



**IMPROVING AGRICULTURAL PERFORMANCE THROUGH AN
UNDERSTANDING OF ENVIRONMENTAL IMPACTS AT
DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT IN
ETHEKWINI DISTRICT**

By

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DECLARATION

I, Phendulwa Jaca, do solemnly declare that this dissertation represents my own personal work and has not previously been submitted for any purpose at this or any other university.

Signature:

Date:

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ACRONYMS

❖ DAFF	Department of Agriculture, Forestry and Fisheries
❖ DARD	Department of Agriculture and Rural Development
❖ DSS	Decision Support Systems
❖ EIS	Executive Information System
❖ FAWU	Food and Allied Workers Union
❖ GDP	Gross Domestic Products
❖ GIS	Geographic Information Systems
❖ KZN	KwaZulu-Natal
❖ MIS	Management Information System
❖ SA	South Africa
❖ SADC	Southern African Development Community
❖ SAPA	South African Poultry Association

ABSTRACT

This study improves agricultural performance through an understanding of environmental impacts at Department of Agriculture and Rural Development in eThekweni district. The study described the three external environmental impacts, namely techno-economies which is a combination of technology and economy, the natural impacts, as well as the political impacts in the sector. Face-to-face semi-structured interview using non-random was used to gather data from five participants at the Department of Agriculture and Rural Development in eThekweni district. Data was analysed using thematic analyses. The findings of the study were that technology and economic environments are the driving influences in agriculture and attention must be brought on such influences because they determine growth of this sector. Technology eased more imports into this country meanwhile there is not as much of comprehensive support for improved production and exportation by local farmers. It was also revealed that some major contributing impacts are scarcity of land to be used for farming, scarcity of water in major parts of the province, and the lack of updated knowledge, skills and skills development in agricultural sector. There is a need to promote agricultural activities to be regarded as priority by the country. That is, promotion of 60 percent local goods consumption before considering foreign products. Agribusinesses together with trade activities needs to be encouraged by local investors.

Key words: Economic growth, Food security, Natural impacts, Organization, Political, Poultry, Technology

CHAPTER 1

1. INTRODUCTION

1.1. INTRODUCTION

Agriculture is the mother of most sectors in most countries. It is the driving force for the success of most sectors namely retailing, manufacturing, catering and others. These highly rely on agriculture since most raw products are supplied by agriculture. As big the industry maybe, its significance and its role is undervalued. This is the motive behind this study.

Population grows, and more people gain wealth to purchase a wide-range of resources. As a result of these factors and more, the demand for food has increased, making food security one of the highest issues on the global policy agenda. As food demand grows, it should positively yield to the country's contribution towards the economy since it would mean that more purchase of food grows businesses or farms that would create more job opportunities and so on. Instead, the agricultural industry is and has been facing vast challenges at the larger extent that hindered its performance. These challenges require a throughout-action. But before action is taken, one needs to understand what underpins these challenges in order to develop appropriate strategies.

Not as an isolated industry, the agricultural sector is confronted by an amount of external environmental impacts that calls for a re-assessment of the existing practices in production and management. These challenges, especially in developing countries, vary from ascending competition for water, land and energy, management practices, the policies, globalisation, trade, the market, technological developments, as well as the lack of skills and knowledge. To a larger extent, these are categorised under technology and economy, the natural and political environments. The study aims to understand these environmental impacts on agriculture in order to improve agriculture's performance.

1.2. CONTEXT OF RESEARCH

The Department of Agriculture and Rural Development (DARD) is a government institution. The Department of Agriculture, Forestry and Fisheries (DAFF) (2014, p.06) stated that the department of agriculture was restructured in the period of democratisation of South Africa in 1994 and the introduction of the land reform and settlement programs to address past injustices.

The department is made of three divisions namely agriculture (horticulture, livestock and field crop), forestry and fishing.

The national level of this department is known as the Department of Agriculture, Forestry and Fisheries. The Department of Agriculture and Rural Development is a national division restructured at provincial level to act as direct farmers' support structure and service delivery mechanism for South Africa (DAFF, 2014, p.06).

The Department of Agriculture is responsible of offering support under various agricultural support programs, constant monitoring and evaluation of projects, mentoring and skilling entrepreneurs, offering financial support, especially small-scale farmers who are looking for financing, health control such as vaccines, development of agriculture policies such as trade policies, marketing the industry and other support structures offering aftercare, such as resource centres which can be regarded as being of crucial importance (DAFF, 2014, p.07).

The DARD in eThekweni district is among other districts in KwaZulu-Natal (KZN) and it aims at creating employment opportunities amongst small eThekweni surrounding farmers. The department works mostly with rural small farmers in supporting them with farming resources as government provision (DAFF, 2014, p.07).

1.3. RATIONALE FOR THE STUDY

The underlying principle of doing this study is that there is a decline in performance of agricultural industry and there is increase in food insecurity. The agricultural industry remains that important sector worldwide, driving most other successful industries. The revolution of the agricultural sector is fundamental to the prospect development and security of the KwaZulu-Natal. Within the province, this industry seems to be greatly contributing to the economy since this industry dominates rural areas. Statistics South Africa (2016) indicates that 54% of KZN population is in rural areas and most of them live through agricultural activities.

Agricultural activities are seen as the primary drivers for KZN's economy. One of the advantageous factors is the resourcefulness of the province, in terms of the land and natural resources. The interest of this study is therefore to examine the environmental impact environmental on agriculture for better understanding, so as to improve the sector's performance.

Even though there are strategies to be formulated, they can head to improve agriculture by considering these influences on how to respond to them.

1.4. PROBLEM STATEMENT

Given the importance of the agricultural sector for South Africa's long-term sustainability, this sector improves, although it is faced with some challenges that hinder its solid performance. There should be a way to find better understanding of this sector's challenges to ensure that strategies to contest those challenges are well formulated.

According to DAFF (2016, p.10), agricultural performance has improved and has massively contributed to the country's economy, more specifically to the gross domestic products (GDP). However, DAFF (2016, p.11) also states that the sector is performing poorer, as compared to other sectors; plus, the improvement of this sector does not mean good performance. The Department of Agriculture has played a major role in this improvement, as it works cooperatively with small, medium and large agricultural farms. Although the agricultural sector may be currently doing well, according to Goldblatt (2016, p.06), it is facing major challenges that largely impact on its performance.

The challenges that impact on agricultural performance include the changing technologies, changes in the economy, the influence of politics as well as climate change and pollution (Kapuya, 2017, p.08). Goldblatt (2016, p.06) points out that the major challenges that the agriculture sector faces include the rising input costs and dependence on external factors that the farmer cannot control, limited natural resources, lack of subsidies and extension support, very little market predictability and non-tariff trade barriers in importing countries, increasing competition from cheap and subsidised imports, predicted negative long-term changes in the climate, as well as the decline in the health and functioning of our supporting and underpinning natural systems.

1.5. MAIN AIM OF THE RESEARCH

The aim of this study is improve agricultural performance through understanding the environmental impacts on agriculture. That is, assessing the impacts of techno-economy, natural,

and political environments on how they contribute towards the performance of agricultural sector.

1.6. RESEARCH OBJECTIVES

The objectives of this study are as follows:

- To understand the techno-economic impact on agricultural performance.
- To understand the impact of political environment on agricultural performance.
- To understand the natural environment impact on agricultural performance.

1.7. RESEARCH QUESTIONS

The central research questions that the study aimed at gathering data around are:

- How do techno-economies impact agricultural performance?
- How does the political environment impact agricultural performance?
- To what extent does the natural environment impact on agricultural performance?

1.8. SIGNIFICANCE OF THE STUDY

The study can have important implications in the improvements of agricultural performance. In addition, it provides the predictions of agricultural growth and sustainability. The study adds towards enriching the knowledge of the comprehensive impact of the environment, techno-economy, together with the role of politics in agriculture. The study also provides the insight approach to strategically tackle these challenges, both locally and globally. It further provides an understanding of how the industry's performance is not independent from these extensive influences. This would improve the performance of the agricultural sector and the impacted industries.

1.9. THEORY FRAME

This study adopted the PESTEL model to allow the researcher to unpack the important concepts in relation to the objectives of the study. Looking at the most challenging side on the businesses outside environment, the study considered the technological, economic, natural environment and

the political factors. Although only four are being assessed, the model is presented as it is. This model suits this study because it is designed to assess the business external environment.

1.10. UNDERLYING ASSUMPTIONS

The assumption in doing this study is that in this country agriculture is poorly performing. In addition to that, the technological, economic, natural and political are the leading factors to this poor performance and their impact are not quite understood. In this view, the fact is that there has been no considerable amount of time spent in strategizing the responses to reduce the negative influences of these factors in agricultural performance.

1.11. OVERVIEW OF THE STUDY

To achieve the purpose of the study, the study is set out as follows:

Chapter 1 is the introduction that outlines the overall aim of the research, the context and rationale for the study, problem statement, the main aim of the research, research objectives, research questions, theory frame, the underlying assumptions, as well as the value of the study.

Chapter 2 offers a review of international and South African literature that is relevant to the study. This includes literature on the environment and how it is impacting on agriculture, in order to improve this sector's performance.

Chapter 3 outlines the qualitative research approach and methods, and the logic that underpins them, the trustworthiness of the study, the ethical considerations and finally, the limitations of the study.

Chapter 4 is the presentation of findings and discussion where review of literature and theoretical framework are done.

Chapter 5 summarises the research findings and concludes the chapter, based on the findings, then finally sets out the recommendations of the study.

CHAPTER 2

2. LITERATURE REVIEW

2.1. INTRODUCTION

Most regions in Africa primarily depend on agriculture. Nyariki (2011, p.36) indicates that agriculture is the backbone of Africa's economy. The agricultural input of the economy has been continuously declining from the past years. However, this division has greatest influence on the growing and developing of the country's economy especially with technology innovation taking over most industries.

Agriculture has a complex relationship with natural resources and the environment and attributing specific environmental effects to agriculture is difficult and not fully understood. Agriculture is the major user of land and water resources, yet it needs to maintain the quantity and quality of those resources in order to remain viable (Joint Working Party on Agriculture and the Environment (JWP), 2004, p.10). Agricultural performances in developing and developed countries have to improve in order to ensure there is sufficient food production in the coming years. But farming operations bring about complex challenges including water scarcity, the depletion of resources, climate change, environmental non-sustainability and health unconsciousness in relation to farming, and are causing levels of uncertainty.

This section unpacks of the environmental literature which is carried out through the adoption of PESTEL model. According to Hough, Thompson Jnr, Strickland III and Gamble (2011, p.32), the PESTEL model represents the following full explanations:

- Political elements highlight the part that the government plays in each industry.
- Economic elements comprise the macroeconomic aspects such as economic growth, inflation rate, and exchange rates.
- Social elements consist of the changing cultures and health awareness, career attitudes and demographics.
- Technological elements consist of innovations such as the internet, automation and nanotechnology.

- Environmental factors stand for ‘green’ issues such as the climate or weather changes, waste and pollution.
- Legal factors are the legislative restrictions or changes such as restrictions in trades. These influence how the organisation operates, its costs and the demand for its products.

This following describes the local and international theories around technology and economic impact on agriculture, the natural impact and political influencers in the performance of agricultural sector.

2.2. TECHNO-ECONOMIC ENVIRONMENT

2.2.1. Creativity and Innovation

This is the use of new methods of production, the new products, exploitation of new markets, new sources of supply and new ways of organising a business (Inauen & Schenker-Wicki, 2011, p.499). In most parts of the world creativity and innovation has brought bring into interaction, the diverse knowledge and to be able to link the two (Inauen & Schenker-Wicki, 2011, p.499). This is seen through technological changes in animal feeding in the European and American countries have transformed drastically from custom practices into more technology use (Inauen & Schenker-Wicki, 2011, p.499). Somewhat different speed of adopting technology in Southern Africa may be viewed as challenge. This is because Aubert, Schroeder and Grimaudo (2012, p.501) argued that adoption of technology in South Africa and Africa has been moving in slow pace leaving the country unable to fairly compete with the world in terms of innovative production process in agriculture.

In South Africa there is absence in the use of inside-out processes which are outward initiatives to make use of intellectual property at the right time (Inauen & Schenker-Wicki, 2011, p.497). Aubert *et al.* (2012, p.501) add that in most parts of the world the agricultural industry is outward and slow on the adoption of technology and has ignored the innovative methods of production.

2.2.2. Internet of Things (IOT)

The era of internet of things (IOT) influences agriculture globally (Zhao, Zhang, Feng & Guo, 2010, p.462). According to Schwat (2015, p.235), globally, there has been transformations in industries as they emerge into IOT and evolve in the products that they offer. The World

Economic Forum Report (2016, p.09) showed that in South Africa, there has been growth in financial services, investors, sales and related workforce. This means that the industries that offer product rather than service, will continue flagging and that directly impacts on agriculture, since this sector also offers tangible products rather services. What Zhao *et al.* (2010, p.463) explain is that businesses are evolving physically into more technology of internet. This proves that more investments will be done in businesses that major in technology that revolve with time.

The use of information technology development, as well as the implementation of social media networks, internet and television, gradually influences investors and customers' views on product quality, competitive purpose, innovation, range and speediness of distribution and the brand as a whole (Kietzmann, Hermkens, McCarthy & Silvestre, 2011, p.245). For example, worldwide, there have been shared and easily accessible health benefits, competitive companies or products, and comparison of valued quality, which influence consumers to switch lifestyles and sellers or suppliers. Armelli and Villanueva (2011, p.03) found that the number of organisations using social media to market their brands has rapidly grown and will grow businesses further in the coming years. In contrast, the DAFF (2014, p.21) reported that the increased use of social networks and consumers relying on media has increasingly negatively impacted on the growth of agriculture in South Africa, since negative media comments around quality production are serious crisis for the industry.

Although there may be challenges in terms of agricultural practices, the information technology systems like management information system (MIS), decision support systems (DSS), geographic information systems (GIS), executive information system (EIS), has risen the process dependability, process control, process effectiveness in the practice of this enterprise (Schiefer, 2003, p.04).

2.2.3. Industrialisation

In most parts of the world, automation has made it challenging for the employed veterans without advanced technological skills to keep up with technology, whereas, technology has been taking over the industries (World Economic Forum, 2016, p.08), which highly requires new skills. Furthermore, the World Economic Forum (2016, p.16) found that automation has replaced

the demand for labour work because machines are doing the work. For instance, a task performed by 20 people can now be done by a single machine operated by 1 person. This might have been the case for the employees reported to have been retrenched from Rainbow Chickens farm in Harmasdale, KZN (Naidoo, 2017). Most Canadian farmers reported to have found efficiency and improved operation in using machines (Aubert *et al.*, 2012, p.545). Kassie, Shiferaw and Muricho (2011, p.1785) put forward the need for constant improvement in the agricultural sector, which directly and indirectly benefits other chains like attracting skilled labour, increased productivity, stimulating the demand for labour, manifested shifts in supply lowering food prices, boost broader development of the rural economy.

2.2.4. Demand and Supply

Using technology, supply from outside countries is no longer a challenge (Hart, Milstein & Caggiano, 2013, p.57). Instead, technology innovations support businesses, including farming decision-making and operations (Aubert *et al.*, 2012, p.511). This has strongly impacted on the agricultural sector, since other companies have got more and eased access to be supplied by companies outside the country. Hart *et al.* (2013, p.57) further reveal that the motivation of the zero tariffs was the desire by the South African government to ensure access to low-cost meat protein for low income households.

