance of a balanced system and environment". This highlights the failure of certification processes to capture the essence of organic agriculture. Farmers can go the route of simple input substitution and still be certified organic, while not necessarily engaging in the philosophy, learning and change processes which other organic farmers have gone through. Such input substitution can affect enterprise viability as costs per hectare for organic inputs are higher than for conventional inputs. While this can be seen as more of a reactive learning process, it does point out that farmers are responding to changes in buyer behaviour, resulting in growing demand for organic produce. Consumers are making use of deeper learning to modify their buying behaviour (Vermeulen and Bienabe, 2007; Du Toit and Crafford, 2003)

Another respondent highlighted the influence of GMOs: "by the time South Africa opens its eyes we will swamped with chemicals and GM products that are rejected everywhere else in the world. No one in their right mind will want to purchase organic produce from such a country". This highlights the thinking on the unforeseen impact of GMOs on accessing international markets for organic produce.

Others refer to the lack of training and support available for organic farmers: "no training or referral or educational documentation for new entrants so it is a terrifying prospect for many to make the leap of faith". This highlights the fear and anxiety that Senge *et al.* (1999) refer to that reinforces cycles of reactive learning. Farming is an economically marginal activity and farmers tend to be risk averse; this statement recognises these risks as a major challenge for organic agriculture. Another respondent reflects a similar sentiment by highlighting the lack of central information, databases, support organisations and standards which make it difficult to find solutions and assistance.

Interestingly, labour problems and labour productivity were highlighted by some farmers as a disadvantage, in contrast to statements in Section 5.3.4 which highlighted the higher labour requirements as an advantage. In South Africa, the number of paid employees in formal agriculture decreased by 13.9% (from 1,000,000

to 940,000; some 60,000 jobs) between 1993 and 2002 (Statistics South Africa, 2002). It is necessary to also consider the social implications of such job losses and the cost that may be attached to this.

Certainly for the conventional farmer, on the farm balance sheet, it makes sense to replace the labour cost with relatively cheap herbicides to control weeds. However, it does raise the question of how efficiency is being measured and what costs are being externalised. Currently, environmental costs are externalised at zero. The recognition that realistic costing should be applied to the production of food reflects deeper learning.

Senge *et al.*, (2008) point to the necessity of bringing the whole system into the room to understand what is being measured. An example of using measurements based on this understanding from the country of Bhutan is used by Senge *et al.* (2008) to illustrate the point. In Bhutan, instead of Gross National Product (GNP), the Gross National Happiness (GNH) index is used to measure national progress. This index includes social and environmental factors such as forest cover, child nutrition and health of the elderly. These measurements reflect a deeper understanding of the whole system. Using this system, Bhutan has consistently been rated by the World Bank at the top of its performance index (which takes into consideration social and economic indicators) for countries receiving development assistance. This is how deeper thinking can broaden systems of measurements that result in policies that increasingly serve the whole. It is this kind of thinking that needs to be applied not only to organic agriculture, but to the value of the environment, and a vibrant, cohesive society and this the world as a whole.

5.3.6 Comments on what should be done to grow the organic sector

Most respondents to this question (75%) were thinking outwardly in terms of the larger systems processes, reflecting deeper learning (Table 19).

Table 19: Answers to the question of what should be done to grow the sector

What should be done to grow the organic sector in South Africa?	Number of responses	Percentage
Answers Reflect Deeper Learning	43	75%
Answers do not Reflect Deeper Learning	14	25%
Total Responses	**57**	**100%**
No of Respondents	**31**	

A large proportion of responses focussed on raising awareness, education and public support for the sector. These statements suggest that the environmental and social goods and services provided by organic agriculture should be recognised in the form of subsidies, such as preferential interest rates for loans to organic farmers. A similar statement from a survey respondent highlights the benefit of subsidies in lowering the cost of organic foods to make them more readily available to the consumer and to encourage more organic farmers. This statement can be interpreted to indicate the recognition that subsidies may help to facilitate deeper learning of farmers by reducing the fear and anxiety associated with 'profound change', while at the same time ensuring that "good" food is accessible to the consumer (Senge *et al.*, 1999). The implication is that this can grow the market, establishing a critical mass of production and consumption to advance the sector. While the use of the word 'subsidies' is often interpreted as a 'handout', what these farmers are saying is that if you bring the bigger system into consideration, organic farmers are internalising social and environmental costs. To a certain extent they are compensated for this by price premiums, but the premiums are more a function of supply and demand dynamics, than recognition of the social and environmental services they provide through their farming system. Deeper understanding of these considerations by state agencies, consumers and other actors bring about innovative ways to recognise and compensate farmers for the benefits they are providing.

Another approach for raising awareness suggests a high profile and vigilant food safety monitoring scheme that focuses on chemical residues in the food chain, consequently raising awareness of food safety issues on the part of the consumer.

The nature of organic farmers is, however, generally to rather attract consumers towards organic foods rather than scare them away from conventional foods.

One respondent highlighted the need to support and educate 'by-default' rural organic farmers by introducing new research and modern techniques of organic farming to supplement existing indigenous knowledge. This respondent also highlighted the need to dispel myths (e.g. lower yields and consequent negative impact on food security) and raise awareness of the benefits organic farming. Supporting rural farmers can slow down urbanisation and the associated social problems that arise from this. If people are better able to sustain themselves in rural settings and local flows of income and consumption are generated, more sustainable rural societies will emerge. Williams and McKenzie (2008a) point out that in the future farmers will be seen as guardians and administrators of the life support systems for society as a whole. The recognition of this role of farmers in the future will result in a new kind of farmer evolving and raise the profile of the farmer in the eyes of society.

Two other statements below demonstrate clearly an understanding of the whole and actions that benefit the whole:

> "Organic production is more sustainable, environmentally friendly and healthy for all involved. This does not however suit the big commercial farmers, agri-chemical industries and the likes, but in a country such as ours more people can become involved in primary production on a smaller scale creating more jobs, employment, nurturing the nation and creating true wealth" (Survey respondent).

The use of the term "true wealth" demonstrates that the respondent is aware of the shortcomings of current measurements of success, based primarily on the creation of wealth (financial capital), while true wealth has strong environmental and social considerations (environmental and social capital). This is reflected in the following statement:

> "Organic farming courses must be ready available and affordable. Our health crisis and the challenges of global warming / climate change are

demanding a major shift in our farming practices and how and what we eat. Yet the organic industry is very difficult to enter due to lack of information, and it is too regulated and expensive for the average small farmer. It is this average small farmer who should be encouraged so that we expand the organic industry quickly and again grow our own healthy food, feed ourselves and so have food security and stop the degradation of our planet" (Survey respondent).

The first part of this statement recognises the need for profound change. The respondent then goes on to identify problems that are preventing the wider adoption of organic agriculture (a deeper understanding of the whole). Based on this understanding, the respondent suggests actions based on the deeper understanding that will result in actions that benefit the whole. This is the process of deeper thinking and learning about the larger systems at work (Senge *et al.*, 1999).

5.3.7 Additional comments by respondents

The final question in the survey provided respondents with an opportunity to add additional comments. Again, a large proportion of responses reflected deeper learning (Table 20). This may be because response to this question is voluntary; the act of answering a voluntary question could be seen as deeper learning in its own right. This required the respondent to ask themselves a deeper question; is there anything I have left out? This then leads to deeper learning.

Table 20: Additional comments by respondents

Any additional comments	Number of responses	Percentage
Answers Reflect Deeper Learning	16	73%
Answers do not Reflect Deeper Learning	6	27%
Total Responses	**22**	**100%**
No of Respondents	**22**	

Again, the focus of comments was on raising awareness of the importance of sustainable agriculture and sharing of information. One respondent suggests that there should be local and regional representatives for the sector comprising of informed and educated individuals to actively grow and support organics in each

area of the country. Another respondent noted that the lack of knowledge by South African agricultural graduates is “simply appalling” and that organic agriculture should be added as a major at all universities. This raises the question of the role of tertiary institutions in leading change and facilitating deeper learning in the context of how food is produced.

Others point out the social issues related to the cost of organic food. As one respondent notes: “organic produce is not the exclusive right of the wealthy - it should be affordable for all” and another asks why organic producers should expect their customers to pay a premium when it is conventional agriculture that “exploits and pollutes people and the environment”. Certainly, the higher cost of organic food is a result of internalising costs, but it is necessary for consumers to understand the true cost of producing the food that they eat. For a commodity that is fundamental to our daily survival, it may be argued that many people in middle and higher income brackets devote a small proportion of their income to food purchases. Certainly, for the urban poor who cannot produce their own food, the higher cost of food can have serious implications for their well-being. However, for their rural counterparts, the higher cost of food can have enormous benefits by creating the recognition of the value of food production, and *how* food is produced. Higher food prices can stimulate rural economies, help to reduce urban migration, and sustain and develop resilient rural societies, as highlighted in Section 5.3.6. Increasing the value attached to food also raises awareness of the environmental and social implications of food that is not sustainably produced, further facilitating ‘deeper learning’ on the part of consumers (Senge *et al.*, 1999; Williams and McKenzie, 2008a).

5.4 The Conversion of Knowledge in Organic Agriculture

The conversion of knowledge occurs primarily through interacting and engaging with other people. Learning and knowledge creation takes place in the social dimension, through socialisation, externalisation, combination and internalisation. Nonaka (2004) points out that knowledge creation is dependent on the degree to which social interaction between individuals that share and develop knowledge occurs (the ontological dimension).

To reveal how knowledge is currently being shared and developed in the South African organic sector, an analysis of the survey question “Where do you obtain / seek advice for problems related to organic farming?” was undertaken. This question aimed to understand what resources are available to organic farmers to solve problems and create new knowledge.

The answers by respondents varied, but could easily be categorised into three different sources of learning and knowledge creation, as follows:

1. *Internet / Books / Training* – respondents indicated that they sourced their information from sources of literature and bodies of knowledge that were available in text form. While internet could refer to the use of chat rooms, information sharing portals, or social networking websites these were not mentioned specifically, so it is assumed that the internet was used for sourcing research related documents. By applying the information from these sources of information to a specific situation and reflecting on the problem, explicit knowledge is used to help crystallise tacit knowledge, resulting in explicit actions. This form of knowledge creation can be categorised according to Nonaka’s (2004) modes of knowledge creation as *externalisation*, where tacit knowledge is transformed into explicit knowledge. For example, existing explicit knowledge on dealing with a specific pest is learnt and results in a modification of behaviour, such as changing crop rotation practices and becomes integrated into the organic production system as explicit action. This form of knowledge creation can be seen as passive connecting along the ontological (social) line

2. *Networks* – This is a more active form of knowledge creation along the ontological line. Here, respondents indicated that they sourced their information from a range of sources through networks, such as other farmers, input suppliers, certifiers, visits to other farms and consultants. This knowledge creation occurs in the *externalisation* dimension, where tacit knowledge is more exposed to ideas and external stimuli and explicit explanations that help to crystallise tacit knowledge in becoming explicit knowledge. Importantly, too, this indicates the recognition of a need to connect and share both good and bad experiences and, in so doing, learn.

