MEASURING TECHNICAL EFFICIENCY OF SMALL-SCALE COMMERCIAL FARMING ENTERPRISES AND THEIR CONTRIBUTION TO THE LOCAL ECONOMY IN VHEMBE DISTRICT, SOUTH AFRICA

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DECLARATION

I, Mike Muzekenyi, hereby declare that this Thesis for a **Doctor of Philosophy in Rural Development (PHDRDV) degree,** submitted to the Institute for Rural Development at the University of Venda has not been previously submitted for any degree, at this or another university. It is original in design and execution; all reference material contained therein has been duly acknowledged.

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ABSTRACT

In rural areas of South Africa, small-scale commercial farming is regarded as an essential role player to end extreme poverty, unemployment and food shortages. As such, the South African government has been supporting this subsector through several channels such as Micro Agricultural Financial Institutions of South Africa scheme and Lima Rural Development Foundation to enhance local economic development in rural areas. While the investments by government to ensure local economic development through small-scale commercial farming is increasing, the overall economic contribution in terms of job creation and income generation by these farmers to the rural economy is not fully known. Thus, this study was undertaken to estimate the contribution of small-scale commercial farmers' enterprise to job creation and income generation in Vhembe District Municipality. A correlational descriptive research design was employed in the study. A sample size of 217 small-scale commercial farmers in four local municipalities in Vhembe District was used. Structured questionnaires were used to collect quantitative data which was analysed using International Business Machines (IBM) Statistical Package for Social Science (SPSS) version 26, Limited Dependent Variable Mod (LIMDEP) version 11 and Microsoft Office Excel 2016. Descriptive statistics were used to characterize small-scale commercial farmers. Limited Dependent Variable Mod (LIMDEP) version 11 and Ratio analysis were used to measure technical in this current study. Ratio analysis was also used to estimate income and employment contribution to Gross Domestic Product (GDP) in Vhembe District Municipality. Ordinary Least Squares (OLS) was used to estimate the economic contribution by small-scale commercial farmers in Vhembe District Municipality. Finally, Freidman means ranking method was used to identify challenges faced in this sub-sector.

Most of the respondents (93%) are above the age of 35 years, implying that there are few youths (<35 years old) practising small-scale commercial farming in Vhembe District. On average, the land size was 11 hectares of which 77% of the respondents are farming throughout the year, and 87% of this proportion rely on commercial farming as a primary source of income. The study further revealed that small-scale commercial farmers rely on cheap labour and family members as a source of employment. This might deter the farmers from optimising the resources at their disposal since cheap labour is often associated with unskilled workers. As such, the results revealed an average technical efficiency of 54,25% implying that there is 44,74% room for improving their productivity. Females farmers were found to be more technically efficient as

compared to male farmers. In terms of employment contribution, the sub-sector contributes around 19800 to the labour market in the District, which translates to 6% of the total employment created in 2019 in Vhembe District. Furthermore, the sector generated gross revenue valued at R90 537 600, which translates to 9% of the Gross Domestic Product (GDP) for Vhembe District in 2019. On average, expenditure on salaries, inputs and access to credit were also found to have a positive effect on GDP in Vhembe District.

The results suggest that small-scale commercial farming presents viable opportunities to improve the current level of production hence employment creation and income generation for local economic development. Considering the current level of technical efficiency, establishing agri-prenuers training programs, investing in modern farming technology and prioritise support to female farmers should improve small-scale commercial farming productivity in rural areas. However, the number of youths participating in agribusinesses is low, which threatens the sustainability of this sub-sector. Thus, professionalizing small-scale commercial farming should be also prioritised with a special focus on attracting and empowering youth which in turn can reduce youth unemployment. As such, investments in small-scale commercial farming should be carried out considering multiple structural transition strategies encompassing technical, economic approaches, age and gender imperatives.

Keywords: Employment, local economic development, income, small-scale commercial farming

DEDICATION

To my father Fannuel Muzekenyi, my late mother Romance Muzekenyi and my beloved siblings Edward Muzekenyi and the late Emily Taruvinga, I am grateful for the vision you saw in me and supported ever since my childhood. Thank you for your continued support which gave birth to a visionary and dedicated economist. I dedicate this work to you and I am forever grateful for the journey I have walked with you.

