DURBAN UNIVERSITY OF TECHNOLOGY

Exploring the Underlying Causes of the Volatility of Sugarcane Productivity on Land Reform Farms in King Cetshwayo District – KwaZulu-Natal

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DECLARATION

I, Mbongiseni Cleopas Ndebele, hereby declare that the work that I present in this thesis is based on my own research. I also confirm that I have not submitted partially or fully any sections of this thesis to any other institution of higher education to obtain an academic qualification.

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23/03/2021

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25/03/2021

Prof K. Reddy Date

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ABSTRACT

Land reform or agrarian reform has been a bone of contention in many countries in a quest to deal with skewed ownership of land through a market-led approach or a state-led approach, while in most instances, it had only been able to address the restoration of land to the dispossessed groups, but failed to improve agricultural productivity. It is important to restore agricultural productivity and be able to meet the world's energy requirements and to feed the population estimated will be over 9 billion people by 2050.

Historically, native (black) South Africans were forcefully removed from productive agricultural land under the Natives Land Act of 1913. Post 1994, the South African government launched three pillars of the land reform programme, (land tenure reform, land restitution and land redistribution) and injected funds to equitably restore land back to the rightful owners, and to sustain agricultural productivity, which have become a paradox, as most of the redistributed agricultural land became unproductive and abandoned immediately after being restored to the previously disadvantaged groups.

The target population for this mixed-methods research study were the 51 active land reform sugarcane farmers in King Cetshwayo District. A purposive sample of six farmers was selected for semi-structured face-to-face interviews and 41 participated in a survey, while the remainder was excluded from the main study as they took part in a pilot study. Qualitative and quantitative data was collected concurrently with both research instruments given equal attention. Despite the salient effects of climate change on agricultural productivity, the study found that there are some institutional, social and technical aspects that lead to the diminishing sugarcane productivity.

Equally so, non-conformance with pieces of legislation such as the Basic Conditions of Employment Act (BCEA) No.75 of 1997 and Occupational Health and Safety Act (OHSA) No.85 of 1993 was found to have contributed immensely to the volatility of sugarcane productivity. The study concluded that compliance with OHSA and the acquiescence with sustainable farming practices outlined in the National Environmental Management Act (NEMA) No. 107 of 1998, which was lacking in most of the farms that took part in the study, could improve sugarcane productivity on land reform farms in King Cetshwayo District.

KEY WORDS:

Volatility, Sugarcane productivity, Land (agrarian) reform, Renewable energy, Monoculture, Efficiencies, Compliance, Best Management Practice (s), Non-conformance, Personnel management.

LIST OF ABBREVIATIONS

AIDS : **Acquired Immune Deficiency Syndrome**

BCEA : **Basic Conditions of Employment Act**

BFAP : **Bureau of Food and Agricultural Policy**

BMP : **Best Management Practices**

BTCD : **Burn-To-Crush-Delays**

DUT : **Durban University of Technology**

EBF : **Emerging Black Farmers**

GR : **Green Revolution**

HIV : **Human Immunodeficiency Virus**

IFAD : **International Fund for Agricultural Development**

IRENE : **International Renewable Energy Agency**

KCD/M : **King Cetshwayo District / Municipality**

LCC : **Land Claims Commission**

MDG : **Millennium Development Goals**

MLAR : **Market-Led Agrarian Reform**

NEMA : **National Environment Management Act**

OHSA : **Occupational Health and Safety Act**

PPE : **Personal Protective Equipment**

RADP : **Recapitalisation and Development Programme**

RV : **Recoverable Value**

SASRI : **South African Sugarcane Research Institute**

SID : **Sugar Industry Directory**

SLAR : **State-Led Agrarian Reform**

UNEP : **United Nations' Environmental Plan**

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OVERVIEW OF THE STUDY

1.1 INTRODUCTION

According to Hardaker, Huirne, Anderson & Lien (2004:6), agricultural productivity is often exposed to excessive risks that are associated with weather uncertainty and many other irregularities that could lead to massive volatility losses. Volatility losses in agricultural productivity could have knock-on effects to the communities as McCarthy (2008) cited in Economists (2013:18), states that the sugarcane farming areas have much lower unemployment levels and higher income streams per capita compared to the areas without sugarcane.

Anecdotal evidence suggests that the South African sugar industry could permanently close one of the sugar mills if the sugarcane productivity dilemma on land reform farms prolongs. According to Thomson & Gillitt (2007:44), massive declines in sugarcane productivity could lead to the closure of some of the sugar mills which could jeopardise the unity of farmers especially when lobbying and dealing with complex sugar industry matters which could also have dire effects on their farming businesses (Gillham & Hurly, 2009:393).

Permanent closure of any of the existing sugar mills could have negative effects on farmers and other subsidiaries in the value chain, which can lead to a high rate of unemployment and poverty. Kempa (2010:1) avers that communities with high unemployment rates are known to have high rates of crime, which then erodes investor confidence. Equally so, the unity among sugarcane farmers enables them to purchase inputs in bulk, enjoy discounted rates from suppliers and improve efficiencies while disunity could leave those who are still in business totally exposed to exploitation, as

stated by Gachora, Kibet & Musiega (2014:378). Wilk, Andersson & Warburton (2013:274) admit that harsh weather conditions coupled with climate change could lead to the volatility of agricultural productivity and further argue that it is unclear as to how commercial farmers undergo harsh weather conditions and sustain agricultural productivity while the emerging black farmers (EBF) quickly surrender.

Kumar & Sharma (2014:112) state that various studies by Onyeji & Fischer (1993), Deressa *et al.* (2005) and Masters *et al*. (2010) endorse the claim that climate changes could have a barring effect on agricultural productivity and this phenomenon is often referred to as “productivity shocks”. According to Gina & Nothard (2014:399), the success of the entire land reform programme is crucial for the long-term sustainability of the South African sugar industry. Bitzer & Bijman (2014:169) point out that quality and productivity concerns in the agricultural sector are now more common in South Africa following the introduction of the land reform programme.

The International Fund for Agricultural Development (IFAD) (2016:48) states that countries cannot succeed in reducing rural poverty without promoting investments in agriculture. Agriculture is an important sector that contributes immensely to the development of the underdeveloped regions of the Third World countries, and cannot be disregarded as an important vehicle in improving lives (Ntshangase, 2016:17). South Africa as a global player is reliant on the agricultural sector to ensure food security, creates employment and alleviates poverty in the deep rural areas. Muwi (2012, cited in Ntshangase 2016:17), argues that the agricultural sector plays a crucial role in the African countries, especially in Zimbabwe, by providing employment to seventy-five per cent of the population while also contributing fifteen to twenty per cent of the gross national product.

The International Fund for Agricultural Development (IFAD) (2016:48) states that countries cannot succeed in reducing rural poverty without promoting investments in agriculture. Despite agricultural productivity decline worldwide, agriculture still remains at the top of the world's agenda in addressing poverty through initiatives such as zero hunger and malnutrition (Omilola & Robele, 2017:2). Pingali (2012, cited in Omilola & Robele 2017:17), avers that agricultural investments should be coupled with policies and programmes that promote equal access to agricultural land, assets and markets, and that the 2030 Millennium Development Goals (MDG) were introduced to address such challenges.

MDG are pivotal to the United Nations' (UN) agenda of reaching sustainable development targets by year 2030, which is also referred to as the Agenda 2030 (Omilola & Robele, 2017:1). Arora (2018:217) posits that it is crucial for the world to invest in agriculture and to sustain agricultural productivity in order to meet the food and energy requirements of the population, which it estimated will be over 9 billion people by year 2050.

According to Anger (2010, cited in Ukeje, Ogbulu, Idike, Nduwe, Iwuala & Clementina 2020:3), the primary goal, among other MDG, is to eradicate poverty and hunger by creating job opportunities through agriculture. The researcher saw it necessary to pursue a study that seeks to address the concerns from various sugar industry stakeholders who want to see the industry prosper and continue as a major contributor to the rural economy and an important provider of employment (Hess, Sumberg, Biggs, Georgescu, Haro-Monteagudo, Jewitt, Ozdogan, Marshall, Thenkabail, Daccache & Marin, 2016:182).

1.2 BACKGROUND ON LAND REFORM IN KING CETSHWAYO DISTRICT

According to Armstrong (2004:205), the initial land redistribution transaction took place at KCD in 2003 when 13 Natal Trust Farms (NTF) were transferred to the surrounding communities as part of the land redistribution programme and came into effect following the land claims that were lodged by Amakhosi (traditional leaders) living in the rural areas surrounding the periphery of the state properties.

Through empirical evidence, out of the 13 farms transferred in 2003, only five were still productive in 2008. Armstrong (2004:195) reassures that this transaction entailed transferring 2 000 hectares of state-owned land that was producing 85 373 tons[1] of sugarcane on average per annum to the previously disadvantaged groups and was facilitated by the Land Claims Commission (LCC). Lyne & Ferrer (2006:264) affirms that forty-five per cent of land redistribution transactions in KwaZulu-Natal took place during 1997-2003.

Since 2003, a lot of individual land transfers have emerged, facilitated by the state or privately on a willing-buyer willing-seller basis with the bulk of them becoming devoid of cropping potential (Lyne & Ferrer, 2006:268). According to (Van Zyl & Kirsten 1997 cited in Mackenzie 2015:1), black South Africans were denied access to productive agricultural land during the apartheid regime and more than eighty-five per cent of agricultural land was in the hands of the whites. Kloppers & Pienaar (2014:689) aver that the elements of land reform are (1) land redistribution, (2) restitution and (3) tenure reform. According to Khan, Shakoor & Ali (2019:112), land reform has been dubbed as synonymous with

[1] In this study tons refer to metric tons, i.e. tonnes

agrarian reform which deals with the cultivation of land and farming as opposed to the land tenure system. According to Kuhnen (1982, cited in Khan, Shakoor & Ali 2019:112), land reform can be described as the implementation of means to redistribute land and restitution and this study assumes this definition.

1.3 RATIONALE FOR THE STUDY

This research project is fundamental as it seeks to find solutions for an isolated group of farmers that have been excluded from previous research studies. In addition to what has been achieved in the previous studies, this research project intends to explore the underlying causes of the volatility of sugarcane productivity, assess the financial implications of the volatility of sugarcane productivity, and explore ways that can be implemented in order to deal with the problem. This research project is an advancement of other research projects by Rungasamy (2011), Gina & Nothard (2014), Mahule (2015) and many other research projects that have investigated factors affecting the sustainability of sugarcane productivity on land reform farms.

These research projects are an indication that sugarcane productivity on land reform farms is erratic and an exploratory study can assist in seeking solutions to restore productivity. The aforementioned research projects by Rungasamy (2011) and Mahule (2015) deduced that the lack of post-settlement support is the root cause of the problem, whereas Gina & Nothard (2014) followed a hypothetical model that explores variables such as the age of the farmer, education level, farming experience and access to loans and grants to find answers to the root cause of the volatility of sugarcane productivity on land reform farms. The researcher conceives that there are other underlying causes of the volatility of sugarcane productivity that are unique to KCD farmers and have rarely been explored in the previous studies.

1.4 SIGNIFICANCE OF THE STUDY

This research project is significant to many sectors, hence the following section discusses how government and policy makers, farmers, scholars and researchers will benefit from the findings of this research study.

Government and Policy Makers: The South African sugar industry creates both direct income and employment opportunities in the regions within which it operates. The sugar industry also promotes direct and indirect economic activity by virtue of its backward and forward linkages that exist between the sugar sector and other core businesses that supply the sugar industry (Ntshangase, 2016:4). Such linkages promote economic growth and contribute significantly in the creation of employment opportunities.

According to Hess *et. al* (2016:182), the sugar industry is an important provider of jobs. Its role has been impeccable over the years, particularly in the rural areas, as it is a rurally based industry that creates jobs both in the milling and the agricultural sector. A high volatility of sugarcane productivity on farms may reduce throughput at the sugar mills and could ultimately lead to severe job losses, thus defeating the constitutional mandate of the government.

Farmers: According to Godwin, Handsome, Ayomide, Enobong & Johnson (2017:78), farm management is about making effective choices and efficient use of resources to achieve a mix of goals to varying degrees, in the face of unknowns. It is therefore important for farmers to have an insight into the things that are affecting profitability of their business ventures in order to make informed decisions about the future, make the right choices and sustain their productivity levels. Efficiency and productivity are of high economic importance for businesses to remain current.

To be effective, farm managers today are expected to focus on producing high yields while preserving soil potential and the environment. Agricultural land is an exhaustible resource and farmers need to find a balance between being effective managers and protecting this wonderful resource from degradation. This research project sought to be a beacon to land reform sugarcane farmers so that they could farm more sustainably and reduce large numbers of proxy farmers.

Scholars and Researchers: According to Stange (1996:25), research provides knowledge about the unknown and knowledge is power. It would be difficult to expect land reform farmers to improve what they don't know. This research project was intended to bridge the knowledge gap for farmers through seminars and workshops, and to add to the body of knowledge regarding the underlying causes of the volatility of sugarcane productivity on land reform farms in KCD. A study of this kind should stimulate more research studies into this sector in the future years. The researcher concluded by making recommendations on areas for future research.

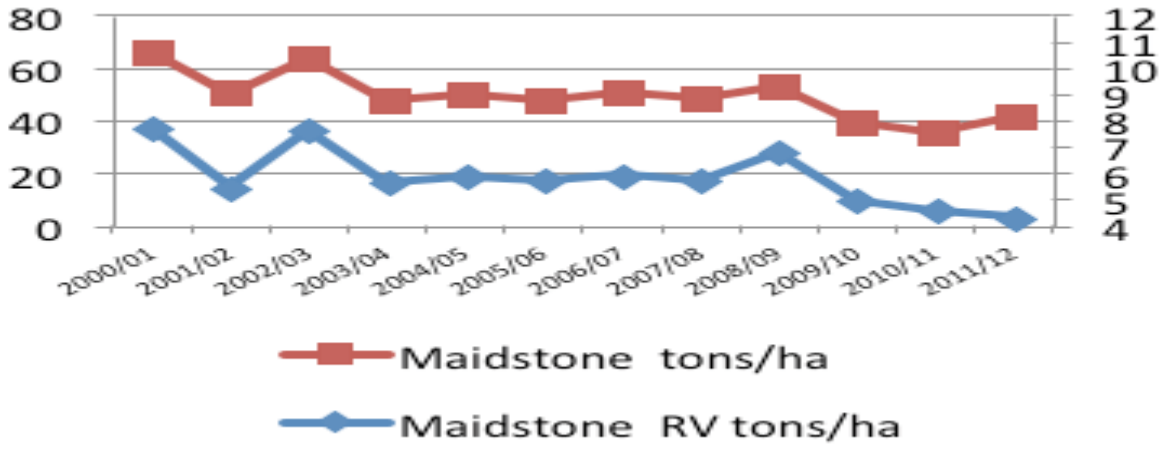
1.5 RESEARCH PROBLEM

The Sugar Industry Directory (SID) (2016/17:6) states that approximately one million people, or two per cent of South Africa's population, depended on the sugar industry for a living, and therefore it become important that the sugar cane farming communities remained productive. According to Gina & Nothard (2014:395), since 2004, the South African government intensified its support for land reform farmers by injecting millions through various schemes that have proven to be futile in improving agricultural productivity. However, Ledwaba (2013:27) concurs and points out that an injection of R750 million since 2004 into land reform farms had been fruitless.

It is against this backdrop that the researcher undertook to explore the underlying causes for this paradox. Sugarcane delivery records for land reform farmers at Amatikulu and Felixton sugar mills showed that in the 2009/10 season they delivered 291 264 tons of sugarcane and this tonnage had diminished to 230 869 tons between 2010/11 and 2012/13 seasons, which was equivalent to a twenty-one per cent decline in productivity over a period of three years, or an annual loss in productivity of seven per cent. Such alarming losses in sugarcane productivity were a cause for concern especially to the land reform sector and triggered this research.

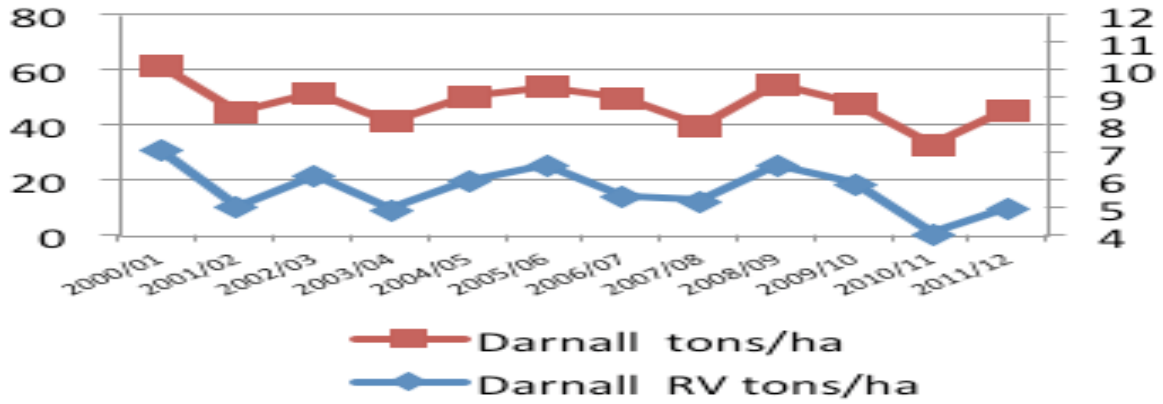
A study conducted by the Bureau for Food and Agricultural Policy (BFAP) in 2014 revealed that the volatility of sugarcane productivity had been upsetting across all categories of sugarcane farming. Figures 1 and 2 show a graphical representation of sugarcane productivity in two mill areas that fall under iLembe District which borders KCD. Sugarcane productivity is expressed in tons per hectare (tons/ha) and recoverable value tons per hectare (RV tons/ha). From the illustrations one can deduce that the volatility of sugarcane productivity has been in existence from all other categories of sugarcane farming for the past 12 years.

Figure 1: Sugarcane productivity at Maidstone sugar mill



Source (BFAP, 2014:22)

Figure 2: Sugarcane productivity at Darnall sugar mill



Source (BFAP, 2014:22)

However, based on anecdotal evidence, the volatility of sugarcane productivity has been more severe on land reform farms in view of the concerns raised by the milling companies and commercial farmers in KCD. The researcher has been working in the district as an Agricultural Advisor for 16 years and part of the meetings where such concerns were being raised.

The dilemma of land reform sugarcane farmers regarding productivity on their farms became a public concern as they are facing an early exit in farming due to some underlying causes that this research project intends to address. Given the extent of the volatility of sugarcane productivity in KCD, it became necessary for the researcher to investigate the causal factors of such volatility.

1.6 AIM OF THE STUDY

As an exploratory study this research is aimed at identifying and critically analysing the underlying causes of the volatility of sugarcane productivity on land reform farms in KCD of KwaZulu-Natal with the hope that the findings could assist farmers in dealing with the productivity challenges.

1.6.1 Objectives of the Study

The objectives of the study are to:

a) Explore the underlying causes of the volatility of sugarcane productivity on land reform farms that fall under King Cetshwayo District Municipality despite cash injection from government and the technical support from the sugar industry;
b) Determine the financial implications of the volatility to sugarcane farm businesses; and
c) Explore ways of managing or dealing with the volatility of sugarcane productivity on land reform farms in King Cetshwayo District Municipality.

1.6.2 Research Questions

The study attempts to provide answers to the following questions:

a) What are the underlying causes of the volatility of sugarcane productivity?
b) What are the financial implications of the volatility of sugarcane productivity on farming enterprises in King Cetshwayo District?
c) What are possible measures of coping or dealing with the volatility of sugarcane productivity?

1.7 PRELIMINARY LITERATURE REVIEW

The sections of the literature review contextualise what other scholars conceive as the underlying causes of the volatility of agricultural productivity. The scholarly work also helped to elucidate the severity of this phenomenon in other countries. According to Hazell & Bernstein (2013:1), agricultural productivity growth is important to improve the competitive advantage of farmers, increasing their revenues, reducing poverty, and fighting the volatility of food prices.

Agricultural productivity refers to a measure of economic efficiency, or the returns to the inputs used in agriculture (Hazell & Bernstein, 2013:7). According to Ramaila, Mahlangu & Du Toit (2011:6), various studies on agricultural productivity by Liebenberg *et al.* (2010), Conradie *et al.* (2009), Nin *et al.* (2003), Schimmelpfenning *et al.* (2000) and Thirtle *et al.* (1993), have shown that since 1910 the world agricultural productivity has been showing symptoms of volatility.

A Cuban case study by Rosset (2005:1) confirms that the volatility of agricultural productivity is a serious concern and if it is not tackled well, problems of hunger and food security will cripple humankind. Studies conducted by Bhardwaj, Guatam and Saxena (2015:66), Mwangi & Kariuki (2015:212) hinted that the factors leading to the volatility of agricultural productivity could either be economic, social, technical or institutional. In a study conducted in Kenya, Mwangi & Kariuki (2015:212) recorded that low adoption of modern agricultural production technologies amongst farmers in Kenya was seen as one of the main reasons for the volatility of agricultural productivity.

The study in Kenya examined the factors leading to slow adoption of modern technologies and revealed that farm households' agricultural technology adoption decisions are dependent on their socio-economic circumstances and institutional effectiveness. The study recommends that policy formulation should take advantage of the factors that positively influence farmers' adoption of modern agricultural production technologies to mitigate the negativity and to sustain agricultural productivity. Bhardwaj, Guatam & Saxena (2015:66) conclude that agricultural productivity will increase in an area if factors such as farm size, labour input, chemical, fertilizer, and planting materials are increased.

According to Bhardwaj, Guatam & Saxena (2015:212), farmer support in the form of agricultural advice or extension support would reinforce the knowledge base of farmers, improve efficiencies and improve agricultural productivity as farmers become more knowledgeable and gain experience through mentorship.

1.8 DEFINITION OF CONCEPTS

Emerging Black Farmers (EBF) referred to those persons (or their dependants) who were excluded from South Africa's formal agricultural economy on the basis of their skin colour, and who had recently begun to engage in farming on a larger scale to sell crops and livestock on the market with the support and assistance of the state (RADP Policy Document, 2013:4).

Land reform (also known as the agrarian reform) referred to the government programme of redistributing agricultural land to compensate those who were forcibly removed from their ancestral land. Hall (2004:214) points out that land reform performs an important symbolic function in the 'new' South Africa as tangible evidence of a nation addressing historical injustice as part of a wider process of nation-building.

Land redistribution referred to the process of giving land back to the dispossessed and had been implemented through a market-led 'willing-buyer, willing-seller' land programme in South Africa (Hall, 2004:215). Since inception, land redistribution processes have been critiqued by various scholars and researchers (Hall, 2004:214; Lahiff & Cousins, 2005:129; Ledwaba, 2013:13) for not meeting its intended outcomes.

Productivity referred to a measure of economic efficiency, or the returns to the inputs used in agriculture (Hazell & Bernstein, 2013:7). Agricultural productivity growth is a key to improving the competitiveness of farmers in markets, enhancing their revenues, fighting poverty, and reducing food prices (Irz, Lin, Thirtle & Wiggins, 2001:452).

Proxy Farmers referred to people who ran their farm businesses while staying in towns and cities and employed managers to run their distressed farms, which included farms that were characterised by low or complete lack of productivity, or lying fallow, under debt administration or that required further support to reach optimal levels of production (RADP Policy Document, 2013:5).

Sugar Industry referred to a diverse industry combining agricultural activities of sugarcane cultivation with the manufacture of raw and refined sugar, syrups, specialised sugar products and co-products (SID, 2016/17:2). At the helm of the South African sugar industry is the South African Sugar Association with statutory powers to represent the sugar industry as an autonomous organisation that operates free of government control, guided by the Sugar Act and Sugar Industry Agreement (SID, 2016/17:2).

Volatility is synonymous with instability or a state of changing completely from better to worse. According to Campbell & Snyder (2012:60), in business, the volatility refers to a decrease or an increase in economic activities due to economic shocks or tranquillity. Jensen (2000:399) avers that the agricultural productivity is volatile due to various shocks in the value chain.

1.9 RESEARCH METHODOLOGY

The research methodology is a systematic approach to finding answers to a research problem (Kothari, 2004:8). According to Carter & Little (2007:1317), the research methodology gives justification for the choice of certain research methods over others. Carter & Little (2007:1324) concede that the research objectives, research questions and the research design determine the choice of methodology and vice versa. A good research methodology as an overarching concept in research must have a research design as its subset.

1.9.1 Research Design

According to Kothari (2004:8), the function of the research design is to give guidance to the process of collecting evidence in a cost effective and timely manner. This research project is designed as an exploratory case study into the causality of the volatility of sugarcane productivity in KCD. A two-phased approach will be used to explore this research case.

Driscoll *et al.* (2007:22) affirm that a 'two-phased approach allows study participants to respond to the survey questions in their own time and provide members of the research team with the opportunity to review and analyse the survey results'. Doyle (2015) cited in Doyle, Brady & Byrne (2016:626) assert that a convergent mixed method research design affords the researcher with an opportunity to fully understand the research phenomenon. This research design will enable the researcher to pay special attention to both qualitative and quantitative data and merge the results during the interpretation process (Doyle, Brady & Bryne, 2016:626).

According to Johnson & Onwuegbuzie (2004), cited in Williams (2012:70), the mixed methods research allows researchers to employ deductive and inductive analysis in the same research study and the researcher plans to employ both these frameworks to inform the research process. Graff (2014:47) affirms that pragmatist researchers are able to determine how both qualitative and quantitative research methods answer the research questions. The pragmatist approach is suitable for this research project as it will allow for a thorough exploration of the research phenomenon while benefiting from the strengths of both research techniques.

1.9.2 Description of Study Area

King Cetshwayo District Municipality is located in the Eastern Region of KwaZulu-Natal province on the eastern seaboard of South Africa. The District covers an area of approximately 8 213 square kilometres from the agricultural town of Gingindlovu in the south, to the Umfolozi River in the north and stretches eastwards to the rural areas of iNkandla. The District offers highly favourable agricultural conditions and has extremely fertile soils and good rainfall. The commercial agriculture is predominantly sugarcane and forestry industries (KCDM IDP, 2009).

According to the KCDM IDP (2009), thirty-one per cent of people have no formal education and eighteen per cent left school before completing primary school, and thirty-five per cent of the youth do not complete school due to various reasons. Agriculture and forestry contribute seven per cent of the total GDP of KCDM. Figure 3 shows the location of the two sugar mills as the centrepiece of the study – Amatikulu and Felixton.

Figure 3: Map of the Study Area

Source: Tongaat Hulett Properties (2013)

1.9.3 Target Population

At the beginning of the milling season (2017/18), there were only 51 active EBF on sugarcane farms in KCD out of a total farming population of 233 large-scale sugarcane farmers (LSF), as illustrated by Economists (2013:21). These 51 EBF will serve as the target population for this study.