3. *Experience and own research* – this was a response from a few organic farmers that reflects the development of implicit / tacit knowledge, or knowledge gained through experience. As one farmer states, he has learnt it as "a 'natural' way of life, instilled by parents since childhood".

Table 21 shows the proportion of individual sources of information that organic farmers use go get information and advice.

Table 21: Sources of information and advice by respondents

Where do you obtain / seek advice for problems related to organic farming?	Number of responses	Percentage
Internet / Books / Training (internalisation)	15	31%
Networks (externalisation)	25	51%
Natural Experience / Own Research (socialisation)	9	18%
Total Responses	**49**	**100%**
No of Respondents	**28**	

Over 50% of respondents made use of some form of network, which indicates that, to a large extent, social interaction is used to learn and develop knowledge; however this does not show the full picture. Some respondents included more than one information source for learning. When the combinations of different sources are analysed, a different picture emerges, where networks are the main source of knowledge creation by organic farmers in the survey. These are presented in Table 22.

Table 22: Sources of information and combinations

Sources of Information	Number
Natural Experience Only	0
Internet Only	1
Internet and Natural Experience	2
Networks Only	10
Networks and Internet	7
Networks and Natural	2
Networks, Internet and Natural	5
No of Responses	**27**
Responses including networks	**24**
Percentage including networks	**89%**

Only three of the twenty seven respondents did not mention the use of networks in getting information and advice for solving problems related to their farming enterprise. This clearly indicates that respondents are primarily making use of networks to obtain knowledge and information and that social learning is a fundamental activity in the creation of knowledge by organic farmers.

If the responses of farmers surveyed are considered in the context of the conversion of knowledge spiral, it is evident that knowledge is being created mainly in the externalisation and internalisation, and to a lesser extent, in the socialisation quadrants or dimensions (Figure 5). Individuals and groups are sharing knowledge to overcome challenges that they face, and in so doing, create new knowledge.

To get a better understanding of what kind of networking resources farmers are using, the data was reviewed to understand what types of networks the farmers were using. Table 23 provides a breakdown of the networking resources that farmers use to get information and advice.

Table 23: Networks used by respondents to get information and advice

Network type	Number
Other farmers	12
Consultants	9
Input Suppliers	2
Certifier - Biodynamic and Organic Certification Authority (BDOCA)	2
Certifier - BDOCA / Tim Jackson	2
Certifier - Ecocert / Afrisco	2
Certifier - Certifying body (unspecified)	1
(Subtotal Certifiers)	(7)
Biodynamic Agricultural Association of South Africa (BDAASA)	1
Extension Services	1
Organics South Africa (OSA)	1
Researchers	1
Visiting organic production in Europe and USA	1
Total Responses	**35**
No of respondents	**28**

Table 23 shows that other farmers are the main source of networking information. This is to be expected as the literature tells us that informal networks are the main

process for knowledge creation (Nonaka, 2004; Senge et al, 1999; Senge *et al.*, 2005). There is a genuineness associated with this knowledge creation as it is from experiences of likeminded people who are sharing experiences about struggling with similar problems. Interestingly, nine respondents mentioned consultants, although they did not specify what kind of consultants these were, and may refer to input suppliers who visit farms as sales representatives and provide advice on various aspects of organic management. Nevertheless, consultants are using their tacit experience gained from working in the sector, crystallising this knowledge into explicit knowledge and sharing this to generate more knowledge (Nonaka, 2004). Seven responses referred to the use of certifiers for advice, although it is not clear whether this advice relates to issues of certification or general organic management problems. Again, tacit knowledge is being crystallised for farmers in the process of externalisation.

In order to accelerate the process of learning, it is necessary to externalise and amplify learning and change through developing the existing networks that exist for knowledge creation that are shown in Table 23. There does exist a rich and varied source of knowledge available through informal networks.

It appears that currently, individuals are engaging with other individuals and organisations in the externalisation and internalisation modes, or thinking and doing processes. To sustain knowledge creation, it is necessary to develop the four processes of socialisation, combination, externalisation and internalisation through facilitating and coordinating ongoing reflection and interaction (Nonaka, 2004).

Two organisations that could play a role in facilitating this process are Organics South Africa and the Biodynamic Agricultural Association of South Africa (BDAASA).These organisations both indicate on their websites that they aim to provide networks and sharing of information for members. BDAASA does differentiate itself from organic farming, as Biodynamic farming has a slightly different approach to farming sustainably, in that there are also metaphysical considerations. As their mission statement indicates, they aim to “Strengthen, promote and advance the practice of biodynamic agriculture in Southern Africa”. Their approaches are similar in that they both eschew the use of chemicals and rely

on natural processes for production (OSA, 2008; BDAASA, 2008). It is clear from the survey that the certifiers also play a significant role in advising; however this is not their core function. It is also questionable whether the certifier should be providing advice directly to farmers that they certify, as there are potential conflicts of interest. Nevertheless, it is the author's view that certifiers do hold significant knowledge and information and could perhaps be working with the associations in generating knowledge that can be shared.

However, the way these organisations are assisting networking and knowledge creation could be improved by being more active in facilitating the sharing of information, learning and knowledge. Currently, there appears to be limited active support for such central networking bodies. This needs to be understood in the context of organic farming being in its infancy in South Africa, with the probable scenario behind this elaborated on below.

It can be assumed that those who choose to become organic farmers in the early stages have certain characteristics as they are pioneers. They will often be considered mavericks by some, but continue on the path of change regardless of criticism, guided by their strong belief and personalities. That is the nature of innovators and is necessary that such independence should exist for change to occur. These character traits have allowed these farmers to push the boundaries by embarking on the process of change.

Such traits can, however, be become counterproductive. The belief and steadfastness that drove the change process meant that often they learnt not to listen to others with differing views. This trait often prevails and prevents further learning and change as these farmers have created a new world view and a new fixed model of the world, based on new understanding which they may have settled into, resulting in resistance to further change. Senge *et al.* (1999) use the metaphor of a 'journey of discovery' to help understand the process of change; it is a journey that never ends. It is in this context that the U movement has to be considered. It is not only conventional farmers who may benefit from profound change; organic farmers also need to consciously continue on the journey of change and exploration.

Not sharing failures or taking note of others successes inhibits such learning (Senge *et al.*, 1999).

It is likely that the steadfast traits described above have limited the success of these associations in enabling better networking and information sharing. As one respondent states: “Organics SA has proven that their kind of structure is not growing the industry. One look at their membership numbers proves that”. The implication of this is that membership is declining. The suggested alternative by the respondent is for local communities and regional representation forums to be established. They should be comprised of informed, educated people who are available to assist and support local organic farmers and actively grow the sector.

This insight hints at the need to externalise and amplify learning and highlights Nonaka’s (2004) recognition that knowledge is created by individuals from informal communities of social interaction that nurture the emergence of knowledge. Communities of interaction are highlighted by Nonaka (2004) as integral to the creation of knowledge - they are often self organising teams that emerge around a common problem and are most effective at a local level. It would be beneficial for farmers to share knowledge in a local context from a practical point of view. Environmental conditions are similar and there is likely to be a similar ‘basket’ of crops being produced, which will assist in pulling farmers together around common problems.

It is necessary to externalise and amplify this learning by integrating the processes to create a widening spiral of continuous dialogue of knowledge creation. It is in this realm that organisations such as OSA and BDAASA and the certifiers have a role to play in facilitating inter organisational knowledge transfer. Nonaka (2004) points out that information is the flow of messages or meanings which change knowledge; it is necessary to organise the flow of this knowledge to keep the spiral amplifying. The role of the various actors superimposed within the ontological dimension of the Nonaka (2004) framework, is provided in Figure 13.

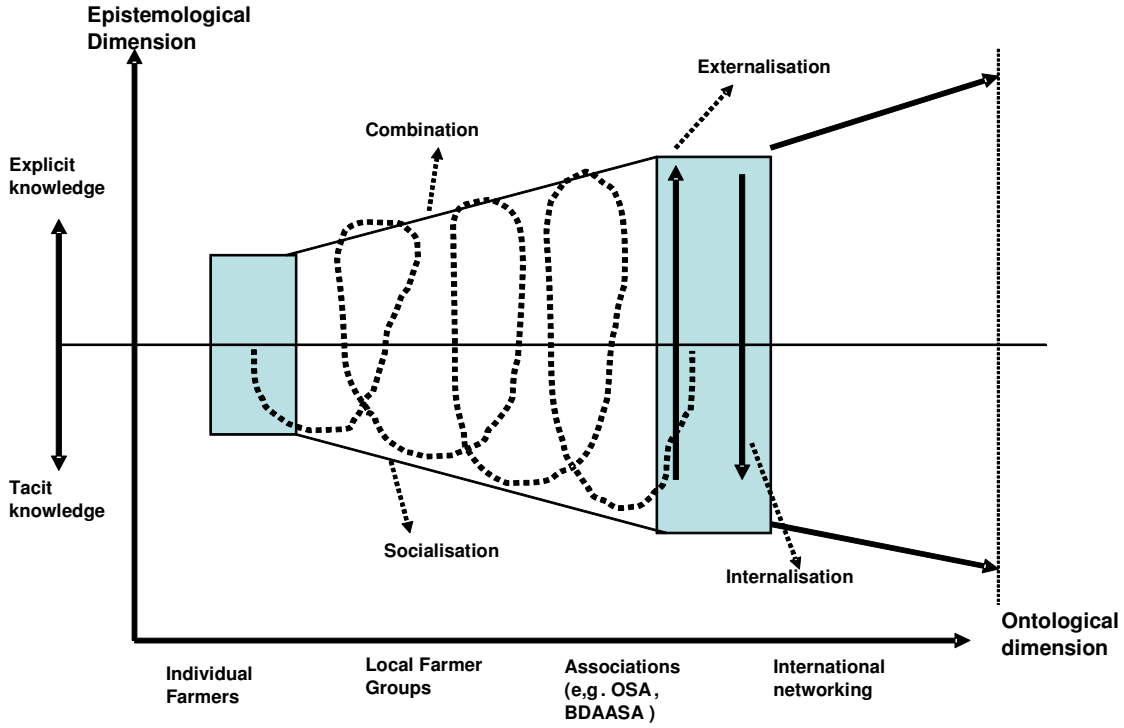

Figure 13: Local groups for knowledge creation and amplification (after Nonaka, 2004, p 175)

It appears that at local levels there are already such self organising teams; respondents indicated that they mostly consult with other farmers around problems. OSA and BDAASA exist for the specific purpose of networking. The components of the networking frameworks already exist. It is now necessary to learn from these networks to develop a deeper understanding of the learning histories and find ways to enhance processes that advance learning and limit processes that retard learning. By assisting farmers to understand the processes of internalisation, externalisation, combination and socialisation, this progression can be enhanced. This can be achieved through engaging with other structures, such as national government and other networks of organic farmers worldwide, as illustrated.