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ABBREVIATIONS

ABBBEE	Agricultural Broad-Based Black Economic Empowerment
AFASA	African Farmers Association of South Africa
AFGRI	African Agriculture
AGRA	Alliance for a Green Revolution in Africa
AgriSETA	Agriculture Skills Education Training Authorities
ASI	Agricultural Sustainability Institute
ASSAF	Academy of Science of South Africa
AU	African Union
APAP	Agricultural Policy Action Plan
BSA	Brand South Africa
CAADP	Comprehensive Africa Agriculture Development Programme
CASP	Comprehensive Agricultural Support Programme
DAFF	Department of Agriculture, Forestry, and Fisheries
DCGTA	Department of Cooperative Governance and Traditional Affairs
DRDLR	Department of Rural Development and Land Reform
ECOSOC	Economic and Social Council
ESCAP	Economic and Social Survey of Asia and the Pacific
FAO	Food and Agriculture Organization
GDPRD	Global Donor Platform for Rural Development
GHS	General Household Survey
GrainSA	Grain South Africa
IFPRI	International Food Policy Research Institute
KPMG	Klynveld Peat Marwick and Goerdeler
LTA	Limpopo Tourism Agency
MAFISA	Micro Agricultural Financial Institutions of South Africa
MALA	Ministry for Agriculture and Land Affairs
MDGs	Millennium Development Goals
MPG	Mpumalanga Provincial Government
NGOPULSE	Non-Governmental Organisation Pulse
NDP	National Development Plan
NEPAD	New Partnership for Africa's Development
NYDA	National Youth Development Agency

PMG	Parliamentary Monitoring Group
PHIP	Post-Harvest Innovation Program
PEA	Production Efficiency Analysis Model
PEAM	Production Efficiency Analysis Model
QLFS	Quarterly Labour Force Survey
SARS	South African Revenue Services
SDGs	Sustainable Development Goals
SEDA	Small Enterprise Development Agency
StatsSA	Statistics South Africa
SFA	Stochastic frontier analysis
TE	Technical Efficiency
UNCTD	United Nations Conference on Trade and Development
UNDA	United Nations Development Agenda
UNDESA	United Nations Department of Economic and Social Affairs
UNEDESA	United Nations Educational, Science and Cultural Organisation
UNDP	United Nations Development Programme
USD	United States Dollar
UNSDKP	United Nations Sustainable Development Knowledge Platform
VDM	Vhembe District Municipality
WDI	World Development Indicators
ZAR	South African Rand
ZHPFSP	Zero Hunger Programme and Food Security Policy

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1. Introduction

In this chapter, the introduction is presented to set the scene for the study. The introduction which covers the background of the study and the problem statement is presented, followed by the significance of the study. The objectives, research questions and conceptual framework are presented thereafter, followed by the organisation of the study, operational definitions of key terms and words used in the study.

1.2. Background

Achieving meaningful local economic development, especially in rural areas, remains a challenge in developing economies (Food and Agriculture Organisation (FAO), 2016b). Across the globe, poverty, unemployment and hunger persist with considerable social and economic costs in rural areas where people are primarily dependent on agriculture (World Bank, 2018). In 2000, approximately 35% (2.2 billion people) of the world's population were highly dependent on peasant farming, and 80% of this populace was living in extreme poverty (United Nations Department of Political Affairs (UNDP), 2017). The number was reduced to 766 million in 2013, which translates to a 65% reduction in the world's impoverished population (World Bank, 2019). The most successful regions in poverty reduction were Europe, North America and Australia (FAO, 2016b; World Bank, 2019). However, poverty, unemployment and hunger remained chronic in Africa, mainly in the sub-Saharan region. In 2013, the World Bank revealed that 68% of the population in sub-Saharan Africa was still living in extreme poverty and highly dependent on peasant farming (Adenle *et al.*, 2016). Thus, peasant farming remained the primary source of livelihood for rural households (UNDP), 2017). The initial focus of peasant farming for rural households was to seek self-sufficiency, but this concentration shifted to market motives (Abdu-Raheem & Worth, 2011).