Katengeza (2012, p.35) states that because most farmers have poor access to appropriate and reliable market knowledge, some farmers produce wrong products to wrong producers. Katengeza (2012, p.35), as well as Pretorius and Small (2012, p.37) agree that because of urbanisation and the increase in land competition, there has been poor quality of products to consumers, while the demand is very high.

In South Africa particularly, more and more land is being occupied by people to build houses, leaving small scale of land for farmers to meet consumer demand, since volumes will be very low. This, according to Katengeza (2012, p.41), has resulted in poor product quality that consumers are not satisfied with. That is, lower quality grade, for example, because there is not enough space to produce more agricultural products. Hence, most farmers have to sell their chicken before they are fully grown as a result of the high demand for the product.

As a result of low grade product quality, farmers then have to settle for low market prices to distributors such as wholesalers, or even consumers themselves because as much as they demand the product, they expect quality product at affordable price. High product costs and poor product quality has raised high demand of the product from foreign countries. That is the focus of the next section.

2.2.5. Imports and Exports

Moon (2011, p.17) argues that imports of agricultural products have been protected by the governments of most respective countries, to secure the growth of their economies. However, South African imports have increased, more specifically poultry, especially in the last 3 to 5 years and it seems to be an ongoing challenge (Kapuya, 2017, p.08).

According to the South African Poultry Association (SAPA) (2017, p.02), poultry imports has increased by eight percent on a monthly basis in January 2017 to 37 375 tons and by a further four percent in February to 39 212 tons. The rise in import numbers is mostly a result of other issues such as the drought period in South Africa. In that case, the country is forced to import large numbers of agricultural products (Pretorius & Smal, 2012, p.34), particularly with generous international trade policies that this country has.

Entering the market duty free in South Africa, Brazil and European countries are the dominant competitors to local farmers (DAFF, 2014, p.21). Brazil commanded the greatest shares (39.53 percent) in South Africa's broiler meat imports during the year 2013, followed by the Netherlands (22.35 percent) (DAFF, 2016, p.21). These countries supply what consumers perceive to be more or less same quality with the products from local companies, but the main part is that the Brazilian and European companies sell their products at cheaper prices than local farmers (Kapuya, 2017, p.20). Other than these, it has been shown by Pretorius and Smal (2012, p.33), as well as Keller and Lehamann (2006, p.179), that generally, consumers have more desire on international than domestic products.

As of the year 2004 to 2013 the country's meat exports were tremendously less than imports (DAFF, 2014, p. 19). In 2013, approximately 450 million kilograms were imported, as compared to less than 50 million kilograms that were exported, making this country the disposable importer

of meat (DAFF, 2014, p.19). This can mean that more imports opened more competitive disadvantage for local farmers. In Johannesburg, the Food and Allied Workers Union (FAWU) delivered an emotional appeal to government to constrict the code of practice of trading in meat (mostly chicken) from outside countries, in order to rescue job losses being experienced by South Africans (Naidoo, 2017).

According to DAFF (2014, p.19), South Africa exports most of its broiler meat to Southern African Development Community (SADC) countries namely Zimbabwe, Mozambique, Botswana and Namibia. Meanwhile, these countries' economies are not well developed to gain South Africa high returns on exports. Another influence is the high electricity costs, mostly resulted from Rand weakening further impacting on the cost of imported inputs and equipment (DAFF, 2015, p.45).

2.2.6. Infrastructure and Resources

The performance of the industry primarily depends on the collaboration of competences and resources inside and outside the organisation. That is why it is crucial for organisations to understand the resource-based view, then explore and exploit all resources (Inauen & Schenker-Wicki, 2011, p.498).

It has been found by Katengeza (2012, p.39) that most farmers in rural areas in developing countries have poor roads. Some have poor network connections for cell phone use, unreliable energy source and somehow, they do not even have access to proper land for farming, which becomes a challenge for most traders to be in touch with rural farmers (Katengeza, 2012, p.39). Agriculture dominates most rural areas, but the lack of development hinders local trading, which is what holds the improvement of this sector.

2.2.7. Trade and Currency

In most developing countries, economic transformation highly relies on the development and growth of the agricultural division (Kassie *at al.*, p.1785). From July to September 2017, South African entered into recession (Naidoo, 2017). The economic instability affects the supply and demand steadiness of agricultural products, productivity and price and trade of all such commodities (Shakoor, Saboor, Ali & Mohsi, 2011, p.328).

Farmers had to increase output price to cover the production costs. On the other hand, consumers were putting some products on option due to economic hardship and that includes chicken, hence, most industries were affected, especially the retailers and restaurants. The economic position mostly increases food prices, especially meat (Pretorious & Smal, 2012, p.1135), leaving consumers spending outrageous amounts of money on food alone.

The recession opens more import trade influx, especially with food, since it is a need to consumers (Katengeza, 2012, p.34). International traders would take advantage of the poor currency performance and sell their products at low prices, resulting in local producers running at losses or totally fail as businesses. The failing of local producers highly impacts the economic growth of the country since there would be fewer exports that contribute to the GDP. This may be the reason why agricultural contribution to the GDP has declined, as Statistics South Africa (2010, p.04) reported that agriculture provides for less than three percent of the GDP.

2.3. POLITICAL ENVIRONMENT

2.3.1. Quality Skills training

Inauen and Schenker-Wicki (2011, p.497) stated that more and more workers require innovation and advanced skills for fast production. These skills are not only self-beneficial, but when the workers know what to do, they become motivated inside-out the organisation (Inauen & Schenker-Wicki, 2011, p.497).

Kapuya (2017, p.21) points out that the shortage of support structures and mentorship, solid agriculturalist organisation, technical training, limited resources, few skilled agricultural entrepreneurs, lack of marketing skills, absence of health control and lastly, the undesirable media interpretations about the run-through of brining, are watershed for the industry. Skills training can be viewed as a major contributor in these factors and mainly because most agricultural business owners or employees are from previously disadvantaged communities (Coetzee *et al.*, 2007, p.06). The government needs to also offer improved skills training that keep up with the changing environment.

2.3.2. Job creation and Job security

The agricultural activities have always been utmost key earnings generator for a great number of rural areas, plus an enormous number of the rural people directly rely on agricultural activities (Pretorius & Smal, 2012, p.507). While in Kenya this sector accounts for approximately 25 percent of GDP, provides employment for close to 70 percent of the population, contributes roughly 40 percent of export earnings and provides most of the country's food supply (Nyariki, 2011, p.36), in South Africa, it contributes further and even employs approximately 40 percent of the general population (Pretorius & Smal, 2012, p.507).

As mentioned before, this sector highly contributes to the grand total of employment within the broiler industry, at around 48 084 employees (DAFF, 2014, p.19). This shows the need to tackle the industry's challenges to ensure improved performance that would secure employment and businesses. Kassie *et al.* (2011, p.1785) found in their Ugandan study, that educated farmers were more effectively using technology and shared insightful information and experiences about new technology, as compared to the uneducated ones.

Close to 300 000 population in a year will be forced to leave this sector and find alternative source of revenue, except if special support is offered (Pretorius & Smal, 2012, p.37). These results are applicable only to the formal economy and it can be assumed that the informal sector will have to absorb a sizeable number of the unemployed (Pretorius & Smal, 2012, p.37).

2.3.3. Stakeholders' cooperation

Since there is no organisation that can have entire knowledge, skills and full resources to be best in everything; organisations can make use of the intra and cross industry cooperation. Firstly, by looking into the collaborative work with multiple stakeholders (Inauen & Schenker-Wicki, 2011, p.504) such as academics, to improve information on improving production performance, and tested strategies to apply the information.

Organizations need to make use of suppliers who significantly provide external sources of knowledge transfer (Inauen & Schenker-Wicki, 2011, p.506). In addition, organisations need to

collaborate with customers who are the driving factor for organisational performance at any given function (Inauen & Schenker-Wicki, 2011, p.506). Finally, Inauen and Schenker-Wicki (2011, p.506) argue that organisations need to collaborate with other competitors, where they may acquire new information to improve their current performance.

2.3.4. Policies in the industry

There is a need for the government in Sub-Saharan countries to address the issues in environmental agriculture by the measures of agricultural policy. This includes agricultural policy measures comprising a wide economic environmental policies and regulations, research development, environmental conditions, facilitation of cooperation and education (KWP, 2004, p.11).

2.3.5. Knowledge Sustainability

Inauen and Schenker-Wicki (2011, p.507) stated that managers need to invest more on research and development (R&D) for internal and external sustainable knowledge. The government needs to encourage continuous knowledge development, for example, in schools. The demand for skilled labour is increasing whereas the demand for less skills labour declines every so often (Schwat, 2015, p.237).

Technology is taking over the agriculture industry and the younger generation is more equipped with the latest technology, but the older generation is more concerned about technology and proper training (Gamage, Sailikitha, Karamchandani, Gowda & Xin Tong, 2014, p.06; Mitchelmore & Rowley, 2013, p.97). Whilst young people are advanced in technology and the latest information in general, the older people are the ones more interested in the agriculture industry, while the young people on whom the supposing knowledge are invested onto, are less interested (Gamage *et al.*, 2014, p.03).

Adams (2005, p.215) states that knowledge systems focus on in-depth expertise and long-term focusing on particular area to be able to combine previous expertise methods with new ones. McElroy (2015, p.16) adds by arguing that conservative practice of knowledge management is allied by means of getting the correct material to the correct individuals, at the correct time.

2.4. NATURAL ENVIRONMENT

2.4.1. Climate Action

Currently, it can be agreed that climate change move forward to be one serious environmental challenge that the present world encounters. The release of greenhouse gases (GHG), the escalation in number of gas such as methane (CH₄), carbon dioxide (CO₂) and nitrous oxide (N₂O), are accountable for causing the changes in the universal temperatures (JWP, 2004, p.19). Climate changes produce fluctuates like intensified levels of sea, variations in rain series, together with the drive of climatic areas as a result of the rising heats. While this takes place, any agricultural activity is highly driven by climate settings (Gomiero, Pimentel & Paoletti, 2011, p.06).

Climate change threatens production in the agricultural division, causing vulnerability physically and economically, respectively. These conditions are making it difficult for farmers to predict production, as they do not know what to expect because even in wet seasons, there appears floods, while in the dry seasons it gets drier (Shakoor *et al.*, 2011, p.328; Gomiero *et al.*, 2011, p.103).

Climate change has a clear direct impact on agricultural production. The climate change can be seen as increasing weather temperatures, delays in onset of the rain, decrease in rainfall (Lybbert & Sumner, 2012, p.117; Haung *et al.*, 2011, p.510). As a result of raising population with nothing to conserve the natural resources and deal with climate change, food insecurity is going to continue being the chronic problem in the future.

Not only South Africa will be experiencing this, but globally, high weather temperatures are expected to continue to be harsh, as long as there is still pollution. Not so great weather changes are still expected in most countries, especially since technology has taken over with no innovations to ensure that technology does not totally take control of natural processes that cannot be controlled (Haung *et al.*, 2011, p.511). As a result of the dry weather, it may require more use of water in agricultural sector, hence, the rise in water scarcity.

2.4.2. Draught and Water Scarcity

In South Africa, not only poultry is struggling, but all agricultural regions in general are struggling due to natural causes such as drought. Looking at the decline in domestic production like South Africa's yellow maize, which has direct impact on the poultry sector (Kapuya, 2017, p.15). Coetzee, Meyer and de Beer (2007, p.03) state that the supply of maize for production, which makes 50 percent of the entire poultry production, has declined due to weather changes, the failing of businesses, high costs of production, high costs of transportation and the increased demand for maize.

Climate change can be regarded as a dominant factor, since currently, South Africa, especially KZN, is experiencing great water shortages. Thus, local farmers also experience ground water shortages and water quality, surface water pollution and waste disposal in water (DAFF, 2014, p.19).

2.4.3. Health and Wellbeing

Uganda has one major challenge in poultry growth limiting productivity and that is viral diseases (Kassi *et al.*, 2011, p.1785). This has been the challenge in the country. DAFF (2014, p.16) reported that poultry diseases outbreaks on local farms. There is a continuous threat of poultry diseases, with birds transporting diseases across regions where diseased birds are allowed to move freely (DAFF, 2014, p.16; Coetzee *et al.*, 2007, p.04). Coetzee *et al.* (2007, p.04) states that in South Africa (S.A), there are no strict rules of screening birds' diseases during sales, especially when items are coming in. Other impacting environmental factors are hazardous chemicals, diesel and gas spillages, fires, air pollution, natural resource depletion, odours from processing plants and mills, and high energy consumption (Department of Trade and Industry (DTI), 2017, p.27).

2.4.4. Environmental sustainability

Agriculture is forefront in managing the entire natural resources such as land, forestry and water. It became of importance, the need to encourage sustainable agricultural performance and food security for the future generation (Moon, 2011, p.16).

According to Moon (2011, p.14), food demand is expected to be extremely high in 2050, due to the expected rise in population by 9 billion, hence, ecological agriculture becomes predominantly important. It means if the focus is only technology and the urbanisation of the natural environment, then agricultural growth in future is blurring. Therefore, it means low income for most average households, which will hinder the performance of the country's economy. It is prerequisite to mend the environmental performance within agriculture by improving benefits, and then reduce harmful environmental impacts for sustainable use of resources (JWP, 2004, p.29).

2.4.5. Natural resources depletion

The two major concerns in agriculture are water depletion and soil degradation. The land intended for agriculture, as well as the amount of engaged soil dropped. However, water usage increases (Aertsens & Van Huylenbroeck, 2009, p.215). Land use is an important indicator for natural resource consumption. There is a land use efficiency indicator, which has revealed that land (particularly in heavily occupied areas) has become a limited good. Meanwhile, agriculture has to contest with users such as housing, nature reserves and other industries for the very same scarce resources (Aertsens & Van Huylenbroeck, 2009, p.215).

Due to the increasing amount of human population in the semi-century or so, globally, agriculture will be forced to double its productivity to meet the global demand for food and hunger reduction (DAFF, 2014, p.19). But then, the serious problem that the agricultural sector is facing is whether it is capable to produce further in a socially acceptable manner, in order to meet the increasing demand in the next years, considering the rate of air pollution, landscapes, biodiversity, clean and adequate water supply, and conserved habitants (Moon, 2011, p.17; JWP, 2004, p.31).

2.4. CHAPTER SUMMARY

This chapter reviewed literature guided by PESTEL model which is the theory frame analyzing the environment. The chapter looked at the techno-economic literature that confirmed that the environment has enormous impact in the performance of agriculture which has immensely hindered growth of this sector. This has been confirmed by insight from notable literature.

Three themes were developed to facilitate the review of literature. The chapter reviewed techno-economic environment. Under this theme there were subthemes which were creativity and innovation, internet of things, industrialization, demand and supply, import and exports, infrastructure and resources, and trade and currency.

This chapter further discussed the second themes which is the political environment. Under this theme, the reviewed subthemes were quality skills training, job creation and job security, stakeholders' cooperation, and knowledge sustainability. Literature reveals that rapid change of the environment that affects agriculture not only to adopt for production but also to improve the sector performance and management.

Finally, the chapter reviewed the third theme of the study which is natural environment. Under this theme, subthemes' literature was reviewed. Subthemes include climate change, draught and water scarcity, health and wellbeing, environmental sustainability, and natural resource depletion.