5.5 The Pedagogy of Adult Social Learning

The final framework to be discussed is that of Mintzberg (2004), which will be used to bring understanding of the three frameworks into focus to see the generic similarities of the frameworks together (see Figure 7). The shift from conventional to organic agricultural production is a shift from an input based towards a more knowledge based system. This is not necessarily only about knowledge and learning related to the production system, but also understanding change and the impact of our decisions and actions on society as a whole.

The analysis of profound change in relation to organic farmers showed that while market and premium considerations were important factors in the decision to go organic, it is in the descriptive terminology used by farmers when referring to the way they farm and the appreciation of what they do that reflects profound change. They have embarked on a change process; have experienced delays and endured difficult times, manifested in many cases by cashflow limitations, during the change process. However, at the end of the change, business results were achieved. It was easier to market the organic produce; water use efficiency improved and many farmers enjoyed the benefits of price premiums. There is also a sense of worth and achievement that indicates that organic farmers see a real value in what they are doing.

In deeper learning, continuous cycles of thinking and doing result in increasing awareness of the whole. In turn, actions are modified to reflect this awareness and increasingly serve the whole. Clearly, organic farmers are conscious of the way they farm and its impact on the environment as a whole. Their actions are modified to better serve the whole from an environmental perspective such as sustaining the soil, minimising pollution and saving water resources. From a social perspective using manual labour was highlighted by some as strength; however others saw the increased labour as a disadvantage. The need for re-educating people about what is important and the creation of true wealth are also highlighted, while providing healthy, pesticide free food to society.

The use of networks is a common theme in the learning frameworks (Mintzberg, 2004; Senge et.al., 1999; Senge et.al., 2005), but is highlighted in the conversion of

knowledge analysis (Nonaka, 2004). Farmers make extensive use of networks for knowledge creation, using, in particular, other organic farmers. The credibility of common understanding resulting in shared experience resulting in knowledge creation is highlighted. The distinctive characteristics of the pioneering spirit of organic farmers is also revealed which is effective in initiating change, however, these characteristics can also be detrimental to maintaining the momentum of change and the creation of new knowledge. Table 24 shows a comparison of the four frameworks of social learning to identify generic similarities and discusses the comparisons in more detail below. .

Table 24: Generic similarities of the four frameworks

Framework	**People, Interaction, Socialisation, Networking**	**Awareness, Thinking, Learning**
Profound Change (Senge, 2004)	People, networking, social interaction.	Development of learning capabilities.
Deeper Learning (Senge *et al*, 1999)	Increasing awareness of and serving the whole.	Evolving awareness; thinking and doing; increased awareness of whole; actions increasingly serving the whole.
Conversion of Knowledge (Nonaka, 2004)	Communal knowledge creation; conversion of knowledge through sharing.	Crystallising and bringing forth new knowledge or unknown knowledge; externalising and amplifying knowledge creation; expanding knowledge to others.
Pedagogy of Adult Social Learning (Mintzberg, 2004)	Lectures for conceptual input and cases to widen exposure.	Reflection on learning, application of learning, action the learning for new experience; increasing natural experience.

While the frameworks recommend acknowledging complexity, the summary of the frameworks in the table does clearly show that it is the interaction of people through socialisation and networking that facilitates awareness, thinking and leaning.

If the profound change analysis is examined in the context of the natural experience framework, it can be seen that farmers are investing in change due to market, health and environmental reasons. They are observing cases that widen their exposure to these issues, reflecting on them and acting. Using networks for sharing information and knowledge is also used by farmers to achieve profound change. In natural learning, this is the use of cases and lectures components, indicating the socialisation dimension of knowledge creation. The development of learning capabilities and personal results includes all the components of the natural learning framework working together to achieve this. Ultimately, business results are achieved from ongoing iterations of the natural experience framework.

Deeper learning shows that organic farmers are thinking and doing. Their thinking reflects a growing awareness of the whole and actions are modified to increasingly serve the whole. Considerations of both the social and environmental implications of their actions inform their thinking and action. Lectures for conceptual input, cases to widen exposure and reflection can be seen as the thinking component in the deeper learning process. The doing is in the application of the learning, its contribution to natural experience and identifying action learning to create new experiences.

The conversion of knowledge shows that farmers are primarily users of networks to create knowledge, but also rely on implicit knowledge (or natural experience) and outside sources of information, such as the internet and books. Knowledge conversion highlights the dynamic interaction of tacit and explicit knowledge to crystallise tacit knowledge into new forms of knowledge and in so doing, modify actions. The process of bringing in outside information (cases and lectures), reflecting and then acting on these highlight the crystallisation process of tacit knowledge.

5.6 Discussion

This chapter has studied the survey data and developed an understanding of the responses using the four learning frameworks described in Chapter 2 (Profound change, deeper learning, conversion of knowledge and the pedagogy of adult social learning). The learning frameworks show that the creation of knowledge requires two fundamental actions: sharing and thinking.

Sharing information, experience and knowledge is necessary for learning to occur. Networking around a common problem or area of interest is the best way to share information and learn. Responses by organic farmers show that they do share information and this is done mainly through informal networks. The creation of knowledge and information through these networks needs to be externalised and amplified to enhance learning related to organic agriculture and its multiple benefits.

Thinking about solutions to problems and finding new ways of doing things is also necessary to develop learning capabilities and address the enormous environmental and social challenges faced by the world today. Organic farmers who responded to the survey showed that they are thinking about problems and seeing the bigger picture and are looking for ways to solve the problem.

While sharing knowledge through socialisation and networking and creating awareness though thinking and learning are fundamental in social learning, it is acting on the new knowledge and information that is critical to change and innovation. Organic farmers have acted as a result of social learning by choosing a farming system that has a lower impact on the environment, considers the social implications of actions and produces nutritious and healthy food.

6 CONCLUSION

The objective of this dissertation was to use comprehension of the four learning frameworks (Profound change, deeper learning, conversion of knowledge and the pedagogy of adult social learning) to enhance the understanding of social learning among certified organic farmers in South Africa. This was achieved firstly through reviewing literature related to organic farming and social learning, particularly the learning frameworks that help with understanding social learning. The learning frameworks were then applied to a survey of organic farmers in South Africa to draw out the learning histories of organic farmers and document these.

A literature review of organic agriculture worldwide revealed that the movement is growing. The review also pointed out a range of benefits associated with this system of farming from an environmental and social perspective. The literature shows that it is likely that conventional farming systems will not be sustained if they continue to externalise the environmental cost of production. These are important considerations; given the environmental and social challenges that society faces in the twenty first century. These challenges require a change in our thinking, and the development of our ability to learn new ways of dealing with the challenges. A fundamental change in food production systems is required. Senge *et al.* (2008) confirm this, noting that more people are beginning to realise that the various sustainability crises facing the world are interconnected and point out that when people begin to understand this, their view of the problem shifts. This shift in thinking is occurring among many organic farmers.

The learning frameworks showed that change requires learning new ways of doing things. Learning, in turn requires investment, risk and critically assessing the underlying assumptions that define our view of the world. Learning and change are inextricably interlinked; one cannot occur without the other. Profound change shows that only through investment in change can learning capabilities be developed. Through deeper learning, actively increasing awareness (thinking) results in increasing change (doing). Conversion of knowledge reveals that the interaction of tacit and implicit knowledge draws out and crystallises new understanding, resulting

in modification of behaviour. Natural experience brings in outside information which is reflected upon and results in change through applying the learning.

Importantly, learning occurs through socialisation. The four learning frameworks all show that networking and interaction is a key element of the learning process. People learn from other people. It is that simple. The complexity arises in understanding how learning occurs and to reflect and critically evaluate our assumptions about the world, recognise 'bad' learning, eliminate it and replace it with 'good' learning.

Applying the learning frameworks to a survey of organic farmers shows that knowledge transfer among organic farmers in South Africa occurs mainly through networks of other farmers, certifiers, input suppliers and consultants. The organic sector in South Africa is growing and some knowledge is being transferred through these networks, however, it is necessary to enhance learning and the creation of organic agriculture among farmers and consumers.

Impregnating the learning frameworks with information and stories from the survey of organic farmers revealed that farmers are indeed social learners. This is to be expected as all people are social learners. What the analysis revealed was that many of the organic farmers surveyed appear to have a special affinity for the environment in which they operate and are considering broader issues rather than simply focussing on-farm production. Senge *et al.* (2008) note that innovators of today are showing how a different future can be created by learning and understanding that they are part of a larger system. Organic farmers are one of the many groups of such innovators.

What is also clear is that farmers have paid a price for their learning. Some refer to being perceived as peculiar and have endured social exclusion, particularly those who embarked on the organic journey many years ago. Others found resistance to change in their commodity organisations, which provide no specific support for organic production. Most respondents who converted to organic farming felt the pinch of limited cashflow, but endured this hardship and found ways to deal with it. Strong belief in the value of organic production to themselves and to society at large

revealed their commitment to the process. They emerged from the change process with a more sustainable system of production. There are also other benefits associated with the change. Farmers found it easier to market their produce and often enjoyed a price premium for their produce because demand exceeds supply.

The growth of the organic sector worldwide is not only pushed by farmers' values and learning, it is also being pulled by the social learning of consumers. Given the current supply and demand dynamics for organic food, it could be assumed that social learning on the part of the consumer is occurring more quickly than with the producer. However, this may not be the case as demand is skewed towards the more developed world; the US and EU account for 97% of organic consumption worldwide (Schneider *et al.*, 2005).

In referring to environmental benefits associated with organic agriculture, many respondents mention improved soil, improved water use, reduced pollution and referred to the benefits to the broader environment. Only one comment referring specifically to biodiversity and two relating to global warming were made. This indicates that there is a broad awareness of the environment, but specific issues and environmental concerns are possibly held as tacit knowledge. It is to be expected that organic farmers will view the benefits at a farm level, even if they are considering the whole in a tacit sense. They look at their organic farming at a farm level and say to themselves 'this is good for me, good for people and good for the environment'. In this sense there is an awareness of the whole and a growing understanding of awareness of the whole. Deeper reflection and inquiry can encourage the farmer to query what exactly this means: how is this system of farming good for me, people and the environment? By asking the question, new ideas may emerge and crystallise into explicit knowledge regarding the exact nature of how this farming system is beneficial.

Another observation is that no negative comments about conventional farmers were made. Neither was there any sense of condescension in the statements made by respondents to the survey, indicating that they are right and the conventional farmers are wrong. Instead, comments show recognition of the need to create awareness and for education and learning necessary to make others aware of organic

agriculture and its benefits. Many of the respondents were conventional farmers before converting. They have gone through the process of changing and learning and recognise implicitly the need for creating and expanding new knowledge of organic agriculture.

A number of statements, on the other hand, show negative sentiments towards multinational corporations (presumably agrochemical companies, such as Monsanto) and GMOs specifically. Large corporations are linked to conventional agriculture through seed companies, agrochemical companies and GMO products. These are powerful organisations and rely on consumption of their products by conventional farmers. It follows that they would not be likely to support a change to organic farming. Large sums of money have been invested in the production of GMOs and agrochemicals, probably with the best of intentions, to increase agricultural productivity.