The evolution of peasant farming into small-scale commercial farming was first noticed in Asia after the Green Revolution Programme was instigated, and small scale agribusinesses became one of the top development agendas (Arik, 2015). In Africa, the recognition of small-scale commercial farming was demonstrated in 2014 (the year of family farming) (Casazza & Chulu, 2016; Alliance for Green Revolution in Africa (AGRA), 2017). The recognition of small-scale commercial farming as a sustainable avenue for local economic development has been influenced

by several arrays such as social, economic and political factors in Africa (Ferreira, 2015). Adenle *et al*. (2016) argued that small-scale commercial farming as a strategy to reduce poverty, unemployment, and hunger became the most discussed issues in regional agricultural conferences. Most African states are committed to supporting small-scale commercial farming as a sustainable strategy for building the economic future of this continent (AGRA, 2017). While there are a lot of positive connotations for small-scale commercial farming, providing evidence regarding the benefits in local economic development can play an essential role in formulating comprehensive growth policies.

1.3. Small-Scale Commercial Farming Development

Small-scale commercial farming is regarded as an important strategic subsector for rural development (FAO, 2017). Correspondingly, the number of rural households practising small-scale commercial farming is fast increasing, making agribusiness one congruent subsector for meaningful rural development in sub-Saharan Africa (AGRA, 2017). This shows that the future of rural economies in developing economies is highly dependent on small-scale agriculture to reduce poverty, unemployment and hunger. Large-scale commercial farmers are thriving in rural areas, but they only cater for more significant markets such as national and international markets. As such, small-scale commercial farming can bridge the gap by catering to local markets.

As reported by FAO (2018), large scale commercial farmers are using the latest technology, which gives them a comparative advantage over small-scale commercial farmers. The use of modern technology in large-scale commercial farming increases production efficiency but have a downside which is increased unemployment (Charmes, 2019). In this regard, an increase in the number of small-scale commercial farmers, who are lanbour intensive leads to increased employment creation (Adenle *et al*., 2016; Nesengani *et al*., 2018; Plessis, 2019). Furthermore, developing small-scale commercial farming subsector requires fewer investments as compared to the large scale commercial farming sector. Small scale commercial farming sub-sector seems to have economies of scale in terms of the availability of cheap labour (Kirsten and Sihlobo, 2019). An increase in small-scale commercial farming is advantageous for rural development since it can act as a redistribution arm to rural poverty through employment creation and income generation. As such, supporting small-scale commercial farmers may help to achieve local economic development in rural areas.

In South Africa, the number of smallholder farmers evolving into commercial farming has been increasing ever since 2014 (Department of Agriculture Forestry and Fishery (DAFF), 2016a). The Agricultural census report in 2018 revealed that the number of small scale commercial farmers increases by 61% from 57 980 in 2013 to 95 476 in 2018 in South Africa (Kirsten & Sihlobo, 2019). This could be a response to the commitment by the government of South Africa to develop rural areas through supporting small scale commercial farming, in line with the Malabo Declaration (Department of Rural Development and Land Reform (DRDLR), 2016). In this regard, small-scale commercial farmers are perceived to be part of the solution for high rates of unemployment, poverty and food insecurity in rural areas (Aliber & Mdoda, 2015; Adenle *et al.,* 2016).

Micro Agricultural Financial Institutions of South Africa (MAFISA), Comprehensive Agricultural Support Programme (CASP) and LIMA-Rural Development Foundation have been instigated supporting small-scale commercial farming in rural areas (DAFF, 2018; DRDLR, 2018a). As reported by DAFF (2018), small-scale agribusinesses received funding from the government, and the most successful provinces are Mpumalanga (30%), Kwazulu Natal (36%) and Limpopo (42%). Limpopo Province received more support amongst the provinces, and the number of small-scale agribusinesses initiated increased in the past five years (Statistics South Africa (StatsSA), 2018). The Agriculture census report revealed that in Limpopo province, mainly Waterberg and Vhembe District Municipality (VDM) contributed 34,93% and 29,86% respectively to the total Limpopo District Gross Domestic Product (Lowder *et al*., 2016; Nesengani *et al*., 2018). This follows the upsurge of the number of small-scale commercial farmers evolving into agribusinesses, given the fact that agriculture still dominates in VDM.