CHAPTER 3

3. RESEARCH DESIGN AND METHODOLOGY

3.1. INTRODUCTION

The study aims to analyse the environmental impact on agricultural activities in order to improve the current performance of this sector and better predictions of this sector's prospect. This chapter therefore discusses the research design and methods that were used during research. Moreover, the relevance of the chosen design and methods is highlighted. This chapter will look at the study questions and objectives. It will then proceed to look at the study design under which there is classification of study design and research paradigm. There is of discuss research methods where there is data collection methods, study site, sampling strategies, sampling size, study participants and pilot testing. Data quality control in form of reliability and validity also forms part of this chapter. Then the chapter describes data analyses, trustworthiness, ethical consideration, limitations of the study, and then the chapter is summarised.

3.2. RESEARCH QUESTIONS AND OBJECTIVES

This study focuses on improving agricultural performance through an understanding of environmental impacts. Hence the following are the research questions that the study aims to tackle.

3.2.1. Research questions

The central research questions that the study gathered data around are:

- How do techno-economies impact agricultural performance?
- How does the political environment impact agricultural performance?
- To what extent does the natural environment impact on agricultural performance?

3.2.2. Research objectives

The objectives of this study are as follows:

- To understand the techno-economic impact on agricultural performance.

- To understand the impact of political environment on agricultural performance.
- To understand the natural environment impact on agricultural performance.

3.3. RESEARCH DESIGN

According to Terre Blanche, Durheim and Painter (2006, p.76) research design is a strategic framework for action that serves as a bridge between research questions and the execution or implementation of the research. Designing research is planning how the research will be conducted (Neuman, 2011, p.174). The researcher uses design to meet the study objectives and address the study's research questions. It illustrates the research paradigm and research approach used as a basis for gathering data (Neuman, 2011, p.174).

3.3.1 Classification of research design

The study employed descriptive research design because it assists the researcher in generating the description of a problem. According to Neuman (2011, p.38) descriptive research design presents a highly accurate picture of the specific details of a situation or a problem studied, traces first-hand information that challenges previous information and generates or categorises styles. This design is an advantage for the study as it allows researcher to demonstrate the relationship and reliability between theory frame and data gathered. An in-depth description of data allows the generalisation to larger population through the contribution of experienced participants pointing out their views, attitudes, current status, feelings and beliefs.

3.3.2. Research Paradigm

Research paradigm is a method of “organising framework for theory and research that includes basic assumptions, key issues, and models of quality research and methods for seeking answers” (Neuman, 2011, p.94). There are two main research paradigms, namely, positivism and post-positivism. According to Neuman (2011, p.95) positivism stands for objectivity; it insists on the measurability and predictability and constructs laws and rules for researching phenomena. Post-positivism on the other hand stands for subjectivity and understanding (Neuman, 2011, p.96). Positivism focuses on quantitative methods, such as survey questionnaires and experiments, in researching phenomena, whereas anti-positivism focuses on a range of qualitative research methods, such as face-to-face interviews and observations (Neuman, 2011, p.77).

The research paradigm for this study is post-positivism since it is a qualitative study. It is characterised by its purpose, which is linked to providing insight into public life, and its procedures, which generate words instead of numbers as data for analysis.

This qualitative study adopted an interview approach because it provides opportunity to first-hand data that will provide insight on techno-economies, natural, and political environmental impacts on agriculture.

3.4. RESEARCH METHODS

Research methods are specific techniques that researchers use to sample, collect, measure and analyse data (Terre Blance, Durrheim and Painter, 2006, p.76). The semi-structured in-depth interviews were undertaken to collect primary data in order to address the research objectives of this study.

3.4.1. Data collection methods

The study used face-to-face in-depth interviews. The in-depth interview allowed the researcher to ask open ended, non-directive and semi-structured questions that motivate elaboration so that views can be recorded and interpreted or analysed (Neuman, 2011, p.325). A semi-structured interview is useful for collecting firsthand data as it consists of questions that allow the participants to be flexible in answering in detail. This also gives the interviewer new ideas and other issues to explore, that were not included while preparing for the interview. Also, semi-structured interview allows the two-way communication, giving participants the freedom to express their views in their own terms. The interviews conducted in September 2017 were recorded using digital voice recorder and notes were taken.

3.4.2. Study Site

The study was conducted at Department of Agriculture and Rural Development at eThekwinini district, in the Durban city centre. The main reason for choosing the Department of Agriculture and Rural Development was that it is the body for most farmers and it is wide exposed to farming in most parts of the KZN province.

3.4.3. Target Population

Neuman (2011, p.246) states that targeted population is “the concretely specified large group of many cases from which a researcher draws a sample and to which results from sample are generalised”. The Department of Agriculture and Rural Development is a bigger body in this sector; hence its employees were targeted. It must be noted that within the department, not everyone is exposed to the environmental impact of this sector within the Department. Hence, the participants are regarded to have sufficient information for findings and conclusions. Due to their direct contact and everyday hands-on with local farming, the study targeted the Agricultural Advisory, Agricultural Economist, Engineer, Agricultural Environmentalist and Human Resource Manager within the Department of Agriculture and Rural Development.

3.4.4. Sampling strategies

Sampling entails the selection of small collection of cases or units (Neuman, 2011, p.242). According to Neuman (2011, p. 243) sampling strategies include probability and non-probability sampling. Probability or random sampling is a quantitative sampling strategy which is the selection of participants by chance using rigorous rules and procedures (Neuman, 2011, p. 243). Meanwhile non-probability sampling also known as non-random or judgment sampling is qualitative sampling strategy which is the selection of participants using judgment or choice of the researcher (Neuman, 2011, p. 244). The study employed a non-probability sampling strategy as it provides insight into the research problem. This strategy entails purposive sampling that the study selected. Neuman (2011, p.268) states that purposive sampling in non-probability sampling that allows the researcher to select population or cases with a specific purpose in mind. Purposive sampling was employed in the study to select participants who provided relevant information for the study, to ensure that data collected was accurate and reliable. Participants were selected for the study because related fieldwork that exposed them to issues to address the study questions and meet the objectives

3.4. 5. Sampling size

Sampling is a process of selecting a small portion or part of the population to represent the entire or target population (Neuman, 2011, p.242). Sampling size is a “total number of units or people selected to participate in the study” (Neuman, 2011, p.242). In this study, the sample size

included five participants across different departments at Department of Agriculture and Rural Development. This sample size is believed to be adequate and suitable for the study because of the exposure they have around environmental influences. Thus the researcher believes that a sample size of five participants will yield adequate data for the study.

3.4.6. Study participants

Neuman (2011, p.243) defines a participant as “a person who answers questions, usually in an interview or group interview”. The following individuals participated in the empirical research study (Table 3.1):

Table 3.1: List of participants included in this study

DEPARTMENT	PARTICIPANT	DATE	TIME
Human Resource Manager	Participant A	22/09/2017	08:00
Agricultural Advisory	Participant B	22/09/2017	12:00
Agricultural Economist	Participant C	22/09/2017	14:00
Agricultural Environmentalist	Participant D	23/09/2017	09:00
Engineer	Participant E	23/09/2017	10:30

A total number of five farmers at DARD were interviewed in order to provide insight into how techno-economies, natural and political environments impact the agricultural performance.

The Agricultural Advisory, and Agricultural Economist, and Agricultural Environmentalist provided the data on the impacts posed by techno-economies environment into agricultural performance. The Agricultural Environmentalist, Engineer and Agricultural Advisory provided data on the impacts by caused by natural environments into the performance of agricultural sector. Human Resource Manager, Agricultural Advisory and Agricultural Economist provided data on the impacts by political environments into agricultural performance.

3.4.7. Pilot testing

According to Hulley (2007) a pilot test is the small scale introductory test conducted in order to evaluate time, feasibility, adverse events, time, and improve upon the study design prior to performance of a full-scale research project. During introductory meeting with the DARD employees, a partial test was conducted. Each employee was given a copy of interview guide schedule (see appendix D). The employees reviewed the interview guide schedule and they then requested for simple terminology when full interview is being conducted. Although target population was clear, individual under each department was nominated by the employees based on their background knowledge. One day for the study was impossible when time was being allocated with study participants. The DARD office manager then verbally allocated second day for completion of the study. There were no other correction emerged from pilot testing.

3.5. DATA QUALITY CONTROL

3.5.1. Reliability

Reliability refers to an evaluating measure which tests the accuracy and consistency of a measuring instrument in measuring whatever concept it is designed to measure (Neuman 2011, p.208). In simple terms it means dependability or consistency. According to Neuman (2011, p. 208) there are three types of reliability. Firstly it is the representative reliability which measures the reliability across groups, a measure that yields to same results for various social groups (Neuman, 2011, p.2018). Secondly there is stability reliability that measures reliability across time, measure should yield to reliable results at different time points assuming what is being measured does not change itself (Neuman, 2011, p.2018). Thirdly it is the equivalence reliability which measures reliability across indicators, measure that yields to consistent results using different specific indicator (Neuman, 2011, p.209).

To ensure consistency of the study, the researcher developed measures that have unambiguous, clear theoretical definitions with constructs that are specific. The study used a range of data sources to ensure that the data is reliable. In order to ensure reliability, the interviews were recorded using a digital voice recorder. Data was then transcribed verbatim in order to make sure that all the important information was captured.

3.5.2. Validity

Validity refers to “the criteria for evaluating the effectiveness of measures which test how well an instrument measures the particular concept it is supposed to measure” (Neuman, 2011, p.211). According to Neuman (2011, p.212) there are four types of validity. Firstly it is face validity is a basic and nominal index of validity. It shows that the items included in the interview are clear and understandable to the respondents. The content validity his ensures that the measures include a sufficient and representative set of items that draw on the concept. The criterion validity determines when the measure separates people in terms of a criterion the measure is expected to predict. Finally, the construct validity confirms how well the results derived from the use of the measure fit the theories around which the test is devised

For validity purpose, the study captured an inside view of how the participants understand the phenomenon being studied. The study measured the findings with existing data to judge validity. This allows the researcher to support, argue, or find gaps in the existing sources. The questions were phrased in simple language to avoid ambiguity. Further, interviews were in form of open-ended questions to allowed in-depth discussion by participants. Participants were allowed to ask question and clarification at a point of no understanding.

3.6. DATA ANALYSIS METHOD

While the researcher analysed the audio recorded interview, specific themes were identified. In the discussion of these themes, Terre Blanche, Durrheim and Painter, (2006, p.367) conclude that qualitative data analysis integrates five steps which are familiarisation and immersion, inducing themes, coding, elaboration, and interpretation and checking.

- 1) In the first step of familiarisation and immersion, the researcher, after completing the interview, the audio recording was listened to in order to organise information based on their respective themes.
- 2) The second step used is to induce themes. This is a bottom-up approach that infers general rules in data analyses (Durrhiem & Painter, 2006, p.38). This step is achieved through narrowing the topic into themes and separately analysing the themes from findings. The researcher labelled important features of the data of relevance to the research questions guiding the analysis. This was done by developing ideas on theories

about environmental impacts on agriculture in order to understand the meaning of the data and went through previous studies on similar studies.

- 3) The third step used is to code data by organising raw data into conceptual categories and created themes or concepts. These codes are developed from themes.
- 4) Elaboration is the fourth step used in this study, where the researcher explores themes by capturing degrees of meaning not captured by coding system. The researcher views data found in a linear sequence and compares and brings events together.
- 5) The final step is interpretation and checking that is written in a form of thick descriptions from data. This step allows the researcher to not omit vital data. There is a use of thematic categories and fixing weak points while reflecting on one's role and interpretation of the data as a researcher (Neuman, 2011, p.511).

3.7. TRUSTWORTHINESS

3.7.1. Truth Value

During the interview, the researcher was paraphrasing, probing and member checking as to stimulate honest responses from the participant. The audio recording and field notes were taken as to ensure truthful responses. The participants' information is given credibility because of the value it adds in the data collection. Therefore, the points of views of participants are taken as most important as they are sources for comparing with existing data on previous research together with independent coding.

3.7.2. Applicability

Depending on the, topic, context and the individual's criteria, the findings can be applicable to other respondents who have the same criteria as this research's participants. The participants' criteria have been stated under sampling strategy. Applicability is assured if the same research could be conducted in close time period.

3.7.3. Consistency

The very same questions could be asked to the same or similar participants again while the researcher continued with the procedure of data collection methods and analysis. The study allowed only five participants, so the researcher to ensure consistency comparing the views of

different participants on the topic was considered. The field notes and audio are kept by the researcher.

3.8.4. Neutrality

This involves an honest data coding and recording to meet the research objectives. The research questions guided data collection to collect raw data and independently code it. Motivation for information is driven by independent contribution research has for the industry.

3.8. ETHICAL CONSIDERATIONS

According to Neuman (2011, p.143) ethics are a set of moral principles which are suggested by an individual or group(s). These principles define what is or is not legitimate to do or what moral research procedure involves (Neuman, p.143).

3.8.1. Autonomy

The participant consented to participate in the study. She signed the consent form (see appendix C). The University of KwaZulu-Natal has specific procedures to ensure that research is implemented and managed ethically. Before the commencement of the research, there was an approval from the two University research committees. That is firstly the Higher Degrees Committee that scrutinises all research activity and approves the details of every project by way of its motivation through to the research methodology. Secondly, there is an Ethics Committee that ensures that no ethical requirements are fringed when carrying out research. Therefore, ethical clearance was issued by the committee (see appendix B). The supervisors took responsibility to ensure that all ethical concerns arising out of the research process are addressed.

3.8.2. Informed consent

Before the participants participated, information sheet was sent to them to read. Then the participants signed the consent form before continuing to participate in the study (see the appendix C attached). Briefly, the form includes the research purpose, the fact that the participation is voluntary, assured confidentiality, free withdrawal from the study to name a few. Also, the researcher sought permission from the participants to tape record the interviews.

3.8.3. Anonymity and confidentiality

The researcher informed the participants that this research is not for publication reasons, it will only be known by the university supervisor as stated in the consent form. The research data is stored privately as a tape recorder and shall be disposed after five years. The participants were informed that the recorder could only be sent to the supervisor if needed. Also, the names of participants are not mentioned for anonymity purposes.

3.9. LIMITATIONS OF THE STUDY

The sampling method used in the study limits the generalisation of the results. But researcher gathered as much as possible data to reach non-bias conclusions. Also, the findings from one participant may not be generalised to the entire agricultural industry. Rather, they can be used as reflections to other sectors within agricultural industry. Finally, there are few studies done on this kind of a topic. This made it difficult for the researcher to access other literature with almost related topics. But relevant sources are used, especially those relevant at the time of this study conduction.

3.10. CHAPTER SUMMARY

This chapter described the research design and research methods used to conduct the empirical field research for this study. This study is descriptive, using interviews as approach to gain deeper insight and better understanding into the impacts that techno-economy, natural and political environmental has over the agricultural sector. The empirical field research focused on the collection, capturing, validation and analysis of the empirical data collected from DARD in eThekweni district. Empirical data were collected using face-to-face semi-structured in-depth interviews with five participants representing DARD. The design of the interview guide was based on the conceptual framework derived from the findings of the literature review. The interview guide contained open-ended questions in terms of the objectives of this study.

The reliability and validity of the empirical data collected were addressed by conducting a pre-test to ensure that questions in the interview guide are clear and not ambiguous. The questions were phrased in simple language to capture all aspects of the factors to be measured. Ethical guidelines recommended for the type of research conducted were strictly adhered to during the

research. Potential limitations associated with the research methodology followed were identified and addressed.

The results obtained are presented for discussion and the drawing of conclusions in accordance to the objectives of this study in the next chapter, chapter 4.