The role of tertiary education institutions in leading change should also be considered. There appear to be few, if any, undergraduate or post graduate streams specifically for organic agriculture. The question arises as to whether universities and other tertiary education institutions are going to respond to social learning only when people demand this, or that should they be leading this change by ‘letting go’ of the concept of the various sciences as distinct streams of learning and ‘let come’ the concept of integrated teaching and learning, and in so doing, embrace complexity and externalise tacit knowledge?

While most organic farmers make use of informal networks to generate knowledge, concerns are raised by other survey respondents regarding the lack of available information, or its formalisation. Growing the sector in South Africa requires the creation and expansion of knowledge related to organic agriculture. This can be achieved by getting people to talk with each other; all farmers and other actors need to be encouraged to engage in conversation and reflection to generate this knowledge.

This can best be achieved by encouraging more farmers to participate in small local networks and discussion groups. Inviting guest speakers and having discussion

themes can help to encourage people to attend and also focus thinking around particular issues. Local organisations that support organic agriculture, such as OSA and BDAASA should play a leading role in facilitating organic conversations around the country. Their main function should be is capturing the learning and disseminating the information to other networks, thus increasing the flow of information. The internet is a particularly good medium for this and has facilitated the transfer of knowledge and change worldwide.

Importantly, such networks should not target organic farmers exclusively. This may seem like a contradiction, but only part of the purpose of such networks is to understand and create knowledge around solutions to problems related to organic production. The real goal is to create a different, sustainable future that widens understanding of the system, looking particularly at environmental and social externalities. This is achieved through making communication and collaboration among actors as wide as possible. Thus, the other important role such informal and formal networks play is in sharing information freely with conventional farmers, consumers, the media, and others, to externalise and amplify the generation of knowledge. While this would focus on organic agriculture, such discussion will enhance understanding of the connectivity between the various problems and, in so doing, getting people to view the problem differently. Themes such as new organic markets and organic commodities showing growth in demand can be used to attract wider audiences. Another way to attract interest is to demonstrate short term cost saving advantages. Discussions of new methods or technologies to manage pests that minimise the need for pesticides, or using fungi to facilitate and optimise uptake of nutrients by plants are good examples of this. Ideas such as these are of interest to all farmers who are all looking at ways to reduce input costs and optimise production. These activities have the potential to draw other farmers into the conversation. In so doing, the conversation can grow and evolve to consider the wider system and result in changes in behaviour.

Part of developing learning capabilities in these networks is to help people to understand learning. Again, organic organisations can assist with this by posting learning literature on their websites and conducting workshops with interested

parties to better understand the process. It will obviously first be necessary for the associations to engage in 'learning about learning' themselves.

Another good way to share information is an electronic discussion board with regular themes and where specific questions can be posted. For example, there could be a monthly theme such as how to control whitefly, best vegetable crop or recipes for making compost. People could tell their story about problem and how they solved it. At the end of the month, this information would be collated and placed in a database for future reference. This is classic knowledge conversion; tacit knowledge is externalised and amplified through the medium of the internet. This will benefit not only organic farmers, but also the associations, some of whom appear to be experiencing declining membership, in spite of the recent growth of the organic sector in South Africa.

In summary, the review of organic agriculture shows that it is a farming system that offers a range of economic, environmental and social benefits. Worldwide, farmers are increasing adopting organic farming practices. The reasons for this can be attributed to social learning; both producers and consumers are becoming more aware of the effects of the choices they make on world around them. Organic farmers who responded to the survey used in this research are indeed social learners. The four learning frameworks, namely Profound Change, Deeper Learning, the Conversion of Knowledge and the Pedagogy of Adult Social Learning show that organic farmers are enhancing their knowledge and understanding not only of their farming operations, but the effects of their operations on the broader environment and modifying their actions as a result. However there are currently few organic farmers in South Africa and there are limitations in how learning and information is shared. Methods of addressing these are discussed in this chapter and Chapter 7 recommends future research which will help to address this matter.

In conclusion, the social learning frameworks show that knowledge creation is about learning to learn, learning to listen, and learning to share knowledge. To do this does require commitment, passion and being prepared to acknowledge and consider views that differ from your own. Supporting existing networks and moving from the local through to the national can help to create knowledge and encourage its

amplification, with the ultimate objective of having a beneficial impact on the global. At the end of the day, global food production is still about efficiency. But it is efficiency in the context of an increasingly complex set of factors that are being considered and measured. Learning to see this and change accordingly, to understand the concept of efficiency in its largest sense, is the challenge. Understanding learning can help to achieve this.

7 RECOMMENDATIONS FOR FUTURE RESEARCH

The research in this document has investigated social learning based on a survey. Considering the limited response to the survey, this is probably not the best way to engage farmers around issues of social learning. It is suggested that the first step in taking the research forward is to share the findings of this dissertation, first with organisations representing the organic sector, and then with organic farmers themselves. The aim of sharing this dissertation is to initiate discussion related to social learning and knowledge creation.

Learning histories and the social learning frameworks show that information is best generated in an interactive setting. Consequently, further research should engage key players in the sector in constructive debate around the future of organic agriculture in South Africa. This debate should establish a set of higher goals in terms of what the sector would like to achieve. This will facilitate cooperation between various organisations as they will be working towards a common vision. It would also be valuable to engage farmers in capturing learning histories that better understand the timelines, delays, and other factors in investigating dynamic growth and change in organic agriculture. Importantly, this engagement should identify and understand what factors promote, and what retard learning in the advancement of organic agriculture.

Developing a better understanding of the use of networks in sharing knowledge and information is another research objective. It would be helpful to develop networking with a clearer purpose, based on the higher goals referred to in the paragraph above. The use of farmers' days, farmer associations, industry associations and other networks should be investigated to determine the role they can play in facilitating learning. Research should aim to help farmers to share their stories and from these, develop models, frameworks and systems to facilitate knowledge creation among organic farmers and those considering organic agriculture.

Understanding the perceptions and worldviews of conventional farmers in relation to defensive routines and resistance to change, particularly to organic farming should also be researched. If a number of fundamental reasons are identified, it will then be

possible to share knowledge that can help these perceptions to evolve and change, and in so doing create new knowledge that can facilitate further consideration of organic and other more sustainable forms of agriculture as an enterprise option.

From a farm to a national policy level, the need to view systems widely, and the issue of externalising social and environmental costs in conventional systems of production, is also highlighted. Research that considers the implications of externalising such costs is necessary. Results of such research can help to shift thinking and influence policy. The Bhutan example in 5.3.5 shows that seeing the problem differently, and shifting policy as a result, can have enormous benefits

Additional general research is required on organic farming in South Africa. There is currently little research available with specific reference to South African conditions. Australia, with very similar climatic conditions to South Africa has a wealth of research and researchers who study organic farming. Research partnerships with such researchers should be encouraged to learn more about how organic methodologies can be better applied. Comparative studies in fields such as water use efficiency, soil erosion, soil biodiversity, carbon sequestration and general biodiversity are also necessary. From an economic perspective, crop yields and pricing structures, production per unit area as well as macroeconomic factors should also be investigated. From an integration perspective research teams consisting of agronomists, ecologists, social scientists and economists should undertake full cost accounting studies of organic and conventional farming systems in South Africa. Research into consumer perspectives of organic agriculture is also necessary. Farmers should be actively involved in the research as they have the tacit knowledge which can be drawn out by the researchers. Research findings need to be made available in an accessible popularised formats and researchers should be encouraged to share their knowledge as much as possible with farmers.

Finally, but importantly, it is necessary to understand whether small scale and peasant farmers who engage in organic and more sustainable agricultural practices are also social learners. Using the learning frameworks on a case study basis with such farmers could provide some interesting insights and identify ways to enhance learning among these farmers.

8 REFERENCES

Aerni, P. and Bernauer, T. 2006. Stakeholders' attitudes towards GMOs in the Philippines, Mexico and South Africa: The issue of public trust. *World Development*, 34(3) pp. 557-575.

Badgley, C., Moghtader, J., Quintero, E., Zakem, E., Chappell, J., Vazquez, K., Samulon, A. and Perfecto, I. 2006. Organic agriculture and the global food supply. *Renewable Agriculture and Food Systems*, 22(2) pp. 86–108.

Baker, B., Benbrook C., Groth, I. and Lutz Benbrook, K. 2002. Pesticide Residues in Conventional, IPM-grown and Organic Foods: Insights From Three US Data Sets. *Food Additives and Contaminants*, 19(5) pp. 447-446.

Balfour, E. 1977. *Towards a sustainable agriculture - the living soil. Address to an International Federation of Organic Agriculture Movements (IFOAM) conference in Switzerland 1977.* http://www.netspeed.com.au/cogs/cogbal.htm. [November 2008]

Biodynamic Agricultural Association of South Africa (BDAASA). 2008. *The Biodynamic Agricultural Association of South Africa*. www.bdaasa.org.za [November 2008]

Bolwig, S and Odeke, M. 2007. *Household food security effects of certified organic export production in tropical Africa: a gendered analysis*. EPOPA. www.unep.ch/etb/publications/insideCBTF_OA_2008.pdf [August 2008]

Brandt, K. and Molgaard , J. 2006. Food Quality. *In* Kristainsen, P. Taji, A and Reganold, J. (eds) *Advances in Organic Agriculture*. pp. 305-327. CSIRO Publishing. Australia.

Brewer, M and Prestat, C. 2007. Consumer attitude towards food safety issues. *Journal of Food Safety.* 22(2). pp. 67-83.

Butler, G., Stergiadis, S., Eyre, M., Leifert, C., Borsari, A., Canever, A., Slotes, T. and Nielsen, J. 2007. Effect of production system and geographic location on milk

quality parameters. *In* Niggli, U. Leifert, C. Alfoldi, T. Luck, L and Willer, H. (eds). *Improving Sustainability in Organic and Low Input Food Production Systems. Proceedings of the 3rd International Congress of the European Integrated Project Quality Low Input Food (QLIF),* University of Hohenhiem, Germany, 20-23 March, 2007. pp. 100-103.

Department of Health, 2005. *Statistical Notes – Pesticide Poisoning*. http://www.doh.gov.za/facts/stats-notes/2005/pesticide.pdf [January 2008].

Du Toit, L and Crafford, S. 2003. Beliefs and purchasing practices of Cape Town consumers regarding organically produced food. *Journal of Family Ecology and Consumer Sciences*, 31. pp. 1-11.

El-Hage Scialabba, N. 2000. *Organic Agriculture And Soil Biodiversity. Results from a 21 Year Old Field Trial.* Research Institute of Organic Farming (FiBL), Frick, Switzerland, August 2000. www.fao.org/organicag/doc/soil_biodiversity.htm [March 2007]

El-Hage Scialabba, N. 2003. Organic agriculture: The challenge of sustaining food production while enhancing biodiversity*. United Nations Thematic Group. Sub-Group Meeting on Wildlife, Biodiversity and Organic Agriculture*. Ankara, Turkey, 15-16 April 2003. http://wo2006.whitebook.pt/bioportal/pt/administrator/components/com_bdbiblio/media/ ad090e00.pdf [March 2008]

El-Hage Scialabba, N. 2007. Organic Agriculture and Food Security. Food and Agriculture Organisation. Rome.