The support given to this sub-sector to fulfil local economic development objectives makes it crucial to learn more about these farmers. Thus, to substantiate the role played by the government to reduce extreme poverty and unemployment in rural areas, it is fundamental to understand how economically viable small-scale commercial farmers are in rural economies (Adenle *et al*., 2016; Agriculture Outlook, 2018). For these reasons, the primary focus of the study was to estimate the economic contribution of small-scale commercial in local economic development.

1.4. Statement of Research Problem

Increases in the unemployment rate, inequality and poverty in rural areas of South Africa make small-scale commercial farming an attractive option to improve the livelihoods of the rural populace (Nesengani *et al*., 2018; Plessis, 2019). The recent attention by the government to fund small-scale commercial subsector is evident that these farmers are believed to have the potential of bringing various socio-economic benefits such as employment creation, income generation and food production for local economic development (FAO, 2018; Khoza *et al.,* 2019). The National Department of Rural Development and Land Reform (DRDLR) together with its strategic partners invested around R120 million towards supporting small-scale farming subsector development in 2017 (DAFF, 2018; DRDLR, 2018). Small-scale commercial farming was considered as part of the Rural Development Program (RDP), and Post-Harvest Innovation Program (PHIP) aiming at reducing poverty, unemployment and increase income-generating systems (Louw, 2018; Nesengani *et al*., 2018). However, the consideration to involve small-scale commercial farming as a means of supporting local economic development is based on partial knowledge of the actual contribution to the rural economy that exists in VDM. The current level of the economic contribution, challenges faced by these small-scale commercial farmers and their level of production efficiency (technical efficiency) are not fully known which makes it difficult to formulate sound agrarian policies.

Regardless of the unavailability of statistics regarding these farmers, the number of agribusinesses in rural-based provinces in South Africa continues to increase (StatsSA, 2018). Thus, having a more in-depth understanding of efficiency levels coupled with the contribution to the local economic development of these farmers necessitated conducting this study.

1.5. Significance of the study

The primary focus of the study was to estimate the contribution of small-scale commercial farming to the local economic development economy in VDM. Little is known regarding the economic viability of small-scale commercial farmers for local economic development in rural areas. Therefore, building a deeper understanding of this subsector may not only lead to well informed eloquent agrarian policies by policymakers but makes it easier to implement such policies. The objectives of the National Development Plan (NDP) 2030, Agenda 2063, Zero hunger 2030 and SDGs (1,2 and 8) are linked to local economic development with significant emphasis on employment creation, reducing poverty and hunger and growing an inclusive economy (American University of Cairo (AUC), 2015; Adenle *et al*., 2016; Bruinsma, 2017). In the context of rural-

based districts such as VDM, major work on the issues of local economic development has been mainly focused on small-scale agriculture. There are various strategies implemented, but there is still a gap between the conceptualisation of local economic development and the potential role of small-scale commercial farming. Therefore, the study estimated the efficiency, economic contribution and identified entrepreneurial challenges to emphasize the significant needs, opportunities and priorities involved in strengthening support for rural farmers. Farmers and extension agriculture officers can benefit from the study since challenges limiting growth and entrepreneurial skills lacking in this subsector were identified and reported through comprehensive feedback sessions.

1.6. Aim and Objectives of the Study

The study aimed to estimate the contribution of small-scale commercial farming to the rural economy in the VDM of South Africa. To achieve this aim, the following were the specific objectives of the study;

i. To characterize the small-scale commercial farming enterprises in VDM.

ii. To measure technical efficiency levels of small-scale commercial farming enterprises in VDM.

iii. To measure the economic contribution of small-scale commercial farming enterprises in VDM.

iv. To identify the economic challenges faced by small-scale commercial farming enterprises in VDM.

1.7. Research Questions

The fundamental question answered was whether the small-scale commercial farming in rural South Africa contributes to income generation and job creation, thereby contribute to rural economic development. Thus, to address the foregoing issues, the following research questions were addressed;

i. What are the socio-economic characteristics of small-scale commercial farming enterprises in VDM?

ii. What is the level of technical efficiency for small-scale commercial farming enterprises in VDM?

iii. What is the economic value of small-scale commercial farming enterprises to the rural economy in VDM?

iv. What are the entrepreneurial challenges faced by small-scale commercial farming enterprises in VDM?