CHAPTER 4

4. FINDINGS AND DISCUSSION

4.1. INTRODUCTION

The previous chapters of this study introduced the research questions and research objectives. A broad literature study was also conducted to identify the impacts the environment has onto agricultural performance. In addition, in the previous chapter, the research methodology that guided this study was presented.

This chapter aims to analyse the empirical data collected from the research sample during research. The findings are presented, analysed and discussed, then conclusions are drawn in relation to the objectives of this study. The study adopted the PESTEL model as theoretical framework to unpack important concepts and to refer to existing literature in order to meet the study objectives. This research study applied semi-structured in-depth interviews as the data collection tool. A total of five interviews were conducted amongst DARD employees who were deemed to be relevant for the study, based on their practical background and area of business. The five participants represented five different the departments within DARD.

This chapter developed themes as they present the findings attained from the participants in order to achieve the overall aim of the research. Every theme, category and code, is also discussed by referring to and quoting from the participants' responses. The study aims to determine (1) understand the techno-economic influences on agricultural performance; (2) to understand the natural environment impact on agricultural performance; (3) and to understand the impact of political environment on agricultural performance.

As previously discussed, thematic data analysis was used to analyse the data. The result of this analysis provided the researcher with a 'thematic map'. Figure 4.1 presents the thematic map demonstrating the findings of the data analysis.

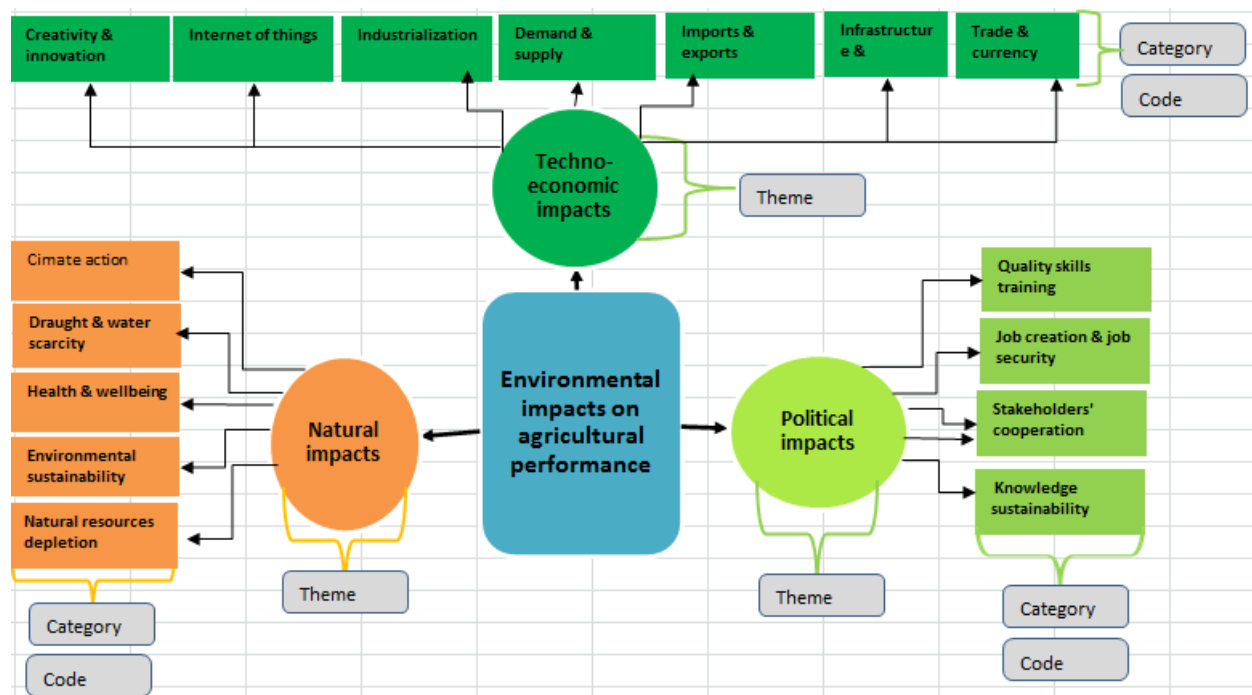


Figure 4.1: The thematic map

The following sections of this chapter will present, analyse and discuss the following three themes of the thematic map: techno-economic, political and natural impacts on agricultural performance. These themes are similar to the conceptual framework, because the emergence of categories of impacts articulated by the participant led the researcher to show the relationship between what empirical data show and the constructs driving the study. Each part of the map will be scrutinised and discussed to provide an in-depth understanding of all the issues that developed from the data. To support the findings, some of the sections will also provide verbatim quotes from the participants.

4.2. ANALYSIS OF DATA

THEME 1: TECHNO-ECONOMIC ENVIRONMENT

4.2.1. Creativity and Innovation

According to participant D, in agriculture there has not been so much innovation of new products and production because the industry is completely made of natural resources. However, participant B said that production processes have transformed over the past years, with more reliance of research department. For instance, it used to take about 8 weeks for farmers to grow

chickens. But with new improved food processing, it is now quicker for farmers to get their chicken meat ready for consumption within 6 weeks.

“There is development in this sector remember innovation is not only technology based. The farmer’s produce can now be easily exported through convenient accessible King Shaka international airport and that according to the department is innovation on its own.”(Participant B)

“...we have seen a shifting practice in agriculture led by technology. As a person who is always in the field some things that I had to come back to the office to access can be now easily accessible instantly in the field with use of technology.” (Participant D)

Participant C stated that even though the agricultural input on economy continuously declined in the past years; this division nonetheless has greatest influence on the growing and developing of the country’s economy. Innovative technology taking over most industries is one of the biggest challenges. Participant D adds to say that when the sector works on adopting certain technologies, some new technologies are created making it difficult to keep up with everyday innovations.

The agricultural sector needs to make use of new methods of production, the new products, exploitation of new markets, new sources of supply and new ways of organising a business (Inauen & Schenker-Wicki, 2011, p.499). Three participants indicated that agriculture is an ancient sector with main purpose of food provision, so markets will always remain the same, products will be the same, maybe with modification to foster fast production and supply will be the same, but only organising the businesses may change into more commercialisation rather than domestic.

“I can see progress, but problem starts when it implementation because current innovation is sometimes mixed with old implementation methods.”(Participant C)

The vital part of creativity is to bring into interaction, the diverse knowledge and to be able to link the two (Inauen & Schenker-Wicki, 2011, p.499). Participant C said this sector has less investment on young people who will bring in fresh thinking and practices. It may be one of the reasons for the shortage of innovation. Young people are more equipped with technology use, yet they are less interested in agricultural sector and these are some of the reasons why Inauen and

Schenker-Wicki (2011, p.501) argue that the adoption of technology in the industry is quite a challenge. Most innovative practices were not originally developed for this sector; rather, they were adopted from other sectors.

In form of managing innovation, there is a need for new ideas development. That is to think outside the box then combining experience and knowledge in a manner that will lead to innovation. This will take place when the agricultural sector employs innovative practices to improve production and to also attract more people into this sector. In that way, there should be investment on research and development and also allow the participation of young minds that has proven to be creative and innovative, so they will implement new creative practices.

It is clear that technology and research development play significant role in establishing new technologies and methods in the ever-changing environment. The latest theories and technologies should be tested to create the possibility of accomplishing the calculated outcomes and to structure the foundation for systematic extension.

4.2.2. Internet of Things (IOT)

Although there may be challenges in terms agricultural practices, DARD states that the information technology systems which the literature refers to as MIS, DSS, GIS, EIS Schwat (2015, p.235) has increased the process dependability, management process, process control and process effectiveness for farmers. Participant D and Participant B confirmed that internet technology accelerates process on service deliver.

“These developed technology systems allow access to instant information about the land, weather conditions or any other environmental condition, so to decide what to farm on which land and in which season.” (Participant D)

“These internet things better processes but the challenge is that most farming takes place in rural or underdeveloped areas where mostly there is either no internet or poor signal for internet use or that farmers are now well equipped with use of such technology” (Participant B)

Participant B stated that that the promotion and use of information technology highly relies on individual business that forms part of entire agriculture. What the business does or does not, reflects on the sector as a whole and influences the sector’s performance. For example, if one

supplier of chicken has poor product quality, it entirely affects the consumers' perception around chicken. This statement confirms argument by Kietzmann *et al.* (2011, p.245) that the use of technology by businesses influences consumer and investor's perception.

“South Africa across all industries have not mastered ways to make use of technology specifically internet to market the business. For example social media could be one platform to attract even international markets...” (Participant C)

As strategy, the Foresight Alliance (2016, p.65) suggests that organisations create that ‘buzz’ on consumers, while excelling in online real-world communication in order to put their industry out there. In contrast, participant C believed that the buzz should be created in attracting new producers who will be innovative and have high product performance to attract more consumers even in international markets. In reality, this industry does not need to pursue consumers because food is everyday need. It has secured market. Rather, the industry needs fresh touch from local producer by finding methods of more supply of product quality at reasonable prices.

4.2.3. Industrialisation

The World Economic Forum (2016, p. 08) found that automation has replaced the demand for labour work because machines are doing the work. The participants confirm this, adding that imports are not the only major contributing challenge in this sector. The participants were asked to provide their views on how does industrialization impacts on issues in agriculture, as quoted below this what they could say:

“Some machines that are used in production may require some skills and knowledge, most old people who are dominating the industry are then excluded.” (Participant D)

“The high unemployment rate... and unskilled people and cheap labour especially in agriculture are a result of industrialization” (Participant B)

“In economic view industrialization maybe good for production cost reduction but it is not good when jeopardizing economic activities of general farmers...” (Participant C)

The changing technologies are replacing labour work. This is because old people may be unable to operate the latest machines. The industry needs to attract young people who can bring in technological expertise, while the aged people dependably bring experience, and then in that form, knowledge is exchanged.

A task performed by 20 people can be now done by single machine operated by one person (Kassie *et al.*, 2011, p.1785). Evidently, participants confirmed that in farms, people no longer plant or grow chicken in domestic forms. Rather, they use machines for easy functions and that is why people are retrenched very often, as their tasks can be easily combined in one machine. Then it leaves them jobless with those skills and expertise drained into waste, as most of these people hardly start their own businesses. Participant B revealed as the department they try to intervene in some agriculture retrenchments cases such as in the Rainbow Chicken where there is collaborated farming project initiative. But participant B also mentioned that it is not possible to reach out to the entire country to combat such challenges. These are some of the reasons why there is need for constant skills development in every sector, with organisations playing a massive role in encouraging skills development of their employees.

4.2.4. Demand and Supply

Hart *et al.* (2013, p.58) noted that with the use of technology, the supply from other countries become one of the challenges. This has strongly impacted on the agriculture sector, since other companies such as Pick n Pay have got more and eased access to be supplied by farmers outside the country. The local farmers have no control of such factors.

As a result of the economic stance of the country, farming in S.A is expensive since everything else is expensive. Participant C stated that farmers cannot compete with other international farmers on price, the reason being that to produce in S.A is very costly. It would be simple to compromise product price and make loss. Secondly, those international farmers produce at lower cost than South African farmers and that is why their products are reasonable, hence, the higher demand from the consumers. On the other hand, retailers and wholesalers stock what is on demand, hence, even Shoprite stocks Brazilian chicken because at the end, they also want to make profit as business.

Led by reviewed literature which most highlight was that in S.A has been high supply from foreign countries which proves demand of foreign products that supporting locally produced and participant C and participant B responses emerged quoted:

“Consumers would not support local produce and prefer foreign products as they like to believe that goods from outside the country are of better quality...government makes it more worse by allowing free trades.”(Participant C)

“The international deals are beyond general farmer’s control...economics and politics play major role in deciding for consumers where to buy and why. When decisions that affect us are taken, we are not there...” (Participant B)

The three participants outlined the important role of the government in the performance of the country. The relations made with other countries are highly impacting on the growth of local industries. Although zero tariffs were desired by the government to ensure access to low-cost meat protein for low income households (Hart *et al.*, 2013, p.57), it is not doing any justice to local producers. Other alternative economic strategies could have been made. Participant B added to make remark on the debate around such economic decision is driven by political issues outlined in the interview with former president Thabo Mbeki on Power FM (2017, July 14th). Participant B highlighted that outstanding point in the interview by Thabo Mbeki highlighted is that more free-trades made with other countries for political benefits leave local industries suffering. Also, the investments should be by local investors into local investees not that.

In S.A particularly, more land is being occupied by people to build houses, leaving small scales of land for farmers to meet the consumer demand. This, according to Katengeza (2012, p.41), has resulted in poor product quality that consumers are not satisfied with. That is, more lower quality grade, for example because there not enough space to produce, most farmers will have to sell their chicken before they are fully grown, as a result of high product demand.

“When selling outside the country local farmers usually sell quality products at affordable or even lower prices because competition posed by other foreign farmers. Also, most agriculture products are perishable, some farmers settle for lower selling price ending up making a loss or

hardly grow in farming because even production costs are very high in this country” (Participant C).

As a result of low grade product quality, farmers then have to settle for low market price to distributors such as wholesalers or even consumers themselves, because as much as they demand the product, they expect quality product at affordable prices.

This shows a need to structure a value chain approach in relation to relevant markets and consumer’s needs. Consumers’ lifestyles are changing as they also respond to the changing environment; producers should also cater for such needs.

4.2.5. Imports and Exports

Although Moon (2011, p.21) argues that the importation of agricultural products has been protected by most governments to secure the growth of their economies, in South Africa, that is not the case. Imports in South Africa have increased, more specifically poultry, especially in the last 3 to 5 years and the problem seems to be continuing (Kapuya, 2017, p.18). In the question on how the imports and exports are managed in this sector to secure development of local farmers some of the participants’ responses were:

“Influx of imports is not only agricultural challenge...every sector of the country faced with the same challenge and it is relatively political than economic.” (Participant C)

“South Africa as whole has turned into a junk imports state.”(Participant B)

The participants confirm that imports are continuously increasing and just recently when there was birds’ flu in South Africa, there was an influx of chicken imports. Participant B reports that importing would continue because there is not enough supply from local farmers to meet the consumers’ demands. These are the instances where the country mostly forced to import large numbers of agricultural products (Pretorius & Smal, 2012, p.34). But the government policies play a major role in the free market of imports.

Meanwhile, the government is not doing enough to promote the consumption of local products by local consumers, starting from cities or towns to provinces. The consumption of local products means support to the local industries. If there is less international competition, then it will mean more businesses can be initiated in the local regions.

“Foreign countries are dominating South Africa with imports, making it hard for local farmers to produce for local consumption.” (Participant C)

Entering the market duty free in South Africa, Brazil and European countries are the dominant competitors to local farmers (DAFF, 2014, p.21). Particularly, participant C outlined that the free trades policies encouraged by the South African government are harming local producers. These are some of the reasons why the South African government needs to review the trading policies, especially in relation to the influx of imports.