El-Hage Scialabba, N., Hattam, C. 2002. *Organic agriculture, environment and food security*. Food and Agriculture Organisation, Rome. http://www.fao.org/DOCREP/005/Y4137E/y4137e00.htm#TopOfPage [March 2007].

Extoxnet. 1996. *Pesticide Information Profiles: Aldicarb.* http://extoxnet.orst.edu/pips/aldicarb.htm [November 2008]

FAO. 1998. *Evaluating the potential contribution of organic agriculture to sustainability goals.* Technical Contribution to IFOAM's Scientific Conference, Mare del Plata, Argentina, 16-19.

FAO. 2003. *Trade Reforms and Food Security – Conceptualising the Linkages*. Food and Agriculture Organisation. Rome.

FAO. 2007. International Conference on Organic Agriculture and Food Security. Report OFS/2007/REP. Food and Agriculture Organisation. Rome.

Fersino, V. and Petruzzella, D. Undated. Organic agriculture in the Mediterranean: state of the art. *Options Méditerranéennes,* Série B n. 40. pp9 – 52.

Finn, A and Louviere, J. 1992. Determining the appropriate response to evidence of public concern: the case of food safety. *Journal of Public Policy and Marketing*. 11(1). pp. 12 – 25.

Fulmer, M and Keys, J. 2004. A conversation with Chris Argyris: the father of organisation learning. *In* Starkey, K.,Tempest, S. and Mckinlay. A. (eds). *How Organisations Learn* (2nd edition). pp. 165-201. Thompson Learning. United Kingdom.

Gaskell, G., Bauer, M., Durant, J., Allum, N. 1999. Worlds Apart? The Reception of Genetically Modified Foods in Europe and the U.S. *Science*, 285(5426) pp. 384-387.

Getz, C., Feenstra, G., and Shreck, A. 2005. *Farmworkers in organic agriculture: Toward a broader notion of sustainability.* University of California Sustainable Agriculture Research and Education Programme. http://www.sarep.ucdavis.edu/newsltr/v17n1/sa-1.htm [March 2007].

Grolink. 2003. *The Organic Certification Directory*. The Organic Standard - Issue 28 / August 2003.

Grolink. 2007. *The Organic Certification Directory.* The Organic Standard - Issue 76 / August 2007.

Hails, R. and Kinderlerer, J. 2003. The GM public debate: a context and communication strategies. *Nature Reviews Genetics* (4) (October 2003), pp. 819-825.

Halberg, N., Sulser, T., Hogh-Jensen, H., Rosegrant, M.W. and Knudsen, M.T. 2006. The Impact of Organic Farming on Food Security in a Regional and Global Perspective. *In* Halberg, N. Alroe, H. Knudsen, M. and Kristensen, E. (Eds) *Global Development of Organic Agriculture: Challenges and Prospects*, pp. 277-322. CABI Publishing.

Hallmann, E. and Remialkowska, E. 2007. Comparison of the nutritive quality of tomato fruits from organic and conventional production in Poland. *In* Niggli, U. Leifert, C. Alfoldi, T. Luck, L and Willer, H. (eds). *Improving Sustainability in Organic and Low Input Food Production Systems. Proceedings of the 3rd International Congress of the European Integrated Project Quality Low Input Food (QLIF),* University of Hohenhiem, Germany, March 20 – 23, 2007. pp. 131-134.

Heckman, J. 2006. A History of Organic Farming - Transitions from Sir Albert Howard's War in the Soil to the USDA National Organic Program. *Renewable Agriculture and Food Systems,* 21(3) pp. 143-150.

Hole, D., Perkins, A., Wilson, J., Alexander, I., Grice, P. and Evans, A. 2005. Does Organic Farming Benefit Biodiversity? *Biological Conservation,* 122(1), March 2005 pp. 113-130.

Horticultural Research International. 2002. *Changes to soil quality indicators following conversion to organic vegetable production.* Department For Environment, Food And Rural Affairs. London.

IFOAM. 2005. *Principles of Organic Agriculture*. http://www.ifoam.org/about_ifoam/principles/index.html [January 2007].

Institute of Natural Resources, 2008. *Study to develop a value chain strategy for sustainable development and growth of organic agriculture.* Unpublished research report submitted to the Department of Trade and Industry. INR Investigational

Report No: IR285.

Institute of Natural Resources. 2006. *A study of barriers to certification in the natural products sector and an assessment of the feasibility of interventions under the natural futures programme*. Report Submitted to the IUCN Natural Futures Programme. INR Investigational Report No. IR265.

International Rice Research Institute (IRRI). 2008. Long term global food crisis looms: experts urge immediate action. *Science Daily*. www.sciencedaily.com/releases/2008/09/080919142548.htm [November 2008]

Jiménez, J. 2006. *Organic Agriculture and the Millennium Development Goals*. IFOAM, Germany 2006. www.unctad.org/trade_env/test1/meetings/bangkok7/OA_MDG_Dossier_sansCover.pdf [June 2007].

Khosla, R. 2006. *A Participatory Organic Guarantee System for India*. Final Report: Food and Agriculture Organisation. India.

Koekoek, F. 2006. *Organic exporter guide: hands-on help for organic exports from Africa.* Export Promotion of Organic Products from Africa. www.ifoam.org/growing_organic/.../EPOPA_OrgExpGuide.php [June 2008]

Kristiansen, P., Taji, A. and Reganold, J. (eds). 2006. *Organic agriculture: a global perspective.* CSIRO. Australia

Leifert, C., Rembialkowska, E., Neilson, J., Cooper, J., Butler, G. and Lueck, L. 2007.Effects of organic and 'low input' production methods on food quality and safety. *In* Niggli, U. Leifert, C. Alfoldi, T. Luck, L and Willer, H (eds). *Improving Sustainability in Organic and Low Input Food Production Systems. Proceedings of the 3rd International Congress of the European Integrated Project Quality Low Input Food (QLIF),* University of Hohenhiem, Germany, 20-23 March 2007. pp. 75 – 95

Lernoud, A.P. 2006. Latin America: Overview. [oral] Presentation at *BioFach Congress 2006*, NürnbergMesse, Nuremburg, Germany, 16.-19.2.2006.

http://orgprints.org/7260/01/lernoud-2006-latin-america.pdf [April 2007]

Lohr, L. Undated. *Economic, Social, and Environmental Benefits Associated with US. Organic agriculture*. Department of Agricultural and Applied Economics, University of Georgia. http://orgprints.org/4411/04/4411-Lohr_4p_revised-ed.pdf [March 2007].

Magkos, F., Arvaniti, F. and Zampelas, A. 2003. Organic food: nutritious food or food for thought? A review of the evidence. *International Journal of Food Sciences and Nutrition*, 54(5) pp. 357 – 371.

Mead, L. Undated. Key Developments in Global and Local Organic markets. *Presentation to the KwaZulu-Natal Organics Agri-Processing Sub-sector Strategy Planning Workshop.* Inchanga Hotel, 22-23 November.

Mintzberg, H.2004. *Managers, not MBAs: a hard look at the soft practice of managing and managing development*. Berrett-Koehler Publishers. San Francisco, USA.

Nonaka, I. 2004. A dynamic theory of organizational knowledge creation. *In* Starkey, K.,Tempest, S. and Mckinlay, A. (eds). *How Organisations Learn* (2nd edition). pp. 165 - 201.Thompson Learning. United Kingdom.

Organics South Africa (OSA).2008. *About Organics South Africa*. www.organicsouthafrica.co.za [November 2008]

Ormrod, J. 1999. *Human Learning* (3rd ed).Prentice-Hall.USA

Padel, S. 2008. Values of organic producers converting at different times: results of a focus group study in five European countries. *International Journal of Agricultural Resources, Governance and Ecology*. 7 (1) and (2) pp 63-77.

Parrot, N. and van Elzakker, B. 2003. *Organic and Like Minded Movements in Africa: Development and Status.* IFOAM. Germany.

Paull, J. 2007. China's Organic Revolution. *Journal of Organic Systems* 2007 2(1) pp. 1-11.

Pfiffner, L. Undated. *Contributions of Organic Farming to a Sustainable Environment* http://orgprints.org/2943/01/pfiffner-2001-proceedings-copenhagen.pdf [March 2007].

Randerson, J. 2004. Organic Farming Boosts Biodiversity. *Biological Conservation* 122 p 113.

Rembialkowska, E., Hallmann, E. and Rusaczonek, A. 2007. Influence of Processing on Bioactive Substances Content and Antioxidant Properties of Apple Puree from Organic and Conventional Production in Poland. *In* Niggli, U. Leifert, C. Alfoldi, T. Luck, L and Willer, H. (eds). *Improving Sustainability in Organic and Low Input Food Production Systems. Proceedings of the 3rd International Congress of the European Integrated Project Quality Low Input Food (QLIF),* University of Hohenhiem, Germany, 20-23 March 2007. pp. 139-143.

Rosegrant, M. Sulser, T and Halberg, N. Undated. *Organic agriculture and food security*. http://www.bfa.com.au/_files/Rosegrant_OrganicAgricultureAndFoodSecurity.pdf [August 2008]

Rosset, P. Collins, J. Lapp, F. 2000. *Lessons from the green revolution: do we need new technology to end hunger?* http://www.soc.iastate.edu/sapp/greenrevolution.pdf [March 2007]

Roth, G. Undated. *Learning Histories Research Project*. http://ccs.mit.edu/LH/overview.html [December 2008]

Rundgren, G. 2002. *Organic Agriculture and Food Security*. IFOAM. Germany.

Rundgren, G. and Lustig, P. 2002. *Feasibility study for the establishment of certification bodies for organic agriculture in Eastern and Southern Africa*. 41. Grolink. Sweden.

Sayere, L. 2003. *New Finding: Organic Farming Combats Global Warming…Big Time*. New Farm Field Trials. www.newfarm.org/depts/NFfield_trials/1003/carbonsequest.shtml [April 2007]

Schneider, M., Richter, T., Spahn, C. and Portmann, K. 2005. *Overview of international organic market development and potential export markets for organic products of Ukraine.* Research Institute of Organic Agriculture (FiBL). Germany.

Scottish Agricultural College. 2005. *Organic Principles*. http://www.sac.ac.uk/consultancy/organic/aboutorganic/whatisorganic/principles/ [January 2007].

Senge, P. Smith, B. Kruschwitz, N. Laur, J and Schley, S. 2008. *The necessary revolution: How individuals and organisations are working together to create a sustainable world*. Nicholas Brealey Publishing. United Kingdom.

Senge, P., Kleiner, A., Roberts, C., Ross, R., Ross, G., Smith, R., 1999. *The Dance of Change: The Challenges of Sustaining Momentum in Learning Organisations. A Fifth Discipline Resource.* Nicholas Brealey Publishing. United Kingdom.

Senge, P., Scharmer, O., Jaworski, J. and Flowers, S. 2005. *Presence: Exploring profound change in people, organisations and society.* Nicholas Brealey Publishing. United Kingdom.