1.8. The Conceptual Framework of the Study

Farming Enterprise Budget concept was adopted as the framework that guided the study. The concept is a list of all estimated income and expenses associated with a specific farm enterprise to provide an estimate of its profitability. The concept is production centred as it shows the inputs used by the farmer, how these inputs are converted into output and the processes used to reach the desired outcome. This concept is divided into three successive stages, namely the input stage (stage one), production stage (stage two) and output (stage three).

Stage one entails how the farmer employs different types of inputs. These inputs range from land, labour, pesticides, animal feeds and seeds depending on which type of farming is practised. There are three types of farming which the study concentrated on namely livestock, crop and mixed farming within the small-scale commercial farming band. In this stage, a farmer is expected to act rationally in terms of gathering and allocation of resources. As mentioned by Booyens and Hart (2018), in the input stage, the farmer is expected to be resource gathering efficient. Thus, proper planning is expected from the farmer because the optimal use of resource identification should be the priority in this stage. Consequently, once resources are gathered, a farmer is expected to employ the resources into farming, and this conversion differs depending on which type of farming is the farmer practising. In this regard, the study could be able to identify critical resources which enable productive farming hence estimation of the resource allocative efficiency of the farmer.

Stage two presents the production phase were different inputs gathered in stage one is used to perform various agrarian activities such as land preparation, planting seeds or seedlings, applying chemicals, weeding and later harvest. All these processes require optimal use of resources; hence the farmers are also expected to act rationally. This stage allows the study to measure technical efficiency, which is the effectiveness of the farmer to use minimum resources and maximize

output. Thus, producing maximum output from a minimum quantity of inputs enables the study to estimate how efficient the farmer is bearing in mind the type of farming practised.

Stage three is regarded as the output stage. This is a critical part of the current research. In this stage, farm outputs are expected to be maximized. Once production is done or the farming season reaches harvesting time, several outcomes should be expected. First, the farmer is expected to harvest and sell the produce in local, national or international markets. In this regard, the study makes use of a farm budget enterprise model to estimate the profits or loss of the farmer in monetary value. Second, farm output has several indicators which enable the study to estimate the technical efficiency of the farmer which is the state at which all goods and factors of production are optimally allocated hence waste is eliminated or minimized. Thus, technical efficiency is a concept used to measure productivity. Thus, the study focused on employment creation imperatives, farm expenses, and income generated as the critical parameters to estimate the economic contribution of small-scale commercial in rural areas. Further clarity on the contribution will be explained in chapter two.