1.9.4 Sample

Kerlinger (1996, cited in De Vos, Strydom, Fouché & Delport 2005:193), defines sampling as taking any portion of a population or universe as a representative of that population or universe. Since the researcher will only be concentrating on the beneficiaries of the land reform programme, a total number of 51 land reform sugar cane farmers in KCD will constitute a research sample.

Teddlie & Yu (2007:77) define purposive sampling as a way of selecting units (e.g., individuals, groups of individuals, institutions) based on specific purposes associated with answering research study questions. A purposive sampling is extreme or deviant case sampling, which is also known as ‘‘outlier sampling’’ because it involves selecting cases near the ‘‘ends’’ of the distribution of cases of interest, which involves selecting those cases that are the most outstanding successes or failures related to some topic of interest.

According to Etikan & Bala (2017:215), in a purposive or judgmental sampling method the researcher carefully selects a sample that will give the best information in line with the research objectives. Since the researcher is familiar with the area and knows most of the farmers, it was easy for him to identify purposive sample participants based on his own judgment and the research objectives. There were no specific characteristics considered for each farmer to be included in a sample for face-to-face interviews**.** Out of a population of 51 land reform farmers, the researcher selected a purposive sample of 6 farmers that took part in semi-structured interviews, while the balance of 41 farmers received survey questionnaires. The other 4 farmers who participated in a pilot study were excluded from the purposive or judgmental sample.

1.9.5 Data Collection Instruments

A semi-structured interview schedule and survey questionnaires were used as instruments for data collection. Appointments for interviews were scheduled and confirmed telephonically with the respondents. Most of the survey questionnaires were distributed to the respondents via emails while some were hand delivered in cases when the researcher did not have the email addresses of the respondents.

The questionnaires were dispatched together with explanatory notes, the consent letters from the Farmers Development Agency (SAFDA) and KCDM and the request for permission to participate in a research project from the Durban University of Technology (DUT). The data collection process ran concurrently.

1.9.6 Data Analysis

Graff (2014:59) admits that analysing mixed methods data requires versatility as it entails more explaining, exploration, development of typologies and concepts. Quantitative data was analysed by means of IBM Statistical Package for the Social Science (SPSS), a software package that is used to analyse statistical data. The author further affirms that the use of a software package and various statistical techniques in a research study, alleviates the complexity of dealing with large numerical data and allows the researcher to discern the data trends. Qualitative data was analysed through content analysis which is the most commonly used method for this study approach (Graff, 2014:59). The author admits that qualitative data analysis involves an inductive process in which the researcher works rigorously to address the research questions. After gathering all the data through semi-structured interviews, the researcher sorted and categorised the research data to identify the dominant research themes.

1.10 ETHICAL CONSIDERATIONS

According to Singer, Von Thurn & Miller (1995:67), when respondents are uncertain during the research about the confidentiality and anonymity, the quality of their responses could be poor. Matters in research that include morals and values are often referred to as ethical issues and should not be violated (Lancaster, 2005:31). Some of the ethical issues that were considered during the research process included the decision to reveal or to conceal the identity of the respondents and to explain the objectives and the intended outcomes of the research study succinctly to all participants.

Clark (2006:4) affirms that anonymising and confidentiality are important in research to protect the identity of the participants from distress. The researcher ensured compliance with the confidentiality and anonymity clause to the satisfaction of the participants by using a computerized data analysis method that coded participants instead of using their names, thus ensuring confidentiality. The researcher also dealt accordingly with the extent to which respondents would remain anonymous, as well as the accessibility of the research results to other researchers and institutions.

This research was conducted in accordance with the DUT ethical policy that promotes high quality research and enterprise culture, with the highest possible standards of integrity and practice' (DUT Research Ethics Policy, 2013:2). A letter of consent was given to each participant to sign, with relevant information about their involvement in the study, and their rights were explained concisely.

1.11 LIMITATIONS OF THE STUDY

This research study was only limited to productive land reform sugarcane farms in KCD. The two sugar mills situated within KCD were Amatikulu and Felixton as per Figure 3 that

shows the extent of the study area. As of March 2016, the total number of productive land reform sugarcane farms in the district had gone down from 64 in 2013 (Ntshangase 2016:7) to 51 according to Lima Rural Development Foundation Report (2016:8). The focus of this empirical study was on this group of 51 land reform sugarcane farms within KCD out of a total population of approximately 233 LSG in KCD, due to their uniqueness. Although the volatility of sugarcane productivity was a global challenge, through anecdotal evidence, this phenomenon was more severe on land reform sugarcane farms in South Africa. The researcher opted not to spread the study to other sugarcane producing areas as it would have been cumbersome considering the timelines of this research study.

1.12 OUTLINE OF THE DISSERTATION

The accompanying section gives a descriptive summary of the contents of each chapter in this dissertation.

Chapter One: Overview of the Study

This chapter gave the background of the study and outlined the severity of the research problem. Some of the key topics that were covered included the aims and objectives of this research project, the rationale and the significance of this research project followed by the preliminary literature review. Chapter One further clarified the scope of the project and concluded by giving a snapshot of the research methodology and ethical considerations.

Chapter Two: Literature Review

This chapter delved into both domestic and international literature that explained the volatility of sugarcane or agricultural productivity. It clarified what had been uncovered

through research as the causality of the volatility of agricultural productivity, while zooming into the past and current studies by various scholars, and identified the gaps in the knowledge base. Chapter Two concluded with an exploration into literature that deals with the financial implications of the volatility of sugarcane productivity on farming enterprises.

Chapter Three: Research Methodology

This chapter discussed in detail the research methodology guiding the entire research process, the research design and the data collection instruments that were employed. Chapter Three also covered a discussion on the relevance of the research methodology selected for the phenomenon under review.

Chapter Four: Presentation and Analysis of Findings

This chapter presented qualitative and quantitative research data collected using the research instruments, such as surveys and face to face interviews. Chapter Four also gave a detailed analysis and interpretation of the research data.

Chapter Five: Conclusion and Recommendations

Chapter Five concluded the research project and put forth some recommendations for farmers on how to deal with the volatility of sugarcane productivity on land reform farms with more emphasis on farm business compliance and some pieces of legislation that govern management of business enterprises.

1.13 CONCLUSION

This chapter introduced the subject matter linking it to the research problem. Further clarity on the research topic was given in various subheadings including the importance

of agriculture, the rationale for the study, the significance of the study and preliminary literature review. Key concepts were defined and a snapshot of the research methodology that the researcher used in order to explore the research phenomenon was provided. In conclusion, the researcher outlined the scope of the research and the limitations that were considered during the research process. Chapter Two deals with the literature review.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter provided an introduction and the background to the study, and presented the research problem and questions that the study intends to address. The chapter answered the question of why a research project in sugarcane productivity is vital for farmers, policy makers and researchers. A detailed account of the objectives of the research, the research problem, research methodology and research ethics were provided. This chapter gives an overview of the literature that deals with the status of agricultural or sugarcane productivity in other countries and in South Africa.

This chapter also investigates approaches to agrarian reform in India, Colombia, Zimbabwe and South Africa and their impact on agricultural productivity. Furthermore, this section presents literature that deals with factors that are responsible for the volatility of agricultural or sugarcane productivity in some selected countries and in South Africa, particularly in KCD. In conclusion, the chapter gives an overview of the cost implications of the volatility of sugarcane productivity in any farming business.

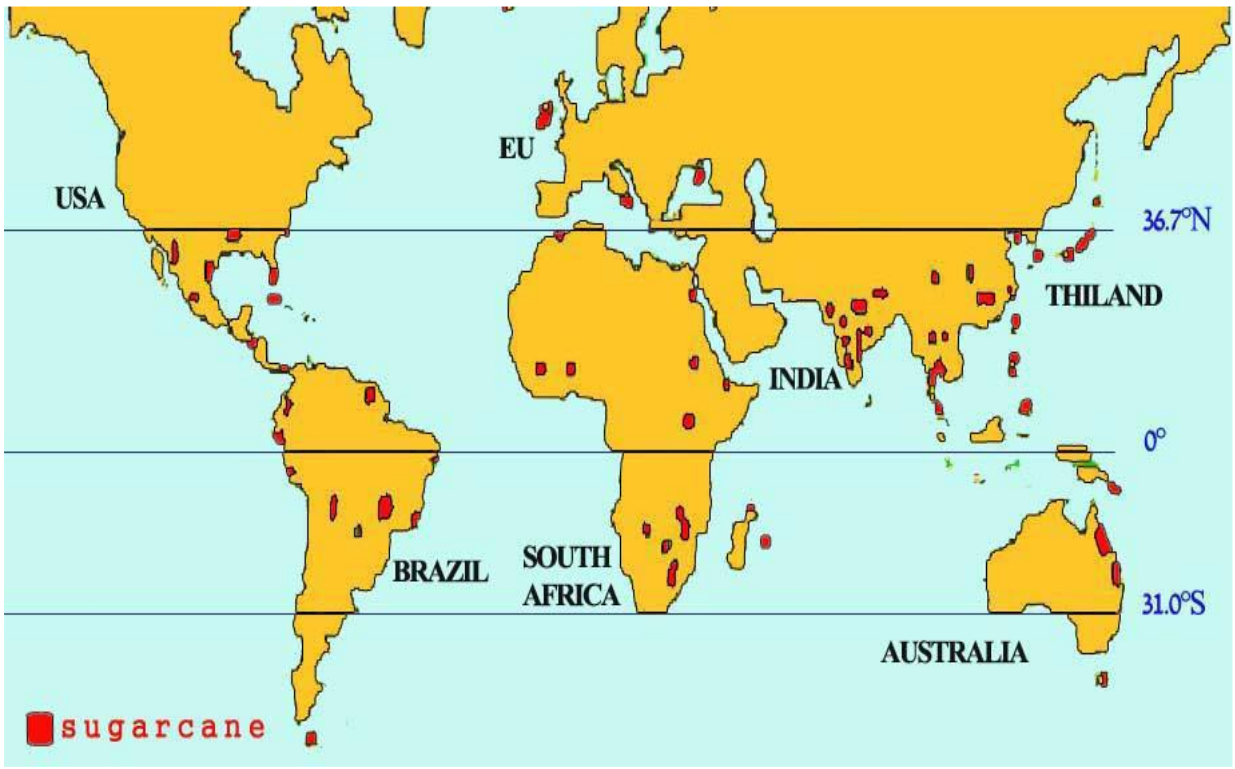
2.2 AN OVERVIEW OF SUGARCANE PRODUCTIVITY

According to Mitchel (2003:5), the production of sugar from sugarcane dates back before the sixteenth century with countries such as India, China and the Mediterranean countries championing the process. The demand for sugar between countries has been varying over decades with various efforts being made to meet the increasing demands. Sentíes-Herrera, Trejo-Téllez & Gómez-Merino (2017:2) explain that eighty per cent of the available sugar is produced from sugarcane while twenty per cent comes from sugar beet.

The world sugar demand was predicted to reach 180 million tons in 2016/17 given its annual growth of two per cent (AB Sugar, 2017:4). In order to fulfil such high demands, it became imperative for the sugar producers to improve efficiencies in the agricultural sector and sugar milling by improving productivity gains and high sugar recovery. Sugar production landscape has been modifying over the years with countries such as Canada, Brazil, India, Thailand, the European Union and Australia becoming the leaders in sugar production (AB Sugar, 2017:8).

Figure 4 depicts the location of these leading sugarcane producers with most of them located between 36.7 degrees N and at 31.0 degrees S of the equator. Tropical and subtropical climates are most favourable to produce sugarcane, hence most of the sugar cane producing countries are to be found closer to the equator (AB Sugar, 2017:4).

Figure 4: Map of the countries producing sugarcane



Source: Mnisi & Dlamini, 2012:4338

According to Tew & Cobill (2008:255), other sugar mills use bagasse, the by-product of sugarcane, to generate electricity and sell excess power to the public, this process is called co-generation. However, Vermerris (2008:23) warns that fossil fuels are finite resources that will soon be depleted, and countries need to look into alternative ways of generating energy to meet the increasing demand for energy. While the future of the world nations looks calamitous at times due to the scarcity of energy sources, agricultural crops including sugarcane could be one of the potential solutions.

Sugar-beet, maize and wheat are some of the commonly used crops to produce ethanol, while sixty per cent of cost-effective ethanol is produced from sugarcane and sugarbeet (Goldemberg & Guardabassi, 2010:18). In a research paper on renewable energy, the International Renewable Energy Agency (IRENA, 2016:4) affirms that producing bioethanol from sugarcane is cost-effective and produces the highest energy compared to any other bioenergy sources. Reid, Ali and Field (2020:274), warn that although bioenergy or energy from agricultural crops such as sugarcane contributes to an increasing energy demand, over reliance on it could lead to remarkable trade-offs with food production and biodiversity.

Apart from producing sugar from sugarcane, there are many alternative uses of sugarcane such as the production of an environmentally friendly fuel called ethanol, which is often used as a substitute for petroleum fuels that are less polluting in terms of carbon emissions and greenhouse gases (Bhagia, Akinosho, Ferreira & Ragauskas, 2017:1). The World Health Organisation (WHO) (2018:1) points out that some of the dreadful effects of uncontrolled air pollution in humans include stillbirth and pre-term birth, as well as diseases into adulthood. Saldiva, Andrade, Miraglia & Andre (2009, cited in Goldemberg & Guardabassi 2010:17), suggest that producing ethanol from sugarcane to

replace diesel could reduce carbon emissions. Stern (2006, cited in Vermirris 2008:23), asserts that one per cent of the global GDP would be worthwhile if invested in efforts to mitigate the effects of climate change, whereas failure could cost a recession worth up to twenty per cent of the global GDP. However, international trade barriers have prevented the growth of this commodity due to the absence of clear biofuel policies (IRENA, 2016).

Table1: Sugarcane productivity in other countries

Country	Area (Million Ha)	Production (Million Tons)	Productivity (Tons/Ha)
Brazil	5.343	386.2	72.3
India	4.608	289.6	62.8
China	1.328	92.3	65.5
Thailand	0.970	64.4	66.4
Pakistan	1.086	52.0	47.9
Mexico	0.639	45.1	70.6
Colombia	0.435	36.6	84.1
Australia	0.423	36.0	85.1
USA	0.404	31.3	77.5
Philippines	0.385	28.8	67.1
Indonesia	0.350	25.6	73.1
Cuba	0.654	22.9	35.0
South Africa	0.325	20.6	63.4
Argentina	0.295	19.2	65.2
Myanmar	0.165	7.5	45.4
Bangladesh	0.166	6.8	41.2

Source: Tamil Nadu Agricultural University (TNAU)

Mitchel (2003:8) avers that sugarcane is grown in 105 countries to produce sugar and other by-products such as bagasse and molasses. Table 1 depicts the sugarcane productivity rankings, with tons of sugarcane produced per hectare used to determine the productivity levels. Throughout this document sugarcane productivity refers to the tons cane per hectare (Tons/Ha) as explained from the work of Dlamini & Masuku (2012:2). Australia and Colombia are ranked the highest in terms of their sugarcane productivity of 85.1 and 84.1 tons of sugarcane per hectare respectively, while the average sugarcane productivity among sugar producers is 65 tons of sugarcane per hectare (Tew & Cobill, 2008:258).

2.3 SUGARCANE PRODUCTIVITY IN SOUTH AFRICA

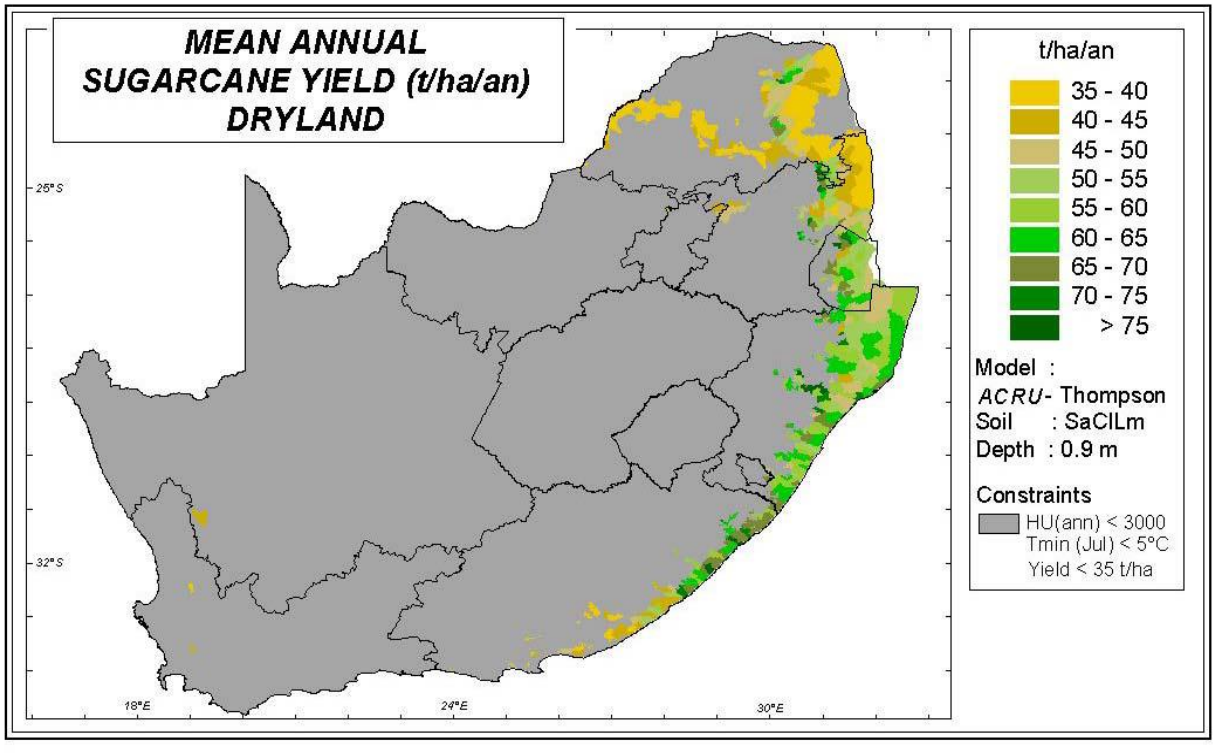
Sugarcane is one of the major contributors to the economy of South Africa, with the sugar industry alone generating an income of R12 billion and contributing R2.5 billion to the country's foreign exchange earnings (Economists, 2013:17). Schulze, Hull & Maharaj (2007:1) state that sugarcane in South Africa is grown on 432 000 hectares with 325 000 hectares harvested annually, while seventy-two per cent of sugarcane comes from the rain-fed areas and twenty-eight per cent from the irrigated areas.

As depicted in Table 1, South Africa was ranked number 13 among the countries that produce of high quality sugar from an estimated mean annual production of about 20 million tonnes of sugarcane, according to the work of Baiyegunhi & Arnold (2011:4960), or 2 500 000 tonnes of sugar of which fifty per cent is exported to the African countries, North America, Middle East and Asia, as stated in Schulze, Hull & Maharaj (2007:1). Based on Table 1, sugarcane productivity in South Africa is at 63 tons of sugarcane per hectare which is mediocre but, however, acceptable.

According to Baiyegunhi & Arnold (2011:4963), sugarcane productivity on large commercial farms in the Eshowe region within King Cetshwayo District was 52 tons of sugarcane per hectare on average. However, through empirical evidence, the average sugarcane productivity on land reform farms in the KCD was between 31 and 42 tons of sugarcane per hectare, which is equivalent to thirty-three per cent below that of the white commercial farms as stated in the work of Schulze, Hull & Maharaj (2007:2) and Baiyegunhi & Arnold (2011:4963).

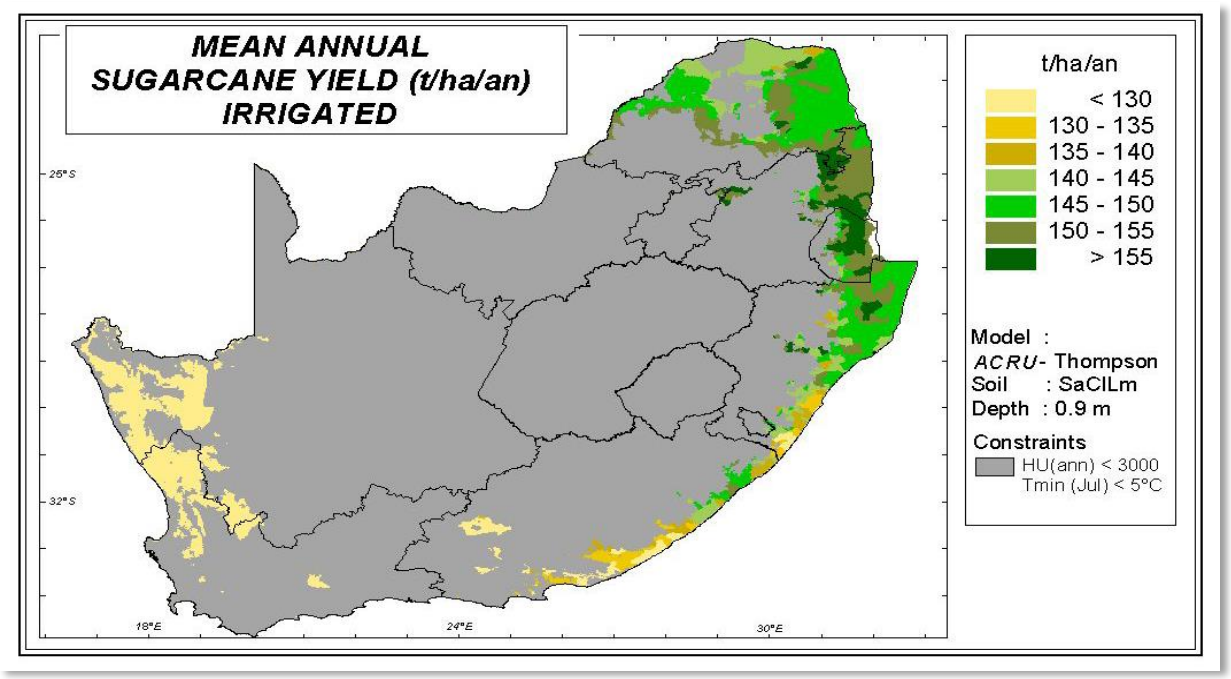
Figures 5 and 6 confirm the expected economic sugarcane productivity from dryland and irrigated sugarcane producing regions in South Africa, including KCD. It is worth noting from the ensuing discussion that large productivity gaps were remarkable between land reform sugarcane farms and white commercial sugarcane farms in KCD.

Figure 5: Mean annual sugarcane yield in dryland areas



Source: Schulze, Hull & Maharaj, 2007:6

Figure 6: Mean annual sugarcane yield in irrigated areas



Source: Schulze, Hull & Maharaj, 2007:6

2.4 RELATIONSHIP BETWEEN APPROACHES IN AGRARIAN (LAND) REFORMS AND AGRICULTURAL PRODUCTIVITY

According to Ntsebeza & Hall (2007:27), agrarian reforms encompass the use of appropriate agricultural practices and their effects on agricultural productivity and labour productivity, and further argue that the agrarian debate centres around the premises of capitalism and political emancipation. Agrarian reforms refer to the equitable access to assets such as land, water, markets, capital, technologies and skills (Van Koppen, Sally, Aliber, Cousins & Tapela, 2009:5).

However, Moyo & Yeros (2005, cited in Matshego, 2011:131), view the agrarian reform as a complex subject and warn about stereotyping it to merely those that are driven by the state and those that are driven by market forces. Cousins (2016:136) views agrarian reform as a human rights matter and an efficient way for governments to reach food

sovereignty and eradicate poverty. According to Borras (2003:368), there are two main approaches in agrarian reforms, namely, the state-led agrarian reform (SLAR) and market-led agrarian reform (MLAR) and each approach differs from the other according to the issues it addresses, as outlined in Table 2.

Table 2: Key features of state and market-led approaches in agrarian reforms

Issues	***State-Led***	***Market-Led***
Getting access to land		
Acquisition method	Coercive; cash-bonds payments at below market price	Voluntary; 100% cash payment based on 100% market value of land
Beneficiaries	Supply-driven; beneficiaries state-selected	Demand-driven; self-selected
Implementation method	Statist-centralised; transparency and accountability = low degree	Privatised–decentralised; transparency
Pace and nature	Protracted; politically and legally contentious	Quick; politically and legally non-contentious
Land prices	Higher	Lower
Land markets	Land reform: cause of/ aggravates land market distortions; progressive land tax and land titling programme	Land reform: cause and effect of land market stimulation; progressive land tax and titling programme required
Post-land transfer farm and beneficiary development		
Programme sequence; development and extension service	Farm development plans after land redistribution. Protracted, uncertain and anaemic post-land transfer development; extension service statist-centralised = inefficient	Farm development plans before pace of redistribution. Quick, certain, and dynamic post-land transfer development; extension service privatised–decentralised = efficient

Credit and investments	Low credit supply and low investments	Increased credit and investments
Exit options	None	Ample
Financing		
Mechanism	State 'universal' subsidies; sovereign guarantee; beneficiaries pay subsidised land price; 'dole-out' mentality among beneficiaries	Flexible loan-grant mechanism; co-sharing of risks; beneficiaries shoulder full cost of land; farm development cost given via grant
Cost of reform	High	Low

Source: Borras, 2003:374

The following sections give an account on the effect of these two agrarian approaches on agricultural productivity, namely, the SLAR in India and Zimbabwe, MLAR in Colombia and South Africa.

2.4.1 State-Led Agrarian Reforms (SLAR) and Agricultural Productivity in India

A State-led Agrarian Reform is known for its control from a central point, characterised by authoritarian to democratic approaches with the state or the government involved in the formulation and execution of the agrarian and land reform processes (Borras, Kay & Akram-Lodhi, 2007:19).

Borras (2003:368) states that SLAR is notorious for promoting 'land size ceiling' that forces landlords to own regulated maximum farm sizes and give away some land to the state to redistribute to the poor and the landless. Borras (2003:368) further condemns land ceiling laws by arguing that countries that embrace them fail to force landlords to comply, thereby encouraging corruption, tenure insecurities, red tape and inefficiencies in the economy that may ultimately lead to the allocation of farms to unfit candidates and

expropriation of productive farms and ultimately rendering them unproductive. According to Besley and Burgess (1998:2), India's land redistribution policies came into effect as a means to stimulate economic growth. The SLAR in India was introduced during the time of the Indian Independence in 1947 (Ghatak and Roy, 2007:251). Besley and Burgess (1998:4) further affirm that Indian Independence brought the land question to the fore, which prompted the introduction of land reforms in 1949.