Shepherd, M., Pearce, B., Cormack, B., Philipps, L., Cuttle, S., Bhogal, A., Costigan, P. and Unwin, R. 2003. *An Assessment of the Environmental Impacts of Organic Farming.* DEFRA. United Kingdom.

South Africa. 1997. *Genetically Modified Organisms Act 15 of 1997* Government Gazette. 383, (18029). 23 May 1997. Government Publisher. South Africa.

Statistics South Africa. 2002. *Census of Commercial Agriculture – Financial and Production Statistics*. Report No. 11-02-02 (2002). www.statssa.gov.za [October 2008]

Stolton, S. 2002. *Organic Agriculture and Biodiversity*. IFOAM. Germany.

Tait, J. 2001. More Faust than Frankenstein: the European debate about the precautionary principle and risk regulation of genetically modified crops. *Journal of*

Risk Research, 4(2) pp 175 - 189.

Taylor, A. 2006. *Overview of the Current State of Organic Agriculture in Kenya, Uganda and the United Republic of Tanzania and the Opportunities for Regional Harmonization.* Prepared under the CBTF Project 'Promoting Production and Trading Opportunities for Organic Agricultural Products in East Africa' United Nations. United States of America.

The Biodynamic Farming and Gardening Association (BFGA). Undated. *Biodynamic Farming*. www.biodynamics.com/node/111 [March 2008]

The Soil Association. 2000. *The Biodiversity Benefits of Organic Farming* www.soilassociation.org [March 2007].

The Soil Association. 2002. *Organic farming, Food Quality and Human Health: A Review of the Evidence.* Soil Association. United Kingdom.

Trewavas, A. 2001. Urban myths of organic farming. *Nature* 410. 22 March 2001. www.nature.com [March 2007].

Trewavas, A. 2004. A critical assessment of organic farming-and-food assertions with particular respect to the UK and the potential environmental benefits of no-till agriculture. *Crop Protection* 23 (2004) pp. 757–781.

UNCTAD. 2008. *Organic Agriculture and Food Security in Africa.* United Nations. United States of America. 2008. www.unep-unctad.org/cbtf [November, 2008].

Van Zyl, H. 2000. *Economic Opportunities in South African Organic Agriculture.* Unpublished Report submitted to the Department of Environmental Affairs and Tourism.

Vermeulen, H and Bienabe, E. 2007. *What about the food 'quality turn' in South Africa? Focus on the organic movement development*. Proceedings of the 105th EAAE Seminar 'International Marketing and International Trade of Quality Food Products', Bologna, Italy,March 8-10, 2007 pp. 691 – 706.

Vossenaar, R. and Wynen, E. (eds). 2004. *Trading opportunities for organic food*

products from developing countries: Strengthening Research and Policy-making capacity on Trade and Environment in Developing Countries. UNCTAD.

Welman, C. Kruger, F and Mitchell, B. 2005. Research methodology. (3rd edition). Oxford University Press. South Africa.

WHO. 1992. Our plant, our health. *Environment and Urbanisation* 4(1) pp. 65-76

Willer, H. and Yussefi, M. 2004. *The World of Organic Agriculture 2004 - Statistics and Emerging Trends. 167*. Bonn: International Federation of Organic Agriculture Movements. www.ifoam.org [March 2007]

Willer, H. and Yussefi, M. 2006. *The World of Organic Agriculture. Statistics and Emerging Trends 2006*. International Federation of Organic Agriculture Movements (IFOAM). Bonn, Germany and Research Institute of Organic Agriculture FiBL, Frick, Switzerland.

Willer, H., Yussefi-Menzler, M and Sorenson, L. 2008. *The World of Organic Agriculture Statistics and Emerging Trends 2008.* International Federation of Organic Agriculture Movements (IFOAM). Bonn, Germany and Research Institute of Organic Agriculture FiBL, Frick, Switzerland.

Williams, J. and McKenzie, F. 2008. *Food versus the environment - and the winner is?* Australasian Science.
http://www.wentworthgroup.org/docs/Food_versus_environment-and_the_winner_is.pdf [August 2008]

Williams, J. and McKenzie, F. 2008a. *Australian Agriculture: redesigning for resilience. In Ten Commitments: Reshaping the Lucky Country's Environment (2008).*
http://www.wentworthgroup.org/docs/Australian_Agriculture_Redesigning_for_Resilience.pdf [August 2008]

Worthington, V. 2001. Nutritional Quality of Organic Versus Conventional Fruits, Vegetables, and Grains. *Journal of Alternative and Complementary Medicine*. April 1, 2001, 7(2) pp. 161-173.

Personal Communications

Callear, Diana. Certifier, Ecocert-Afrisco Certification, South Africa. 18 September 2007; 7 October, 2008.

Erasmus, Niel. Principal Author of the South African Organic Standard, Directorate of Food Safety and Quality Assurance of the National Department of Agriculture, South Africa.15 October, 2008.

Jackson, Tim. Certifier, Biodynamic and Organic Certification Authority (BDOCA), South Africa. 15 October 2007; 7 October 2008.

Klokow, Ernest. General Manager, Organics South Africa (OSA), South Africa. 10 June 2007.

Rundgren, Gunnar. Organic Researcher and Consultant, GrolinkAB, Sweden. 12 July 2007.

APPENDIX 1: SURVEY QUESTIONNAIRE FOR ORGANIC FARMERS

***Note**: This survey was compiled by the project team involved in the commissioned project. The project team was led by the author of this dissertation. The draft of the questionnaire was submitted to the project steering committee for review and comment. Comments were incorporated into the questionnaire, after which it was approved by the steering committee. The survey was then distributed to organic farmers.*

The Institute of Natural Resources has been appointed by the Department of Trade and Industry to undertake research on the organic production and value chain in South Africa. The main purpose of the study is to identify strategies that will support the growth of the organics industry in South Africa through identifying the major challenges and opportunities associated with this form of agriculture.

Producers of organic products deal with these challenges and opportunities on a daily basis. **You** therefore have an important contribution to make to this investigation. We therefore value your contribution by completing the attached questionnaire.

All personal and contact information will be kept confidential, unless you indicate in section A1 that you would like your information to be shared. The data gathered from this study will be collated on a commodity and regional basis, and will not be traceable back to its source. Should you further wish to ensure that the information you submit remains confidential, don't fill in the "PERSONAL DETAILS" section. We do, however, request that you provide your "FARM LOCATION" information (A3).

The form may be completed by hand or electronically and can be returned by email, fax or by post. Should you require a printed copy, please inform us and we will send one with a self addressed stamped envelope. Please add additional pages if you would like to add more information.

Your assistance is appreciated. Should you have any queries regarding this questionnaire, please contact:

Jon McCosh Institute of Natural Resources PO Box 100396, Scottsville, 3209 Tel: 033-346 0796, Fax: 033-346 0895 Email: mccoshj@ukzn.ac.za.	*Leli foumu liyatholakala nangesisiZulu* *Hierdie vorm is ook in Afrikaans beskikbaar*

A	PERSONAL DETAILS		
A1	**I want this information to be kept confidential**	Yes	No

A2	CONTACT DETAILS			
	Surname		First Name(s)	
	Postal Address			
			Code	
	Telephone		Fax	
	Cell phone		Email	
A3	**FARM LOCATION**			
	Province			
	District Municipality			
	Local Municipality			

B	PRIMARY PRODUCTION			
B1	**What commodity groups do you produce organically?**			
		Detail (e.g. Mangoes, Peas, Beef, Soya etc)	**When did you start producing?**	**When were you Certified Organic?**
	Fruit			
	Vegetables / herbs			
	Field crops			
	Industrial crops			
	Livestock			
	Livestock products			

	Aquaculture			
	Nutraceuticals / pharmaceuticals / medicinal			
	Cosmetics			
	Essential oils			
	Ornamentals (e.g. flowers, décor plants)			
	Organic animal feed			
	Compost / potting medium			
	Organic Farm Inputs (e.g. bio-controls, soil amendments, inoculants etc)			
	Other, please specify			

B2	**Please indicate what type of certification you have (Please indicate with an "X")**					
	Certified Organic (Individual)		Certified Organic (Group certification)			
	Organic In Conversion (Transitional)		Participatory Guarantee System (PGS)			
	Produce organically, but not certified					
B3	**If you are in transition, when did you start converting to organic (Year and Month)?**					
B4	**Are you involved in both organic and conventional production? (Please mark your selection with an "X")**			Yes	No	
	If yes, please give details (area of each, limitations of dual systems etc):					
B5	**How many hectares of land do you have certified organic?**					
B6	**Describe your production for the period Oct 05 - Sept 06 (i.e. the latest growing season / production period)**					
	Product	**Hectares / herd size**	**Quantity / volume**	**Average Sales Price per Unit**		

B7	**Do you anticipate expanding your organic production?**	Yes	No
	Please you provide at least one reason why?		

B8	**What do you use / do to improve your soil (productivity, fertility, quality etc)? (Mark with an "X" where relevant)**			
	Activity			**Source (e.g. on farm, or name of supplier)**
	Compost	Yes	No	
	Organic fertiliser	Yes	No	
	No Till	Yes	No	
	Earthworms	Yes	No	
	Legumes	Yes	No	
	Other, Please give detail			

B9	**Please list the three most prevalent / detrimental pests and control practices you use**			
	Pest Type / Name	**Crop**	**Practices (e.g. rotation, companion planting, spray)**	**Products (name of product and how applied i.e. spray / baits etc)**

B10	**Please list the three most prevalent / detrimental important diseases and what control practices you use**			
	Disease Type	**Crop**	**Practices (e.g. rotation, companion planting)**	**Products (name of product and how applied i.e. spray / baits etc)**
B11	**What weed control practices do you use? (Mark with an "X" where relevant)**			
	Manual		Mulch	
	Mechanical		Flaming / Thermal	
	Crop Rotation		Organic Herbicides	
	Other, Please explain			
B12	**Some producers suffer significant crop losses or rejection at markets due to product quality in the first few years following organic conversion (selling to either organic or conventional markets)**			
	Did you experience this problem?		Yes	No
	How did this impact on the cash flow of the organic production system, and how did you deal with it			
	How long did it take for your cashflow to become positive under from your organic production component?			