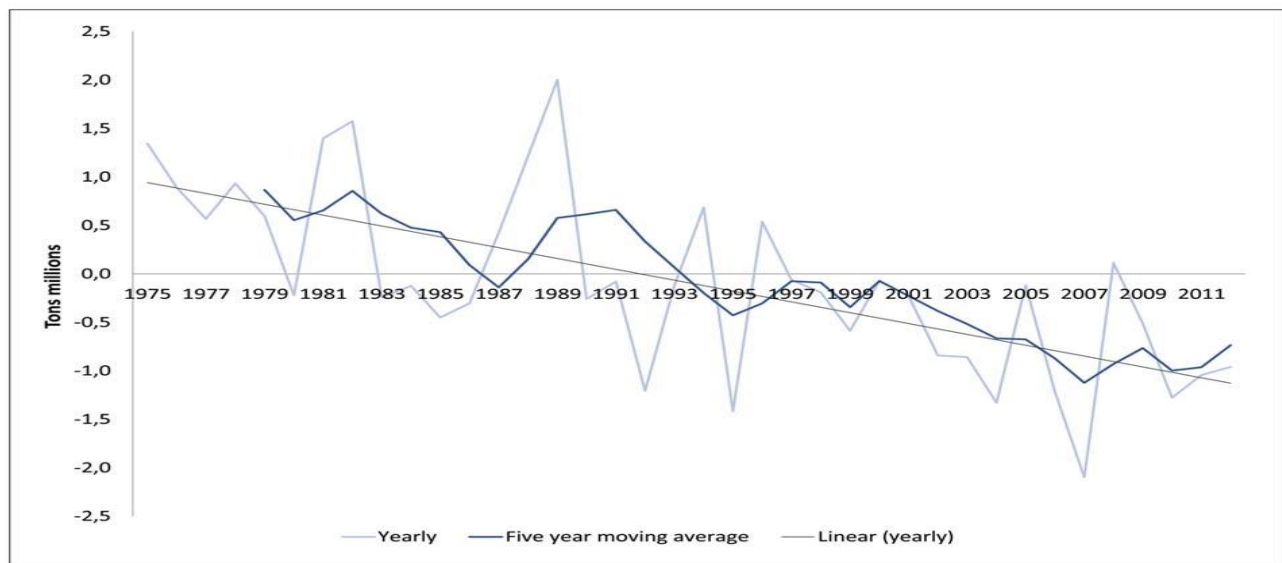
“If there was restriction in terms of imports then that would boost local farmers to produce for the country which will not only grow the economy, but also fight against other issues such as employment...the government needs to restrict imports while promoting local produce...” (Participant D)

These countries supply what consumers perceive to be more or less the same quality with the products from local companies, but the main part is that Brazilian and European companies sell their products at cheaper prices than local farmers (Kapuya, 2017, p.21). Other than these, it has been shown that generally, consumers have more desire for international products than domestic products (Pretorius & Smal, 2012, p. 33; Keller & Lehamann, 2006, p. 179). This is because participant C emphasized that consumers prefer products from outside the country, as the stereotype is that the international products are of better quality. This applies to even other industries such as clothing.

From 2004 to 2013, the country’s meat exports were tremendously less than imports (DAFF, 2014). But participant B reported that the exports have improved in areas the department services because they had strategised with the then new airport (King Shaka International Airport), with the aim of promoting agricultural industry. Participant C added that more imports opened more competitive disadvantage for the local farmers, especially in KZN.

Figure 4.2 shows the results combined, as decline value contributions of South African agricultural produce of over 30 food items including meat, eggs and vegetables. It is clear that there is a sinking trend over time and S.A. is currently not self-reliant in terms of producing major foods consumed by most households.

Figure 4.2: South African net exports



Graph 1: South African net export quantities of meat, cereals, milk, cheese, eggs and vegetables.

Source: Greyling (2015)

According to DAFF (2014: 19), S.A exports most of its broiler meat to SADC countries, meanwhile these countries' economies are not well developed to gain S.A high returns on exports. These countries, according to participant C have developing economies, which does not produce high investment returns for S.A.

4.2.6. Infrastructure and Resources

"Nobody is interested in starting from foundation in farming...even some investors are looking to invest in farms that are resourceful, rather than initiating resources." (Participant C)

The performance of the industry primarily depends on the collaboration of competences and resources inside and outside organisation (Inauen & Schenker-Wicki, 2011, p.498) and that is why the department has encouraged local projects and support local businesses to effectively use the available resources such as land. Participant B pointed out that they collaborate with other stakeholders in service delivery, although other stakeholders may not have enough resources to support the department immediately at the time of need. For example, the building of roads and internet connections are beyond DARD's areas of expertise. That is why participant D stated that always encourages the use of areas that are friendly and that area easily accessible. For example, engineering friendly areas would be flat surfaces to build poultry business structure in order to

eliminate extra costs. But then, the question remains that if all the smooth areas are all targeted for different uses, what is to be done with the areas that need extra work?

The government may be working towards supplying rural businesses with long-term infrastructure, but there is slow progress work towards improving access to farmers with paved roads together with internet connectivity. Public service quality from the government should be of same standard in rural and urban areas. The government needs to encourage more service delivery to the rural areas. The same services provided in urban areas should also be available in rural areas. More effort is needed to develop infrastructure, which includes internet connectivity, paved roads, especially in rural areas where most agricultural practices are taking place. This would allow easy access to producers that have an experiential land for the business incubator model.

4.2.7. Trade and Currency

Having S.A. entering recession (Naidoo, 2017), this country has been the dumping place for American and European countries. Now, because of the economic stance of the country, consumers are more likely to buy the cheaper priced products, especially that most of the South African population is poor. The three participants outlined that the issue does not just lie on the government and other organisations, but consumers have more power than any of the involved bodies. The question on how trade and currency impact on agricultural performance, the following responses emerges as quoted:

“Consumers determine the need for trade by buying or not buying these dumped goods.”
(Participant D)

“Farmers had to increase output price to cover the production costs, while on the other hand, consumers were either not buying the chicken, decrease buying chicken or bought cheaper chicken from foreign producers.” (Participant C)

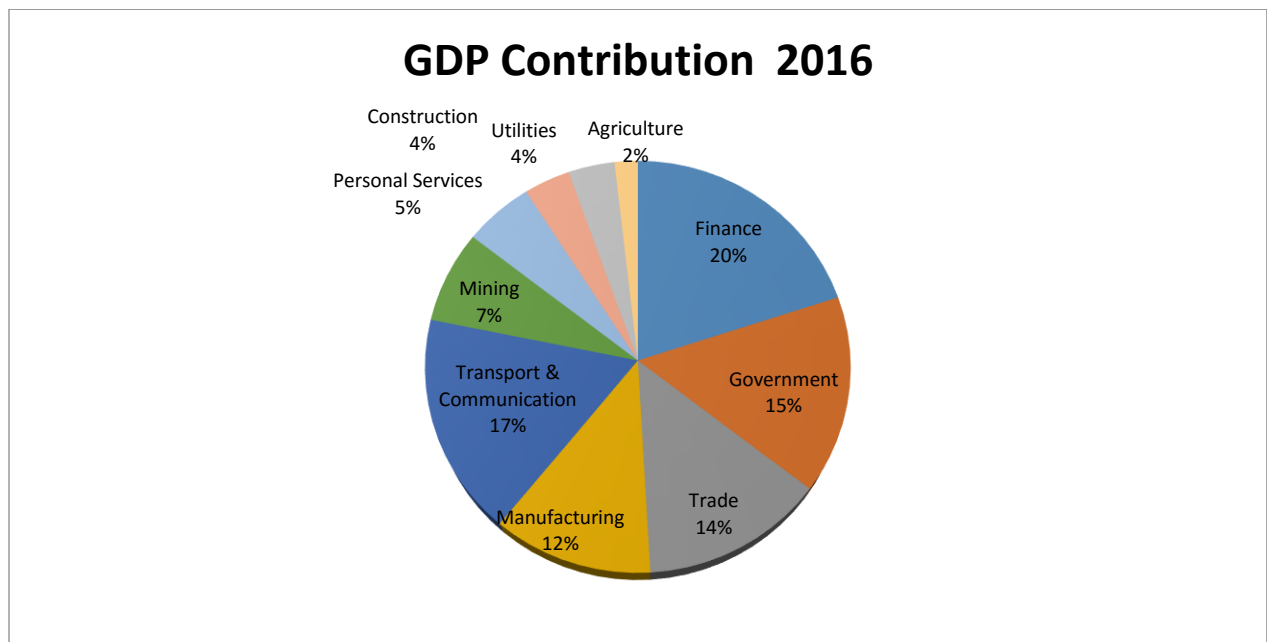
“When the Rand is weak, the outside suppliers take full advantage over local producers especially in agriculture since most products are perishable.”(Participant B)

It has been found that not only those international traders are taking advantage of the poor performance of the currency, but also, local producers are failing to grow internationally. When local producers are selling their products internationally, if the rand is weak, producers get lesser

return and, in most cases, they have no choice but to settle for whatever offer given to them. According to participant B, most of the agricultural produce is perishable. In this way, it makes it hard for local producers to expand as they would be making loss or no higher returns to motivate growth. It is one of the reasons why even large farmers like Rainbow are failing, because they are cutting down cost by reducing labour or shutting down as a result of the farm running at a loss.

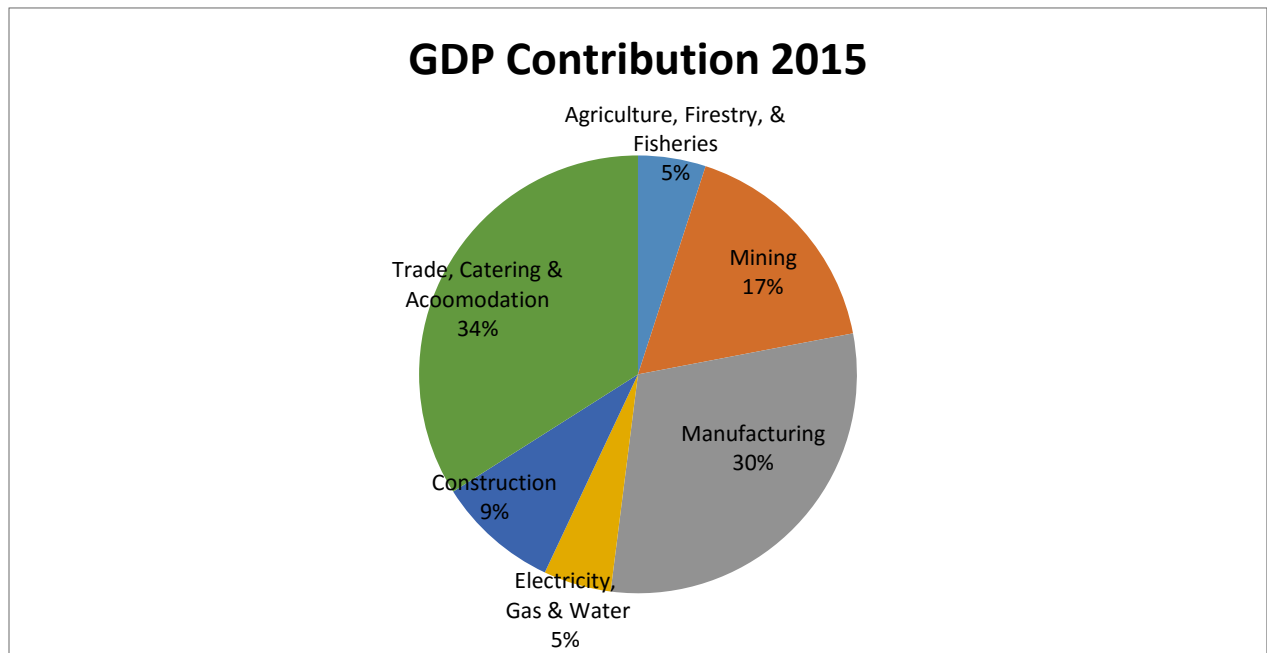
The farmers are discouraged to produce in poor performing currency and these are the reasons why agricultural contribution to the GDP over the past years has been poor (Stats S.A, 2014; 2017). Figures 4.3 and 4.4 Figure indicates the decline in agricultural contribution to the GDP in just a year. Agricultural contribution to the GPD declined by 3 percent in just a year from 2015 to 2016. These graphs show that agriculture is the lowest contributor to the GDP, amongst all other sectors, even amongst small sectors such as personal services, catering and accommodation.

Figure 4.3: Sector contribution to nominal GDP



Source: DARD Data (2017)

Figure 4.4: Contribution to GDP by Sector



Source: Stats SA (2015)

4.3. ANALYSIS OF DATA

THEME 2: POLITICAL ENVIRONMENT

4.3.1. Quality Skills training

The study found common trends in this sector. Most farmers are reported to have limited motives to acquire more skills. There is no willingness to invest in knowledge and skills training. Inauen and Schenker-Wicki (2011, p.497) stated that more and more workers require innovation and advanced skills for fast production. But instead, participant A noted that there is inadequate supply of skillful or expert employees and producers. There is a poor integration of performance systems. Participant C revealed that as DARD they plan to work cooperatively with colleges to get a supply of skilled personnel to lead in current skills execution.

“There is a lack of know-how amongst developing farmers, where agricultural activities are carried out without proper guidance leading to business failure.” (Participant B)

Findings confirm accuracy in Kapuya’s (2017, p.21) statement that many people who are attracted to this sector are mostly illiterate. As mentioned by Kapuya (2017, p.21), there are high rates of shortage of support structures and mentorship, solid agriculturalist organisation, technical training, limited resources, few skilled agricultural entrepreneurs, lack of marketing skills, absence of health control and lastly, the undesirable media interpretations about the run-through of brining are watershed for the industry. These accelerate challenges of services delivery from, with and to the illiterate farmers.

Participant A stated that illiteracy and low literacy levels, especially in rural farmers of the many makes it difficult to communicate. The contributing factor is that most rural farmers are previously disadvantaged population. Although the number of population owning cell phones is at the highest level in most countries, participant B argued that most farmers do not use smart phones for accessing information and communication, for instance, using social media. It is mainly because the older people who are interested in this sector have no great exposure of using technology such as sending emails or faxing. These make it hard to exchange information and fast querying in case of encountering problems.

Skills training can be viewed as a major contributor in knowledge factors, mainly because most agricultural businesses owners or employees are from previous disadvantaged communities (Coetzee *et al.*, 2007, p.06). This has been confirmed by four participants, that where this sector dominates, most of the people were previously disadvantages, especially those they serve. So, in other words, these communities lack resources hence, they are lacking independence from the government. This then becomes the burden of the Department of Agriculture to address the inequalities and poverty.

It should be noted that not only is S.A facing these environmental challenges. However, participant A said that over the years, Africa has unreasonably invested limited agricultural research and training. Participant B indicated that program contents and facility training

institutions have declined over time and there is an improper technological development. Trainings and teachings are out-of-date in this sector, added participant B. Following is the response of agricultural economist on same issue of standpoint in quality skills in agriculture:

“Agricultural curriculum is somehow outdated as it does not equip the youth with applicable entrepreneurial skills to develop the entire sector...” (Participant C)

The three participants affirmed that contemporary agriculture and curriculum are still focusing on production in farms, instead of encompassing all the subdivisions of agriculture on entrepreneurship and value-chains, agri-business, marketing, processing and the development of critical thinking. The government needs to also offer improved skills training that keep up with changing environmental requirements.

The habitual training method applied to breed civic servants, for governmental policy are obsolete, making them slightly irrelevant for the needs of contemporary end-users, which increasingly shift in the direction of problem solving skillfulness, management of competence alongside market driven systems, value adding and orientation to the private sector.

The most common factors that evolve around abilities, skills training and knowledge includes decisions models, availability of finances and that is why farming is failing in most parts of South Africa. The lack of the above factors can be classified along with additional factors of shortage of business model adoption and the principles for commercialisation of agricultural products. The above findings confirm the claims made by DAFF (2017) and Nyariki (2011, p.49), that the number of commercialised farms is continuously declining, especially in KZN. These are some of impacts in the performance of agriculture.

Existing skills and expertise of farmers, even established ones, should not be disregarded. The government and those established farmers, together with other business entities, should foster an increase for improvement production in the existing farmland. The production should be ensured that it is environmentally responsible, so that production will also continue in the future. The

existing farmers should be supported to prevent the failure of the existing farms and loss of skills and expertise.