Chenery, Hollis, Ahluwalia, Bell, Duloy and Jolly (1970, cited in Besley and Burgess, 1998:2) aver that the main reason for the land reform policies in India was to improve the lives of the poor and to alleviate poverty. Ghatak and Roy (2007:251) state that the India land reform processes consisted of four pillars, namely, tenancy reform, abolition of intermediaries/ proxies, land ceiling and land consolidation. Ghatak and Roy (2007:252) further argue that half of the land in India had been under intermediaries for most of the time before the independence.

According to Besley and Burgess (1998:4), the first category of land reform policies was aimed at regulating tenancy agreements to ensure smooth transfer of land ownership to tenants. The authors further argue that the second category of land reform policies introduced in India was focusing on the elimination of proxy farmers who acted as intermediaries and collected rent on behalf of the British government while the third category dealt only with land ceiling laws and regulating the amount of land allowable to individuals; the fourth category dealt with the consolidation of land to achieve agricultural efficiency gains. Besley and Burgess (1998:20) posit that land reform processes in India, especially tenancy reform and elimination of proxies, played a crucial role in poverty alleviation, and such findings diffuse the assumptions that seek to undermine the success of land reform processes in the least developed countries (LDC).

According to Ghatak and Roy (2007:252), the elimination of intermediaries has been the most successful of all land reform processes in India, while the entire land reform process may have caused some instability to the agricultural productivity in India.

2.4.2 Market-Led Agrarian Reform (MLAR) and Agricultural Productivity in Colombia

According to Lahiff (2007:1), MLAR has been the centrepiece of land reform in most countries since the early 1990's and its introduction marked an end of the socialist and capitalist reforms that came into effect at the end of the Second World War, making way for assisted purchase schemes in the form of grants and subsidies. Lahiff (2007:4) views MLAR as referring to reforms that seek to:

- Redistribute land;
- Liberalise land and other markets;
- Upgrade small-scale farmers into commercial farmers; and
- Minimise the state involvement in the allocation of land.

However, according to Lahiff (2007:4), MLAR can be characterised as follows:

- The market selects the land;
- Market sets the price of the land;
- Market selects the beneficiaries;
- Market determines what to produce; and
- The market gives support to the beneficiaries.

According to Albertus and Kaplan (2013:198), unresolved land issues led to community unrest in Colombia and land reform policies were seen as key to bringing stability by government. Zamosc (1986), cited in Albertus and Kaplan (2013:204), states that in 1970

various cases of land invasions by disgruntled communities due to unmet demands were reported in Colombia. Pressure from the rebel groups necessitated the Colombian government to introduce the Social Agrarian Reform Act of 1961 to promote agricultural activities and to alleviate political pressure from the international community. Land reform was then introduced in Colombia as a means to address the inequitable allocation of land and to improve agricultural productivity (Deininger, 1999:7). To fast-track the process, the Colombian government introduced grants or subsidies to enable the poor to purchase agricultural land; however, subsidies created greed among landlords who were eventually tempted to sell marginal farms with poor infrastructure in order to benefit from the subsidies (Borras, 2003:367).

Deininger (1999:7) affirms that the MLAR in Colombia failed dismally at increasing agricultural productivity and alleviating poverty levels among the poorest communities, and only 25 per cent of good agricultural land in Colombia was reserved for agricultural production, while the remainder was used mainly as pastures, leaving many hectares of land underutilised, thus compromising agricultural productivity. According to Machado (1998, cited in Albertus and Kaplan 2013:204), the land reform process in Colombia brought misery to the rural communities, leaving large areas of barren agricultural land. Fraser (2002:73) agrees that tenure insecurities may weaken farm management practices and lead to productivity decline.

2.4.3 SLAR and Agricultural Productivity in Zimbabwe

Moyo (2011:493) affirms that Zimbabwe have 30-years of experience in the land reform setting since receiving its Independence in 1980. Njaya (2015:91) explains that Zimbabwe agrarian reform was at its peak in 2002 as a state-led approach that was implemented to accelerate the redistribution of land under the Fast Track Land Reform

and Resettlement Programme (FTLRRP). Mazwi, Muchetu & Chibwana (2017:1) posit that the land redistribution programme in Zimbabwe under the FTLRRP banner managed to address the social agenda policy while the success in improving agricultural productivity could not be achieved due to the isolation of Zimbabwe by the Bretton Woods Institutions.

However, Moyo (2011, cited in Mkodzongi & Lawrence 2019:1) argue that Zimbabwe agrarian reform was ineffective as it was based on racial grounds and deprived skilled and resourceful farmers the opportunity to own productive agricultural land that would have resulted in productivity growth and stability in the agricultural sector. Mkodzongi & Lawrence (2019:1) add that, although the Zimbabwen FTLRRP was officially introduced following the enactment of the Land Act, which was promulgating the redistribution of agricultural land from the white farmers to small-scale farmers and black commercial farmers, it was ineffective in improving agricultural productivity.

2.4.4 MLAR and Agricultural Productivity – A South African Perspective

According to Cousins (2016:1), 350 years ago, indigenous people of South Africa were removed from productive agricultural land and natural resources by the white settlers through land grabbing. Ntsebeza and Hall (2007:3) further clarify that white farmers were viewed as successful mainly due to the support they received from the apartheid government, which gave them a competitive edge over black farmers. Cousins (2016:2) admits that land reform in South Africa was necessary as a way of addressing the racial imbalances of the apartheid regime embedded in the Natives Land Act of 1913. Various studies confirm that South Africa followed a MLAR while addressing the issue of the restoration of land (Hall, 2004:215; Ntsebeza and Hall, 2007:8; & Bitzer and Bijman, 2014:168).

According to Bitzer and Bijman (2014:168), through the MLAR the government of South Africa provided grants per household to the deserving “wanna-be-farmers” and this encouraged the formation of cooperatives and partnerships and enabled the commercialisation of agriculture among the previously disadvantaged communities. However, the South African agrarian approach has been critiqued widely by various scholars (Hall, 2004:215; Lahiff and Cousins, 2005:129; Ntsebeza and Hall, 2007:9; Bitzer and Bijman, 2014:169) for promoting overcrowding and failing to afford a decent living for its beneficiaries.

According to Mahule (2015:74), land reform in South Africa was an artefact of three pillars, namely, land redistribution, land restitution and land tenure. According to Sender and Johnston (2004:155), the implementation of land reforms in sub-Saharan Africa has caused trauma to the poorest communities. Some of the knock-on effects of the agrarian reforms in sub-Saharan Africa have been the decline of casual and seasonal employment as the new breed of farmers struggle to sustain productivity levels (Sender and Johnston, 2004:155).

Table 3 explains how each land reform pillar addresses the issue of land ownership among the previously disadvantaged groups in South Africa. Land tenure was meant to protect the rights of people living in privately owned properties such as private farms and tribal land, while land restitution was meant to restore land back to the people who were dispossessed of their land under the Natives Land Act of 1913, whereas the redistribution pillar was aimed at creating a new breed of black commercial farmers.

Table 3: Three pillars of Land Reform in South Africa

LAND REFORM LEG/PROGRAMME	TARGET GROUP	CRITERIA	PROCESS
Land Tenure Reform	Tenure reform was meant to protect those who are residing on private owned farms as tenants and/or those staying under tribal authorities. Tenure reform was meant to formalise the rights of the above-mentioned individuals.	To qualify for land tenure reform a person must be a South African citizen with green bar-coded ID. Have a right to occupy (PTO) permit or be a farm dweller that has occupied the land in question for a period of more than ten years.	Affected individuals submit an application. The relevant land reform office processes the application. The applicant is notified of the outcomes of the application. PTO holders and farm dwellers are entitled to have their rights formalised.
Land Restitution	The restitution of land rights was founded and the Restitution of Land Rights Act (1994) was promulgated as a result. The Restitution Act was meant to see to it that victims of land dispossession as a result of the implementation of the Natives Land Act of 1913 are redressed accordingly.	South African citizens with green-barcoded IDs. Those who lost land rights as a result of the Natives Land Rights Act (1913). Original dispossessed individuals. Direct descendants of the original dispossessed community or part of the community dispossessed of land rights.	Must have lodged a land claim on or before the 31st of December 1998 (cut-off date). Office of the Commission accepts or rejects the claim based on research. If accepted, a Gazette notice is published accordingly. After the gazetting negotiations start, the claim is then settled in terms of section 42D of the Act and land is bought and transferred in the name of land claimants.
Land Redistribution	Redistribution assists those who never lodged land claims with the Commission on Restitution of Land Rights in order for them to have access to the privately owned lands. In order to implement the redistribution programme, a programme known as "Land Redistribution for Agriculture Development Programme" (LRAD) is followed. This programme is aimed at creating an emergence of black commercial farmers.	Must be a South African citizen with green barcoded ID. Blacks who wish to venture into small-scale agriculture.	Affected individuals submit an application. The relevant land reform office processes the application. The applicant is notified of the outcome of the application. If the application is successful, the department acquires the farm on behalf of the beneficiaries.

Source: Mahule, 2015:75

Studies conducted by Hall (2004:222) and Lahiff and Cousins (2005:129) record that some farms were transferred to new farmers without adequate resources and poor infrastructure. Both studies condemn the agrarian approach in South Africa for disregarding post-transfer support and affirm that it has contributed immensely to the volatility of agricultural productivity.

Lyne and Ferrer (2006:268) attribute the volatility of agricultural productivity in the land reform sector in South Africa to poor land acquisition strategy, which led to 47 per cent of land reform farms being purchased on marginal agricultural lands, which could be challenging for emerging farmers and can be one of the underlying causes of the volatility of sugarcane productivity.

The authors further argue that administrative delays from the government to disburse the grants to purchase farms caused some discomfort from the willing sellers who ended up throwing the deals over, while in some cases they completely disinvested due to looming claims on their properties. Ntshangase (2016:27) admits that there have been some cases in South Africa where farmers have completely disinvested in farming sustainably when their farms were listed on the land claims database and such acts have compromised sugarcane productivity.

2.5 AN OVERVIEW OF FACTORS LEADING TO THE VOLATILITY OF SUGARCANE OR AGRICULTURAL PRODUCTIVITY IN OTHER COUNTRIES

This section of the literature review contextualises the volatility of sugarcane or agricultural productivity in other countries as well as some of the research work done in this field of study to elucidate the prevalence and the severity of this phenomenon.

2.5.1 An Overview of the Factors Leading to the Volatility of Sugarcane or Agricultural Productivity in other countries

Lessons learnt from the Cuban case study by Rosset (2005:1) affirm that the volatility of agricultural productivity is a huge challenge and if it is not tackled well, problems of hunger and food scarcity will cripple humankind. According to Rosset (2005:3), the Cuban agricultural sector was faced with a dilemma in late 1989 and 1990 with agricultural inputs

such as fertilisers and pesticides dropping by more than eighty per cent while energy sources also dropped by fifty per cent. According to Rosset (1995, cited in Rosset, Patel & Courville 2006:227), the state intervention with the introduction of incentives to farmers who adopted new technologies was among a myriad of methods that were adopted by the Cubans to overcome the dilemma.

A study conducted by Pokharkar (2000:5) in Maharashtra, India, reveals that India had over decades experienced the volatility of sugarcane productivity and points to the inefficiencies of farmers as having led to the problem. Sundara (2011, cited in Shanthly & Ramanjaneyulu 2014:93), concurs with Pokharkar and goes further to condemn climate change as the root cause in recent years. According to Shanthy & Ramanjaneyulu (2014:98), since humans have no control over weather, the use of innovative technologies such as the Sustainable Sugarcane Initiative (SSI) could improve sugarcane productivity vertically as sugarcane-producing regions in India have exhausted their productive capacity.

Bhardwaj, Guatam, Saxena (2015:66) reinforce that agricultural productivity could diminish if production inputs such as pesticides, fertilizers and planting materials (seed) are not made available in abundance. The ageing population of farmers in Australia is a serious concern and could be partly blamed for the volatility of agricultural productivity (Sappey, Hicks, Basu, Keogh & Gupta, 2012:98). It is further argued that the average Australian farmer is between 55 years and over 65 years of age (Sappey *et al,* 2012:98).

This age bracket between 50 and 60 years is worrying since farm management involves spending long hours of hard work outdoors and walking around the farm to do field inspections, which could be a challenge for the infirm. Rocchi, Romano & Hamza

(2013:199) aver that agricultural policy changes in Syria thwarted the efforts for food security while Yamashita (2015:39) affirms that Japan lost one million hectares of productive agricultural land due to fiscal policies that are counter to productivity growth. Young (2018:1) shares a similar view that the introduction of the sugar tax in Thailand was seen to be the cause of a four per cent decline in sugarcane productivity.

Desperate times call for desperate measures. This saying is real in the sub-Saharan African countries as they are faced with the volatility of sugarcane productivity due to monoculture practices of sugarcane farming. Smaling, Nandwa & Janssen (1997:98) regretted the global imbalance of soil nutrient ledgers that has led to the volatility of agricultural productivity, especially in sub-Saharan Africa and particularly in Kenya. Versi (1995, cited in Barany, Hammett, Sene & Amichev 2001:37), states that commercial agriculture in Kenya constitutes thirty per cent of Africa's gross domestic product (GDP).

However, this wealthy agricultural hub of Africa is facing the threat of collapse due to the AIDS pandemic which could reduce the agriculture workforce by seventeen per cent by 2020 (Barany *et al,* 2001:37). UNAIDS (1999), cited in Barany *et al.* (2001:38) reports that women in sub-Saharan Africa with sick husbands spend less than sixty per cent of their time at work in order to take care of their husbands, and this has negative connotations on agricultural productivity.

According to Gilbert, Hilary & Asher (2012:205), eighty-three per cent of the farmers interviewed in Kenya agreed that they received information about credit providers from agricultural advisors or extension specialists. Gilbert, Hilary & Asher (2012:199) propose that agricultural extension services should be well organised and efficient in order to address the needs of the new farmers, which includes identifying information gaps such

as information about the location of financial institutions and the requirements on how to access credit. Adequate agricultural support services are essential for the success of new farming ventures.

Such comments converge with Gina & Nothard (2014:400) and Dardagan (2018:16) who suggest that proper training and mentoring of new farmers is paramount to preparing them mentally for the unexpected. Gilbert, Hilary & Asher (2012:206) acknowledge that productivity levels were compromised in Kenya due to inadequate agricultural extension support services and also when inexperienced farmers are given farms without proper training on how to farm. According to Mutonyi (2014:5), sugarcane productivity in Kenya declined from 110 tons cane per hectare to 51 tons cane per hectare between 1997 and 2012, which is way below the world benchmark yield of 64.4 tons cane per hectare. Mutonyi (2014:171) advised that there is a need for Kenyan farmers to explore the use of soil ameliorants such as potassium supplements and lime to mitigate the problem.

Mwangi & Kariuki (2015:210) warn that in low adoption of modern agricultural production technologies amongst Kenyan farmers could lead to the volatility of agricultural productivity. Gillingham & Lee (2012:320) undertook a study in Tanzania on farmers' perceptions about the impact of livestock damage on agricultural productivity. Of the 198 households interviewed, ninety-six per cent conceded that livestock cause severe crop damage and are a limiting factor on crop yields; thirty-five per cent of respondents ranked it as the primary constraint on their agricultural productivity. Gross, Drouet-Hoguet, Subedi & Gross (2017:29) observed that in Nepal wild animals destroyed agricultural crops at different growth stages between dusk and dawn resulting in enormous losses in agricultural productivity.

Isaga (2018:243) found that Tanzanian farmers struggled to get finance for their farm businesses from commercial banks as agriculture is considered a high-risk sector due to erratic weather and political instability. Access to business finance and the ability to meet debt commitments are the crux of any business success.

2.6 FACTORS LEADING TO THE VOLATILITY OF SUGARCANE PRODUCTIVITY IN SOUTH AFRICA

South Africa's agricultural productivity dilemmas are not apart from other countries but, however, distinctly unique. According to the South African Sugar Association (2014, cited in Hess, Sumberg, Biggs, Georgescu, Haro-Monteagudo, Jewitt, Ozdogan, Marshall, Thenkabail, Daccache & Marin 2016:182), there are 79 000 and 350 000 direct and indirect jobs that are created through production and processing of sugarcane.

This creates a need for an exploratory study into the underlying causes of the volatility of sugarcane productivity in order to stimulate agricultural growth through the rural economies. The following sections discuss the impact of technical factors, socio-economic factors and institutional factors that lead to the volatility of sugarcane/ agricultural productivity in South Africa and in KCD.

2.6.1 Technical/ Biophysical (Environmental) Factors

The following section of the literature review examines the effect of agricultural management practices and environmental factors on sugarcane productivity.

a) Soil Nutrients Depletion and Management

Sugarcane is a monoculture crop and soils where it is planted need to be replenished timeously to avoid soil degradation. Food and Agriculture Organisation (2005, cited in

Schulze, Hull and Maharaj 2007:2), reported that fertiliser used in sugarcane accounts for eighteen per cent of the total fertiliser used in South Africa. According to Jenkins, Miklyaev, UJeneza, Afra, Matanhire, Basikiti and Nsenkyire (2017:8), agricultural productivity can decline if nutrient replenishment is ignored or applied incorrectly. Poor management of soils can lead to the high accumulation of acids and salts in the soil which may render the soil nutrients unavailable for the plant to use and retard the growth of the plant (Machado & Serrelheiro, 2017:1).

Das & Avasthe (2018:65) warn about poor soil nutrient management practices such as incorrect calibration of fertiliser equipment before application and the use of incorrect type, as that can be time-consuming and may lead to severe financial and productivity losses. Taking soil or leaf samples to the laboratories for analysis is one of the best management practices that could minimise any loss. Application timing and proper placement of fertilisers is very important to ensure improved productivity, nutrient use efficiency and to minimise the volatility of sugarcane productivity.

b) Climate Change / (Drought)

According to Funk & Brown (2009:273), climate change would potentially lead to reduced precipitation in some regions and flooding over others and this will have serious consequences on agricultural productivity. It is therefore vital to craft ways to survive in the unknown future in order to sustain agricultural productivity levels. Jangproma, Thamasirirak, Jaisil & Songsri (2012:1298) state that growing sugarcane varieties with drought tolerance could alleviate drought problems and reduce yield losses from drought stress.

Knox, Daccache, Hess & Haro (2016:1) state that climate change could have a significant impact on agricultural productivity and the livelihoods of the communities that are dependent on agriculture for a living. The authors further affirm that climate is the primary determinant of agricultural productivity and warn that the changing climatic conditions could lead to huge volatility losses in agricultural productivity. According to Elum, Modise and Marr (2016:2), adaptation strategies such as planting varieties with a shorter growing period and changing planting times to align with rain are crucial solutions of addressing climate change and its adverse impacts on agricultural productivity.

Tena, Mekbib, Shimelis & Mwadzingeni (2016:10) posit that climate change has led to the reduction and poor distribution of rainfall resulting in the volatility of sugarcane productivity. Despite the devastating effects of climate change in the agricultural sector, Bawayelaazaa Nyuor, Donkor, Aidoo, Saaka Buah, Naab, Nutsugah, Bayala, Zougmoré, Bayala, & Zougmoréa (2016:12) recommend the adoption of adaptation strategies such as crop and land management to mitigate the impact. Senties-Herrera, Trejo-Telles & Gomez-Merino (2017:363) admit that the effects of climate change has been quite remarkable in Mexico and such effects will lead to a twenty-five per cent decline in agricultural productivity by year 2080. According to Wustro & Conradie (2018:8), the salient effects of climate change has persuaded most farmers to change their behaviours in order to survive and stay in business, hence climate is becoming a lesser concern as farmers are investing their energies on the adaptation strategies.

2.6.2 Socio-Economic Factors

The following sections give a detailed account of how the social and economic factors can affect sugarcane productivity.

a) Age

According to Gina & Nothard (2014:399), farming is not age specific but an analysis of the factors affecting the sustainable production on land reform farms has shown that farm productivity could be compromised due to ageing. According to Ntshangase (2016:34), sixty-six per cent of the sugarcane farmers in South Africa are above 50 years of age while forty-eight per cent are over 61 years of age. The findings by Ntshangase (2016) agree with Nxumalo & Oladele's study (2013:85) which found that most farmers in the Zululand region are above 60 years of age and are mainly men.

Godwin, Handsome, Ayomide, Enobong & Johnson (2017:45), posit that managers need to be sufficiently flexible, mentally and physically in order to meet the demands of the business environment. Based on empirical evidence while dealing with farmers, the researcher affirms that with ageing it could be cumbersome for farmers to endure the severity of outdoor life, hence the need for young and energetic farmers to take over the reign or alternatively have a well-planned succession plan for the ageing farming population.

According to Gina & Nothard (2014:399), acceptance of advice and technological innovations is easier with young farmers and a necessity for farmers in general due to the current information explosion. Contemporary farmers are bound to handle large amounts of farm data, hence the need to quickly embrace new technologies and innovations is of paramount importance. Various scholars such as Nxumalo & Oladele (2013:85), Mwangi & Kariuki (2015:213) affirm that age is an important factor that influences decisions such as the adoption of new technologies and could make a farmer's life easy when young and energetic or a torture when old.

b) Succession Planning

According Oduwusi (2018:2), succession planning is a way of preparing the organisation for the time when a key member leaves, while also creating a pool of talented and motivated persons, who are ready to take over when the eventuality occurs. Despite the dire need of addressing the succession planning in the agricultural sector, the sustainable agricultural future remains under threat due to the problem of generation renewal (White, 2015:331). Nnabuife, Nwogwugwu & Okoli (2019:1891), aver that succession planning discussions are taboo in traditional societies and such discussions often have an emotional content for the business founder.

The authors conclude that businesses with clear succession plans are more sustainable and prosperous than those that do not have clear plans at all and this necessitates the importance of a well-articulated succession plan in any business. Some scholars such as White (2015:331) and Ntshangase (2016:3) concur that farming has become less attractive to the youth who are expected to succeed their parents in managing farms and this apathy could be detrimental to the future of farming, while Chiswell & Lobley (2015:3) suggest that the introduction of modern technology in farming such as robotic milking could attract children with passion for information technology.

c) Labour Productivity

Sugarcane farming in South Africa is a labour intensive business and employed about 55 000 labourers in primary production in the 2003/04 season (Murray & Walbeek, 2007:117). Van der Zee (2009:5) maintains that casual and seasonal employment on farms has been facing a downward trend following the introduction of various social grants. According to Kamil (2012, cited in Gutura & Tanga 2015:7), the individualistic theory states that poverty is an inherent trait, and share the view that poverty is the result

of laziness that confines people to complete reliance on handouts or grants which promotes a dependency syndrome. Such mentality is counter-productive and needs to be discouraged as it reduces the available labour that can be absorbed by the job market.

However, some labour experts have been concerned about the declining labour productivity in South Africa, citing the effects of restrictive labour laws and poor work ethics (Kruger, 2012:7). Interviewed on *Power Lunch* television show by Williams Lindsay (6 February, 2013), Peter Aling affirmed that the labour productivity in South Africa had declined since the 1980s and further argued that manual labour was being replaced by heavy machines, hence it could be irrational to credit the high productivity gains to manual labour. According to the study by Kharsany & Karim (2016:35), large numbers of good quality and skilled labour are lost in the Sub-Saharan Africa due to the AIDS pandemic while most employers have been experiencing poor labour turnover and high levels of absenteeism attributed to health matters.

High levels of absenteeism and mortality are counter-productive and may also have a negative effect on agricultural productivity. The growth of the agricultural sector in terms of job creation has been massive over the years as Cousins, Genis & Clarke (2018:1) concur that the workforce in the agricultural sector had exceeded 200 000 between 2011 and 2018 making it the largest employer in South Africa amid labour productivity concerns. However, Cousins, Genis & Clarke (2018:2) denounce the appalling state of welfare on farms and condemn farmers for the widespread noncompliance with the labour laws in the agricultural sector that could retard both labour and agricultural productivity.

d) Access to Credit / Finance

Fernando (2006:7) concedes that smaller businesses cannot even afford microcredit due to high interest rates, which however, farmers with a larger surplus of funds can afford. According to Ibrahim & Aliero (2012:6250), financiers can reduce the risk and uncertainty of losing the money they lend to farmers by requiring collateral since the lender can theoretically recover some, or all, of his loan in the event of default.

According to Gina & Nothard (2014:399), most of the land reform sugarcane farmers in South Africa have a complete reliance on government grants since they cannot acquire funding from commercial banks. Pessu (2015:16) found that some of the reasons why people are reluctant to start new businesses are, inability to access funding and the difficulty to raise funds in order to meet cash flow challenges. This latter statement could be true since most land reform farmers are self-starters who in most cases do no own assets that are acceptable as traditional collateral by credit institutions.

2.6.3 Institutional Factors

Sanchis, Sanchis-Llopis, Esteve & Cubel (2015:227) affirm that institutional factors could have a barring or sometimes enhance agricultural productivity through the legislative directive being imposed to ensure compliance and stability. According to Martin & Clapp (2015:551) the state has numerous roles in ensuring that the agricultural sector runs smooth by mediating between the sector and financial institutions as well as creating support structures to regulate the agricultural sector in terms of policy formulation and legislation. The following sections explain the way in which institutional matters and legislation can affect agricultural productivity.

a) Government Policies

According to Isaacs (2016:3), the South African labour sector is characterised by high levels of poverty, unemployment and poverty. A high percentage of South Africans are dependent on the wage income for a living, while forty per cent rely on government grants (Isaacs, 2016:3). The Labour Relations Act of 1975 (LRA) together with the Basic Conditions of Employment Act of 1997 (BCEA) outline the regulatory minimum wage for each sector of economy and this is annually discussed and agreed upon with trade unions and employment agencies (Isaacs, 2016:20).

According to Cousins, Genis & Clarke (2018:2), the government as the custodian of law and order provides a legislative directive and ensures that there is compliance with the labour laws of the country while discouraging the long-term trend in commercial agriculture of increased job shedding as a result of mechanisation and a shift to temporary, casual and seasonal labourers. The authors further lament the poor remuneration of farm labourers as way below the statutory minimum wage even in some wealthy farming areas of South Africa.

Table 4 illustrates some of the perceptions from farmers regarding the introduction of the minimum wage for farm workers. These perceptions were captured through the surveys that were conducted in the sugarcane growing regions in South Africa to gauge the acceptance levels of the minimum wage on farms following the introduction of the minimum wage policy. Although the policy was meant to address the ethical issues of the farming business, many farmers vented their bitterness and fear towards the new policy as it was perceived to be counter labour productivity.