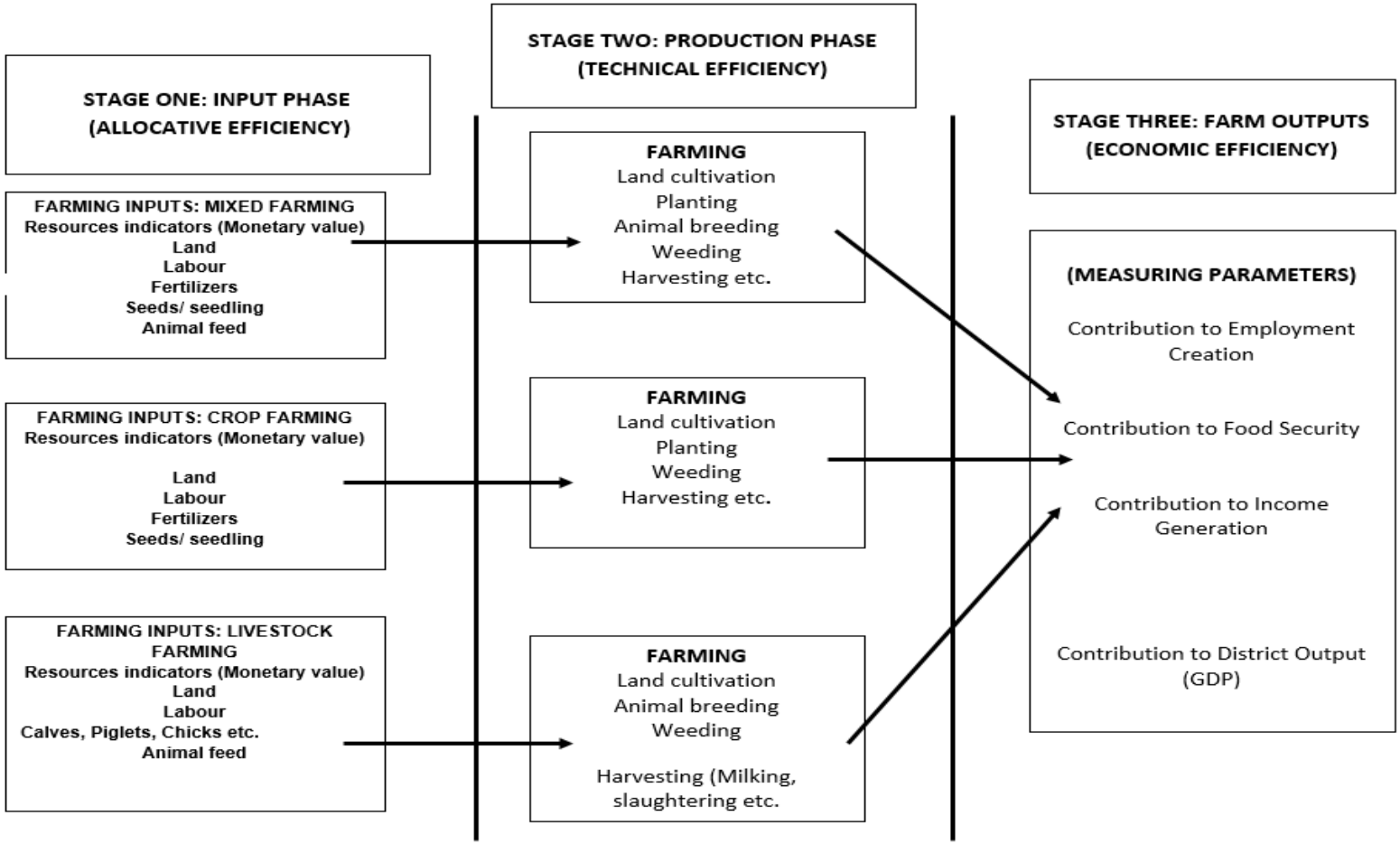

Figure 1.1: Small-scale commercial farming Conceptual Framework

Source: The United Nations Educational, Scientific Culture Organisation (UNESCO) (2009)

1.9. Operational Definitions of Key Terms and Concepts

Estimation refers to a scientific process of finding an approximation, which is a value or outcome that is usable for some purpose even if input data may be incomplete, uncertain, or unstable (Deeks *et al*., 2019).

Economic contribution refers to the gross change in economic activities associated with an industry, event, or policy in an existing regional economy that can be attributed to a given area. This covers the gross change in employment creation, the use of new productive resources and increase in food security within a specified area (Towse & Hernandez, 2020).

In this study, *Small-scale commercial farming* refers to the production of crops and livestock on small pieces of land mainly for the market within livestock, crop or mixed farming system (Lonah, 2019). As such, small-scale commercial farming was used interchangeably with small-scale agribusinesses

Local economic development refers to the process of improving the economic well-being of people living in rural areas. It involves the improvement of human welfare through employment creation, income generation and food security through small-scale commercial farming (Larnyoh, 2019).

Technical efficiency refers to the effectiveness of the farmer with which a minimum given set of inputs is used to produce maximum output (Fernandez-Blaanco *et al*., 2019).

1.10. Outline of the Thesis

This thesis is organized as follows:

Chapter one: This chapter consists of the background of the thesis, problem statement, research questions, objectives, the significance of the study, conceptual framework, and operational definitions. This chapter gives an overview of the purpose of the study.

Chapter two: In this chapter, relevant theoretical and empirical literature concerning small-scale commercial farming sub-sector were revealed. Also, the gap in the literature was identified, which formed the basis of the study.

Chapter Three: In this chapter, the research methodology that is, the target area, population, the research design, sampling techniques, data collection and analysis (methods, techniques, and tools) were presented. Also, ethical consideration and expected outcomes were covered in this section. Furthermore, this chapter covered the model specification and explained critical variables included in the model. Also, a farm enterprise budget model was clearly shown and briefly explained, given the objective of the study.