There is a gap in investments in agricultural sector. Focus may be put in other sectors that are seen to be important because of the immediate result that they show. But there is need to offer sponsorships at secondary level for those who have interest in agriculture, through their academic performance.

4.3.2. Job creation and Job security

The agricultural activities have always been utmost key earnings generator for great numbers of people in the rural areas, plus an enormous number of the rural people directly rely on agricultural activities (Pretorius & Smal, 2012, p.507). Meanwhile unemployment is escalating.

“The country is losing over 1 million jobs and the province has lost over 120 000 jobs in the past 3 years. The biggest concern is job loss in agriculture and manufacturing, as they are efficient sources of employment.” (Participant A)

It is outbreaks because as Pretorius and Smal (2012, p.37) outlined, these results are applicable only to the formal economy and it can be assumed that the informal sector will have to absorb a sizeable number of the unemployed.

“KZN is the second over populated province in South Africa, with approximately 19 percent of the entire population. This means that the suffering of this province alone contributes to almost a quarter of job losses in the country.” (Participant C)

There is a need to tackle industry challenges to ensure improving performance that would secure employment and businesses. This is because some of the challenges are known by the government and the province is losing on skills that have already been invested in. Another impact outlined by the three participants is the lack of policies and procedures and non-business orientated business.

Agriculture has for a while not been regarded as a commercial activity. It is seen as extra activity from the real job. That is why even when it fails, the country does not protest about it. There is a need for promoting agri-businesses and trade activities, with the intention of encouraging the local entrepreneurship development and provide equal opportunities to women and the youth, in terms of job creation or entrepreneurship.

Agriculture must be taken as commercial unit, with the intentions of promoting the business model that would begin inside the government. This means that the agricultural sector should not only be seen as customary activities. But rather, the government needs to promote economic practices for the farmers, to ensure entire involvement in the domestic and export markets.

4.3.3. Cooperating stakeholders

Since there is no organisation that can have the entire knowledge, skills and full resources to be the best in everything; organisations can make use of the intra and cross industry cooperation. As part of the government's plan to grow the agricultural sector in the province, DARD engages traditional leadership in commercialising agriculture. Although this has been the initiative of the government, participant B reports that the challenge with traditional leadership is that most of these leaders have no or limited knowledge about the usefulness of resources.

“...for instance in terms of crop, there are cases where solar analysis is conducted and discover fertile land for planting; but because areas are led by Ngonyama trust and chiefs most resources are allocated based on political decisions, power and for ones benefit.” (Participant B)

Participant A pointed out that because of the benefits of political powers that the leaders have, the distribution of resources to beneficiaries is somehow unjust. This then makes it difficult to facilitate some initiatives to grow the province's economy. Furthermore, the appointment of industry leaders such as ministers is more channeled by politics, because some of them would have no background knowledge on the industry or training in managing and leading large and multifaceted organisations.

Agriculture adopted the involvement of academics, which is highly suggested by Inauen and Schenker-Wicki, (2011, p.506), so as to improve the information on production and performance

management. The five participants proudly mentioned that DARD alone works closely with Cedara College in Pietermaritzburg. This institute's role in agricultural science is to discover new methods and strategies of continuously improving this sector. This is not enough, but it is the first step. The private and public education and training institutes also need to be core partners to cater for the industry needs.

Inauen and Schenker-Wicki (2011, p.506) argued that there is a need to collaborate with other competitors, consumers and suppliers. Meanwhile, participant C argued that this sector has fragmented competition that does not allow innovative ways of competing. Competition can take place at business level, not just in industrial per se. The same applies to consumers and suppliers, because they do not respond to the entire sector; rather, the responses are directed to individual businesses that decide on what action to take regarding those responses.

There should be an independent entity that coordinates different institutions and different stakeholders to participate in various sectors' development, such as education and training, trade bodies, local leaders, the public and private representatives, economic development, civil societies, students, employees and so forth.

4.3.4. Policies in the industry

The participants highlighted that it is guided by policies and the entire agricultural sector is guided by the sector.

"Some of the policies include the Promotion of Access to Information Act (2 of 2017), the Agricultural Research Act (86 of 1998), and the Agriculture Development Fund Act (175 of 1993) and others..." (Participant A)

According to participant A and participant B these policies are guiding strategies for progressive development with activities including commercial farming and the facilitation of co-operations. Quote below of emerges from being asked effectiveness of agricultural policies to ensure growth in this sector. Agricultural advisory said:

"The challenge is that department has found contradiction in policies at the point of implementation." (Participant B)

Some policies are good in paper in terms to assist in improving performance of agriculture but when they are implemented they do not only contradict with other policies within this sector, rather they contradict with other sectors' policies. Participant C indicated that the reform policies created a sense of dependency among the farmers, more specifically the young entrepreneurs and small farmers. This shows a need to redevelop and test the policies before full implementation. The policies can also be amended and reinforce for effectiveness.

4.3.5. Knowledge Sustainability

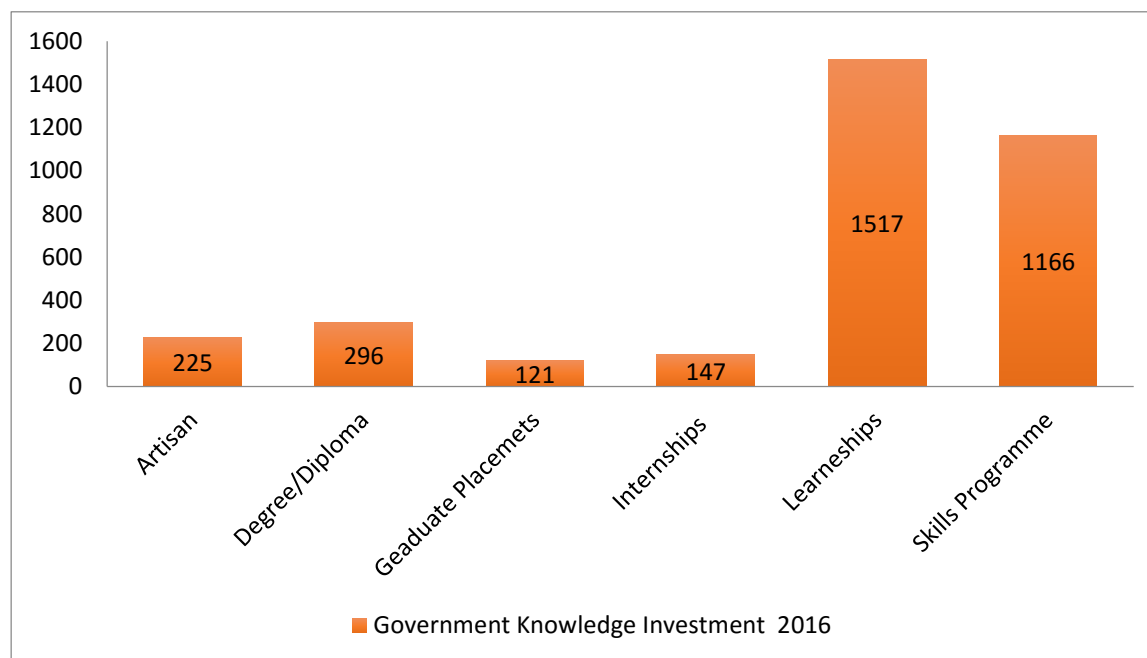
As a result of the demand for skilled labour (Schwat, 2015, p.237), the government needs to encourage continuous knowledge development, for example in schools. There is no adequate management of information systems in the industry. There is notes obscure formulation of comprehensible vision of the presented challenges and planned satisfactory resolutions to develop systems in public education. Participant A stated that administrative data and integrated flow of graduates into labour markets is outdated, unreliable or insufficiently managed. This makes it hard to determine where exactly, what the problem is, and strategically plan interventions.

“Some young people in this sector are in it but they are not interested in it, do not consider it as main career or they choose agricultural career as last choice after office jobs” (Participant B)

Whilst young people are advanced in technology and the latest information in general, older people are the ones more interested in the agricultural industry, while the young people who are can access vast knowledge are less interested (Gamage *et al.*, 2014, p.03).The challenge with this argument by Gamage *et al.* is that participant C argues that the majority of young scholars registered in agricultural courses in the country and Africa at large are not in the program by interest. Rather, they are doing agricultural courses because they had poor grades that prevented them to enter into programs of their choices. This then concludes that graduates in the agricultural sector are likely not to be interested in the career, in the long run, which may lower commitment to develop this sector. Evidently, Figure 4.5 shows a number of candidates who were supported by the government to complete skills development in 2016. By this graph one can conclude that fewer people acquired training in form of profession such as degree. Rather,

agricultural knowledge is acquired as a general skill, as shown by the high numbers of skills programs and learnerships.

Figure 4.5: Knowledge Investment in Skills development



Source: DARD DATA (2016)

Participant A indicated that policy agreements on educational quality adequacy have been the major factors affecting industry growth. This is because the rating for the Bachelor's level is inadequate for knowledge sustainability, having students passing with 50 percent average. Meanwhile, the number of university enrollers is increasing. This yields to the country's quantity, rather than the quality investments on knowledge by the government.

There is less encouragement and involvement of youth to take agriculture as a form of investment. Through education, seminars and further mobilisation across the country and SADAC countries, there must be a motive to encourage the involvement of youth in agriculture and also select agriculture as a top priority, as well as considering it as a career, rather than an informal activity to engage in while waiting for real job.

It is the government's role to promote more engagement, especially of the youth, into industries such as agriculture, for economic sustainability and to eliminate the high rates of unemployment. There should be sponsors for such industries so that people would be encouraged to pursue such careers and make it appealing to the youth. Participant A added that more money is wasted on general jobs that do not necessarily contribute to the performance of this sector. Table 4.1 below shows that KZN's number of professionals and skilled workers are not balanced, gender wise, and unsatisfactory number are meanwhile elementary occupants and associates, together with high numbers of managers.

Table 4.1: Employee Trained by Occupational Category and Gender

OCCUPATIONAL GROUP	MALE	FEMALE	TOTAL
Managers	429	147	576
Professionals	585	169	754
Technicians and Associate Proffesionals	1117	365	1482
Clerical Support Workers	221	385	606
Service and Sales Workers	267	141	408
Skilles Agricultural , Forestry, Fishery, Caft and Related Trade Workers	1092	692	1784
Plant and Machine Operators and Assemblers	1373	110	1483
Elementary Occupantion	21191	22809	44000
TOTAL	26275	24818	51093

Source: AgriSeta, DARD Data, 2017

Adams (2005, p.215) and McElroy (2015, p.16) may have argued for knowledge exchange or expertise for long-term focus, but the findings suggest otherwise. Participant B revealed that established farmers are struggling, for example, the Rainbow, to show that there are serious challenges that go beyond expertise. How much more can this affect emerging and small farmers who are already struggling with central production to improve on expansion? This proves uncertainty in this sector's productivity and reliability of expertise.

There has also been land reform issues where young entrepreneurs have limited access to the land, because it is either expensive to buy or land owners are not willing to share. Even if the land is unused, policies in place do not allow occupation without owners' agreement. That is why some areas are not used, although they can contribute to the growth of the industry.

Some farmers lack the skills to effectively use the available resources such as land. In addition, participant B believed that generational beliefs and culture are also contributing factors in the lack of commitment and willingness to farm, which highly contributed to reduced performance in the agricultural sector.

The private sectors are supposed to play key roles in the entire system of developing agricultural industry. They should offer assistance in terms of equipping with strategies to enhance knowledge in this sector, by providing scholarships to students who take agriculture as a priority, provide cooperative trainings, provide with on-the-job trainings, offer mentorships and encourage their current employees to enter into agri-businesses and offer informal trainings. These will yield to sustainable knowledge creation.

The agricultural sector should be used as a first tool to promote food security, create jobs and business opportunities. In that way, it will discourage the country's development of international businesses and other countries' economies. This sector is very important in contributing towards developmental opportunities, more specifically, with job opportunities in the rural areas.

Somehow, there is no good leadership, accountability, transparency and good governance, from the local entities. Meanwhile, these influence the facilitation and identification of developmental gaps and challenges, and then progressively strategize in filling those gaps. It may be the reason for the slow response to some of the industry challenges.

The study findings show that it may happen that industry leaders have no knowledge or experience in relation to agriculture. So, how one then leads something they have no knowledge of? Rather, it is political powers that control decisions to appoint leaders. The selection of leadership teams and management should entirely be based on enormous experience in agriculture and agricultural relevant activities. This would yield to effective planning, in

strategizing and decisions making that are more relevant to agriculture, rather than just authoritarian practices. Background knowledge is needed.

4.4. ANALYSIS OF DATA

THEME 3: NATURAL ENVIRONMENT

This section of the study focuses on the impact of on the growth or performance of agriculture. Nature drives the performance of agriculture, as this section highly depends on it for function. Briefly, it looks at influences such as climate change, water supply, health and wellness or security and generally, the depletion of natural resources.

4.4.1. Climate Action

Weather type directly impacts on agriculture, both on animals and crops. It mainly affects the producer and the consumer. The following response arose from agriculture environmentalist noting how serious the issue of being driven by environment, quote:

“Climate change makes it hard to predict the production as the end results depend on the weather conditions.” (Participant E)

Shakoor *et al.* (2011, p.328) and Gomiero *et al.* (2011, p.103) stated that what is more challenging is that in wet seasons, there appear floods, while in dry seasons gets drier. Climate may result in the scarcity of natural resources. For example, if there were hot weather conditions and resulted in low produce of maize, then the supply for chicken food would be very low, which in turn influences production in poultry.

All countries must expect weather changes, unless there are innovations took place that can control the process (Haung *et al.*, 2011, p.511). Participant D acknowledged that because they rely on nature, they cannot control other contributing sectors in climate actions, because the country needs all the sectors for full function. Industrial sectors and construction, to name just a few, are other contribution sectors to climate changes. This is through the release of greenhouse gases (GHG), the escalation in the number of gas such as carbon dioxide (CO₂), that are accountable for causing changes to universal temperatures (JWP, 2015, p.19)

Delays in the onset of rain and the decreasing rainfalls are some of the driving factors of climate change in KZN. Lybbert and Sumner (2012, p.116) argue that it is not just a one country issue, but a global one. Participant A mentioned that it is not necessarily high temperature rates, but it is the scarcity of everyday need that is difficult to conserve. Participant B said that in recent years, people witnessed incidents in different seasons that have not been seen before, such as snowing in spring and heavy rains in winter. KZN Province has been attacked by floods for many occasions, which are something that rarely happened before.

Four participants affirmed that food insecurity is going to continue being the chronic problem in the future. This is because they are not the only key players in ensuring food security, rather, every sector and everyone is fully responsible in ensuring environmental care. The impacts are beyond agriculture's control.

4.4.2. Draught and Water Scarcity

Most agricultural divisions and in some instances, other sectors are linked to one another. Poultry is linked to crops for chicken food supply, mining for energy and so forth. So, if one sector is impacted by draught or water scarcity, it is likely to influence another sector's performance. For example, if crops suffer from water scarcity, whereas the supply of maize for production which makes 50 percent of the entire poultry production (Coetzee *et al.*, 2007, p.07) that obviously leaves the poultry sector vulnerable. This then may result in the failing of businesses, high costs of production, high costs of transportation and raised demand for products.