Table 4: Farmers' responses to labour legislation in the KwaZulu-Natal South and North Coasts, 2005

	South Coast (n=60)	North Coast (n=43)
Cancel new projects	25% (15)*[2]	7% (3)*
Freeze posts	20% (12)	14% (6)
Retrench unproductive workers	67% (40)	56% (24)
Use contract labour	13% (8)*	35% (15)*
Mechanise harvesting	15% (9)	19% (8)
Phase out farm accommodation	23% (14)*	37% (16)*
Train labour	42% (25)*	56% (24)*
Nothing	12% (7)	7% (3)

Source: Murray and Walbeek, 2007:122

Some of the perceptions from farmers were totally averse to the policy and the responses in Table 4 bear testimony to this. Fifty-six per cent to seventy per cent of the farmers thought that the solution would have been to retrench some workers, while others resorted to charging workers for some of the fringe benefits such as farm accommodation and skills development. The perceptions outlined in Table 4 reflect that the level of discomfort towards the new laws could in some instances lead to job-shedding and ultimately have far-reaching consequences on agricultural productivity.

b) Market Access and Infrastructure

According to Wynne, Murray & Gabriel (2009:51), sugarcane farmers in the 20th century in South Africa were paid on the quantity of sugarcane delivered to the mill and later, from year 2000, the RV payment system, which promotes the improvement in the quality of sugarcane, was introduced. Commercial sugar is obtained by extracting juice from

[2] *Significantly different at 5 per cent

sugarcane stalks and, by means of chemical and physical processes this juice is purified and water is separated from the sugar crystals (Honig, 2013:3). According to Jenkins (2013:4), the location of the sugar factory is vital for two main reasons:

1. Sugarcane deteriorates rapidly after harvesting and must therefore be delivered promptly to the factory to avoid sugar losses; and
2. At least seven tonnes of sugarcane are required to make one ton of sugar when delivered without any delays.

Bitzer & Bijman (2014:168) admit that meeting high quality standards is a challenge for most land reform farmers and lament the racial divisions in South Africa that subjected black farmers to rudimentary production technologies that compromise quality and returns. Abrha (2015:39) blames the poor infrastructure in most farms as the reason for land reform farmers failing to meet the quality standards required by the markets and further argues that farmers are often forced to transport their produce for long distances to reach markets and this affects the quality of their product.

Kadwa (2017:2) affirms that the RV payment system refers to the payment system that incentivises farmers for producing sugarcane of a better quality rather than quantity, while reducing pollutants that may have negative effects in the processing of sugar such as high fibre and non-sucrose. Any drop in the quality of sugarcane or RV per cent may lead to the loss of income which is equivalent to R3 360 per hectare as illustrated in Table 5 (Kadwa, 2017:2). Table 5 shows that on a 50-hectare farm, the loss in revenue due to BTCD could amount to R168 000 per annum. This illustration shows that the farm income may vary from two different farms with equal sugarcane productivity and cost structures mainly due to delays in reaching the market or the sugar mill after harvesting.

Table 5: Loss in revenue due to BCTD

Cane/ Tons/Ha	Extraction Costs/Ton	Haulage Costs/Ton	Harvest to Mill	Relative RV%	Relative RV Tons/Ha	Income/ Ha	Income/ Ha after Harvest to Mill
70	R80	R60	R9 800	11.00%	7.70	R36 950	R27 160
70	R80	R60	R9 800	12.00%	8.40	R40 320	R30 520

Source: Kadwa, 2017:2

According to Abrha (2015:39), the poor infrastructure is the main cause for farms to deliver sub-standard products as required by the markets and further argues that farmers are often forced to transport their produce for long distances to reach markets and this affects the quality of their product due to the high perishability of agricultural products.

c) Water allocation reforms

Van Koppen *et al.* (2009:25) emphasise that the quest for equitable ownership of land is similar to the quest for equitable access to irrigation water which is termed water reforms. Knox *et al.* (2011:1) state that eighty-five per cent of available fresh water resources in Africa are used to irrigate agricultural crops and supplement poor precipitation due to climate change.

According to Hess *et. al* (2016:182), sugarcane production is central to the debate on water-energy-food and the pressure to increase agricultural productivity and water use efficiency. Okunlola, Ngubane, Cousins and Du Toit (2016:7) concede that emerging farmers in South Africa struggle to sustain agricultural productivity on their farms because they are made to operate under unfavourable conditions with marginal rainfall and no constant supply of irrigation water.

According to Denby, Movik, Mehta and Van Koppen (2016:479) the transformation of the water sector could have been achieved by transferring water from those who have water in abundance to the have-nots. Water sector transformation has not been readily achieved due to the red tape when applying for water licences and the modalities that go along with water rights that promote inequality in water entitlement (Greenberg 2010, cited in Denby, Movik, Mehta and Van Koppen, 2016:480).

Through personal engagement with land reform farmers, the researcher has learnt that their predicament has been that water rights in some farms were sold by the previous farm owner to other water users before the process of land transfer was concluded. This left the new owners destitute and reliant on rain water in marginal rainfall areas while waiting for their water rights licence to be re-issued, thus compromising sugarcane productivity.

d) Trade policies and Taxes

According to Wa Cipamba (2015:25), South Africa as a country was introduced into trade liberalisation about 5 decades ago before the democratic government in 1994. Wa Cipamba (2015:27) further argues that globalisation and liberalisation of trade require for countries to introduce subsidies and incentive schemes to protect domestic markets. Barwick, Cao & Li (2017:42) aver that the provision of a shield to the domestic market is important and may include import tariffs, subsidies and incentives and further concede that insufficient trade barriers, such as protective tariffs, can jeopardise the creation of jobs and result in the failure of many emerging businesses. Jenkins, Miklyaev, UJeneza, Afra, Matanhire, Basikiti and Nsenkyire (2017:8), affirm that trade policies and exchange rates could have a major effect on agricultural policies and emphasise the dire need for the agricultural sector to work closely with government to ensure mutual understanding.

Accordingly, subsidies and tariffs provide a buffer to traders against the negative impacts of trading in the global scene. Shaw (2018:1) states that in the case of sugar, adequate tariff protection could allow for the collection of import duties for any foreign sugar import that lands on the shores. Consequences are very dire in instances where the trade buffers are non-existent, as Shaw (2018:1) reports that the dropping of the tariff on sugar imports in South Africa in 2017 resulted in large quantities of sugar imports being dumped into the country.

Cheap sugar imports are detrimental to sugarcane farmers and sugar millers as they both share in the division of proceeds but even more severe to the emerging sugarcane farmers (Shaw, 2018:2). Njobeni (2018:13) reports that sugar businesses in South Africa took strain in 2017-2018 season because of the influx of cheap sugar imports. According to Ensor (2018:1), South African sugar producers, which include sugarcane farmers and sugar milling companies, had to turn to the government for aid and to level the playing field by providing a shield for the domestic sugar market.

2.7 THE FINANCIAL IMPERATIVES OF THE VOLATILITY OF SUGARCANE / AGRICULTURAL PRODUCTIVITY

According to Machete (2004:3), sixty-five per cent of poverty in South Africa is rural based and farming is the main contributor of household income in most rural communities in South Africa. Table 6 illustrates the percentage contribution of various income sources to the household income, with farming or agriculture contributing more than forty per cent of the household income. This affirms that agricultural productivity improvement in rural and urban communities can improve lives.

Table 6: Household Income Sources

Income Source	Average Monthly Income	Contribution as a % of total household income
Farming	545	41.0
Pension	329	24.8
Wages	258	19.4
Remittances	16.5	12.4
Family Business	19	1.4
Other non-farm income	13	1.0
Total	1 329	100

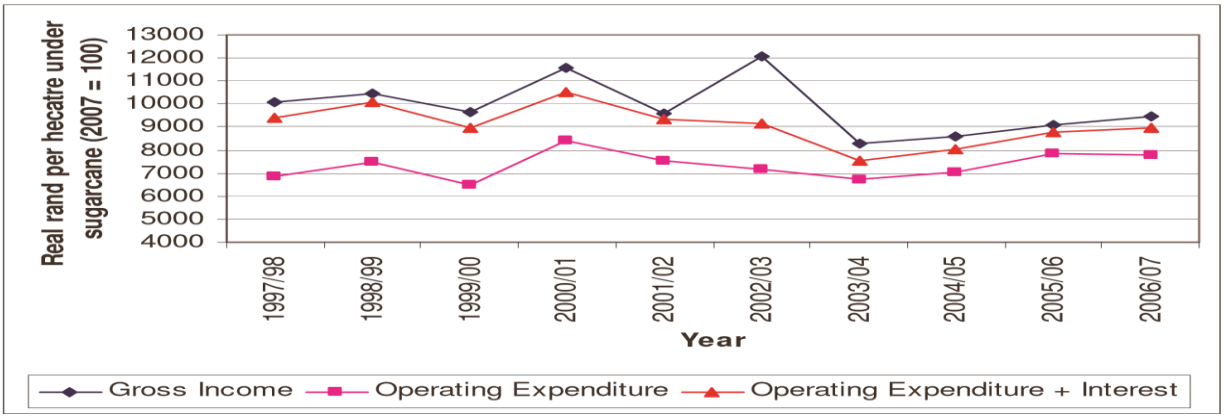
Source: Machete, 2004:4

Any reduction in farm income as the main contributor of household income may cause an upset to the household cashflow and exacerbate poverty. According to Floyd & Darroch (2009:384), the performance of land reform sugarcane farmers during 1997-2007 in KwaZulu-Natal, South Africa, was below that of their commercial counterparts. Various engagements with land reform farmers during the study have shown that productivity levels on most land reform farms in KCD had not improved.

Floyd & Darroch (2009:384) further note that the income gap between the two groups of farmers was huge with commercial farmers earning an income of R11 857 per hectare versus R9 882 per hectare for the land reform farmers, and the real costs per hectare were R8 782 for commercial farmers versus R9 492 for land reform farmers. This discrepancy in income and costs is attributed to the way in which each of the farming categories conducts their business.

According to Fernando (2006:3), high operating costs in some businesses could be attributed to poor physical infrastructure such as insufficient roads, transport and telecommunication channels. Some challenges that relate to law and order can increase the operating costs as more security personnel could be required (Fernando, 2006:3).

Figure 7: Real Gross Income and Operating Expenditure[3] per hectare under sugarcane for land reform farmers, KwaZulu-Natal, South Africa, 1997/98-2006/07



Source: Floyd and Darroch, 2009:386

Figure 7 depicts the relationship between gross income and the operating costs for the majority of land reform farms. Operating costs reached a peak slightly above R10 500 in 2000/01 and came down to just below R10 000 in 2006/07. According to Baiyegunhi & Arnold (2011:4963) the main constituents of the farm operating costs are inputs such as farm staff (thirty-three per cent), chemicals (nine per cent), fertilisers (twenty-nine per cent), fuel and lubricants (seventeen per cent) and machinery maintenance (twelve per cent). Ali and Vocke (2009:11) warn ostensibly about the danger of high operating costs as they may put any farm business in jeopardy.

[3] Operating expenditure = labour + chemicals + fertiliser + fuels and lubricants + mechanical maintenance + fixture maintenance + services + administration + licences + cane transport + sundry (mainly contractors).

Footnote Number 3 shows other components of the total operating cost. Any percentage increase or decrease in any of these constituents may result in an upswing or downswing of the cost graph. Based on Figure 7, the likelihood for land reform farmers to sustain productivity levels on sugarcane farms is questionable given their high operating expenditure and high interest rates. Vass (2015:28) states that businesses need to do a cost-benefit analysis timeously in order to avoid incurring high operating costs on futile activities.

2.8 CONCLUSION

The versatility of a sugarcane crop is remarkable and should be explored to unlock its many uses such as bioenergy and co-generation. The bone of contention that is land reform sugarcane productivity, should be harnessed in order to ensure a smooth transition of black farmers into South Africa's mainstream economy, from subsistence agriculture to commercial agriculture without compromising agricultural productivity. Arguably, some of the land reform processes have impacted negatively on agricultural productivity and there is a need to explore various mechanisms of implementing agrarian reforms without affecting agricultural productivity. Chapter Three will look at the research methodology used in this research study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

Chapter Two gave an overview of sugarcane productivity from other countries and in South Africa while delving into the use of sugarcane to produce sugar and as an alternative energy source. Chapter Two also explored the impact of agrarian (land) reforms on agricultural productivity in India, Colombia, Zimbabwe and in South Africa, and gave an analogy of technical, social and institutional factors leading to the volatility of sugarcane productivity, or at most agricultural productivity, in other countries and in South Africa.

This chapter outlines the research methodology and the research design followed in this study. The chapter also explains the data collection tools and data analysis methods that were utilised and how they are compatible to this type of research study. The chapter concludes by explaining how matters of research ethics such as confidentiality, anonymity and plagiarism were upheld throughout the research process in line with the research ethics policy of DUT.

3.2 THE RESEARCH METHODOLOGY

Remenyi (1996:20) argues that the choice of a research methodology is dependent on the type of research design and approaches used throughout the research process. It is therefore incumbent upon the researcher to combine all appropriate research components that will enable the achievement of the research objectives and to properly address the research questions. According to Kothari (2004:8), research methodology is a systematic approach to solving the research problems in a scientific way while following generally accepted principles in research.

The main objective of this research study is to explore the underlying causes of the volatility of sugarcane productivity and Mackenzie & Knipe (2006:5) posit that research methodology refers to a holistic approach followed by the researcher throughout the investigation, an approach which is relative to the research methods, data collection tools and analysis. According to Nemoto & Berglar (2014:1), the aim of educational research is to contribute to the development of new theories, exploration of the research phenomenon and to enhance teaching methods. The following section is a discussion of different designs and approaches used in this research study and the reasons for their choice.

3.2.1 Research Design

Newman & Ridenour (1998:2) avers that quantitative research hinges upon pre-conceived ideas of the researcher (hypotheses), whereas qualitative research aims to explain what was observed and experienced by the researcher. Marshall (1996:522) posits that the choice of the research approach, whether qualitative or quantitative, is mainly guided by the research questions more than the researcher's preferences.

Remenyi (1996:13) outlines various research designs that are suitable for different studies and cautions researchers to exercise caution when selecting the best fit for their specific projects. Yin (2003, cited in Cresswell 2007:5), defines research design as a sequence that joins empirical data and the subsequent research stages, which ultimately leads to the intended conclusions. According to Kumar (2014:122), research design is the roadmap that the researcher decides to follow during the research journey to find answers to the research questions.

Kumar (2014:123) further affirms that the key functions of a research design are to conceptualise the research processes and to ensure that the correct research approaches are followed to address the research objectives and questions. This research study is designed as a convergent mixed method or concurrent triangulation. This design is suitable for this type of research as it will enable the researcher to assign ample time to both qualitative and quantitative research approaches (Doyle, Brady & Bryne, 2016:626). The following sections explain how each research approach differs from the other.

3.2.2 Research Approaches

The following sections explain the different research approaches used in research and how each approach differs from the other. The research approach used in this research study will also be discussed

- **Qualitative Approach**

Newman & Ridenour (1998:3) avers that qualitative research is of a naturalistic or interpretivist nature and aims to interpret the world's problems according to what was observed or experienced by the researcher. Bowen (2008:138) states that qualitative research is the research in a natural setting that demands robust data collection instruments and proper documentation of the research procedures followed throughout the entire research. The interpretivist approach can be used in a qualitative study.

According to Burns & Burns (2008:14), an interpretivist approach includes a subjective world where experiences of people differ and the researcher becomes immersed in the study and becomes part of the participants of the research. Burns & Burns (2008:18) further affirm that the level of control from the researcher over respondents is very

minimal in qualitative studies and warn that the research findings are often generalised and subjective, whereas scientifically inclined researchers may rather prefer a more objective stance.

Baxter & Jack (2008:545) view this approach as paramount because it promotes mutual relationships and trust between the researcher and the respondents, and also creates an enabling environment for respondents to engage freely. According to Freshwater & Cahill (2013:4), qualitative research is the methodological stance that is rooted to the epistemological convictions of the researcher. The qualitative approach allows for flexibility of the research process. The methods used to collect research data in this approach include, among others, observations, focus groups and person-to-person interviews.

- **Quantitative Approach**

According to Newman & Ridenour (1998:2), a quantitative research approach puts more emphasis on positivistic philosophies where the researcher has preconceived ideas (hypotheses) and would like to put them to the test to confirm whether or not they are true. Newman & Ridenour (1998:4) admits that a positivist stance moves the researcher away from being speculative towards a more insightful position that is confirmed through sensory data.

Burns & Burns (2008:14) enumerate some of the components of a quantitative approach as:

- An objective world with universal laws and causality;
- The use of accurate and objective measures;
- The researcher remains distant from the respondents;
- The research process is extensive, rigid and aligned with the hypothesis;

- Test methods include the use of experimenting and surveys; and
- Deductive reasoning underpins the scientific research process.

Burns & Burns (2008:14) admit that a quantitative approach is used to develop laws and principles by means of extensive experiments, and warn that a quantitative approach often disregards human factors that include experiences and human interpretation of real life.

- **Mixed Methods Approach**

A mixed methods research approach is used in this research. Kopinak (1999) cited in Abro, Khurshid & Aamir (2015:104) avers that mixed methods research involves the collection and analysis of the research data through more than one method to determine if there is convergence and this enhances the trustworthiness of the research findings. According to Abro, Khurshid & Aamir (2015:104), through the mixed methods approach, qualitative and quantitative approaches complement each other in a single research project.

According to Greene & Caracelli (1989) cited in Abro, Khurshid & Aamir (2015:104), some of the advantages of combining two methods in one research study include the following:

- To overcome the deficiencies and biases that may arise in using one method;
- To seek the convergence of the research results;
- To complement different sides of the phenomenon;
- To identify any contradictions on the research data; and
- To give direction to the study.

According to McKim (2017:202), mixed methods research has been widely used by many researchers since 1950 to explore a variety of research projects. Cresswell & Plano-Clark (2011, cited in McKim 2017:202) state that mixed methods researchers need more time to collect and analyse two different sets of data. Through the mixed methods approach, the researcher views the research project in multiple perspectives and positions and combines the ideas from qualitative and quantitative research in the same research project (Almeida, 2018:137). Cresswell (2013, cited in Abro, Khurshid & Aamir 2015:104) posits that there are mainly three research design models that can be pursued by the researcher when using the mixed methods approach, viz.:

- Two-phase design approach where qualitative and quantitative approaches are treated as separate,
- Dominant-less dominant design with one methodology dominating over the other, and
- Mixed-method design which requires the mixing of paradigms either in the introduction, literature review or during the integration of the research, and the researcher adopted this approach in this study.

3.2.3 Pilot Study

Van Teijlingen & Hundley (2001:1) posit that a pilot study is a mini version of the full-scale study that is carried out to test the feasibility of the research instruments. According to Remenyi (2012:56), issues of validity and reliability of the research instruments can be addressed through pre-testing in the field before embarking on a full-scale study, as the researcher can often become attached to his work and be unable to identify any irregularities with the research instruments.

Kumar (2014:150) posits that pilot testing of the research instruments enables the researcher to identify problems that the respondents might have in understanding and interpreting the research questions. Kumar (2014:213) avers that the validity and reliability of the research instruments is crucial in any research study and further clarifies that validity refers to the extent to which the researcher measures the research phenomenon, while reliability refers to the consistency, stability and the accuracy of the research tools (Kumar, 2014:213). In this research study, a pilot study was carried out to:

- Test the efficacy of the research instruments;
- Gauge if they would be able to achieve the intended outcomes;
- Test the clarity of the questionnaires; and
- Estimate the time needed to apply the questionnaires on each farm.

Out of the population of 51 land reform farmers in KCD, the researcher selected a convenience sample of two farmers to test validity and reliability of the survey questionnaires and two farmers to test the interview schedule. According to Kumar (2014:244), a convenience sampling technique is guided by accessibility, geographical location and often known contacts to the researcher. The aforesaid attributes contributed to the selection of the pilot study participants. In addition, they had to be active land reform sugarcane farmers within KCD.

Those who participated in the pilot study were excluded from the full-scale study. Appointments with the respondents were scheduled telephonically and confirmation emails were sent to the respondents in advance with the letter of information, a consent letter, and a copy of the research instrument. Face to face interviews were conducted in Zulu for Zulu-speaking farmers and in English for Coloured or Indian farmers to enable comprehension.

The feedback from the pilot study gave an indication that both research instruments were comprehensible to the participants and no alterations were made to the original instruments.

3.2.4 Study Area

The study area is KCD that covers an area of approximately 8 213 square kilometres, starting from the agricultural town of Gingindlovu to the Umfolozi River in the north and stretching eastwards to the rural areas of iNkandla (KCDM Integrated Development Programme, 2009:22). Sugarcane produced in KCD is supplied to Amatikulu sugar mill which is located in the southern parts of the district and the Felixton sugar mill which is located in the northern parts of the district. These two sugar mill supply areas define the boundaries of the study area.

3.2.5 Population

The study population comprises of 51 active land reform beneficiaries farming with sugarcane in KCD. The intended participants of the research are farm managers and supervisors who are responsible for the daily operations and decision making on land reform sugarcane farms.

3.2.6 Sampling

According to Marshall (1996:522), selecting a correct sample size for a research project is an important ingredient that will enable the researcher to generalise the study results back to the population being studied. According to Teddlie & Yu (2007:77), a purposive sampling technique directs the researcher to the respondents with the specific qualities that are needed for the fulfilment of the research objectives.

Patton (2002, cited in Teddlie & Yu 2007:83) admits that, through purposive sampling, the researcher gains more insight from a smaller number of selected cases. In this study, the researcher used a purposive sampling technique to select six farmers who took part in the interviews, while the remaining 41 farmers participated in the survey. Singh & Masuku (2014:3) aver that proper use of sampling techniques can enable the researcher to attain good results and find appropriate responses to the research questions. Kish (1965) and Robert (2004, cited in Singh & Masuku 2014:3) warn that sampling techniques should be used appropriately to make data collection process faster and cost-effective.

3.2.7 Data Collection Instruments

According to Driscoll *et al.* (2007:19), various mixed method designs differ according to how they prioritise the data collection, whether concurrent or sequential. Cresswell & Plano Clark (2007, cited in Driscoll *et al.* 2007:20) assert that in a concurrent mixed method design the data collection instruments validate each other to address the research questions.

Nemoto & Beglar (2014:1) mention that the research instruments should be customised to enable the researcher to gather adequate data that can enable him to find answers to the research questions. The authors further argue that the most common data collection instruments used in research include tests, interviews, observations and surveys. In this research study, the researcher used surveys and interviews to find answers to the research questions. According to Kumar (2014:171), research data can be classified as primary data and secondary data.

- **Primary data**:

According to Burns & Burns (2008:49), primary data refers to the new data that is collected during the research study. For this research study, primary data was collected

by means of Likert-Scale survey questionnaires and interviews from land reform sugarcane farmers in KCD. According to Nemoto & Beglar (2014:2), Likert-Scale questionnaires are advantageous when conducting surveys to a larger group because data collection can be quicker and the interpretation of data is more versatile. Croasmun & Ostron (2011:21) concede that surveys with customised questionnaires enhance the reliability of the research and could be more rewarding.

However, Nemoto & Beglar (2014:8) caution researchers not to use surveys as the only research instrument for the entire research and add that surveys produce excellent results when used jointly with other instruments. The questionnaire comprised of 35 questions where the respondents were expected to indicate whether they, 1 – Strongly Disagree, 2 – Disagree, 3 – Neither Agree nor Disagree, 4 – Agree, and 5 – Strongly Agree. It was divided into five sections where section A of the survey required the biographical details of the farmer and years of experience in farming in order to gauge the farmer's knowledge and skills in sugarcane farming.

Section B dealt with farm management and labour welfare issues while Sections C, D and E dealt with the relationship with stakeholders, the financial position and the state of resources, such as farm equipment and infrastructure respectively. According to Remenyi (2012:2), the aim of the academic interview is to gather evidence that will be used to answer the research questions. Kothari (2004:98) states that the significance of semi-structured interviews is that they allow for a greater freedom to ask or to omit some of the questions and also offer more flexibility over who should answer which questions, while providing the researcher with a better control over the research sample. The interview schedule was designed to find answers to the following research questions:

a) What are the underlying causes of the volatility of sugarcane productivity on land reform farms that fall under King Cetshwayo District?
b) What are the financial implications of the volatility of sugarcane productivity?
c) What possible measures can be followed to cope with the volatility of sugarcane productivity?

Remenyi (2012:5) warns that academic interviews should be conducted in a secured place away from distractions so as to receive the informants' attention. Details of the questions used to conduct semi-structured interviews are provided in the interview schedule. Six farmers were randomly selected for the interviews. The selection was not based on specific performance or characteristics but purely dependent on the availability and accessibility of the farm manager or supervisor during the scheduling of appointments.

- **Secondary data**:

Burns & Burns (2008:49) define secondary research data as the existing data sources that relate to the study under review. The authors further clarify that sources of secondary data include the existing body of knowledge that enlightens the research topic and the research methodology of the subject under review. Some secondary data sources used in this study include magazines, videos, leaflets, newspapers, government publications, conference proceedings, reports, academic journals, books, unpublished manuscripts, statistics and the internet.

3.2.8 Data Analysis

According to Driscoll *et al.* (2007:24), in a concurrent mixed method research, research data may lose depth and flexibility during the quantitising process of qualitative data, and

the researcher deemed it fit to streamline the data analysis processes for this study. In analysing data gathered through the qualitative approach the researcher employed a thematic content analysis method. Vaismoradi, Jones, Turunen & Snelgrove (2016:100) states that thematic content analysis is a narrative approach that is used to analyse textual data and to clarify important themes uncovered during the research process while Anderson (2007:2) warns that thematic content analysis should be coupled with more analogous procedures to make it more meaningful.

- **Thematic Content Analysis:** Elo & Kyngas (2008:108) define thematic content analysis (TCA) as a method of distilling words and classifying them into few categories with the aim of providing insight and represent facts in a simple way. According to Vaismoradi, Jones, Turunen & Snelgrove (2016:103), some important stages in thematic content analysis include data coding, interpretation and theme creation as outlined in Table 7.

  Elo & Kyngas (2008:109) aver that through TCA, data sorting may either lead to a deductive approach where the research examines the existing research theory, or an inductive approach where the researcher combines the data collected and generalises the evidence. For the purpose of this research study, the researcher coded and categorised all qualitative data to ensure that proper inferences and recommendations were reached.

  Anderson (2007:2) avers that qualitative data analysis hinges upon the researchers' understanding of the research findings. Vaismoradi *et al.* (2016:101) further clarify that after theme development each main theme should be broken down into subthemes in order to have a comprehensive view of the data collected.

According to Bowen (2008:140), qualitative researchers should strive to reach data saturation stage during data analysis and this can be reached by exhausting all the data analysis stages to a level where there are no new insights, no new themes or any other new matters relating to the phenomenon under review.