B13	**Please list your three main external inputs and suppliers. Please mark with an X where appropriate**			
	Inputs	**Certified**	**Non Certified, but approved**	**Supplier**
B14	**Water usage - in your experience, has organic production improved your water use efficiency?**	Yes	No	Don't know
B15	**If yes, please give figures / examples to substantiate**			
B16	**How many people do you employ?**			
	Full time / permanent		**Part Time / Seasonal**	
	Has your number of employees changed since conversion to organic farming / production?			
	Increased (%)		**Decreased (%)**	**Don't know**
	What reasons can you give for these changes			
B17	**Has the skill levels of your employees increased due to conversion to organic farming practices? Please explain.**			

B18	**Please list the five biggest challenges you experience in terms of primary production (cultivation, harvesting and post-harvesting) or processing**
	What support do you need to address these challenges?
B19	**Where do you obtain / seek advice from for problems related to organic farming (.e.g. other farmers, input suppliers, consultants, internet, extension services etc)**

C	**RECORD KEEPING**
C1	**What challenges do you experience in terms of record keeping? Describe:**

D	**MARKETS and MARKETING**					
D1	**Where is your produce marketed?**		**Locally**		**Exported**	
	Combination (please indicate percentage split)		% local		% exported	
D2	**Whom do you market to?**	**Local**	**Export**	**Please provide names and contacts**		
	Retailers					
	Wholesalers					
	Processors/Manufacturers					
	Farmers Markets					
	Box schemes					
	Agents					
	Other, please describe					
D3	**How has organic production assisted you in terms of being able to market your produce?**					
D4	**Do you cooperate with other producers in the marketing of produce?**			Yes		No
	Please provide details (e.g. other producers, cooperatives, etc)?					
D5	**Please provide an indication of the price premium you receive for your organic produce (% above average price)**			**Percent Premium Received**		

	per product	
	1	
	2	
	3	
	4	
	5	

E	**GENERAL**		
E1	**Please list what you consider to be the three main strengths/advantages and three main weaknesses/challenges of Organic Farming in South Africa**		
	Strengths	Weaknesses	
E2	**What do you think, as an organic producer, should be done to support and grow the organics industry?**		
E3	**Are you aware of the development of the South African Organic Standard?** **When this legislation is enacted, how do you think it will impact on your operations?**		
E4	**Would you be prepared to provide this study with more detailed information if we paid you a farm / factory visit? (If yes, please ensure that you have**	Yes	No

	provided us with your contact details?)		
E5	**We would like to develop a uniquely South Africa definition for organic agriculture.** **If you feel that there are concepts, ideals or key words that should be included in the definition, please provide these here?**		
E6	**Please add any additional information you feel is relevant to supporting the growth and development of the Organics Industry In South Africa**		

APPENDIX 2: SURVEY – REASONS FOR CHOOSING ORGANIC FARMING

Broad Reason	Reason	No of times recorded	Percentage
Environment related 26%	Well being / health of the environment / ecologically sound	12	14%
	Long term sustainability and viability	6	7%
	Healthy soil / better soil	4	5%
Health related 20%	Healthier food / safer food human health / better food quality.	14	16%
	Personal health reasons (family etc)	3	4%
Knowledge / Innovation related 5%	Innovative thinking / skill advantage / knowledge development	4	5%
Market / premium related 35%	Has helped to market produce	9	11%
	Growing Market demand	19	22%
	Higher prices / premiums	2	2%
Minimal Inputs 1%	Minimal inputs	1	1%
Philosophy related 11%	Belief in system / philosophy (or opposition to conventional) / self reliance	9	11%
Social 2%	Worker health / social upliftment	2	2%
	TOTAL	85	100%
	No of respondents	22	

Verbatim comments on reason for choosing organic

The customers demand organic food; organic food is a good thing to do- it is good to the soil and the environment and for the health of people; organic farming is a learning curve, yields are low and inputs are high; the market is still growing and has the potential to be big; the public wants to eat healthy food; the government must subsidise organic farmers.
Experimenting
Disease free area in the Cederberg area- we are blessed and fortunate. There is a huge demand
Market is present- demand is growing for organic stuff.
We believe that the quality of produce is better in all aspects and much more sustainable in the long-term.
Minimum inputs; no burning of fossil fuel except for deliveries; self-reliance.
I believe in the organic philosophy. I am convinced that convetnional farming is not sustainable, and is harmful to the natural environment. We need technical support from research institutions and incentives from government (we are actually improving the soil and not destroying it like conventional farming does. organic production has made the marketing of my produce a lot easier. organic production has sustainability and the produce is of good quality. it also deals with issues of ethics.
Organic agriculture is sustainable, balances life and is healthy.
Much unpolluted land, out of season production to EU producers, dry climate. There: is land available, are lessons learnt, are systems developed, are economies of scale, tree health, disillusionment with conventional agriculture. Organic farming has assisted me in terms of being able to market my produce through improved quality-taste.

Expansion: to get to a critical mass of production for business to become commercially viable. There's use of natural/ organic material-thus avoiding environmental damage. Organic production has assisted me in terms of marketing my produce by raising the price of my produce- my produce fetches higher prices.
There's a growing trend and the demand for produce is high- there's a high demand for biodynamic produce
Organic agriculture has made accessing the market easier due to low competition. There's increasing demand and organically produced food is healthier and tastier.
we supply both conventional and organic growers- demand is growing by the latter
Healthier food products, better working environment for workers- no health risks. Niche markets. Growing demand for organic produce.
Huge market potential; both locally and internationally; market demand outstrips my supply- will expand; wide variety of indigenous crops, scented, medicinal and aromatic plants that are already growing organically; well-adapted indigenous breeds of livestock.
Demand for organic vegetables is good; healthy fertile soils; supplying healthy foods; no use of toxic substances; the business is still growing.
unspoilt nature with low levels of contaminations due to the size of our farming land and relatively low development standards; despite the lack of organised facilities the organic movement keeps on growing, generating alternative markets to the large retail chains that tend to dominate today's shopping scene.
Organic production saves water, improves the quality of the soil and can improve production
Strong export market; information on organics is abundant; innovative thinking
Marketing value; environmental advantage; skill advantage
products are free of harmful chemicals and have a much better taste; very little pests due to the creation of a healthy soil
organic is healthier/ safer
Organic production is environment friendly; sustainable; develops niche markets esp. overseas.
More diverse basket of products; ecologically sound
We feel that organic production is the right thing to do and feel good about it; it is healthier, it is environmentally friendly- it is a low capital input method of farming that is attainable for anyone who wants to be self-sufficient. For a country it makes great economic sense. Why does one want to compete with 1st world technology when indigenous knowledge has taken centuries to adapt to the environment , adjust needs to be adapted to our current situation?; there is high demand for our produce- people are much more aware and are very keen on our fresh organic produce.
relatively chemical free produce; more wholesome produce; sensitivity and awareness of the environment
we have suitable areas for cost effective production; enough manual labour for organic practices; links with S.A's image for nature conservation. Organic production has helped a lot in getting the product on to the shelf.
Good soil
certification has helped market our produce
Growing market; soil improvement
Advantage in selling; able to achieve a premium status.
Based on the demand from Woolworths and knowledge
Doesn’t want to grow plants with poisonous pesticides
Market edge
Market edge
Agric sustainability
Doesn't believe in conventional methods of farming, including the use of pesticides, etc.
Demand for organic tea
Friends introduced him to it, likes the concept of farming organically as it is less harsh on the land, meaning less depletion of land and better production of crops

For the environment and social upliftment issues
Believes in organic farming and feels that all farming should go organic
Better for people and the earth
Life philosophy
Sustainability - to save the earth
There is a demand for organic produce and to have a foot in the door
Convinced of organics, life philosophy

APPENDIX 3: SURVEY – SOURCES OF INFORMATION AND ADVICE

Distilled Categories

Source of Information	No of Responses	Percentage
Networks (other farmers, certifying body, consultant, extension services, cross visits)	21	66%
Natural Experience / Action Learning (own research, common sense, experimentation, observation)	5	16%
Internet / Literature / books	4	13%
Training	1	3%
Implicit Knowledge	1	3%
	32	100%
No of Respondents	33	

Broad Categories

Source of Information or advice	No of times recorded	Percentage
Networks / Other Farmers / Associations	13	39%
Internet / Literature / Books	4	12%
Certifying Body	3	9%
Consultant	3	9%
Experience / Observation / Common Sense	2	6%
Own Research / Experimentation	2	6%
Cross visits	1	3%
Extension Services	1	3%
Fruit Industry does not take organic farming seriously	1	3%
Hands on Experience and observation	1	3%
Natural way of parents from childhood	1	3%
Training Courses	1	3%
Total	33	100%
No of Respondents	33	

Actual Responses

Category	Specific Answer
Certifying Body	Ecocert office
Certifying Body	If it is necessary from the certifying body
Certifying Body	Afrisco- ecocert, the company that certifies our farm as organic other famers
Consultant	Consultant
Consultant	Consultant /in house researcher

Consultant	Consultants
Cross visits	Visiting organic production in Europe and USA
Experience / Observation / Common Sense	Experience
Experience / Observation / Common Sense	Common sense
Extension Services	Extension service
Fruit Industry does not take organic farming seriously	The fruit industry does not really take organic farming seriously enough to provide advice / information
Hands on Experience and observation	Own hands on experience and observation
Internet / Literature / Books	Internet
Internet / Literature / Books	Overseas literature
Internet / Literature / Books	Books
Internet / Literature / Books	Internet
Natural way of parents from childhood	Natural way of life by parents from childhood
Networks / Farmers	Other participants in the organic scene, customers, suppliers, farmers alike
Networks / Farmers	BDASA-Biodynamic Association of South Africa
Networks / Farmers	Other farmers
Networks / Farmers	The BDOCA and Tim Jackson
Networks / Farmers	OSA
Networks / Farmers	Other farmers
Networks / Farmers	Group of organic farmers
Networks / Farmers	Customers
Networks / Farmers	Australia very advanced in organic industry and knowledge about organic farming and organic practices
Networks / Farmers	Input Supplier
Networks / Farmers	Input Suppliers
Networks / Farmers	We phone Tim Jackson of BDOCA, and find him very helpful and supportive. Other than this there is very little help, what happens when tim Jackson passes on
Networks / Farmers	Hundreds of phone calls received and made
Own Research / Experimentation	Own research
Own Research / Experimentation	Own experimentation
Training Courses	Training courses

APPENDIX 4: SURVEY – SKILLS LEVELS

Summary of Responses

Increase in skills levels due to conversion to organic farming	Number of responses to question	Percentage
Investment in training	6	19%
Learnt composting and other organic skills	6	19%
Increased observation and awareness	5	16%
Increased communication and sharing has created an understanding of the value of organic farming	5	16%
Increased awareness of hygiene and quality	1	3%
Learning about organic farming	1	3%
No – more training is required	1	3%
Greater understanding of pest and disease biology needed	1	3%
Don't know	1	3%
Have developed skills in computers and public speaking, some represent us abroad	1	3%
No new skills established	1	3%
Greater understanding of the harm of agrochemicals and how we need to save our soils	1	3%
Packing and processing has introduced new skills and new levels of responsibility	1	3%
Increased understanding of green issues and global warming and the role they can play in saving the environment	1	3%
Total	32	100%
No of Respondents	32	

Full Responses

Because the organic farming allowed us to become a Woolworths supplier demands good practices and ongoing training of all employees as part of their business Partner Agreements. Especially awareness of Hygiene and Quality / Presentation have been highlighted in line with packaging requirements.
Workers must be conscious of what they are doing and why
They have learnt to identified different pests and diseases
Be more observant as to the surroundings, as well as identify which "weeds" are beneficial and which should be removed
We are teaching them how to farm organically
Compost making planting and seeding
No impact
Increased awareness
More time and money invested in training
No- there is need for more training
Absolutely , we have had to move a away from simple following spray programs to understanding nature and farming better and we had to develop a sensitivity for the complexity of our actions.