“Water scarcity is a major challenge in every agricultural division...without water agriculture is disaster.” (Participant D)

Local farmers are experiencing ground water shortages and water quality, surface water pollution and waste disposal in water (DAFF, 2014: 19). Meanwhile, participant E believed that everyday routines and irresponsibility are major causes of drought. People waste which is beyond the department's control. Two participants affirmed that DARD has made efforts of water conservation through projects of Jojo tanks provision to small farmers. This initiative alone is not

sufficient to conserve water; rather, change of human behaviour could go a long way in sustainability.

4.4.3. Health and Wellbeing

There is a continuous threat of poultry diseases, with birds transporting diseases across regions where diseased birds are allowed to move freely (DAFF, 2014, p.16; Coetzee *et al.*, 2007, p.04). When question on what this literature revealed, participant D contested these statements by stating that some diseases are not a matter of transportation; rather, diseases are beyond human control. There are vaccinations which helps those trained and under supervision of the department. But for the independent businesses, it is a major challenge because they do not have guidance and some sort of tools for fighting the diseases.

“In this sector there’s ongoing challenge which is beyond farmers’ control and that is disease and at times of diseases the country is compelled to buy products outside...” (Participant B)

Health and wellbeing threatens food security. This has been another challenge, especially with animals because diseases leave a huge impact. Participant D pointed that bird’s flue attacked business between June to July 2017 and left other relevant sectors suffering including retailers and restaurants.

4.4.4. Environmental sustainability

Participant D and participant B reasoned that one of the influencers in the sector’s performance is that over the years, this sector has been regarded as a form of resource management means. This then resulted in very low efforts on growth investments in the sector. This is the same way some authors like Moon (2011, p.21) argue that agriculture is at the forefront in managing the entire natural resources such as land, forestry and water. This has also put pressure on the sector to regard resource sustainability as their major focus, while other sectors have taken environmental sustainability as an option or rather, additional activities in their plans. Meanwhile, environmental sustainability is a responsibility of every sector.

Seemingly, the strategic responses to challenges are mostly considered internally in organisations such as employee performance, rather than spending efforts in focusing on external impacts. Therefore, there should be a focus on these external factors for effective strategic response formulation.

4.4.5. Natural resources depletion

The study found that land is an issue, as uttered by Aertsens and Van Huylenbroeck (2009, p.215) that land has become a limited good, while agriculture has to contest with users such as housing, nature reserves and other industries for the very same scarce resources. Participant E reported that most industries are competing over the use of land with other sectors such as housing, manufacturers and so forth.

“People care less about agric activities because it does not directly affect them...people would use most resourceful land to build houses because of they lack information and unbothered.”
(Participant B)

The Participant E added that another issue caused by the scarcity of resources is that most areas are short of proper land or spaces to do agricultural business. The engineering division aims to reach to a proper site where work can immediately begin, rather than levelling the space. But because the remaining spaces are not entirely proper due to limited spaces, some businesses fail to initiate or some launch, but fail in the long run, because the area of production is not favourable for the particular agricultural activity.

“...let alone that entire country has limited water, but KZN highly depends on municipality for water supply which results in dependability and hindered growth of farming...” (Participant D)

Water scarcity is another issue that the sector is facing. The province and the country at large have been faced with water scarcity. Meanwhile, water is a major source of agricultural production. Animals use water at every level and participant B noted that most of the areas it serves, such as Mzinyathi in Inanda, KZN, are experiencing water scarcity. This makes it difficult for businesses from such areas to succeed because the municipalities are highly depending on limited supplies of water for basic needs such as cooking and drinking. Businesses in agriculture will then produce under high cost rates due to water scarcity; and this determines the success or failure of the business.

As a result of the growing number of human population, in the semi-century or so, globally, agriculture will be forced to double its productivity to meet the global demand for food and hunger reduction (DAFF, 2014, p.23). But then, the serious problem that the agricultural industry faces is whether it is capable to produce further in a socially acceptable manner or not. That would determine the ability to meet the increasing demand in the next years. But, looking air pollution, landscapes, biodiversity, clean and adequate water supply, and conserved habitats (Moon, 2011, p.17; and JWP, 2004, p.09) will determine the future performance.

There should be a mobilization of resources through an emphasis of domestic resources. This means there should be initiatives that will promote the use of local available resources such as land and access to free water, rather than occupying crowded spaces in towns, leaving resource-rich areas. Through private and public organisations' support and encouragement, this can be achieved.

4.5. CHAPTER SUMMARY

Chapter 4 served as the data analysis chapter of this study. The chapter begun by revisiting the objectives of the study, indicating which objectives the chapter aimed to address. This was followed by the data analysis section of the chapter. Consideration was given to the responses obtained from the participants during the interviews. Three themes were identified, namely, techno-economic, political and natural environmental impacts on agricultural performance. Different categories and codes were developed for each theme in order to arrange the empirical data in a meaningful order. The data collected on environmental impacts from interview was presents, analysed and discussed.

The next chapter, Chapter 5, concludes this dissertation by summarising the main findings. Each objective will be considered individually, revisiting both the literature and the empirical findings of each objective in order to draw conclusions and make recommendations.

CHAPTER 5

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. INTRODUCTION

In preceding chapters, the problem statement, objectives, literature study and empirical data analysis were presented. Chapter 4 presented the findings and discussion of the empirical data. This concluding chapter presents a summary of the key findings, recommendations and areas for further research, and limitations of the study.

The primary objective of this research study was to assess the impacts directed by technoeconomic, political and natural environments towards agricultural performance. This chapter serves as a primary summary of the study. Each objective is considered individually by summarising the literature and empirical findings, drawing conclusions and providing recommendations on how to overcome the identified impacts. After the discussion of each objective, the chapter concludes by discussing the limitations of the study and also by making recommendations for future research on a similar topic. The concluding section of this chapter summarises the main discussions and findings of the study.

5.2. SUMMARY OF THE STUDY

The study covered five chapters. Chapter 1 was the introduction that outlined the overall aim of the research, the context and rationale for the study, problem statement, the main aim of the research, research objectives, research questions, theory frame, the underlying assumptions, as well as the value of the study. Chapter 2 offered a review of international and local literature that is relevant to the study. It included literature on the environment and how it is impacting on agricultural performance. Chapter 3 outlined the qualitative research approach and methods, and the logic that underpins them, the trustworthiness of the study, the ethical considerations and finally, the limitations of the study. Then chapter 4 was the presentation of findings and discussion where review of literature and theoretical framework are done. Lastly, chapter 5 summarised the research findings and concludes the chapter, based on the findings, then finally set out the recommendations of the study, limitations, and areas of future research the concluding remarks.

5.3. SUMMARY OF KEY FINDINGS

This section presents summary of finding in relation to the study's aim. The research objective that the study aimed to achieve were to understand the techno-economic influences on agricultural performance, to understand the impact of political environment on agricultural performance, and to understand the natural environment impact on agricultural performance.

The findings were presented on objective on understanding the techno-economic impacts on agricultural performance. Based on the findings, there are slow developments and fewer innovations within the agricultural sector. Even though technology may work as support in the sector, agriculture has adopted it but still lacks fast adoption of technology and innovation. Further, people are not skilled enough to drive creativity and innovation. The imports, demand for foreign products and few supplies from local producers which discourages expansion of local businesses. The competition directed by foreign suppliers discourages further investment and involvements especially by young people.

The findings that achieved objective aiming to understand political environment influencing agriculture are as follow. There is poor investment on agricultural skills in S.A incompetently leaving agricultural sector unable to sustain itself for long run. Educational system has exposed the sector to vulnerability of being not considered as commercial occupation. The lenient policies of this country such as free trade have exploited local farmers' opportunity to grow. There is no adequate management of information systems in the industry. There is obscure formulation of comprehensible vision of the presented challenges and planned satisfactory resolutions to develop systems in public education.

In understanding natural environmental impacts on agricultural performance, the findings are that the country has been facing drastic climate change which may take some time to recover from. The change in climate then resulted in water scarcity and limited other natural resources. Furthermore, competition over land directed by other industries is very high in this country. There is inefficient use of available resources.

5.4. RECOMMENDATIONS

This section focuses on the recommendations to improve agricultural sector. The primary aim of this study was to understand environmental impacts on agricultural performance. Chapter 4 presented the results of the analysis of the data obtained from the semi-structured in-depth interviews and discussed the findings. This section briefly provides a list of the identified environmental impacts (from both the literature and the empirical study) and the recommendations on how these impacts can be tackled.

Table 5.1 presents the impact by techno-economic environment on agricultural impacts by theory and findings followed by recommendations.

Literature findings	Empirical findings	Recommendations
<p>The literature discussed on techno-economic impacts. These are briefly recapped as follows:</p> <ul style="list-style-type: none"> • Slow innovation and adoption of technology (Inauen & Schenker-Wicki, 2011, p.499, Aubert, Schroeder and Grimaudo, 2012, p.501). • Low domestic supply and High demand supply of foreign product (Kapuya, 2017, p.08; Pretorius & Smal, 2012, p.33; Keller and Lehamann, 2006, p.179). Poor product quality (Katengeza, 2012, p.35; Pretorius & Small, 2012, p.37). • High imports and low exports (Kapuya, 2017, p.20; DAFF, 2014, p.19). 	<p>The following are the main techno-economic impacts on agricultural performance identified during interviews with participants at DARD.</p> <ul style="list-style-type: none"> • Slow innovation and improved implementations. Overly relying on ancient methods with slow adoption of technology (Section 4.2.1). • Less local suppliers and high foreign suppliers. High demand for foreign products (Section 4.2.4) • High rates of imports and low exports (Section 4.2.5). 	<ul style="list-style-type: none"> • The government needs to encourage more exports through subsidizing farmers, especially small-scale farmers. The government needs to intensify same levels of attention on both the exports and imports. But more importantly, policies that support exports are more encouraged, so the indigenous food market will grow. Furthermore, consumers would be able to support products of South Africa. If there are limited products from outside the country, then the consumers will be left with no choice but to support the local brands which will in return grow the South African industries and the country economy as whole. • The government needs to withdraw free trades policies. In that way influx of imports will be reduced and it may encourage more supply from the locals with no intensified or ‘unfair’ competition posed by foreign countries. In doing so, strategic

		<p>implementation possibly will be to promote 60 percent local goods consumption before considering foreign products.</p> <ul style="list-style-type: none"> • There is a need to develop and implement management strategies that will support growth of this sector.
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Table 5.2 presents the impact by political environment on agricultural impacts by theory and findings followed by recommendations.

Literature findings	Empirical findings	Recommendations
<p>The literature discussed on political impacts. These are briefly recapped as follows:</p> <ul style="list-style-type: none"> • Out-dated information and few or no skills (Inauen and Schenker-Wicki (2011, p.497). No mentorship and support (Kapuya (2017, p.21). • Imbalanced knowledge sustainability (Gamage et al., 2014, p.03). Low demand for skilled labour (Schwat, 2015, p.237). 	<p>The following are the main political impacts on agricultural performance identified during interviews with participants at DARD.</p> <ul style="list-style-type: none"> • Inadequate supply of skillful. Interest shown by illiterate. Less investment on skills. Poor quality skills (Section 4.3.1) • Inadequate constant support and on-going mentorship (Section 4.3.5) • No knowledge sustainability (Section 4.3.5). 	<ul style="list-style-type: none"> • More promotion of agri-businesses and trade activities needs to be encouraged by local investors. The national policies do not support or encourage local supplies to boost the local sectors. Options for security always come from outside the country. This creates dependency by local farmers and consumers. The procurement policies should be fostered to support the local industries. That would improve local production and motive for local industries to expand not only in supplying for locals, but rather go international as well. If necessary investments are made on agri-businesses, then more people would be motivated to go into agriculture. • There is need to incorporate skills and practices. New graduates and emerging farmers may not have the same exposure to practical part of production and that is why they need to be mentored. On top of that, student learning should not be in books and classrooms only, but rather, offer internships and learnerships for job and skills exposure. There is also the need to ensure the full participation of students to incorporate class learning and field work for accelerated expertise. Support should

		also be given to those acquiring education in order to prevent negative experiences to change negative perceptions of the society about the industry.
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Table 5.3 presents the impact by natural environment on agricultural impacts by theory and findings followed by recommendations.

Literature findings	Empirical findings	Recommendations
<p>The literature discussed on natural impacts. These are briefly recapped as follows:</p> <ul style="list-style-type: none"> • Changing climate (Paoletti, 2011, p.06; Shakoor et al., 2011, p.328; Gomiero et al., 2011, p.103). • Increased draught (DAFF, 2014, p.19). • Limited and degraded land (Aertsens & Van Huylenbroeck, 2009, p.215; (DAFF, 2014, p.19). 	<p>The following are the main natural impacts on agricultural performance identified during interviews with participants at DARD.</p> <ul style="list-style-type: none"> • Drastic climate change (Section 4.4.1) • High draughts levels (Section 5.6.1.1) • Limited and depletion of resources (Section 4.4.4). 	<ul style="list-style-type: none"> • Continues awareness and educational programmes should be held often for the public to conserve resources. • Agricultural activities should be regarded as a priority by all of the country's provinces and the private sector. Among other things distribution of land should have means to assess how beneficial it can be for agricultural activities before distributed to other sectors.

5.5. LIMITATIONS OF THE STUDY

The sampling method used in the study limits the generalisation of the results to the entire population. Also, the literature made it difficult for the researcher to access other literature with related topics. But then this is addressed in the next topic.

5.6. AREAS OF FUTURE RESEARCH

The following possible research focus areas were identified by the researcher during the course of the study.

- The issue of high import rate and desire for foreign products was found to be one of the major contributors in not only agriculture but in other sectors as well. Research can be conducted to encourage support of local products and local suppliers.
- The future studies need to look at forms to aware and encourage potential farmers especially youth that agriculture is not simply ancient activity rather commercial occupation and form of investment.
- Study suggests that there is a gap in studies conducted not only on topics related to this study, but insufficient agricultural studies have been conducted in South Africa. The future research is needed to add in the body of knowledge in agriculture.
- Government policies are consuming local investments by not supporting local farmers or producers which then contributes to other issues such as unemployment. Therefore, research and studies could be undertaken on possible incentives and support that government can provide to encourage agricultural activities and supporting local farmers.
- The study only covered only briefly four environmental factors. There are other macro environmental factors that future research still needs to look at. These factors covered in the study may still be in-depth studied alternatively as similar topic. Research can even look at environmental impacts in agriculture at micro level.
- There is a need to conduct research on how can the developments and implementations of management strategies can be advanced to support growth of this sector.

5. 7. CONTRIBUTION OF THE RESEARCH STUDY

The data that was collected can be used to create awareness among farmers to see the need of improving the industry's growth and dedication of service delivery. Strategic systems can be created to tackle macro influencers at the micro level.

The research study contributes to the application of macro environment theory in the agriculture industry, with particular emphasis on impact the environment has on agricultural performance.

The impacts identified in this study are not only applicable in agriculture, but relatively to other sectors as well.

Recommendations were made on how the industry can overcome the environmental impacts. These recommendations could be further developed in future research studies.

The study of the literature and the findings of this research make a contribution to the body of knowledge and provide new insight into this field.

5.8. CONCLUSION

The aim of the study was achieved since macro environmental influencers were analysed. The discussion unpacked experiences and opinions of the participants involved. The study concludes that this sector does not perform as expected, simply because there have been less investments that regards agriculture as one of the important commercial industry to contribute largely in the economy. There has not been enough in-cooperation of technology that efficiently deals with agriculture, which may generally involve everyone, regardless of their age and educational level. That is why in most parts of the province, agricultural activities are still conducted in ancient methods, which is partly slow in accelerating production; hence, the slow growth of the sector at large.