Table 7: Phases and Stages of theme development in qualitative research

Phases	**Stages**
Initialisation	Reading transcripts and highlighting meaning, Coding and looking for abstractions in participant's accounts, Writing reflective notes, Classifying, Comparing
Construction	Labelling Translating and transliterating Defining and describing Immersion and distancing
Rectification	Relating themes to established knowledge, Stabilising
Finalisation	Developing the story line

Vaismoradi et al., 2016:103

3.2.9 Statistical Data Analysis

Khothari (2004:131) affirm that quantitative research produces large amounts of data that needs to be reduced for ease of reading and for further analysis. According to Field (2013:4), statistical data analysis can help to reduce the anxiety of dealing with complex numerical data and leads to effective planning and good decision making in the field of business and management studies.

Field (2013:19) further mentions that quantitative data analysis involves graphical presentation of the research data to reveal data trends and how they fit into the statistical models. Kumar (2014:264) confirms that graphs make the analysed data more comprehensible and easier to communicate. Quantitative data sorting was carried out by means of an excel computer programme and categorised in terms of numerical and nominal values so that it can be easy transferred into SPSS (Version 24) for further analysis.

3.3 ETHICAL CONSIDERATIONS

Guillemin & Gillam (2004:264) identify two major dimensions of research ethics, which include procedural ethics that relate to research involving humans and ethics in practice that deals with everyday ethical matters that come up during the research process. Kumar (2014:283) states that the judgement as to which ethical issues should be considered in any research activity should be guided by the code of conduct at the time of the study.

According to Erickson & Kovalainen (2015:68), research ethics ensure professionalism and eliminate instances of lies and wrong doings that are common in research. Adherence to the institutional research code of conduct and ethical aspects of this research were addressed in line with the DUT research ethics policy, which endeavours to protect those who take part in research. Permission to conduct this type of research was granted by the Institutional Research Committee. Some of the ethical values that were considered during this research study are explained in the following discussion.

Confidentiality: Burns & Burns (2008:37) distinguish between confidentiality and anonymity by saying that confidentiality ensures that the identity of participants is not disclosed to people who are not directly involved in the research, while anonymity

ensures that participants remain anonymous throughout the study. Research participants were assured of confidentiality and protection of their identities during the research process, which includes not divulging their names and contact details to external parties, with the exception of the university examiners who may need to confirm that the research processes were duly followed (DUT Research Ethics Policy, 2013:2). According to Burns & Burns (2008:37), the confidentiality clause includes not videoing participants privately and without their informed consent, which could be seen as an infringement of their privacy. The researcher complied with all aspects of confidentiality.

Not Inflicting Harm: Burns & Burns (2008:36) warn that life-threatening types of research studies should be avoided at all costs, or alternatively dummies instead of humans or animals should be used. It is the responsibility of the researcher to ensure the safety of all research participants. This research study was classified as Category 2 type of research with minimal risk to humans, animals and environment.

Walliman (2011:42) states that research involving humans and animals is sensitive in nature as humans should be treated with great respect pre-and post-research, any disregard of ethics could completely jeopardise the research process. According to Kumar (2014:83), certain behaviours in research such as inflicting harm on humans and animals, disregarding confidentiality and misrepresentation of the research information can be considered unethical in research.

Concealing Identity of Participants: Clark (2006:4) avers that concealing the identity of participants provides protection and has legal benefits as it ensures that participants are protected when dealing with sensitive or confidential information that may cause discomfort when disclosed.

Coding of the research data instead of using the names of the participants during the data analysis phase ensured compliance with good ethical behaviour. According to Burns & Burns (2008:37), anonymity could be difficult to achieve when respondents are monitored continuously on how they respond to treatment in the case of medical research, however, researchers may conceal the identity of participants by using pseudonyms, and the researcher complied with this ethical aspect of research.

Not Coercing Participants: According to Burns & Burns (2008:35), participation in a research study should be voluntary and researchers should furnish all participants with information pertaining to the study so that they are able to decide whether they willingly participate or withdraw. The authors further affirm that such transparency with the participants can eliminate any future surprises and put them at liberty to terminate their involvement when they feel exposed to danger or life-threatening situations. In this study, the researcher gave all participants consent letters to sign as well as the background information of the study and assured them that they would be allowed to disengage at any time without being penalised.

Burns & Burns (2008:38) warn about remuneration of participants as it creates dependency and bias when participants fear that when they terminate their involvement, they will also have to relinquish their remuneration benefits. Research participants were informed that there would be no financial reward for participating in the study. They were however encouraged to hear that the findings would be communicated to them and other role players that deal with land reform matters in the sugar industry.

3.4 LIMITATIONS OF THE STUDY

Remenyi (1996:18) states that time and money are the most valuable resources in research and research boundaries should be ideal and practical. It would not have been ideal and doable for the researcher to extend the study across other districts due to the timelines for this research study and budgetary constraints. To be more practical and ideal, this study only focuses on 51 land reform sugarcane farmers in KCD that are actively farming and are aware of the daily challenges that are affecting all sugarcane farmers and the sugar industry at large. Sugarcane farms in KCD supply their sugarcane to Amatikulu and Felixton sugar mills.

The researcher had challenges in getting all survey forms back from the respondents but was, however, encouraged to receive a ninety-five per cent response rate which, according to De Vaus (1996), cited in Rosa (2011:215), is acceptable when above eighty per cent. Scheduling face-to-face interviews with farmers was also a challenge as the researcher had to drive to the farms only to find at times the farmer busy or even unavailable for the interview at the agreed time. The researcher felt that extending the research to the large commercial farmers was not necessary as the phenomenon under review is more severe on land reform sugarcane farms and such extension was going to delay the research project beyond the agreed timelines.

Through perseverance and commitment, the researcher managed to surmount these challenges and ultimately interviewed all six farmers. In some instances, two to three dishonoured appointments had to be tolerated since the data collection period coincided with the sugarcane harvesting period which is the busiest time for sugarcane farmers. It wouldn’t be feasible to generalise the study to sugarcane farmers outside the jurisdiction of KCD due to the set timelines for this study.

3.5 CONCLUSION

Chapter Three outlined the research methodology as the overarching scientific approach of solving research problems, which is aligned with the research methods that are used throughout the study. This chapter also explained the research design as the roadmap of any research that is guided by its constituents, such as the research approach, research tools and data analysis. Chapter Four presents the qualitative and quantitative results.

CHAPTER 4

PRESENTATION, ANALYSIS AND INTERPRETATION OF RESULTS

4.1 INTRODUCTION

The previous chapter explained the research methodology and the research design followed in this study. It also outlined the data collection tools and data analysis methods that were utilised and how they are compatible with this type of research study. Chapter Three concluded by explaining how this study complied with research ethics matters such as not inflicting harm, concealing identity of participants and not coercing participants throughout the research process in line with the research ethics policy of the university.

This chapter presents the qualitative and quantitative data obtained from the semi-structured interviews and surveys. According to Johnson & Onwuegbuzie (2004:14), a mixed methods research approach builds on the synergy that exists from qualitative and quantitative research approaches and allows the researcher to have a better insight into the research phenomenon under review, hence the researcher found it suitable to employ both approaches in this study. Interviews and surveys were conducted concurrently as the primary data collection tools, with 46 sections or questions that were aimed at exploring the underlying causes of the volatility of sugarcane productivity.

Sections were classified into 3 categories with category 1 questions made up of section A and B of the interview schedule and of the survey, intended to find answers to the first research question about the underlying causes of the volatility of sugarcane productivity on land reform sugarcane farms. Category 2 questions were made up of sections C and D of the survey and C of the interview schedule that were intended to find answers to the second research question dealing with the financial implications of the volatility of sugarcane productivity on land reform farms in KCD.

Category 3 questions were made up of sections D of the interview schedule and E of the questionnaires which were intended to find answers to the third research question on how to deal with the volatility of sugarcane productivity. Interview appointments were scheduled telephonically with farm managers and supervisors while survey forms were distributed via e-mail or hand-delivered where the e-mail deliveries seemed to encounter problems. Qualitative results were analysed and classified in research themes that arose during the thematic content analysis processes, while quantitative results were presented in descriptive statistics in the form of graphs and cross-tabulations.

4.2 RESPONSE RATE FOR THE SURVEYS AND INTERVIEWS

In total, 41 questionnaires were despatched and 39 were returned, which gave a ninety-five per cent response rate. A total of six farmers were available for interviews making a response rate of one-hundred per cent for interviews. According to De Vaus (1996), cited in Rosa (2011:215), a survey response rate above eighty per cent is acceptable and ideal for generalising the research findings. On the other hand, Birdie (1989), cited in Rosa (2011:216), argues that if the number of non-respondents in a survey is very small, then their effect on the research results would be minimal. Based on (De Vaus, 1996 & Birdie, 1989, cited in Rosa, 2011:215), the researcher concluded that a ninety-five per cent response rate for surveys and a one-hundred per cent for interviews deemed ideal and far exceeded the expectations.

4.3 PRESENTATION OF RESEARCH RESULTS AND INTERPRETATION

Throughout the analysis, the researcher used pseudonyms and referred to the interviewees as either ‘Farmer 1, 2, 3, 4, 5 or 6’ to protect their identity and any undue victimisation, in accordance with DUT research code of ethics. The following is the summary of interview discussions with farm managers and farm supervisors where the farm manager was away or not available for an interview.

4.3.1 Summary of the Interview Discussions

- ***Farmer 1***

Farmer 1 identified himself as a 41-year-old sugarcane and livestock farmer who acquired a farm through the land reform process. He had been managing a diverse enterprise farm with 25 hectares under cane for nine years and had a passion for livestock farming that included pigs, cattle and sheep. He had no formal qualification in agriculture but had a business qualification that enabled him to exercise a business approach to farming. He believed that the reason why he continued to farm despite the volatility of sugarcane productivity was mainly because of his passion for farming.

The farmer was of the view that government support to land reform beneficiaries was inadequate and added that it lacked skills development, capacity building and financial management which are the skills required by any emerging farmer to farm sustainably. Farmer 1 lamented the effect of adverse weather conditions, machinery breakdown and cashflow (access to credit) challenges as some of the problems that often forced him to change his operational plans or put them on hold at the expense of sugarcane productivity.

He agreed that the adoption of the best management practices would be a key to a sustainable future in agriculture and should be supported widely and encouraged although some activities are too costly. When asked to rate his farm labour productivity out of 10, he gave it rating of four and added that over the years he had been experiencing high levels of absenteeism and shared the view that farm workers didn't have pride in farming jobs and would withdraw at any time without notice if they found any industrial jobs. Farmer 1 was of the view that private and public agricultural advisory support services were out-dated and needed to be reviewed to accommodate the needs of a new breed of farmers – the land reform farmers.

- ***Farmer 2***

Farmer 2 was a 50-year-old sugarcane farmer with 10 years of farming experience. She had been managing her 43-hectare sugarcane farm that she acquired through the land reform process and has a formal qualification in business studies. She admitted that government land reform post-settlement support processes are inadequate while short courses in sugarcane agriculture have been very helpful in honing her farming skills. She further emphasised that new land reform farmers should be encouraged to attend the short courses in sugarcane farming offered by KwaShukela Training Centre.

The farmer admitted that the volatility of sugarcane productivity was a problem on her farm and blamed the poor soil conditions and poor irrigation infrastructure that she inherited from the previous owner as the cause. Another added problem that she mentioned was the theft of power cables which often led to the suspension of irrigation for extended periods and negatively affected sugarcane productivity. She added that high costs of electricity and farm inputs had narrowed the profit margins and affected sugarcane productivity.

She conceded that she was not clear on what the best management practices (BMP) entails wholly but was adamant that any best practices should be encouraged to farm sustainably. According to her, planning of farm operations is crucial for every farmer but weather conditions and cashflow challenges often cause a distortion to the plans. She added that banks demand collaterals when lending money to farmers and land reform farmers often don't have the equivalent of what the banks require. She expressed concerns about the high costs and scarcity of manual labour and said some of the farming operations do not run normally throughout the year due to labour problems.

According to Farmer 2, the Sectoral Determination for agricultural workers favoured farmers farming with other agricultural commodities such as grapes in terms of investment returns. She maintained that it was a challenge to improve sugarcane productivity due to low returns resulting from the dwindling sugar sales and a hostile business environment in the world sugar markets. She pointed out that there was a need for government to provide subsidies to emerging farmers as they contribute to the economy of the country and create employment.

- ***Farmer 3***

Farmer 3 was an experienced 62-year-old farmer who has been farming with sugarcane for more than 30 years. The farming entity was managed as a family business and Farmer 3 served as the Managing Director of the entity with a formal qualification in business studies, coupled with some short courses in sugarcane farming. The farming entity was acquired on a willing-buyer willing-seller principle and had a total area of 58 hectares under cane and a portion of citrus plantation that supplements sugarcane income.

The farmer's view on the government land reform support processes was that they were adequate and blamed land reform beneficiaries for not showing full commitment to farming and the instant gratification attitude as a hindrance. Although sugarcane productivity had been volatile on his farm, he credited his success to his diversified farming operations that allowed for commodities to cross-subsidise each other during the difficult times, as well as proper planning of operations. He criticised the security systems on farms, as well as issues of nature conservation and reckoned that these have indirectly contributed to the volatility of agricultural productivity on his farm in various ways.

According to Farmer 3, tightening private and public security could reduce levels of theft on farms and vandalism of the crop by wild animals such as monkeys and wild pigs which, according to him, contributed to a five per cent decline on his farm's productivity. He stated unequivocally that he wouldn't have survived if it weren't for diversifying. Farmer 3 argued that the level of extension support and agricultural advice provided to farmers had declined quite remarkably from the time he started farming and if this problem was not addressed, the sugar industry could soon be faced with a serious shortage of skilled agricultural professionals. Responding to the question of labour productivity, he added that the labour output on his farm had declined and blamed health, welfare issues and community dynamics as key drivers.

- ***Farmer 4***

Farmer 4 was an efficient land reform sugarcane farmer farming on 121 hectares of land acquired through the land reform process and also leasing other properties. He described himself as a 51-year-old farmer with more than 30 years of practical experience in sugarcane farming, passionate about sugarcane farming but never acquired any tertiary level education due to poor family background. According to him, success in farming was attributed to him being raised by a small-scale sugarcane farmer and having attended various short courses in sugarcane farming to gain more knowledge.

He added that farm yields had shown improvement on his farm over the years despite adverse weather conditions and cashflow challenges. The respondent denounced lack of transparency and fairness in the land reform processes and affirmed the need for mentorship and training on financial management to new farmers before taking over their farms. The grower admitted that planning for farm operations was a necessity but a challenge due to uncertainty of the weather, availability of labour and cashflow.

He added that best management practices were needed to a sustainable future for farmers, although very costly, and suggested that sugar millers, larger sugar users like sweetened beverages companies and sweets manufacturers should be encouraged to fund initiatives that are aimed at promoting sustainable farming practices. When asked about the level of support from millers and farmer associations, he acknowledged that such organs provided inadequate and irrelevant support for the land reform farmers and needed a holistic review.

Summing up the discussion, the respondent admitted that labour productivity had deteriorated over the years due to health-related issues such as HIV and AIDS, and sometimes laziness due to other sources of household income. He provided a stern warning that the government land reform departments should be doing a thorough assessment of the farms as opposed to just buying the worst-performing farms and giving them to the land reform beneficiaries for redistribution.

- ***Farmer 5***

Farmer 5 identified himself as a land reform beneficiary who owned a 203-hectare sugarcane farm that he acquired in 2009 through the government land redistribution processes on a willing-buyer willing-seller principle. The farmer was a 62-year-old retired educator who had been farming with sugarcane for eight years and had no formal qualification in agriculture. He admitted that productivity on his farm had been highly volatile and declined from the average of 65 tons of cane per hectare to the recent 28 tons of cane per hectare. He ascribed this to poor farm infrastructure and resources as well as insufficient post-settlement support from the government in terms of guidance and provision of mentorship as well as lack of highly skilled staff with agricultural knowledge from the land reform regional departments.

He agreed that as an emerging sugarcane farmer, some of his inability to manage his cashflow coupled with injudicious farming practices during the two-years of drought contributed to the deterioration of his farm. He had a better understanding of some of the BMP which include trashing versus the burning of cane at harvest and agreed that he barely applied them due to cashflow challenges. The farmer acknowledged the support from stakeholders such as the mill and farmer associations, but appealed for a more robust agricultural extension support that put more emphasis on performance monitoring and evaluation to detect problems before they led to a total shutdown of the farming business.

According to the farmer, access to credit was a challenge when sugarcane productivity was unstable, as banks classified him as a risky client and would regard lending him money as irresponsible. He added that labour productivity was a problem due to laziness and high levels of absenteeism, but however, had no problem with labour availability locally, except for the harvesting operations. Some other major contributors to the volatility of sugarcane productivity were stray livestock, theft, high input prices (electricity for irrigation), uneven terrain (not easy to mechanise) and wild animals.

- ***Farmer 6***

Farmer 6 was a 212-hectare sugarcane farmer that had acquired the farm through a private sale on a willing-seller willing-buyer principle in 2009. He had neither matric nor a formal qualification in agriculture. He started his sugarcane farming career as a small-scale farmer and had since then been farming with sugarcane for more than 25 years. Although 62 years of age, he still looked strong and was actively hands-on on most of the farm activities.

He mentioned that a holistic review of the land reform process in the country was essential, with more emphasis on the legal implications of some of the processes and their impact on buyers. He was of the view that land prices had sky-rocketed and the government should intervene on land valuations. He acknowledged that the yields on his farm had been declining from 68 tons of cane per hectare to the recent average of 48 tons, but blamed the drought, high input prices and the cost of labour as the driving forces behind the volatility.

Conservancy issues were a serious concern for Farmer 6. According to the respondent, monkeys and bush pigs were very destructive and had destroyed a large number of hectares under cane on his farm, yet the law forbidding illegal shooting of wild animals. Poor road infrastructure on the farm was a deterrent during harvesting while maintenance costs were high and mobility to the mill was often a challenge on rainy days. He blamed the miller for inadequate support to land reform farmers.

4.3.2 Research Themes Arising from Interview Discussions

Qualitative data were analysed through TCA which included data coding, interpretation and theme creation as outlined by Vaismoradi, Jones, Turunen & Snelgrove (2016:100). An inductive data analysis process was used to combine the data collected and to generalise the evidence. According to Thomas (2006:239), the inductive data analysis process helps to reduce complex data through theme development or categories.

A total of 18 sub-themes were uncovered and refined into five main themes which include: 1) Training and development, 2) Land reform processes, 3) Agricultural advisory services, 4) General management, and 5) Resource utilisation and efficiencies. Table 8 shows the frequency of each research theme during the interview discussions.

Table 8: Theme frequency

Research themes	Frequency
1. Training and Development	100%
2. Land reform processes	100%
3. Agricultural advisory services	70%
4. General management	65%
5. Resource utilisation and efficiencies	50%

- ***Training and Development***

Training and development seemed to be the most common theme and was mentioned in all six interviews as the key to sustainable farming but, however, disregarded by the Land Reform Department and sugar industry role players to a large extent. The need for training and development of farmers from government and the private sector institutions is paramount mainly because most of the land reform beneficiaries come from different backgrounds other than farming, and some form of business incubation period could be ideal to ensure a smooth transition and a proper bridging of the knowledge gap.

Some of the respondents revealed that the retired white commercial farmers were prepared to reach out and mentor them through a structured mentorship programme at a cost, but the Catch-22 situation was who should be funding the programme. The Department of Agriculture's budget could not be accommodative of such a programme while the Land Reform Department was in pursuit of achieving land redistribution targets. Stemming from the interview discussions with the land reform farmers was a general perception that farming was viewed as being a stress-free and easy to do alternative to most black communities, who ended up committing themselves without conducting research into the skills and resources available.

Farmer 5 admitted that his background as an educator only enabled him to understand the business language better and enhanced his engagement with other stakeholders in farming but deprived him of the financial management skills that are essential to manage business finances and people. This comment resonated with the quantitative results which uncovered that approximately two-thirds of the respondents had some formal or informal training in agriculture, business studies and sugarcane farming. However, the biographical data of the surveyed sample also revealed that only thirty-three per cent of the respondents had matric certificates and forty per cent had done other post-matric qualifications or a sugar course (see Figure 9). This is an important point of departure when formulating a training manual that is best suited to the needs of sugarcane land reform farmers.

- ***Land reform processes***

Various authors in the literature review section, such as Lahiff, (2007), Ntsebeza & Hall, (2007), Bitzer & Bijman (2014), affirmed that the land reform programme in South Africa was introduced in order to address the inequitable allocation of land and the racial imbalances that came into effect due to the Natives Land Act of 1913. On the contrary, through interviews with land reform beneficiaries the researcher learnt that some of the land reform processes that were aimed at developing the emerging farmers seemed to have become ‘weapons of mass destruction’.

Quantitative results have shown that forty-four per cent of the respondents were not happy with the government land reform processes, while twenty-one per cent chose to stay on the fence on this question. By virtue of these results, the researcher concluded that more than sixty per cent of land reform farmers felt hard done in regard to the land reform processes in various ways.

Chapter Two outlined that the MLAR could not yield any good results while the beneficiaries of land reform processes condemned the pace of some of the key processes for the declining sugarcane productivity. Some of the common complaints that arose from interview discussions included the lack of post-transfer support from government and the sugar industry role players which were an ally to the dilemma of who should be doing what among government departments.

Farmer 2 was quoted as saying: 'W*hile government departments argue about who should be doing what in terms of providing funding for agricultural inputs and other necessary support measures, the new farmers would be at crossroads and agricultural productivity would take a knock'.* Some of the major challenges that came up in the interview discussions were that the state officials make improper decisions when purchasing farms and exclude some important items such as farm machinery and other equipment, citing the shortage of funds. Decisions of this nature have subjected new farmers to exploitation by contractors and to being price-takers which Hall (2004:215) calls the failure of land redistribution to link acquisition of land with resources to work on the land sustainably.

- ***Agricultural Advisory service***

According to Pye-Smith (2012:11), the contemporary agricultural advisory service had over time suffered some shortcomings that made it more bureaucratic and inefficient. The provision of an agricultural advisory service by government and private institutions had been a pillar of strength in the agricultural sector worldwide for decades as it addressed stakeholder relationship matters. Quantitative results showed that farmers valued their relationship with their stakeholders, especially the miller and the government. These received scores of fifty-nine per cent and fifty-four per cent respectively.

The interview discussions provided an opportunity to gauge the satisfaction levels regarding the support from these two institutions. Respondents 1 and 3 were very critical of the current public and private agricultural advisory service and argued that it was designed for the large commercial farmers. Farmer 3 reiterated that the current agricultural advisory service epitomised the shortage of agricultural skills in the country and added that it would not be able to address the mentorship element which was much needed in the land reform segment. Some researchers in the literature review section, such as Gilbert, Hilary & Asher (2012) and Dardagan (2018), affirmed that any weaknesses in the agricultural advisory service sector could result in a catastrophic agricultural future.

The respondents acknowledged that an efficient agricultural advisory service would ensure that farmers receive professional guidance through knowledge transfer, and advice from the experts who have studied and done research in the field of agriculture. The South African government, through the Department of Agriculture, provides agricultural advice to emerging and large commercial farmers while the sugar industry also provides experts who are industry-specific in farming and economic advisory services. Through discussions with farmers the researcher was able to gauge that farmers' perceptions regarding the available sources of agricultural advice from the government and the sugar industry role players are that the agricultural advisory service's sector was out-dated and required to be refurbished in order to cater for their needs.

- ***General management***

In theory, general management processes focused on the collective use of resources through planning, organising, leading and controlling, with the manager playing a pivotal role in leading, marshalling or liaising to achieve the intended objectives (Thenmozhi, 2006:4).

Four farmers who were interviewed admitted that the human resource management aspect in their farms was a challenge since working on the farm was viewed by farm workers as inferior compared to working in an industrial environment. Farmer 1 and 3 lamented the high levels of absenteeism and ill-discipline among farm workers which concurred with the quantitative results where thirty-three per cent of the respondents showed that they had problems with managing people, while more than thirty per cent said farm workers were not trustworthy.

Poorly managed teams produce poor results, hence more than thirty per cent of the survey respondents agreed that labour productivity was low and workers were often unable to complete their daily tasks and could not work without supervision. It was noteworthy that thirty-three per cent of the survey respondents operated as proxy farmers and spent few hours on farms, probably because they had other business interests that earned them an extra income and took priority over farming thus compromising sugarcane productivity. Another aspect of management that came up during interviews was operations management.

However, some of the startling revelations emanating from the interviews were that the problem of indecision among farm managers and supervisors was seen as the root cause of the decline in sugarcane productivity. Some farmers cited high input costs and low returns as reasons for abandoning some of their farming operations, which ultimately led to a loss in productivity. Twenty-one per cent of the survey respondents agreed that they neither had laid-out plans nor followed proper planning procedures due to cashflow problems which according to the interview discussions were caused by mismanagement of business income.

Financial management is the centrepiece of any business venture and if it is ignored, businesses may not survive. Respondents agreed that training in financial management would assist them in making informed business decisions especially when it comes to business finances. Forty per cent of the survey respondents agreed that their farm businesses were in poor financial health but not blacklisted, while thirty per cent admitted to be over-geared and non-compliant with business procedures.

- ***Resource utilisation and efficiencies***

According to Pawlowski, Piatkowski & Zebrowski (2009:95), the functions of organising and controlling in general management ensure that the organisation improves and maintains efficiencies in three significant levels namely, organisational, process, and workstation. The efficient utilisation of resources in an organisation is crucial to improving productivity gains. The controlling function includes laying out standards and curtailing any deviations in order to achieve the organisational plans. Through interviews, it was difficult with some farmers to tell whether their labour force could be regarded as efficient or highly productive since they did not have performance standards to measure their output.

It was also noted that some farmers did not have systems to measure various mechanical efficiencies, especially in the case of farm tractors and equipment. The condition of farm available resources was a concern as the survey showed that 39 per cent of the farms were poorly resourced while twenty-one per cent admitted to having out-dated machinery and equipment on their farms, which made effective and efficient farming a problem. It was worth noting that some of the interview respondents did not know anything about the best management practices and this was seen as a disadvantage as most of the best management practices could provide a solution to the efficient utilisation of resources.

4.3.3 The Survey Instrument

The survey instrument consisted of 41 items, with a level of measurement at a nominal or an ordinal level. The questionnaire was divided into five questions that measured various items, as illustrated below:

A Biographical data

B Farm/farmer, labour

C Stakeholder relations

D Finances and access to credit

E Resources

4.3.4 Reliability Statistics

The two most important aspects of precision are reliability and validity. Kumar (2014:161) states that the terms reliability and validity are often used interchangeably in research to refer to the appropriateness and accuracy of the research process. In this study, reliability was computed by taking several measurements on each subject. According to Churchill & Suprenant (1979, cited in Changar & Atan 2021:11), a reliability coefficient of 0.60 or higher is considered as 'acceptable' for ensuring reliability. Table 9 reflects the Cronbach's alpha scores for all the items that constituted the questionnaire.