Agriculture as opposed to agribusiness
Skills levels increased in areas such as compost making, squoting and harvesting practices
Greater understanding of pest and disease biology is needed for organic control
Skills levels has increased due to training in organic production not due to conversion
They have a better understanding of the needs of the plant and how to combat problems without chemical use
Don't know
They have learnt to how to make compost
The employees went on several courses for the farming and winemaking process to understand the organic impact
They gained skills in computers and public speaking as some of them now represent us abroad
People learnt how to follow organic practices
Ongoing training in seeding production, soil +compost preparation, irrigation ,pest control ,weed control harvesting preparation for market
All action are explained and monitoring is much more extensive, therefore a close feel +undrestanding fro organic culture
The workers work with us and they understand what we do and more importantly why we do what we do
We make a point to educating them on every process that occurs on the farm and we also rely on their past experience to add value to the work done on the farm
No new skills established
Staff are very aware and alert for tick diseases in cattle and goats. Compost making efficient and effective
Everyone has a much better understanding of the harm Agro chemicals do to us and how we are trying to improve and save our soils
Packing our own fruit and processing to make jams has introduced new skills and levels of responsibility, with our employees rising to the challenge
They are starting to notice articles/ news items about being 'green' and global warming and understand the role they can play in making it better
Staff are trained in areas of expertise e.g compost making, pruning, herbs etc
Everything we do is explained to staff. The how and the why, with the desired outcome explained
The staff are trained to be vigilant in looking out for pests or diseases. They participate in deciding how to deal with the problems

APPENDIX 5: SURVEY – HOW DID CROP LOSSES (CHANGE) IMPACT ON CASH FLOW

Summary

How crop losses impacted on cash flow for organic production	Number of Responses	Percentage
Negative cash flow	10	40%
Reduced yields	4	16%
Little/no impact	2	8%
Reduced shelf life	2	8%
Increased labour costs	2	8%
Production decreased	1	4%
Positive impact cash flow	1	4%
Not applicable	1	4%
Negative perceptions of organic quality	1	4%
Reduced production costs	1	4%
Total	25	100%
No of Respondents	25	

Actual Responses

operation was and still is cash negative and is subsidised by other activities
we had to conduct our own research to develop better production techniques
we had a loan lots of money, almost went bust, had to sell some land, and find the right markets
negatively, smaller yield, smaller export volumes
survived because of organic premium
still negative
Cash flow reduced to 50% of conventional. went to debt, ate bread for 2 years, prayed a lot
the operation is still small scale
There was very little impact of our business of selling to the local community as opposed to big buyers
It had a positive effect on my cashflow
Production costs went down. Although yields also drop the relationship between production cost and total yield become more favourable
Niche market saved me from global slump in grape/ wine market
major negative impact on cash flow the first three years of conversion .funded cash flow from other sources

rejections combined with lower production is a big restricting factor for the future of organic production
not applicable. We started organic marketing prior to in conversion crops and were pioneers in getting in conversion introduce to Pick N Pay
Organic products are often link to bad quality which is not true
There is no difference in terms of quality as long as the yield is adapted to the potential of the plant
The yield might be less than in conventional production, it means that the cost per produced unit is higher
This cost inflation has to be forwarded to the client, who might not find the justification of the price inflation in terms of quality
In other terms, client will compare the price /quality ratio with other product, regardless if they are organic or not
He will than place himself as a consumer and ask himself if the price match with the quality .if not he will not buy the wine and we as producer, might have to sell this good organic wine without any organic premium. We will then make a loss
Negative cash flow
problems were experienced with a new type of biological sheet in table grape boxes to replace
impregnated sheets to improve shelf life
We have moved to a controlled atmosphere box and sell a lot as fair trade rather than as organic
in establishing the wine grapes we used typical organic methods of compost and straw mulching, but as these had to come in from outside the area it proved too expensive
This has made production one third less expensive than conventional
cash flow implications were very serious .fortunately the sugar cane income helped
We did see a correction in the grape yields in the first year on one of our young blocks. This is however corrected itself in the second year
Winsgrense ernstig gesny- het egter positiewe kontavloei gehandhaaf
Organic production is very labour intensive and we struggle to make end meet. But we are dedicated to the principles of organic farming and feel the government should show more support

APPENDIX 6: SURVEY - TIME FOR CASHFLOW TO BECOME POSITIVE

How long did it take for cash flow to become positive	Number of Responses	Percentage
3 years	6	40%
Can't say	3	20%
Did not become negative	2	13%
1-2 years	1	7%
4 years	1	7%
5 years	1	7%
7 years	1	7%
	15	100%
Total Respondents	15	

Actual Responses

longer than 8 years
5years
3 years
several years
still negative as a result of poor management and changed staff
not yet
4 years. Cumulatively, 6 years
at off -take
one year
4 years
not yet positive, but processing of fruit e.g drying and juicing can help
2 years
Dit hang die jaar en klimaartaf-baie of min plae
There should be no difference between conventional and organic production if the area and techniques are chosen correctly
We are in a warm dry area with little pressure from fungal diseases and growing cover crops has overcome the compost problem
4 years
Still not achieved due to ongoing expansion -anticipate 2008
3 years
5years
We converted the farm to organic when we purchased it. At that stage no wine was made on the farm as our farm is starting up now
We did experience a small decrease in yield, but the quality of the grapes and the wine more than compensated for it
Met apples slegs in een seisoen negtatiewe vloei gehad- hoofsaaklik AGV insekskade
4 years

7 years

Dealing with cashflow changes

How did you deal with cashflow changes	No of responses	Percentage
Subsidised by other activities	4	31%
Found Niche markets / relied on premiums / passed cost on to customer	4	31%
Research to improve production / storage techniques	3	23%
Cost per unit production decreased more	1	8%
Cashflow corrected in second year	1	8%
	13	100%
No of respondents	13	

Actual Responses

Subsidised by other activities
Conducted research to develop better production techniques
Sold Land and identified new markets
Improved production methods
Organic premium
Unit cost per unit production decreased more
Found Niche market
Subsidised by other activities
Cost passed onto the customer
used organic technologies to improve shelf life
sold fairtrade to improve premiums
subsidised by other activities
Corrected in second year

APPENDIX 7: SURVEY - WATER USE EFFICIENCY

Effects of organic on water consumption

Has organic production assisted you in water efficiency	No of responses	Percentage
Has reduced our water usage / increased efficiency	12	67%
Can't Say	6	33%
Total	18	100%
No of Respondents	18	

Water usage values	**No of responses**	**Percentage**
No values	1	6%
Reduced by 25 - 30 %	1	6%
Reduced from 6 to5hrs per week	1	6%
Selling off water rights	1	6%
Reduced 10-7cm per week	1	6%
Reduced by 20 %	1	6%
Reduce application once week to once every 3 -4 weeks	1	6%
No figures, but reduced	6	35%
Use irrigation scheduling	2	12%
Plant 4 hs instead of 2	1	6%
Spring water for drip irrigation	1	6%
	17	100%
No of Respondents	17	

Actual Responses

we have only farmed organically and hence have no comparative values
water use was reduced by 25-30% due to better water retention of soils, soil erosion did also never happen
the less water your plants will use
The soil become colloidal and return the rain/ irrigation

Midsummer usage on mature trees has dropped from 6 hrs a week to 5hrs.(microject) rainfall events, even 5mm,reduce need for irrigation
The increased humus in the soil has retained the water for much longer. This happened to such an extent that I'm now selling off water rights to my neighbour
water retention in soil has improved due to increased organic matter content in soil
Organic with micro irrigation (9000m3), conventional with drip irrigation(4500m3)
used to use 10cm of irrigation a week as the soil organic content improved I cut this down to 7 cm a week in summer and 5cm a week in water
neutron moisture metering is used to schedule irrigation
cover crops might take up more water but overall the efficiency is higher as the cover crops keep the soil cool and prevend evaporation from the surface
It about 20% less water than in beginning
spring water used -aquire on farm-all under drip
Irrigation to minimise waste +other water saving practices
In year one we had to water our vineyards weekly, now we only water evry third to forth week.
We can plant 4 hectors of winter pastures where previously it was two
I have no figures to substantiate but the orchards are using less water, there is more moisture in the soil, the Neutron moisture probe diagrams show the soil is drying out slower
During last years extensive drought in our area we did not lose any crops or trees due to the deep mulching and fertile soils

APPENDIX 8: SURVEY – HAS BEING ORGANIC ASSISTED YOU IN MARKETING YOUR PRODUCT?

Has being organic assisted you in marketing your product?	No of Responses	Percentage
Yes	19	70%
No	3	11%
Not Clear	5	19%
	27	100%
No of Respondents	27	

Actual Responses

It differentiated me from rest of farmer
Helps move our extra stock
Not much
there is a demand for biodynamic produce
firstly had to find the importers, than screen the good from the bad we then have to invest in market development
great to market something that is in short supply
demand for organic vegetables is good
production problems demand -demand seed supply
don't know
Differentiation of product from commodity citrus
Improve quality -taste
it fetches higher prices
mad either a lot earsier
locally -no assistance
export-niche markets
biggest basket of products proof that we are serious about the environment and sustainable production
very well 19
Only 10% of our total to is from organic sale. It is niche market, which allows us to increase our portfolio and gain attention on the market place
The margins are not high, it opens doors as only few people can offer what we have
Rooibos limited does our marketing
Help a lot to get the product on the shelf
Easier access to markets because the competition is low
Greatly -after much groundwork and promoting

Certification assist in marketing because it is at this stage still seen as a niche market, however, bing organic and having a poor quality product will not assist you at all
Te min om invloed te he^
initially, 10-20 years ago we were seen as being a bit odd, but now our produce is sought after. People are much more aware and are very keen on our fresh and organic produce
The certification of our product help the consumer know they are buying organic produce. There is a huge market but only for crtified organic produce
There is a growing awareness of the health benefits and also the need to support those that are using their resources sustainably and not poisoning the planet further

APPENDIX 9: SURVEY – COMMENTS ON BUSINESS GROWTH

To get an idea of trends in business growth, respondents were asked to comment on the growth of their enterprise, which are presented in Table 25.

Table 25: Comments on business growth

Comment on Business Growth	No of times recorded	Per cent age
Volume and turnover decreasing	1	5%
Fledging enterprise - No trends noticed	3	14%
Volume and turnover stable	2	10%
Volume and turnover stable - limited by production capacity	1	5%
Increased	3	14%
0-10% increase in volume and turnover	5	24%
10 - 40% increase in volume and turnover	5	24%
100% increase in volume and turnover	1	5%
	21	100 %
Not Stated	5	81%
		21/26

The majority of respondents indicated that business was increasing, reflecting a growing demand for and production of organic agricultural produce.

Specific statements regarding growth made by respondents include:

- 3-4% increase in volume
- 5% growth since last year
- 5% year on year increase
- 6% Increase in turnover
- 10% year on year growth over last five years
- 20% year on year growth over the last three years
- 40% year on year growth in volume and turnover over the last three years
- 20% increase in volume
- 30 - 40% year on year growth for the last three years
- 40% year on year increase in volume

- 100% year on year increase in volume for last four years, but started from a very small base