At large, less attention has been given to agriculture to improve the skills of the workers in the sector. Rather, it is taken as the activities that one can do while waiting for the real job, or extra activity to do alongside one's actual career. That is why even some of those involved would not put extra effort to improve it.

It calls for attention from agricultural managers to take action in strategizing on how the performance of this sector can be improved. It is their role to promote and develop the sector from micro to macro levels. The managers must play enormous role marketing this sector from local to international level. With this and more, it may not be an overnight action to improve agricultural sector but slight ongoing and consistent developments may yield to positive outcome in the near future.

REFERENCES

- Adams, K. (2005) *The source of innovation and creativity. National centre on education and the economy for the new commissions*, September 2005, America.
- Aertsens, J. and Van Huylenbroeck, G. (2009) *A meta-analysis of the differences in environmental impacts between organic and conventional farming*. British Food Journal, 111 (100), pp.1098-1119.
- Armelli, G. and Villanueva, J. (2011) *Adding social media to the marketing mix*. IESE insight, 09, pp. 01-27.
- Aubert, B. A., Schroeder, A. and Grimaudo, J. (2012) *IT as enabler of sustainable farming: an empirical analysis of farmer's adoption decision of precision agriculture technology*. United Kingdom: Elsevier [online]. Available: <http://dx.doi.org/10.1016/j.dss.2012.07.002> (Accessed: 15/05/2017).
- Bilton, T. (2015) *The state of the South African poultry industry. Supermarket and retailer*, March 2015, page 17-22.
- Coetzee, Z., Meyer, F. and de Beer, J. (2007) *Subsector study: chicken meat*. The National Agricultural Marketing Council, report no. 03 of January 2007.
- Department of Agriculture, Forestry and Fisheries (2017) *Abstract of agricultural statistics*. Pretoria, Republic of South Africa
- Department of Agriculture, Forestry and Fisheries (2016) *Abstract of agricultural statistics*. Pretoria, Republic of South Africa
- Department of Agriculture, Forestry and Fisheries (2016) *Trends in the Agricultural Sector 2015*. Pretoria, Republic of South Africa.
- Department of Agriculture, Forestry and Fisheries (2014) *A profile of the South African broiler market value chain*. Acadia, Republic of South Africa.
- Department of Trade and Industry (2017) *Challenges facing the SA poultry sector*. Committee on Trade and International Relations, Republic of South Africa.

- ENCA news (2017) *Watch: In conversation with Thabo Mbeki, South Africa*, Thursday 13 July 2017-10:30 p.m. [online]. Available: <https://www.enca.com/south-africa/catch-it-live-in-conversation-withthabo-mbeki> (Accessed: 24/08/2017).
- Foresight Alliance (2016) *Brands 2030: ten forecasts on the future of brands and branding* [Online]. Available: <http://www.foresightalliance.com/wp-content/uploads/2010/03/The-Futures-of-Work-1.12.2016.pdf> (Accessed: 24/08/2017).
- Gamage, H R., Sailikitha, T., Karamchandani, J., Gowda, K. and Xin Tong, X. (2014) *Three generations and their work life balance: are we balancing work and life or adjusting life for work?* University of Wollongong, Bali, 23-26 November 2014, pp. 01-10.
- Goldblatt, A. (2016) *Agriculture: facts and trends South Africa*. WWF: South Africa.
- Gomiero, T., Pimentel, D. and Paoletti, M. G. (2011) *Environmental Impact of Different Agricultural Management Practices: Conventional vs. Organic Agriculture*, Critical Reviews in Plant Sciences, 30, pp.95-124.
- Greyling, J. C. (2015) *A look at the contribution of the agricultural sector to the South African economy* [Online]. Available: <http://www.grainsa.co.za/a-look-at-the-contribution-of-the-agricultural-sector-to-the-south-african-economy> (Accessed: 01/03/2017).
- Hart, S. L., Milstein, M. B. and Caggiano, J. (2003) *Creating sustainable value*. The Academy of Management Executive, 17 (02), pp. 56-69.
- Hough, J., Thompson Jnr, A. A., Strickland III, A. J. and Gamble, J. E. (2011) *Crafting and executing strategy creating sustainable high performance in South Africa: text, readings, and cases* (2nd Ed.) Master's thesis, University of Stellenbosch: McGraw-Hill.
- Huang, H. von Lampe, M. and von Tongeren, F. (2011) *Climate change and trade in agriculture*, Food Policy, 36, pp.9-13.
- Hulley, S. B. (2007) *Designing clinical research*, Lippincott Williams & Wilkins, 35, pp. 168-169.

- Inauen, M. and Schenker-Wicki, A. (2011) *The impact of outside-in open innovation on innovation performance*, European Journal of Innovation Management, 14 (04), pp.496-520.
- Joint Working Party on Agriculture and the Environment (2015) *Agriculture and the Environment: Lessons Learned from a Decade of OECD Work*, 2003 OECD report, pp. 1-35
- Kaasie, M., Shiferaw, B., Muricho, G. (2011) *Agricultural technology, crop income, and poverty alleviation in Uganda*, World Development, 39 (10), pp.1784- 1795.
- Kapuya, T. (2017) *What next for South Africa's poultry sector?* Agriculture business chamber conference report, 21 January 2017, International trade and investment intelligence.
- Katengeza, S. (2012) *ICT-based market information services, operational environment and performance: the case of Malawi agricultural commodity exchange and food and nutrition security joint task force*, American international journal of social science, 02, pp.34-43.
- Keller, K. L. and Lehmann, D. R. (2006) *Brands and branding: research findings and future priorities source*, Marketing Science, 25 (06), pp.740-759.
- Kietzmann, J. H., Hermkens, K., McCarthy, I. P. and Silvestre, B.S. (2011) *Social media? Get serious! Understanding the functional building blocks of social media*, Business Horizons, 54, pp.241-251.
- Kurukulasuriya, P., Mendelsohn, R., Hassan, R., Benhin, J., Deressa, T., Diop, M., Eid, H. M., Fosu, K. Y., Gbetibouo, G., Jain, S., Mahamadou, A., Mano, R., Kabubo- Mariara, J., El-Marsafawy, S., Ouda, E., Ouedraogo, M.S., Séne, I., Maddison, D., Seo, S. N. and Dinar, A. (2006) *Will African agriculture survive climate change?* The World Bank economic review, 20 (03), pp.367-388.
- Lienbenberg F. (2013) *South African agricultural production, productivity, and research performance in the 20th century*. Philosophiae doctor, University of Pretoria, South Africa.

- Lybbert, T., and Sumner, D. A. (2012) *Agricultural technologies for climate change in developing countries: Policy option for innovation and technology diffusion*, Food Policy, 37, pp.4-123.
- McElroy, M. W. (2015) *The New Knowledge Management - Complexity, Learning, and Sustainable Innovation*. Butterworth: Heinemann.
- Moon, W. (2011) *Is agriculture compatible with free trade?* Ecological Economics, 71, pp.13-24.
- Naidoo, M. (2017) *Rainbow Chicken on a knife edge*, Sunday Tribune, 08 January [Online]. Available: <https://www.iol.co.za/news/south-africa/kwazulu-natal/rainbow-chicken-on-a-knife-edge-7354387> (Accessed: 07/05/2017).
- Neuman. L. (2011) *Social Research Methods: Qualitative and Quantitative Approaches* (7thEd.). United States of America: Pearson International.
- Nyariki, D. M. (2011) *Farm size, modern technology adoption, and efficiency of small holdings in developing countries: evidence from Kenya*, The journal of developing areas, 45, pp.35-52.
- Pretorius, C. J. and Smal, M.M. (2012) *Notes on the macro-economic effects of the drought*. Report on the Investigation on the Reconstruction of Agriculture, Economic Advisory Council of the State President, 20 November, 2009.
- Salinger M. J. (2007) *Agriculture's influence on climate during the Holocene*. Agricultural and Forest Meteorology, 142, pp.96-102.
- Schiefer, G. (2003) *New technologies and their impact on agriculture, environment and the food industry*. EFITA 2003 Conference 5-9. July 2003, Hungary: Debrecen.
- Shakoor, U., Saboor, A., Ali, I. and Mohsi, A.Q. (2011) *Impact of climate change on agriculture: empirical evidence from arid region*, Pak. J. Agri. Sci., 48(4), pp.327-333.
- Statistics South Africa and National Department of Agriculture (2016) *Employment trends in Agriculture*. Pretoria: Government Printer.

- Statistics South Africa (2009) *Gross Domestic Product, 3rd Quarter 2009 [Online]*. Available at: <http://www.statssa.gov.za> (Accessed: 12/09/2017).
- Terre Blanche, M., Durrheim, K. and Painter, D., (2006) *Research in Practice*. Cape Town: University of Cape Town Press.
- Thomson, A. M., Izaurralde, R. C., Rosenberg, N. J. and He, X. (2006) *Climate change impacts in agriculture and soil carbon sequestration potential in the Huang-Hai in China*. Agriculture, Ecosystems and Environment, 114, pp. 95-209.
- Vink, N. and Van Rooyen, J. (2009) *Perspective on the performance of agriculture in South Africa since 1994 and implications for its role in achieving sustainable food security*. University of Pretoria, Working paper draft 3.
- World Economic Forum (2016) *The future of jobs employment, skills and workforce strategy for the Fourth Industrial Revolution*, Global Challenge Insight Report [Online]. Available: <http://hdl.voced.edu.au/10707/393272>. (Accessed: 13/04/2017).
- Zhao, J., Zhang, J.; Feng, Y. and Guo, J. (2010) *The study and application of the IOT technology in agriculture*. Beijing Academy of agriculture and forestry sciences: Beijing, China.

APPENDIX A

GATEKEEPER LETTER



agriculture
& rural development

Department:
agriculture
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PROVINCE OF KWAZULU-NATAL

KZN Department of Agriculture & Rural Development
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Date: 04 July 2017

The Head

University of KwaZulu Natal

Durban

4000

**RE: PERMISSION TO CONDUCT RESEARCH AS PART OF THE RESEARCH DISSERTATION
REQUIREMENT FOR COURSE WORK DEGREE: Phendulwa Jaca student number 211554281**

In respect of the above – named who requested permission to conduct research as part of the research dissertation requirement for M. Com course work Degree with the Department of Agriculture and Rural Development, Department grant her permission for one day.

Thank you.

ADMINISTRATION MANAGER

ETHEKWINI DISTRICT

DATE

APPENDIX B

ETHICAL CLEARANCE



20 September 2017

Ms Phendulwa Jaka (211554281)
School of Management, IT & Governance
Westville Campus

Dear Ms Jaka,

Protocol reference number: HSS/1516/017M

Project title: Improving agricultural performance through an understanding of environmental impacts at Department of Agriculture and Rural Development in eThekweni District

Approval Notification – Expedited Application

In response to your application received on 23 August 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Ms Jayrasha Ramasamy-Gurayah
Cc Academic Leader Research: Professor Isabel Martins
Cc School Administrator: Ms Angela Pearce

Humanities & Social Sciences Research Ethics Committee

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Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

APPENDIX C

INFORMED CONSENT FORMS

INFORMED CONSENT FORM FOR PARTICIPANTS

Title of the study: Improving agricultural performance through an understanding of environmental impacts at Department of Agriculture and Rural Development in eThekweni district.

To whom it may concern

My name is: Phendulwa Jaca

I am a Commerce Masters student at the University of KwaZulu-Natal. For my degree, this year, I have to complete a research project on the above topic. I believe that understanding environmental impacts is an important topic to improve agricultural performance.

You are kindly requested to participate in one interview. Your participation in this study is entirely voluntary, and anonymity will be ensured in the research report. Should you find the interview/ discussion difficult or tiresome, you are welcomed to discontinue without any penalty.

I also request your permission, which I will use for record purposes only.

I SHLAKANIPHI NZAMA hereby confirm that I understand the content of this document and the nature of the research projects. I consent to participate in this study and do so under my own free will.


Signature of Participant

22/09/2017
Date

Phendulwa Jaca
Signature of Researcher

22/09/2017
Date

INFORMED CONSENT FORM FOR PARTICIPANTS

Title of the study: Improving agricultural performance through an understanding of environmental impacts at Department of Agriculture and Rural Development in eThekweni district.

To whom it may concern

My name is: Phendulwa Jaka

I am a Commerce Masters student at the University of KwaZulu-Natal. For my degree, this year, I have to complete a research project on the above topic. I believe that understanding environmental impacts is an important topic to improve agricultural performance.

You are kindly requested to participate in one interview. Your participation in this study is entirely voluntary, and anonymity will be ensured in the research report. Should you find the interview/ discussion difficult or tiresome, you are welcomed to discontinue without any penalty.

I also request your permission, which I will use for record purposes only.

I Phendulwa Jaka hereby confirm that I understand the content of this document and the nature of the research projects. I consent to participate in this study and do so under my own free will.


Signature of Participant

22/09/2017
Date


Signature of Researcher

22/09/2017
Date

at Department of Agriculture and Rural Development in eThekweni district.

To whom it may concern

My name is: Phendulwa Jaka

I am a Commerce Masters student at the University of KwaZulu-Natal. For my degree, this year, I have to complete a research project on the above topic. I believe that understanding environmental impacts is an important topic to improve agricultural performance.


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I also request your permission, which I will use for record purposes only.

I Devon Gerber hereby confirm that I understand the content of this document and the nature of the research projects. I consent to participate in this study and do so under my own free will.


Signature of Participant

25/09/2017
Date


Signature of Researcher

23/09/2017
Date

Title of the study: Improving agricultural performance through an understanding of environmental impacts at Department of Agriculture and Rural Development in eThekweni district.

To whom it may concern

My name is: Phendulwa Jaca

I am a Commerce Masters student at the University of KwaZulu-Natal. For my degree, this year, I have to complete a research project on the above topic. I believe that understanding environmental impacts is an important topic to improve agricultural performance.

You are kindly requested to participate in one interview. Your participation in this study is entirely voluntary, and anonymity will be ensured in the research report. Should you find the interview/ discussion difficult or tiresome, you are welcomed to discontinue without any penalty.

I also request your permission, which I will use for record purposes only.

I Vusumuzi Khanyile hereby confirm that I understand the content of this document and the nature of the research projects. I consent to participate in this study and do so under my own free will.


Signature of Participant

23/09/2017
Date


Signature of Researcher

23/09/2017
Date

APPENDIX D

GUIDING INTERVIEW SCHEDULE

Topics to be covered:

Understanding the techno-economic influences on agriculture performance

How techno-economies influence the agriculture performance?

- Creativity and Innovation
- Internet of Things (IOT)
- Industrialization
- Demand and Supply
- Imports and Exports
- Infrastructure and Resources
- Economic transformation
- Trade and Currency/ Economic position

Understanding the natural environment impact on agriculture performance

At what extent does natural environment impacts agriculture performance?

- Impacts of draughts
- Water quality and shortage
- Climate action
- Health and Wellbeing
- Environmental sustainability/Responsibility
- Energy accessibility
- Natural resources depletion

Understand the role played by political environment on agriculture.

What role does politics play in the performance of agriculture?

- Quality Skills training
- Support and Mentorship
- Youth development
- Job creation and Job security
- Entrepreneurship
- Leadership and Knowledge investment
- Cooperation/Partnering with other stakeholders
- Marketing of the industry
- Knowledge Sustainability
- Systems and Strategies

APPENDIX E

TURNITIN REPORT

Thesis Phendulwa

ORIGINALITY REPORT

10%

SIMILARITY INDEX

6%

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