Table 9: Cronbach's alpha scores

		Number of items	**Cronbach's alpha**
B1 - B10	Farm/ farmer	10	0.603
B11 - B20	Labour	10	0.7
C1 - C5	Stakeholder relations	4	0.613
D1 - D5	Finances and access to credit	5	0.803
E1 - E5	Resources	5	0.707

The reliability scores for all sections exceed the recommended Cronbach's alpha value of 0.60 which indicates a degree of acceptable, consistent scoring for these sections of the research. The principle component analysis was used as the extraction method, and the rotation method was Varimax with Kaiser Normalisation. This is an orthogonal rotation method that minimises the number of variables that have high loadings on each factor. It simplifies the interpretation of the factors.

- Factor analysis/loading show inter-correlations between variables; and
- Items of questions that loaded similarly imply measurement along a similar factor. An examination of the content of items loading at or above 0.5 (and using the higher or highest loading in instances where items cross-loaded at greater than this value) effectively measured along the various components.

It was noted that the variables that constituted the various sections loaded along 2, 3 or 4 components (sub-themes). This means that respondents identified different trends within the section. Within the section, the splits are colour coded. For an example, Section B1 – B10 had a combination of farm business etiquettes, climate and conservancy issues and these trended differently as their impact on sugarcane productivity also varied. Equally so, Section C1 – C4 indicates how farmers valued their relationship with external stakeholders against farmer-to-farmer relationship which Gaucher, Le Gal & Soler (2004, cited in Bezuidenhout, Kadwa & Sibomana, 2013:10), argue is key to improving agricultural productivity.

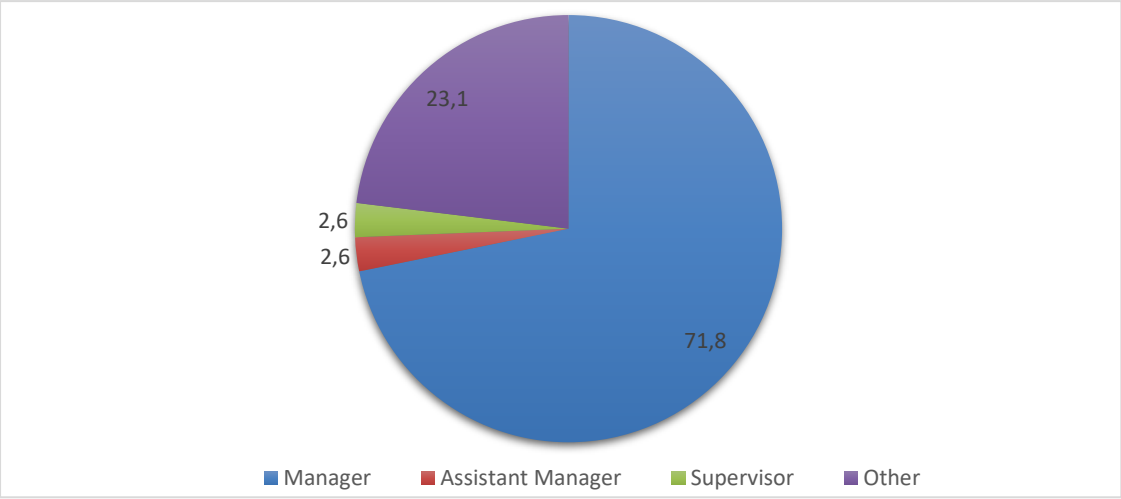
4.3.5 Section Analysis

The section that followed analysed the biographical data of the respondents and their scoring patterns per variable per section. Field (2013:19) suggests that graphs and tables are ideal in a research study and make statistical data more comprehensible. Hence the accompanying sections present quantitative results using various graphs and tables that show the variables that constitute each section. Results were then further analysed according to the importance of the statements.

Section A: Biographical Data

This section summarises the biographical characteristics of the respondents. The figure below indicates the positions that respondents held in various farms that participated in the survey.

Figure 8: Positions of the respondents



Nearly three-quarters of the respondents were managers, with other (unspecified) being twenty-three per cent. This was a useful statistic as it indicated that respondents were senior staff and would have answered from an informed point of view. This was also borne out with the high reliability values.

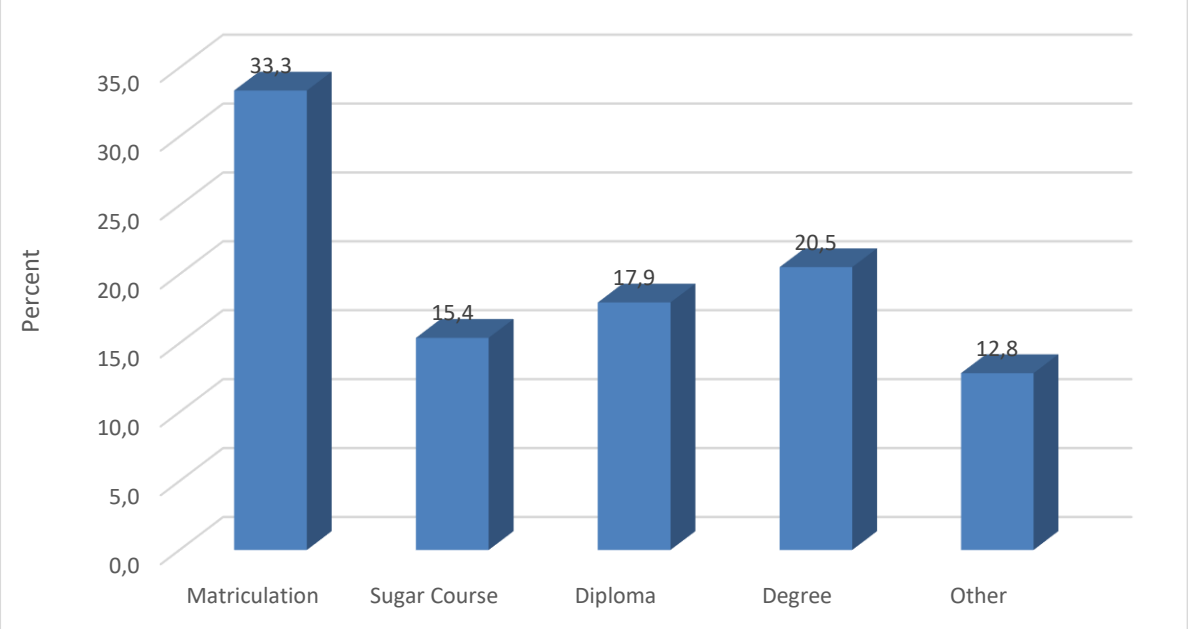
The accompanying Table 10 shows important statistics that indicate the number of respondents that had been trained formally and informally on sugarcane farming.

Table 10: Number received formal and informal training

	Frequency	Percent
Yes	25	64.1
No	14	35.9
Total	39	100

As shown in Table 10 above, 64.1% of the respondents received training while 35.9% did not. The findings show that that the majority of the respondents had had some formal or informal training in agriculture, business studies and sugarcane farming. Isaga (2018:245) affirms that education is an important factor that can affect a farmer's access to bank credit as they are expected to understand credit terms and conditions so that they can complete loan applications properly. Figure 9 & Table 10 indicates the level of education of the respondents.

Figure 9: Level of education of the respondents



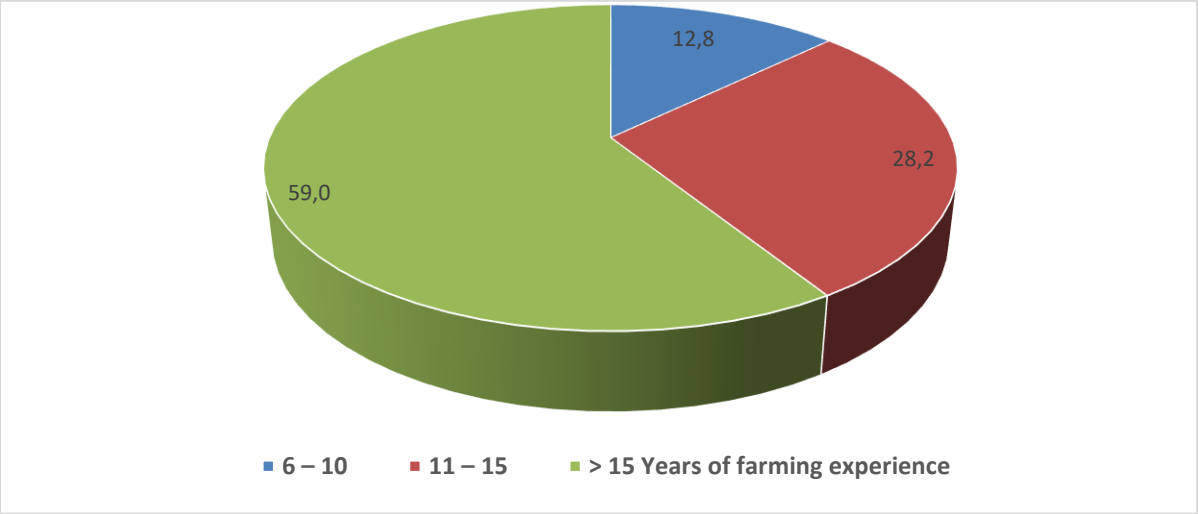
As indicated in Table 9 above, 33.3% had matriculation, 15.4% of the respondents had completed a Sugar Course, 17.9% had a diploma and 20.5% had a degree, while 12.8% had other qualifications. The findings show that collectively, the majority of the respondents had some post-matric qualification although a third of them only had matric, which is a gateway to a tertiary qualification. The minimum entry requirement for a sugar course was a matric certificate as the theory content required an understanding of some high school concepts or phrases, hence the number of respondents with sugar course certificates was very low at fifteen per cent. In essence, this was a useful statistic as it indicated that a fair proportion of the respondents had a higher qualification and that some of the responses gathered would have been from an informed (learned) source. The accompanying statistics indicate the age of the respondents (in years).

Table 11: Age of respondents

	Frequency	**Percent**
26 - 35	2	5.1
36 - 45	8	20.5
> 45	29	74.4
Total	39	100.0

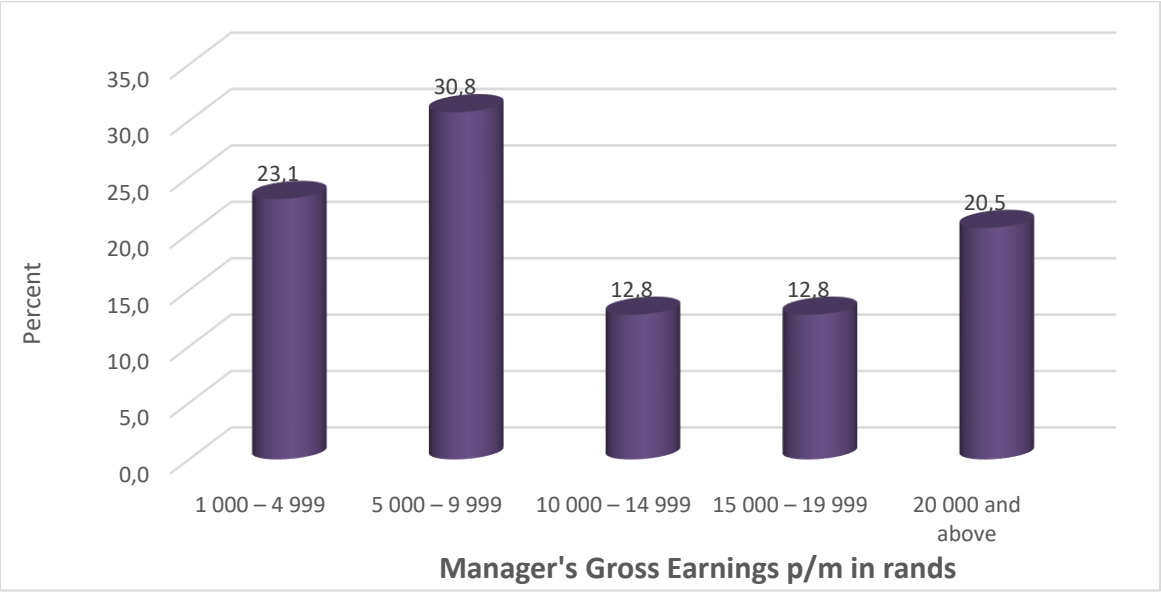
Approximately 5 per cent of the respondents were between 26 and 36 years of age, 20.5% were between 36 and 45, while 74.4% were older than 45. Hence the majority were over 45 years. This was also a useful statistic as it indicated the maturity of the sample. Nxumalo & Oladele (2013:85) share the view that age is an important factor that influences the decisions such as the adoption of new technologies that could make farming as a business a lot easier. However, three quarters of the respondents were older than 45 years of age, which concurs with the concerns raised by Nxumalo & Oladele (2013:85) and Ntshangase (2016:34) of the ageing population among the current community of farmers and the dire need for succession planning.

Figure 10: Years of farming experience.



The respondents were farmers with all having more than five years of farming experience. Through empirical evidence, experience has been the best teacher for many farmers and this is a very useful statistic for sugarcane farmers and other sugar industry role players. This graph (Figure 10) shows that fifty-nine per cent of the respondents had been farming with sugarcane for more than 15 years, which was an indication that a larger group of farmers were more resilient despite the volatility.

Figure 11: Manager's monthly earnings



This is an important statistic indicating the variability in earnings for people doing a similar job, with more than fifty per cent of farm managers earning below R10 000 per month while only twenty-one per cent earned more than R20 000. According to Lima (2016:16), the market rated monthly salary for a farm manager in South Africa was between R15 000 and R25 000. These results affirmed that farms in good standing in terms of sugarcane productivity, paid their managers and supervisors well and vice versa. However, salaries below market rate could be a disincentive for managers and supervisors to put more of their discretionary efforts.

Section B1 – B10

This section deals with operations management and explored how it could affect sugarcane productivity. Table 12 is a summary of the scoring patterns on various operational activities and other items related to farming. In a nutshel, the table shows a high percentage of land reform sugarcane farmers (≥ forty-five per cent) who found it difficult to manage their workers, while (≥ fifty per cent) agreed that they spent few hours on their farms probably due to other commitments that earned them additional income.

Table 12: Farm operational activities and other items

		Strongly disagree		Disagree		Neither Agree nor Disagree		Agree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Managing people is difficult	B1	5	12.80%	11	28.20%	6	15.40%	13	33.30%	0.09
Staying on the farm is a challenge	B2	4	10.30%	17	43.60%	7	17.90%	10	25.60%	0.001
Spend few hours on the farm daily	B3	9	23.10%	14	35.90%	3	7.70%	13	33.30%	0.053
Farm productivity is erratic	B4	4	10.30%	1	2.60%	5	12.80%	18	46.20%	0
Don't have/follow proper work plan	B5	10	25.60%	9	23.10%	12	30.80%	8	20.50%	0.826
Apply best farm management practices (BMP)	B6	2	5.10%	7	17.90%	14	35.90%	9	23.10%	0.048
Don't know about the BMPs	B7	14	35.90%	10	25.60%	6	15.40%	8	20.50%	0.018
Only farming to retain my inheritance	B8	9	23.10%	21	53.80%	3	7.70%	4	10.30%	0
Familiar with government policies on farms	B9	3	7.70%	3	7.70%	8	20.50%	18	46.20%	0.001
Natural disasters and livestock a problem	B10	3	7.70%	0	0.00%	4	10.30%	10	25.60%	0

Figure 12: Farm operational activities and other items

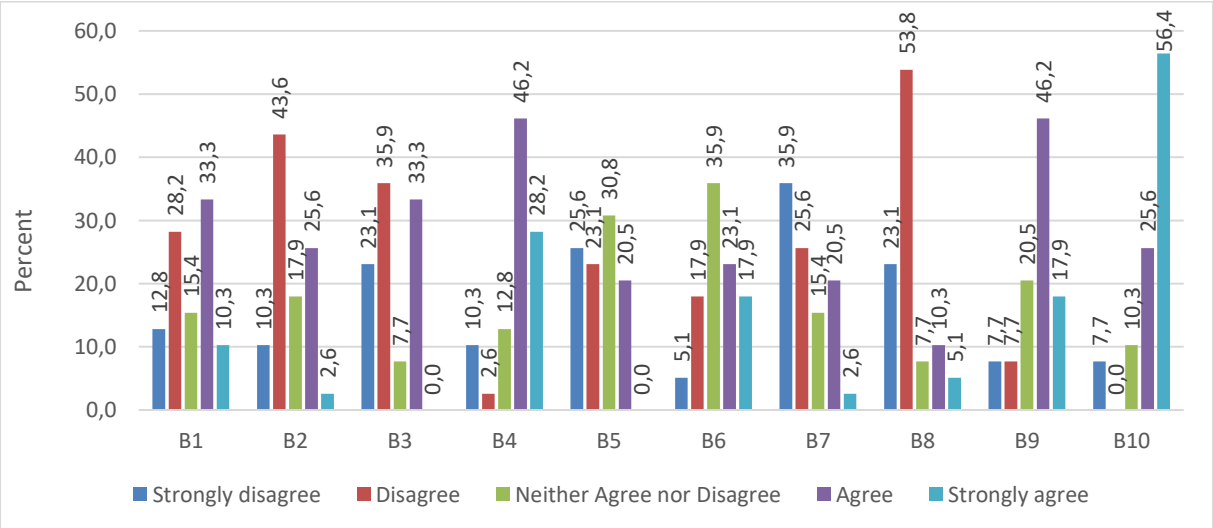


Table 12 and Figure 12 show the results on each of the sub-themes relating to “farm operational activities and other items”:

- **Managing people is difficult:** Collectively, just under half (43.6%) of the respondents either agreed (33.3%) or strongly agreed (10.3%) that managing people is difficult, while 28.2% disagreed and 12.8% strongly disagreed.
- **Staying on the farm is a challenge:** Collectively, the majority (53.9%) of respondents either disagreed (43.6%) or strongly disagreed (10.3%) that staying on the farm is a challenge while 25.6% agreed and 17.9% were neutral.
- **Spend few hours on the farm daily:** Collectively, the majority (59%) of respondents either disagreed (35.9%) or strongly disagreed (23.1%) that they spend few hours on the farm daily, while 33% agreed.
- **Farm productivity is erratic:** Collectively, the majority (74.4%) of the respondents either agreed (46.2%) or strongly agreed (28.2%) while 10.3% strongly disagreed and 12.8% were neutral.
- **Don’t have/follow proper work plan:** Collectively, almost half (48.7%) of the respondents either disagreed (23.1%) or strongly disagreed (25.6%) that they do not have or follow a proper work plan while 20.5% agreed and 30.8% were neutral.
- **Apply best farm management practices (BMP):** Collectively, 41% of the respondents either agreed (23.1%) or strongly agreed (17.9%) that they apply the best farm management practices while 35.9% were neutral and 17.9% disagreed.
- **Don’t know about the BMPs:** Collectively, the majority (61.5%) of the respondents either disagreed (25.6%) or strongly disagreed (35.9%) that they don’t know about the BMPs while 20.5% agreed and 15.4% were neutral.

- **Only farming to retain my inheritance:** Collectively, the majority (76.9%) of the respondents either disagreed (53.8%) or strongly disagreed (23.1%) that they don't know about the BMPs while (10.3%) agreed.
- **Familiar with government policies on farms:** Collectively, the majority (64.1%) of the respondents either agreed (46.2%) or strongly agreed (17.9%) that they are familiar with government policies, while 20.5% were neutral.
- **Natural disasters and livestock are a problem:** Collectively, the majority (82%) of the respondents either agreed (25.6%) or strongly agreed (56.4%) that natural disasters and livestock are a problem on their farms while 10.3% were neutral.

The findings indicate that the majority of the respondents indicated that they spend a few hours a day on the farm; that farm productivity is erratic; that they know about BMPs; that they are familiar with government policies on farms and that natural disasters and livestock are a problem. The majority also disagreed that staying on the farm is a challenge.

Section B11 – B20

This section dealt with human resource management and welfare issues and explored the perceptions of farm managers and supervisors on labour relations issues as they can impact negatively on productivity if they are not properly addressed.

Table 13: Farm Labour and welfare issues

		Strongly disagree		Disagree		Neither Agree nor Disagree		Agree		Strongly agree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Seldom finish daily task	B11	4	10.30%	8	20.50%	6	15.40%	14	35.90%	7	17.90%	0.122
Trustworthy	B12	2	5.10%	11	28.20%	16	41.00%	7	17.90%	3	7.70%	0.002
Obey instructions	B13	5	12.80%	7	17.90%	8	20.50%	17	43.60%	2	5.10%	0.003
Highly productive	B14	7	17.90%	7	17.90%	10	25.60%	14	35.90%	1	2.60%	0.02
Work without supervision	B15	12	30.80%	12	30.80%	8	20.50%	3	7.70%	4	10.30%	0.053
Do not get PPE to do the daily tasks	B16	2	5.10%	11	28.20%	15	38.50%	10	25.60%	1	2.60%	0.001
Know their rights	B17	0	0.00%	8	20.50%	14	35.90%	14	35.90%	3	7.70%	0.034
Highly motivated	B18	1	2.60%	11	28.20%	15	38.50%	11	28.20%	1	2.60%	0
Healthy and physically fit	B19	2	5.10%	4	10.30%	14	35.90%	16	41.00%	3	7.70%	0
Diligent	B20	4	10.30%	4	10.30%	18	46.20%	11	28.20%	2	5.10%	0

Figure 13: Farm Labour and welfare issues

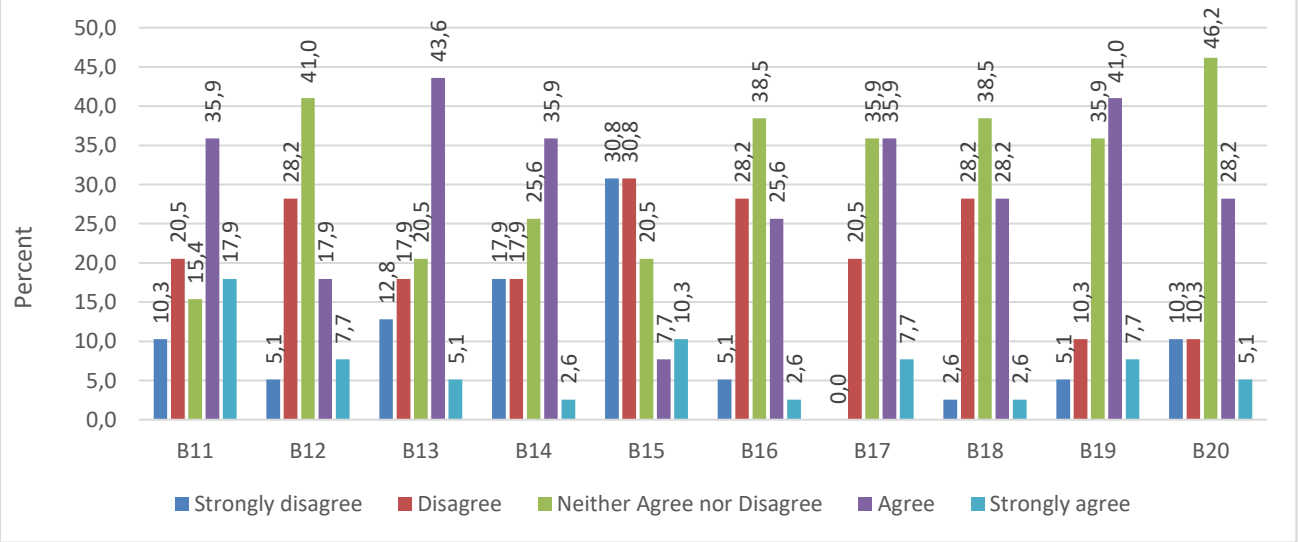


Table 13 and Figure 13 show the results on each of the sub-themes relating to “farm labour and welfare issues”:

- **Seldom finish daily tasks:** Collectively, the majority (53.8%) of the respondents either agreed (35.9%) or strongly agreed (17.9%) that farm workers seldom finish their daily tasks while 20% disagreed and 15.4% were neutral.
- **Trustworthy:** The majority (41%) of the respondents were neutral in that farm workers are trustworthy while 28.2% disagreed and 5.1% strongly disagreed.
- **Obey instructions:** Collectively, almost half (48.7%) of the respondents either agreed (43.6%) or strongly agreed (5.1%) that farm workers obey instructions while collectively (30.7%) disagreed (17.9%) or strongly disagreed (12.8%).
- **Highly productive:** Collectively, 38,5% of the respondents either agreed (35.9%) or strongly agreed (2.6%) that farm workers are highly productive while 35.8% collectively disagreed (17.9%) or strongly disagreed (17.9%).
- **Work without supervision:** Collectively, the majority (61.6%) of respondents disagreed (30.8%) or strongly disagreed (30.8%) that farm workers perform their duties without supervision, while 20.5% were neutral.
- **Do not get PPE to do the daily tasks:** Collectively, 33.3% of the respondents either strongly disagreed (5.1%) or disagreed (28.2%) when responding to whether their workers do not get PPE to do their daily tasks, while 38.5% were neutral and 28.2% either disagreed (25.6%) or strongly agreed (2.6%).
- **Know their rights:** Collectively, the 43.6% of the respondents agreed (35.9%) or strongly agreed (7.7%) that farm workers know their rights, while 20.5% disagreed and 35.9% were neutral.
- **Highly motivated:** Collectively, 30.8% either agreed (28.2%) or strongly agreed (2.6%) that their workers were highly motivated to do their work. Further,

collectively, 30.8% disagreed (28.2%) or strongly disagreed (2.6%), while 38.5% of the respondents were neutral.

- **Healthy and physically fit:** Collectively, almost half (48.7%) of the respondents agreed (41%) or strongly agreed (7.7%) that farm workers were healthy and physically fit, while 35.9% were neutral.
- **Diligent:** Collectively, 33.3% agreed (28.2%) or strongly agreed (5.1%) that farm workers are diligent when carrying out their duties, while just under half (46.2%) of the respondents were neutral and 10.3% disagreed.

The findings show that the majority of workers “seldom finish daily tasks” and that they “work with supervision”, while almost half the respondents obey instructions and were physically fit.

Section C

This section dealt with public relations matters and explored how they could have a negative or a positive impact on sugarcane productivity.

Table 14: Relationship with various stakeholders

		Strongly disagree		Disagree		Neither Agree nor Disagree		Agree		Strongly agree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Relationship with the miller is important	C1	0	0.00%	2	5.10%	2	5.10%	12	30.80%	23	59.00%	0
Government support on my farm is adequate	C2	17	43.60%	10	25.60%	8	20.50%	2	5.10%	2	5.10%	0
Relationship with municipality is important	C3	1	2.60%	0	0.00%	9	23.10%	21	53.80%	8	20.50%	0
Relationship with SAFDA/SACGA is important	C4	1	2.60%	0	0.00%	2	5.10%	15	38.50%	21	53.80%	0
Association with fellow farmers is important	C5	1	2.60%	1	2.60%	0	0.00%	9	23.10%	28	71.80%	0

Figure 14: Relationship with various stakeholders

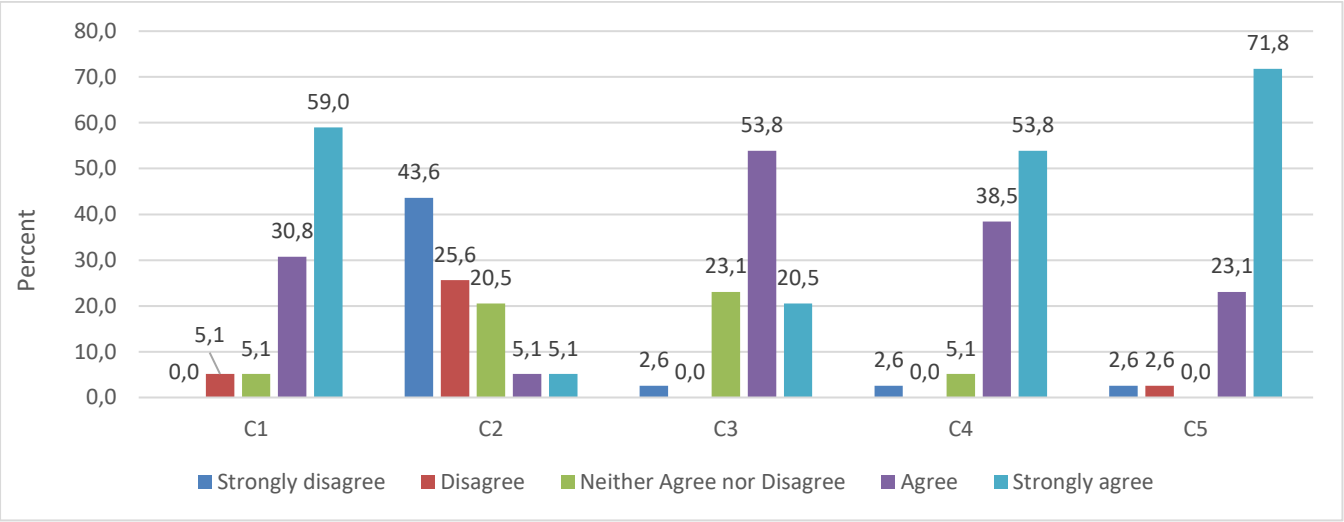


Table 14 and Figure 14 show the results on each of the sub-themes relating to the "relationship with various stakeholders":

- **Relationship with the miller is important:** Collectively, the majority (89.8%) of the respondents agreed 30.8% or strongly agreed 59% that the relationship with the sugar miller was important, while 5.1% disagreed.
- **Government support on my farm is adequate:** Collectively, the majority (69.2%) of the respondents disagreed 25.6% or strongly disagreed 43.6% that the government support on their farms was adequate, while 20.5% were neutral.
- **Relationship with municipality is important:** Collectively, the majority (74.3%) of the respondents agreed 53.8% or strongly agreed 20.5% that their relationship with the municipality was important, while 23.1% were neutral.
- **Relationship with SAFDA/SACGA is important:** Collectively, the majority (92.3%) of the respondents agreed 38.5% or strongly agreed 53.8% that their relationship with farmers' associations was important, while 5.1% were neutral.
- **Association with fellow farmers is important:** Collectively, the majority (94.9%) of the respondents agreed 23.1% or strongly agreed 71.8% that their relationship with other farmers was important.

The findings show that the majority felt that the relationship with the miller, the municipality, SAFDA/SACGA and with fellow farmers is important; and that government support on their farms were inadequate.

Section D

This section dealt with the financial health of the farm business and explored how this can affect sugarcane productivity.

Table 15: Farm Business Health

		Strongly disagree		Disagree		Neither Agree nor Disagree		Agree		Strongly agree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Poor financial health	D1	4	10.30%	6	15.40%	13	33.30%	8	20.50%	8	20.50%	0.219
Blacklisted	D2	12	30.80%	15	38.50%	7	17.90%	3	7.70%	2	5.10%	0.003
High debt levels	D3	5	12.80%	9	23.10%	6	15.40%	12	30.80%	7	17.90%	0.413
No budget/ cashflow plan	D4	8	20.50%	15	38.50%	10	25.60%	6	15.40%	0	0.00%	0.204
Don't follow sound accounting/ compliance methods	D5	7	17.90%	15	38.50%	11	28.20%	5	12.80%	1	2.60%	0.005

Figure 15: Farm Business Health

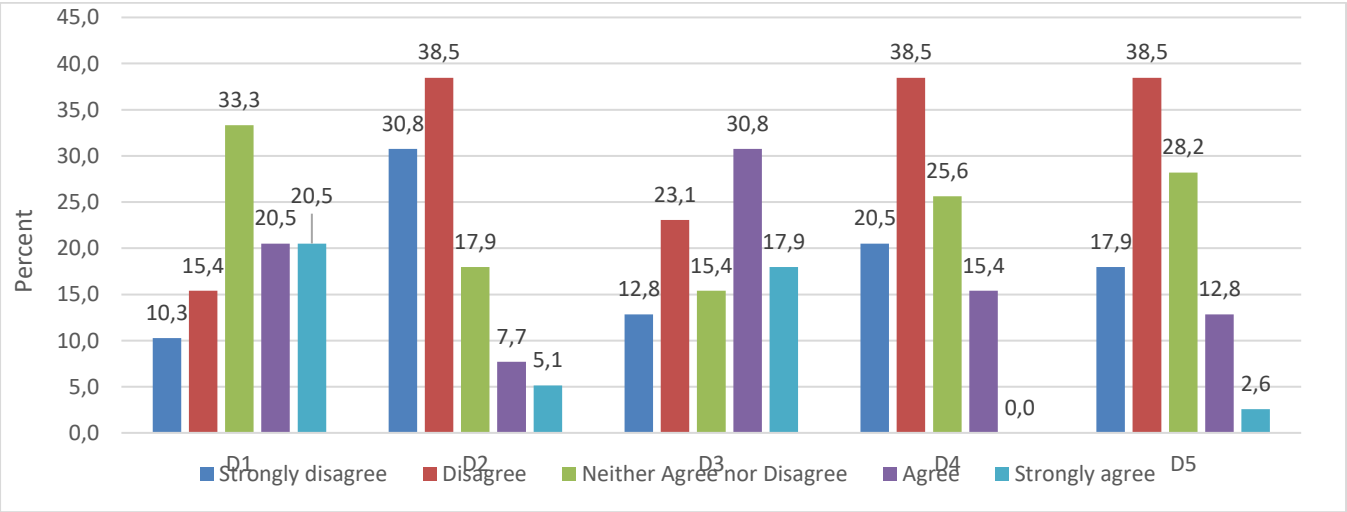


Table 15 and Figure 15 show the results on each of the sub-themes relating to the “farm business health”:

- **Poor financial health:** Collectively, 41% of the respondents agreed (20.5%) or strongly agreed (20.5%) that their farm businesses were in a poor state of health, while 33.3% were neutral.
- **Blacklisted:** Collectively, the majority (69.3%) of the respondents disagreed (38.5%) or strongly disagreed (30.8%) that their farm businesses were blacklisted (or have a record of non-payment), while 17.9% were neutral.
- **High debt levels:** Collectively, almost half (48.7%) of the respondents agreed (30.8%) or strongly agreed (17.9%) that their farm businesses had high debt levels (over-geared), while 35.9% collectively disagreed (23.1%) or strongly disagreed (12.8%).
- **No budget/ cashflow plan:** Collectively, 59% of the respondents disagreed (38.5%) or strongly disagreed (20.5%) that they do not have financial plans (budgeting & cashflow projections) for their farm businesses, while 15.4% agreed and 25.6% were neutral.
- **Don’t follow sound accounting/ compliance methods:** Collectively, the majority (56.4%) of the respondents disagreed (38.5%) or strongly disagreed (17.9%) with the statement that they do not follow business principles (corporate culture), while 12.8% agreed and 28.2% were neutral.

The findings show that the majority disagreed that their farms were blacklisted; that their businesses had high debt levels; that they do not have financial plans (budgeting & cashflow projections) for their farm businesses and that they do not follow business principles (corporate culture).

Section E

This section dealt with the condition of farm resources such as infrastructure, equipment and machinery. The section also looked at how these farm resources can be utilised effectively and efficiently to improve sugarcane productivity.

Table 16: State of Farm Resources (Machinery and Infrastructure)

		Strongly disagree		Disagree		Neither Agree nor Disagree		Agree		Strongly agree		Chi Square
		Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	p-value
Irreparable	E1	7	17.90%	16	41.00%	9	23.10%	6	15.40%	1	2.60%	0.004
Poor	E2	4	10.30%	14	35.90%	7	17.90%	12	30.80%	2	5.10%	0.009
Do not have anything	E3	8	20.50%	20	51.30%	7	17.90%	2	5.10%	2	5.10%	0
Out-dated	E4	5	12.80%	18	46.20%	8	20.50%	6	15.40%	2	5.10%	0.001
Adequate	E5	8	20.50%	15	38.50%	6	15.40%	7	17.90%	3	7.70%	0.039

Figure 16: State of Farm Resources (Machinery and Infrastructure)

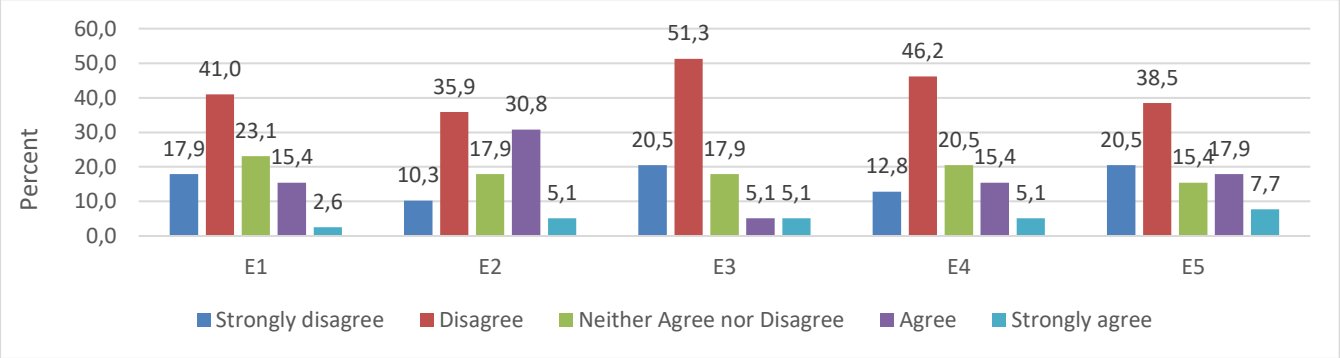


Table 16 and Figure 16 show the results on each of the sub-themes relating to the "state of farm resources (machinery & infrastructure)":

- **Irreparable:** Collectively, the majority (58.9%) of the respondents disagreed (41%) or strongly disagreed (17.9%) that their farm machinery and infrastructure were irreparable while 15.4% agreed and 23.1% were neutral.
- **Poor:** Collectively, just under half (46.2%) of the respondents disagreed (35.9%) or strongly disagreed (10.3%) that their farm machinery and infrastructure were in a poor state while 30.8% agreed and 17.9% were neutral.

- **Do not have anything:** Collectively, the majority (71.8%) of the respondents disagreed (51.3%) or strongly disagreed (20.5%) that they do not have farm machinery and proper infrastructure, while 17.9% were neutral.
- **Out-dated:** Collectively, the majority (59%) of the respondents disagreed (46.2%) or strongly disagreed (12.8%) that their farm machinery and infrastructure were outdated, while 15% agreed and 20.5% were neutral.
- **Adequate:** Collectively, the majority (59%) of the respondents disagreed 38.5% or strongly disagreed 20.5% that their farm machinery infrastructure was adequate, while 17.9% agreed and 7.7% strongly agreed.

The findings show that the majority disagreed that their farm machinery and infrastructure were irreparable; that they do not have farm machinery and proper infrastructure; that their farm machinery and infrastructure were outdated; and that their farm machinery infrastructure was adequate

4.4 DISCUSSION ON COMMON THEMES IDENTIFIED

- ***Passion for farming***

The findings from the qualitative study indicated that the respondents were farming with passion not as a hobby. This is in alignment with the findings from the surveys, where the majority of the respondents clarified that they were not only farming to retain their inheritance. Other areas of the surveys that were in congruence with this theme were found in Section B-2, where the majority were in agreement with the statements, “Staying on the farm is a challenge” and B-3, “Spend few hours on the farm daily”.

- ***Land reform support***

The findings from the interviews showed that the respondents clearly put blame on the land reform processes for the failure of some of the redistribution and restitution farms in King Cetshwayo District. The participants felt that the government funding to purchase farm inputs arrived late when the damage on the farms was more severe while others complained about the government officials not visiting regularly to assess the situation or to do an official hand-over to the Department of Agriculture. In some cases. These statements are in agreement with the findings from the quantitative study, as in Section C-2 of the survey, the majority of the respondents disagreed that "*government support on my farm is adequate*". According to Cousins (2016:3), land reform processes have been politicised and this led to the delays in the implementation.

- ***Weather and Livestock***

The researcher added this section to gauge the severity of the climate change on farm productivity and livestock grazing. Findings from the qualitative study showed that the respondents elucidated this theme by giving examples such as shortage of irrigation water in their reservoirs which is attributed to the erratic rainfall patterns due to climate change. Sentíes-Herrera, Trejo-Téllez & Gómez-Merino (2017:60) recommends that the technification of farms could bring the benefits from irrigation water and mitigate the effects of climate change. Some respondents lamented the damage caused by stray livestock and wild life such as monkeys and bush pigs to be of high economic importance. The majority of the respondents from the quantitative study agreed that "farm productivity was erratic" and they blamed the climate change/natural disasters for the volatility.

- ***Machinery and poor infrastructure***

The findings from the qualitative study showed that “machinery and poor infrastructure” was a problem with some farmers having challenges relating to the breakdown of haulage tractors at the peak of the harvesting season, while there was no back-up tractor to carry on with work and this has a negative effect on their revenue. Others mentioned the irrigation infrastructure which is often destroyed by thieves who are stealing copper cables thus disturbing water supply to the farm houses and the sugarcane fields.

These findings are in agreement with the findings from the quantitative study (Sections E-2 and E-5 of the surveys) which showed that the majority of the respondents agreed that they are poorly resourced in terms of machinery and infrastructure and also have inadequate resources. According to Abrha (2015:39), the poor infrastructure in most farms is the reason why land reform farmers fail to deliver their produce on time and to meet the quality standards required by the markets

- ***Credit***

The findings from the qualitative study showed that access to credit as a stumbling block to their success. Some of the limitations faced by the participants included not having sufficient collateral, since most of land reform beneficiaries are starters. These findings resonate with the findings from the quantitative study (Sections D-1 of “ Poor financial health”, D-3 of “High debt levels” and D-4 of “No budget and cashflow plan”), where the findings indicated that financial institutions like to be associated with businesses that honour their debts repayments and a poor business payment history is a drawback. Access to credit emerged during the literature review as one of the causes for the volatility as affirmed by Pessu (2015:16).

- ***Labour productivity***

The findings from the survey showed that labour productivity levels are down while the majority of the respondents agreed that farm workers "*seldom finish their daily task"* while almost half agreed that farm workers were "*healthy and physically fit"*. These findings differed from the interview which revealed high levels of absenteeism and health issues, such as high HIV/AIDS infection rates, were the reasons for absenteeism. According to Kharsany & Karim (2016:35), large numbers in the labour force are lost annually in the Sub-Saharan countries due to HIV/AIDS. The findings from the survey (Section B-15) showed that the majority of respondents disagreed that they "*work without supervision*". This is in agreement with the interview findings as respondents perceive farm workers as being lazy and that they needed to be fully supervised daily to get better productivity from them.

4.5 CONCLUSION

This chapter presented the research results and data analysis from interviews and surveys conducted on land reform farms in KCD. This chapter also discussed the research themes that emerged from the qualitative data while Chi-square tests and bivariate correlations were also performed from the quantitative data to test statistical significance of the variables and variables with a direct proportional relationship. Analysis revealed that general management, and particularly personnel management, is the primary underlying cause of productivity decline in most of the land reform sugarcane farms that took part in the study, while high levels of non-compliance with some pieces of legislation, such as the Occupational Health and Safety Act (OHSA) and Basic Conditions of Employment Act (BCEA), were also observed through interaction with farmers.

Poor personnel management could have a reciprocal effect on labour productivity as most respondents echoed high levels of absenteeism and poor labour productivity as concerns and blamed government grants and HIV and AIDS as the causality, which was untrue. Government land reform processes, training and development and agricultural advisory services emerged during interviews and surveys as the underlying causes of productivity decline, while some farmers decried the need for post-settlement support such as the coaching and mentorship of new-entry farmers until they are fully fledged. The next chapter discusses the research findings and make further recommendations on sustainable farming and managing the volatility of sugarcane productivity.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The primary focus of this research project was to explore the underlying causes of the volatility of sugarcane productivity on land reform farms in KCD of KwaZulu-Natal. The researcher undertook this exploratory study due to various concerns from the farming communities about the diminishing sugarcane productivity on land reform farms which could stifle economic growth and lead to massive job shedding in areas that are dependant of sugarcane productivity as the key driver of the local economy.

Chapter One clarified the importance of sustaining agricultural productivity as a mechanism to meet food and energy requirements of the population, which is estimated will be over 9 billion people by year 2050. The chapter also highlighted that the volatility of sugarcane productivity is a major challenge due to monoculture practices in sugarcane farming, but is even more severe on land reform sugarcane farms due to various underlying causes that this research study explores. The background to land reform in South Africa was discussed broadly together with the highlights of the research objectives and questions.

Chapter Two presented an overview of the agricultural or sugarcane in other countries and in South Africa and gave a synopsis of how land reform processes have impacted on agricultural productivity in India, Colombia, Zimbabwe and South Africa. The chapter also outlined literature that deals with the factors leading to the volatility of agricultural productivity in other countries and in South Africa and concluded by looking at the financial imperatives of the volatility of sugarcane or agricultural productivity.

Chapter Three covered the research methodology and the design used in this research study. This chapter was very crucial in this study as it gave an account of the scientific processes followed while exploring the research phenomenon. Chapter Four presented the qualitative and quantitative research results of the data collected through face-to-face interviews and surveys and the analysis thereon. Both qualitative and quantitative results were collected concurrently through scheduling of appointments and visits and via emails.

This chapter (Chapter Five) made conclusions and recommendations to the qualitative and quantitative results that were obtained through the semi-structured interviews and surveys. The recommendations were mainly based on the research themes that arose during the study and on literature that dealt with managing the volatility of agricultural productivity. This chapter presented the summary of the research findings and concluded with a discussion on the legal ramifications of some common practices on land reform sugarcane farms. The researcher concluded the research project by giving an account of the recommendations for managing the volatility of sugarcane productivity on land reform farms and put more emphasis on sustainable agricultural development within the precincts of the laws that govern South Africa.

5.2 SUMMARY OF THE FINDINGS

Overall, both qualitative and quantitative results showed that land reform sugarcane farmers had different perceptions regarding the underlying causes of the volatility of sugarcane productivity. In order to summarise the findings of this research comprehensively, the researcher gave each finding a guiding theme to gauge the success of this research project against the intended objectives, and the following discussion covers all the themes thereon.

General Management Practices

Category 1 questions included Sections A and B of the survey tool and the interview schedule, which were intended to find answers to the first research question. The quantitative results revealed that thirty-five per cent of the respondents agreed that they found it difficult to handle personnel management matters such as recruitment, placing and discipline. Failure to handle human resource matters could lead to acute performance issues that are catastrophic to any business, hence fifty-four per cent of the respondents confirmed that workers often failed to complete their daily tasks.

Results also showed that thirty-one per cent of the research participants did not agree nor disagree to having proper work plans for their daily activities, while twenty-one per cent agreed that they had serious issues with planning for farm operations, which includes all other administrative duties. The researcher found that the respondents were dishonest in their responses, as some of the interview participants viewed the components of the planning phase as an administrative burden and confirmed that they often keep on postponing this aspect of their work until it becomes undoable.

Unsustainable Farming Practices

The concept of BMP was a taboo subject to approximately forty per cent of the research participants while only forty per cent agreed that they had applied them on their farms. Some of the BMP stipulations are essential for sustainability, preserving the environment and productivity improvement and these statistics showed high levels of non-compliance with the environmental laws among land reform sugarcane farmers, which could make them liable for environmental taxes in future (if introduced in South Africa) and compromise sugarcane productivity.

According to Kingston, Meyer, Garside, Kee Kwong, Jeyabal & Korndorfer (2007:3), applying BMP in sugarcane husbandry practices, business management and environmental management can improve productivity and promote environmentally-friendly practices.

Non-Conformance with Safety Rules and Regulations

About 64 per cent of the respondents agreed that they were familiar with the laws of the country, which was contrary to some of the practices on the farms that contravened some of the work safety regulations conferred in the Occupational Health and Safety Act (OHSA) and the Basic Conditions of Employment Act (BCEA). The results showed that some of the respondents were dishonest while responding to section B-16 of the survey instrument while some agreed that they do not provide personal protective equipment (PPE) for their workers, so exposing them to fatal incidents and the dangers of contracting diseases.

According to Hadjukova, Klementova & Klementova (2015:473), work safety is one of the dimensions of job satisfaction and could stifle attempts of improving productivity when taken for granted. Hence some farmers complained about high levels of absenteeism and poor performance which could be indirectly linked to substandard working conditions.

Poor Land Reform Processes

Category 2 questions included in sections C and D of the survey questionnaire were intended to find answers to this second research question. Seventy per cent of the respondents believed that the support from the Department of Agriculture, Land Reform and Rural Development was inadequate. Respondents echoed that the post-settlement support lacked the elements of coaching and mentorship which are keys for a successful incubation process.

Part of the concerns raised by the respondents about the land reform processes included the fact that often the government would release tranche payments for inputs such as fertilisers and weed control chemicals very late, when sugarcane had already missed the important growth stages that required fertilisers and no weed competition.

Business Non-Compliance

Section 24(a) and (b) of the Companies Act, No 71 of 2008 confers that businesses should have a safe record keeping system and timely financial reporting to ensure business efficiency. Sixteen per cent of the respondents agreed that they were operating non-compliant farm business entities due to cashflow challenges and steep regulations for conformance, while twenty-eight per cent dodged to giving a clear answer.

According to Nielsen & Parker (2010:2), business compliance refers to when a business operates within legal, social and economic parameters, while some businesses become non-compliant deliberately when the non-compliance penalty is smaller than the returns of conducting a business. More than forty per cent of the respondents confirmed that their farm businesses were in a poor state of health and experiencing high debt levels, while only thirteen per cent of the respondents were honest and stated that they were blacklisted and were unable to access credit or meet their VAT repayments to SARS due to cashflow challenges and the instability of their sugarcane productivity.

Trade Barriers

Category 3 questions were included in sections E and in the general section of the interview schedule to find answers to the third research question and to allow respondents to be more elaborate during discussions. During interview discussions farmers revealed that trading internationally was a challenge for them as an emerging group.

With sugar traded on the international scene, land reform sugarcane farmers felt that they were prejudiced in terms of revenue when exchange rates were poor and when the world sugar prices performed poorly. Such indirect knocks on revenue affected farm business's cashflow and resulted in substandard agricultural practices that eventually affect sugarcane productivity.

Inefficiencies

According to Van Fleet, Van Fleet & Seperich (2013:26), successful management is the achievement of efficiency and effectiveness to attain goals, where efficiency refers to operating in a way that conserves resources. Through interview discussion, farmers acknowledged that management of farm assets to achieve efficiencies and sustainable farming would be the key drivers to a sustainable future.

However, eighteen per cent and twenty per cent of the respondents argued that higher efficiencies might not be achieved on their farms as they had irreparable and out-dated assets, such as farm equipment and infrastructure, while sixty per cent decried having no equipment and poor infrastructure that left them completely reliant on exploitation by contractors. Van Fleet, Van Fleet & Seperich (2013:26) further maintain that acceptable efficiencies could be achieved by investing wisely, harvesting at the correct time and proper planning which is lacking in most land reform sugarcane farms.

5.3 CONCLUSIONS

The research tools were able to properly address the objectives of this research project which included to:

a) Explore the underlying causes of the volatility of sugarcane productivity on land reform farms that fall under KCD;

b) Determine the financial implications of the volatility; and
c) Ascertain if there are systems in place to manage the volatility of sugarcane productivity on KCD farms.

The results showed that poor general management practices and resource utilisation, inefficient agricultural advisory services and inadequate land reform processes are the key underlying causes of the volatility of sugarcane productivity on land reform farms in KCD. The researcher was also able to discern that if these underlying causes are not contained, the knock-on effects will be the demise of businesses as more than forty per cent of the farms were found to be in poor financial health, while more than fifty per cent of the farms were over-geared and unable to access credit from financial institutions.

The researcher concluded that the volatility of sugarcane productivity on land reform farms in KCD can be managed sustainably through compliance and adherence to various pieces of legislation such as the Occupational Health and Safety Act (OHSA), The Bill of Rights and National Environmental Management Act (NEMA) and Conservation of Agricultural Resources Act and efficiencies management.

5.4 RECOMMENDATIONS ON HOW TO MANAGE THE VOLATILITY OF SUGARCANE PRODUCTIVITY

Arguably, the volatility of sugarcane productivity is manageable and can be minimised to an extent where it does not compromise the farm business operations. The following discussion deals with recommendations for dealing with the volatility of sugarcane or agricultural productivity and should be able to help the distressed land reform sugarcane farms to recuperate and soldier-on. Coupled with the recommendations, are techniques for improving yields, increasing productive land, using BMP in agriculture and improving labour productivity.

5.4.1 Recommendation One: Improving Yields

According to the SID (2016:25), the South African Sugarcane Research Institute (SASRI) is responsible for sugarcane research, development and innovation programmes that are aimed at improving the performance of varieties and enhancing their productivity. The information on the release of new sugarcane varieties and their qualities is disseminated to farmers through the Extension Officers and sugar industry publications. Cramer & Jansen (1991:482) opined that new varieties are high yielding (HYV) and are produced through the green revolution (GR) techniques.

They are highly responsive to nitrogen, are photoperiod insensitive and can double and even triple yields per hectare over traditional varieties. According to Ameen & Raza (2017:129), the first GR started in the early 1940s and led to sustainable improvements in agricultural productivity and the reduction of carbon emissions while promoting the use of refined agricultural techniques such as plant transformation and gene transfer methods. Innovations of this magnitude require protection and seed producers worldwide to preserve their patents through the Intellectual Property Rights which ensure they have continued returns for their investment.

The rights of sugarcane breeders in South Africa are protected under the Plant Breeder's Rights Act No. 15 of 1976, which makes provision for the protection of any innovative crops against manipulation without permission from the breeder. The Act also makes provision for the plant breeders to gain financial remuneration or royalties for their work, which encourages them to continue embarking on a tedious and expensive breeding process for new and better varieties. According to Cramer & Jansen (1991:481), there is a wide disparity in yields between the developed countries and the less-developed countries which is evident when comparisons are made on the yield of wheat in 1989 in

Pakistan of 1.9 metric tons/ hectare less than the 6.2 tons/ hectare in West Germany. Such high yields in the developed countries come essentially from the use of improved seeds derived from the breeding processes, fertilisers, plant protection, irrigation water and a sound financial system. Many countries can learn good lessons from Israelis success story of improving agricultural productivity through smart development techniques and the use of higher-yielding crops to increase volumes and sales (Obasanjo, Mills & Van der Merwe, 2018:5). The authors further affirm that Israeli farmers managed to improve agricultural productivity by twenty-six per cent while using twelve per cent less water because of the use of computerised irrigation systems with improved water- use efficiencies.

5.4.2 Recommendation Two: Intensifying Land Usage

According to Jiang, Deng & Seto (2013:38), farmers need to intensify the use of limited agricultural land to improve agricultural productivity and the researcher supports this statement on land reform farms as this will bridge the productivity gap that exists between commercial farmers and land reform farmers, as outlined in Chapter 2, Section 2.3. Barbier (2004:3) states that land expansion projects to increase productive agricultural land could increase by forty-seven per cent in 2050, with sixty-six per cent of new agricultural land coming from deforestation and conversion of wetlands in the developing economies. However, farmers need to ensure that any new agricultural development is aligned with Chapter One of NEMA No. 107 of 1998, which denounces the disturbance of natural vegetation, wetlands and estuaries. Besides NEMA, the Conservation of Agricultural Resources Act of 1983 makes provision for the conservation of agricultural natural resources and maintenance of productive agricultural land by preventing soil erosion and protecting water sources.

According to the Alliance for a Green Revolution in Africa (AGRA) (2018:2), half of the world's uncultivated land is in Africa, and Africa needs to transform the agricultural sector in order to be able to fully utilise this wonderful resource. Africa farms roughly twenty per cent of its potentially arable land while South America farms only ten per cent (Cramer & Jensen, 1991:482). The authors further argue that there are two broad categories of land that are used to differentiate between land that is actually in use as opposed to the land that could be used for agricultural activities in the future:

- Arable land that is currently being cropped without incurring additional costs of development; and
- Potentially arable land that could be brought into production after undergoing physical development to make it productive.

AGRA (2018:2) posit that the poor infrastructure and poor labour productivity in Africa are stumbling blocks to the growth of the sector, and recommends that more efforts would be required to unlock the potential of the idling agricultural land. According to Cramer & Jansen (1991:482), the costs of developing additional agricultural land would make economic sense only if the value of output could cover the costs of bringing it into production. Barbier (2004:3) argues that increasing productive agricultural land could improve agricultural productivity by nineteen per cent.

5.4.3 Recommendation Three: Using Best Management Practices (BMP)

Van Fleet, Van Fleet & Seperich (2013:26) aver that successful management entails the achievement of efficiencies and effectiveness levels by knowing when to do what and how, while higher levels of efficiencies are expected when managing physical resources, natural resources and financial resources.

Between eighteen per cent and twenty per cent of the respondents agreed that their physical resources, such as farm tractors, were out-dated and irreparable, while thirty-six per cent agreed that they were poorly resourced and sixty per cent needed additional resources to operate without reliance on contractors. Proper mechanisation planning would be ideal to ensure effective utilisation of available resources. According to Chapter 2, Section 24 (b), (i), (ii) and (iii) of the Bill of Rights in South Africa, it is the responsibility of all South African citizens to ensure that they use natural resources sustainably to benefit the present and future generations.

Forty-six per cent of the respondents who took part in the survey agreed that farm productivity is erratic which is in agreement with the respondents who took part in face-to-face interviews who blame climate change for the volatility. Chapter One of NEMA No. 107 of 1998, condemns the deliberate performance of tasks that can disturb the ecosystem and biological diversity. BMPs are often introduced in line with relevant laws that promote sustainable farming systems and curb non-conformances.

According to Reganold & Wachter (2016:2), some of the sustainable farming practices include the adoption of organic practices, maintaining biodiversity while accommodating the latest technology and renewable energy forms, whereas unsustainable agricultural practices such as monoculture, the use of synthetic chemicals and fertilisers, poor soil conservation practices and inefficient utilisation of water are discouraged as they erode agricultural productivity extensively.

Pender, Nkonya, Jagger & Sserunkuuma (2001:19) concede that improved land management and crop rotation led to improved agricultural productivity in Uganda and helped in restoring soil fertility. The BMP would be very helpful to sustainable farming

and to increasing agricultural productivity (Tamini & Larue, 2009:26). American farmers are widely recognised throughout the world for their ability to continually increase output while inputs remain relatively constant (Rickets & Rickets, 2009:45). The authors also argue that agricultural productivity per hour worked had been increasing faster than industrial productivity over the past 20 years due to improved efficiencies in agriculture. While most land reform farmers complain that BMP are pricey, they still value them highly for sustainable farming, while some recommended that it would be ideal if this initiative could be subsidised at the central level of the sugar industry.

5.4.4 Recommendation Four: Corporate Citizenship

Corporate citizenship refers to when businesses take cognisance for the welfare needs of the surrounding communities and ensuring business compliance while in pursuit of maximising profits (Lee & Tan, 2019:263). According to Cousins, Genis & Clarke (2018:2), the farming sector is a suspect for not exercising corporate citizenship through gross violation of human rights laws and labour laws, coupled with high levels of non-compliance. The authors further argue that some of the common violations on farms include illegal evictions, poor working conditions and paying wages far below the acceptable minimum wage, as outlined in the Sectoral Determination for agricultural workers. Chapter 2 of the BCEA stipulates the acceptable rate of pay, working hours and overtime for workers and further gives authority to the Minister of Labour to regulate these sections of the legislation to ensure alignment with the OHSA. Some of the key sections outlined in Section 55(4) of the BCEA include:

- Minimum rates of remuneration;
- Prohibiting remuneration in kind of more than 10% of the wage;
- Keeping of employment records; and

- Setting minimum standards for housing and sanitation for employee dwellings in line with the occupational health and safety rules.

According to Van der Zee (2017:19), the total remuneration package for a farm worker is often inclusive of payment in kind which includes rations, housing, grazing and cultivation rights which according to the Sectoral Determination should not exceed 10 per cent of the wage. The author further asserts that farmers who pay higher cash wages usually subscribe to lesser payment in kind and vice versa. During interviews, some of the respondents agreed that the level of job satisfaction among their workers was very low and could take any industrial jobs over their farming jobs.

Hadjukova, Klementova & Klementova (2015:472) affirm that job satisfaction is an emotional condition that motivates a person to put in more discretionary effort and is a recipe for improving labour productivity. Van der Zee (2017:7) affirm that better working conditions and better wages can improve labour productivity while non-compliance could demoralise the labour force and compromise labour productivity. Chapter 2 of the Constitution of the Republic of South Africa, 1996 (Act 108 of 1996) is the Bill of Rights where sections 24 (a) and (b) make provisions for employers to create an enabling environment for employees to perform their duties without causing harm to their health and be protected from working in hazardous environments.

Chapter One of NEMA encourages workers to refute carrying out any work that could pose danger to their health and the environment. However, twenty-six per cent of the land reform farmers that participated in the survey admitted that they do not buy PPE for their workers while thirty-nine per cent dodged to giving a clear answer to the question, which is an indirect admission that they are non-compliant. NEMA also stipulates that workers need to know their rights and would be acting within the confines of the law if they refused

to carry out any work that would jeopardise their health. This is contrary to the survey responses of more than thirty-five per cent, where farmers alleged that farm workers knew their rights. According to Reganold & Wachter (2016:4), some agricultural chemicals that are used to kill weeds and insects may lead to health problems including cancer, negative effects on biodiversity and severely degrade freshwater and marine ecology.

Section 7 (b) of the BCEA and Chapter 8 (2) (a) of OHSA stipulates that it is the duty of the employer to safeguard the health and safety of employees. Therefore, farmers would be in contravention of the law when forcing employees to carry-out unsafe duties without providing them with PPE as outlined broadly in section 5.2 of this research paper. According to Bitsch (2009:17), non-compliance with personnel management procedures, can demoralise workers and compromise labour productivity. It is therefore recommended that personnel management should be incorporated in a modular course for new entry land reform farmers before taking on new farms.

5.5 FINAL REMARKS

According to Leighton (2015:7), land reform in South Africa was inevitable as it sought to address the inheritance of skewed land ownership. However, the pace of land redistribution required extreme measures which included the much debated issue of land expropriation. There was a vacuum in terms of support for the redistributed agricultural land and the land reform department needed to revisit its programmes to address those challenges. South Africa had more than 20 years into democracy and it was becoming common knowledge that appreciation for human rights should precede productivity gains. Farmers, as responsible business people, have a duty in terms of common law principles to uphold the Constitutional Rights for their workers and put human rights before agricultural productivity, and this could be an area for future research.

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APPENDIX A: LETTER OF CONSENT

Faculty of Management Sciences

Department of Public Management & Economics

Date:_____

Dear Participant

Dear Sir/ Madam

RE: Permission to conduct research
I am Mbongiseni Cleopas Ndebele studying towards a **Masters in Management** degree at the Durban University of Technology (DUT). I am currently completing the research component of my post graduate degree. My research topic is entitled**: "Exploring the underlying causes of the volatility of sugarcane productivity on land reform farms in King Cetshwayo District, KwaZulu Natal".**

You are cordially urged to participate in this research study. Your participation in this research process is voluntary and strictly confidential. Your assistance will be highly appreciated and I look forward to your positive response. Should you have any further queries please contact Thandokwakhe Sibiya (Director: Operations - SAFDA) on 0790777100 or Rekha Naidoo (Public Relations Manager at King Cetshwayo District Municipality) on 035 7992500.

Yours faithfully

_____
Student
Contact Details – 0824366419

_____

Supervisor / Promoter
Contact Details – 0844978151

(IsiZulu Version)

Mnumzane/Nkosazane

Imvume Yokwenza ucwaningo
Mina nginguMbongiseni Cleopas Ndebele owenza iziqu zomkhakha wezokuphatha (Masters in Management) eNyuvesi Yezobuchwepheshe yaseThekwini (DUT). Lolucwaningo lumayelana: "**Ukucwaninga ngezimbangela ezicashile zokwehla komkhiqizo womoba emapulazini abantu abasanda kubuyiselwa umhlaba kuKing Cetshwayo District, KwaZulu-Natali"**

Uyacelwa ukuba ubambe iqhaza kulolucwaningo. Ukubamba iqhaza akusiyo impoqo futhi kuyimfihlo. Usizo lwakho luyokwaziswa kakhulu. Uma ufisa ukuqonda okuthile ngaloluchwaningo, ukhululekile ukuthinta laba abalandelayo: Thandokwakhe Sibiya (Umqondisi – kwaSAFDA) 0790777100 noma uRekha Naidoo (Umphathi wezokuxhumana kuMasipala iKing Cetshwayo) ku-035 7992500.

Ozithobayo

_____
Umfundi – 0824366419

_____
Ophethe ucwaningo – 0844978151

APPENDIX B: SURVEY QUESTIONNAIRE

SURVEY QUESTIONNAIRE FOR LAND REFORM SUGARCANE FARMERS
NAME OF PROVINCE: KWAZULU-NATAL
NAME OF DISTRICT: KING CETSHWAYO

AN EXPLORATION OF THE UNDERLYING CAUSES OF THE VOLATILITY OF SUGARCANE PRODUCTIVITY ON LAND REFORM FARMS IN KING CETSHWAYO DISTRICT, KWAZULU-NATAL

The aim of the study is to explore the underlying causes of the volatility of sugarcane productivity by examining the symptoms of volatility on land reform farms. This study seeks to identify causes of the volatility of sugarcane productivity, and recommend some possible solutions to curb the scourge.

Dear Sir/Madam

Please answer the questions below to the best of your ability. Your accurate and objective response in answering questions is of vital importance as it will be used to determine the underlying causes of the volatility of sugarcane productivity on land reform farms and ensure the sustainability of this sector into the future.

NB: THE INFORMATION YOU GIVE WILL BE TREATED WITH HIGH CONFIDENTIALITY. IT IS THEREFORE NOT NECESSARY TO GIVE YOUR PARTICULARS IF YOU WISH TO REMAIN ANONYMOUS.

A. Biographical Details: Please put answer or an X where appropriate.

1. What position do you hold on the farm? .

Manager	Assistant Manager	Supervisor	Mentor	General Worker	Other (Specify: please write) ……
01	02	03	04	05	06

2. Education level

Matriculation	Sugar Course	Diploma	Degree	Other (Specify) ……
01	02	03	04	05

3. Have you any formal training in the job you are doing?

Yes	No
01	02

4. Gross income level p/m in rands

1 000 – 4 999	5 000 – 9 999	10 000 – 14 999	15 000 – 19 999	20 000 and above
01	02	03	04	05

5. Years of farming experience

	0 – 5 years		6 – 10 years		11 – 15 years		More 16 years

6. Age

	Less 25 years		26-35years		36-45 years		More 46 years

B. Farm/Farmer, Labour, Stakeholder Relations, Finances and Resources

Using the scale below, please answer the following questions on the following pages.
1= Strongly disagree
2= Disagree
3= Neither Agree nor Disagree
4= Agree
5= Strongly agree

Q7
Farm/Farmer
Think about **your farm/yourself**. Do you agree or disagree that each of the following words or phrases describe your farm/yourself? Circle one answer for each statement using the scale at the top of the page.

Farm/ Farmer		**Scale**				
B1	Managing people is difficult	1	2	3	4	5
B2	Staying on the farm is a challenge	1	2	3	4	5
B3	Spend few hours on the farm daily	1	2	3	4	5
B4	Farm productivity is erratic	1	2	3	4	5
B5	Don't have/follow proper work plan	1	2	3	4	5
B6	Apply best farm management practices (BMP)	1	2	3	4	5
B7	Don't know about the BMPs	1	2	3	4	5
B8	Only farming to retain my inheritance	1	2	3	4	5
B9	Familiar with government policies on farms	1	2	3	4	5
B10	Natural disasters and livestock a problem	1	2	3	4	5

Q8
Labour
Think about **your farm workers**. Do you agree or disagree that each of the following words or phrases describe your farm workers? Circle one answer for each statement using the scale at the top of the page.

Labour		**Scale**				
B11	Seldom finish daily task	1	2	3	4	5
B12	Trustworthy	1	2	3	4	5
B13	Obey instructions	1	2	3	4	5
B14	Highly productive	1	2	3	4	5
B15	Work without supervision	1	2	3	4	5
B16	Do not get PPE to do the daily tasks	1	2	3	4	5
B17	Know their rights	1	2	3	4	5
B18	Highly motivated	1	2	3	4	5
B19	Healthy and physically fit	1	2	3	4	5
B20	Diligent	1	2	3	4	5

C. Stakeholder Relations
Q9
Think about **your relationship with stakeholders**. Do you agree or disagree that each of the following words or phrases describe your relationship with stakeholders? Circle one answer for each statement using the scale at the top of the page.

Stakeholder Relations		**Scale**				
C1	Relationship with the miller is important	1	2	3	4	5
C2	Government support on my farm is adequate	1	2	3	4	5
C3	Relationship with municipality is important	1	2	3	4	5
C4	Relationship with SAFDA/SACGA is important	1	2	3	4	5
C5	Association with fellow farmers is important	1	2	3	4	5

D. Finances and Access to credit

Q10

Think about **your farm finances**. Do you agree or disagree that each of the following words or phrases describe your farm situation? Circle one answer for each statement using the scale at the top of the page.

Finances and Access to credit		**Scale**				
D1	Poor financial health	1	2	3	4	5
D2	Blacklisted	1	2	3	4	5
D3	High debt levels	1	2	3	4	5
D4	No budget/ cashflow plan	1	2	3	4	5
D5	Don't follow sound accounting/ compliance methods	1	2	3	4	5

E. Resources

Q11

Think about **resources**. Do you agree or disagree that each of the following words or phrases describe your farm resources? Circle one answer for each statement using the scale at the top of the page.

Resources		**Scale**				
E1	Irreparable	1	2	3	4	5
E2	Poor	1	2	3	4	5
E3	Do not have anything	1	2	3	4	5
E4	Outdated	1	2	3	4	5
E5	Adequate	1	2	3	4	5

T**hank you for your support and cooperation.**

APPENDIX C: INTERVIEW SCHEDULE

INTERVIEW SCHEDULE FOR LAND REFORM SUGARCANE FARMERS
NAME OF PROVINCE: KWAZULU-NATAL
NAME OF DISTRICT: KING CETSHWAYO

AN EXPLORATION OF THE UNDERLYING CAUSES OF THE VOLATILITY OF SUGARCANE PRODUCTIVITY ON LAND REFORM FARMS IN KING CETSHWAYO DISTRICT, KWAZULU-NATAL

The aim of the study is to explore the underlying causes of the volatility of sugarcane productivity by examining the symptoms of volatility on land reform farms. This study seeks to identify causes of the volatility of sugarcane productivity, and recommend some possible solutions to curb the scourge.

Dear Sir/Madam

Please answer the questions below to the best of your ability. Your accurate and objective response in answering questions is of vital importance as it will be used to determine the underlying causes of the volatility of sugarcane productivity on land reform farms and ensure sustainability of this budding sector into the future.

NB: THE INFORMATION YOU GIVE WILL BE TREATED WITH HIGH CONFIDENTIALITY. IT IS THEREFORE NOT NECESSARY TO GIVE YOUR PARTICULARS IF YOU WISH TO REMAIN ANONYMOUS.

A. Biographical Details: Please put answer or an X where appropriate.

1. What position do you hold on the farm? .

Manager	Assistant Manager	Supervisor	Mentor	General Worker	Other (Specify: please write) ……
01	02	03	04	05	06

2. Education level

Matriculation	Sugar Course	Diploma	Degree	Other (Specify: please write) ……..
01	02	03	04	05

3. Have you any formal training in the job you are doing?

Yes	No
01	02

4. Gross income level p/m in rands

1 000 – 4 999	5 000 – 9 999	10 000 – 14 999	15 000 – 19 999	20 000 and above
01	02	03	04	05

5. Years of farming experience

6. Age

B. Farming and Stakeholder Relations: Please put answer or an X where appropriate.

7. In your opinion, are government land reform support processes adequate?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____

8. How did you acquire the current farm/s?

_____
_____
_____
_____
_____

9. Have your farm yields improved or declined since you acquired the farm?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____

10. Do you have/ follow a specific work plan routinely? (POLC) (Daily, Weekly, Monthly and Yearly)

_____
_____
_____
_____
_____

11. What are the key challenges that often affect your planning and how do you succumb to those challenges?

_____
_____
_____
_____
_____

12. What are the Best Farm Management Practices (BMP) in your knowledge?

_____
_____
_____
_____
_____

13. Have you ever had any challenges in getting farm inputs (fertilizers and weedicides)?

Yes	No
01	02

Please explain your answer

_____
_____
_____

14. Are you getting enough support from milling companies, Canegrowers, SASRI and SAFDA?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____

15. Is access to credit easy or a challenge for your farm?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____
_____

16. Is farm labour readily available throughout the year locally?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____
_____

17. How would you rate labour productivity in your farm?

Excellent	Good	Average	Poor	Very Poor
05	04	03	02	01

Give reasons for your rating

_____
_____
_____
_____
_____

18. What are main challenges faced by your farm?

_____
_____
_____
_____
_____
_____

19. How are these challenges impacting on your farm's productivity and profitability?

_____
_____
_____
_____
_____

20. Would you say you are better-off or worse-off financially than before you took over the farm?

Motivate your answer

_____
_____
_____
_____
_____
_____

21. How do you rate the overall efficiency of your farm?

Excellent	Good	Average	Poor	Very Poor
01	02	03	04	05

Please explain your answer

_____
_____
_____
_____
_____
_____

C. Resources

22. Is your farm adequately resourced in the following:

a) Furniture & office equipment (e.g. desks, chairs, filing cabinets, computers etc.)?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____

b) Personnel?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____
_____

c) Services of a qualified Bookkeeper/Accountant?

Yes	No
01	02

Please explain your answer

_____
_____
_____

d) Equipment (e.g. tractors, farm implements etc)?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____

e) Infrastructure (e.g. workshop, roads and bridges, conservation structures, storage facilities, etc.)?

Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____
_____
_____

D. General

23. Are there any other reasons for the volatility of sugarcane productivity on land reform farms that I have not addressed?

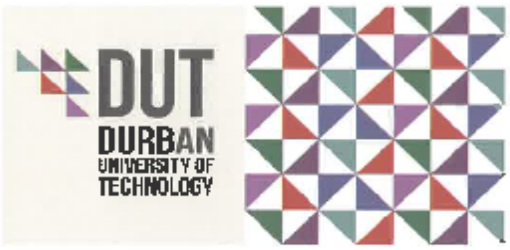
Yes	No
01	02

Please explain your answer

_____
_____
_____
_____
_____
_____
_____

T**hank you for your support and cooperation.**

APPENDIX D: ETHICAL CLEARANCE



Institutional Research Ethics Committee
Research and Postgraduate Support Directorate
2nd Floor Berwyn Court
Steve Biko Campus
Durban University of Technology

P O Box 1334, Durban, South Africa, 4000

Tel: 031 373 2375
Email: irec@dut.ac.za
http://www.dut.ac.za/research/research_ethics

www.dut.ac.za

1 March 2020

Mr M Ndlehele
P O Box 8658
Empangeni Rail
3910

Dear Mr Ndebele

Exploring the underlying causes of the volatility of sugarcane productivity on Land Reform farms in King Cetshwayo District, KwaZulu Natal
Ethics Clearance Number: IREC 032/18

The Institutional Research Ethics Committee acknowledges receipt of your Safety Monitoring and Annual Recertification report.

I am pleased to inform you that the study has been approved to continue.

Please note that ethical approval has been extended till **23 April 2021**, if the research is not complete within this time, you will be required to apply for recertification three months before the expiry date.

Yours Sincerely

Professor J K Adam
Chairperson: IREC

APPENDIX E: LANGUAGE EDITING LETTER

Brenda Morris
57 Caversham Road, Pinetown 3610
Tel: (031) 7024415 *Cell*: 082 5747643

6 April 2019

To:
Mr Mbongiseni Ndebele
School of Applied Law
DUT
Durban

To Whom it may Concern:

This serves to confirm that I, Brenda Morris, a freelance editor and proofreader, performed an editing/proofing function on Mr Mbongiseni Ndebele's thesis entitled *Exploring the Underlying Causes of the Volatility of Sugarcane Productivity on Land Reform Farms in King Cetshwayo District – KwaZulu-Natal.*

I dealt exclusively with matters relating to spelling and grammar and made no content input to the paper.

Yours sincerely

B P Morris
Editor/Proofreader

APPENDIX F: TURNITIN REPORT

Exploring the underlying causes of the volatility of sugarcane productivity on land reform farms in King Cetshwayo District - KwaZulu-Natal

ORIGINALITY REPORT

11%	10%	3%	9%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to University of KwaZulu-Natal Student Paper	2%
2	Submitted to University of Stellenbosch, South Africa Student Paper	1%
3	Submitted to Mancosa Student Paper	1%
4	Submitted to University of South Africa Student Paper	1%
5	uir.unisa.ac.za Internet Source	<1%
6	scholar.sun.ac.za Internet Source	<1%
7	scholar.ufs.ac.za:8080 Internet Source	<1%
8	researchspace.ukzn.ac.za Internet Source	<1%

21/05/2020

Z'NPEHLE
(SUPERVISOR)

APPENDIX G: KING CETSHWAYO DISTRICT MUNICIPALITY LETTER

KING CETSHWAYO
DISTRICT MUNICIPALITY

04 October 2016

To whom it may concern

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH: MR MBONGISENI NDEBELE

The King Cetshwayo District Municipality is a category C municipality on the north coast of KwaZulu-Natal. It is home to five local municipalities, i.e.

- uMfolozi Municipality
- City of uMhlathuze
- uMlalazi Municipality
- Mthonjaneni Municipality
- Nkandla Municipality

Mr Ndebele has indicated that he is currently studying at the Durban University of Technology doing his Masters Degree in Management. His research focus is on the declining sugarcane productivity on farms acquired by the previously disadvantaged groups within King Cetshwayo (uThungulu) District.

He has notified the municipality of his intention to conduct this research project and requested our consent. Sugarcane farming is one of the key drivers of the local economy within the municipality and also a major contributor in mitigating unemployment and this research project seeks to explore some of the underlying factors of the decline in yields on selected farms.

The King Cetshwayo District Municipality hereby grants consent for such research to take place.

Yours in service delivery

TF MNGUNI
ACTING MUNICIPAL MANAGER
KING CETSHWAYO DISTRICT MUNICIPALITY

Postal Address Private Bag X 1025 Richards Bay 3900 **Address** King Cetshwayo District Municipality House Richards Bay CBD **Tel** (035) 799 2500 **Fax** (035) 789 1409
Web Address www.uthungulu.org.za

APPENDIX H: LETTER FROM FARMERS DEVELOPMENT AGENCY

South African Farmers Development Agency
Registration number 163-564 NPO
53 Midsomer Crescent
Somerset Park
4021

SA FARMERS DEVELOPMENT Agency

TO WHOM IT MAY CONCERN

Friday, 12 August 2016

Gatekeepers' Letter: DUT MTech Management research, Mbongiseni Cleopas Ndebele (21649298)

The South African Farmers Development Association operating through the South African Farmers Development Agency, represents small-scale and land reform farmers in the South African sugar industry. The Association advocates for sharper focus on the challenges of sustainability faced by this category of farmers within the industry. It partners and collaborate with partners committed to the same cause in order to improve the suitability, viability and profitability of black farmers within the South African sugar industry.

Mbongiseni has indicated that he is registered with the Durban University of Technology for a research programme (MTech Management), understanding a research titled: ***Exploring the volatility of sugarcane productivity for Land Reform farmers in uThungulu District, KwaZulu Natal.***

SAFDA supports this study and encourage farmers to participate in order to learn more about challenges facing land reform farmers. This in turn will help SAFDA in formulating support programmes for such farmers when the study is complete.

Yours sincerely

Thandukwakhe Sibiya
Director: Operations
South African Farmers Development Agency
tsibiya@sa-fda.org.za
0790777100