Chapter Four presents the analysed data on characteristics of small-scale commercial farmers in VDM.

Chapter Five measures the production efficiency for small-scale commercial farming in VDM**.**

Chapter Six measures the economic value of small-scale commercial farmers to the rural economy in VDM

Chapter Seven covers the presentation of results on economic challenges and entrepreneurial constraints faced by small-scale commercial farmers in VDM.

Chapter Eight provides a synthesis of the research, recommendations and areas of further studies.

1.11. Chapter Summary

This Chapter has provided a synopsis of the thesis by highlighting the background of the thesis on agriculture from an international perceptive to the local scenario. The thesis problem statement was then specified based on the background information obtained. Thesis objectives, research questions, the rationale of the thesis, conceptual framework and organization of the thesis were covered thereafter. The subsequent chapter covered the literature review in which both theoretical and empirical literature regarding small-scale commercial farming was revealed.

References

Abdu-Raheem, K. and Worth, S., 2011. Household food security in South Africa: evaluating extension's paradigms relative to the current food security and development goals. South African Journal of Agricultural Extension, 39(2):pp. 91-103.

Adenle, A., Manning, L. and Azadi, H., 2016. Agribusiness innovation: A pathway to sustainable economic growth in Africa. Trends in Food Science and Technology, 59 (2) pp: 88-104.

Alliance for Green Revolution in Africa, 2017. *The Business of Smallholder Agriculture in Sub-Saharan Africa.* [Online] Available at: https://agra.org/wp-content/uploads/2017/09/Final-AASR-2017-Aug-28.pdf [Accessed 11 April 2019].

Agriculture Outlook, 2018. BFAP Baseline agricultural outlook 2018 - 2027,BFAP, Pretoria.

Aliber, M. and Mdoda, L., 2015. The direct and indirect economic contribution of small-scale black agriculture in South Africa. Agricultural Economics Research, Policy and Practice in Southern Africa, 54(2): pp. 18-37.

Arik, M., 2015. Economic Impact or Contribution: Essays on Business and Community Relations. 2nd ed. London: Lexington Books.

American University of Cairo, 2015. *Agenda 2063.* [Online] Available at: https://www.un.org/en/africa/osaa/pdf/au/agenda2063-framework.pdf [Accessed 19 August 2019].

Booyens, I. and Hart, T., 2018. Innovation in a Changing South Africa: Extant Debates and Critical Reflections. Springer Link, 162(4):pp. 269-277.

Bruinsma, J., 2017. *World Agriculture: Towards 2015/2030.* 1 ed. Routledge, London.

Capstick, M., 2020. The Economics of Agriculture. 2nd ed, Routledge, Axon.

Deeks, J., Higgins, J. and Altman, D., 2019. Analysing data and undertaking meta-analyses. In: J. Higgins, et al. eds. Cochrane Handbook for Systematic Reviews of Interventions, Second Edition: Wiley Online Library, London.

Casazza, A. and Chulu, O., 2016. "Aligning the Sustainable Development Goals (SDGs) to the National Development Plan, Towards domestication of the SDGs in South Africa, Johannesburg: Wits School of Governance.

Charmes, J., 2019. Trends and Characteristics of the Informal Economy and Its Components. 2nd ed, Springer, Cham.

Department of Agriculture Forestry and Fishery, 2016. Abstract of Agricultural Statistics. [Online] Available at: http://www.daff.gov.za/Daffweb3/Portals/0/Statistics%20.pdf [Accessed 9 September 2017].

Department of Agriculture Forestry and Fishery, 2017. DAFF and Marine Living Resources Fund on their Annual Performance Plan; DPME input, with Minister. [Online] Available at:

https://pmg.org.za/committee-meeting/24290/?via=cte-menu [Accessed 5 September 2017].

Department of Rural Development and Land Reform, 2016a. Rural development and the economic upliftment of the lives of South African Rural communities. [Online] Available at: www.drdlr.gov.za [Accessed 25 July 2017].

Fernandez-Blaanco, V., Rodreguex-Alvarez, A. and Wisniewska, A., 2019. Measuring technical efficiency and marginal costs in the performing arts: the case of the municipal theatres of Warsaw. Springer Link: 43(2):pp. 97-119.

Food and Agriculture Organisation, 2016a. International Guideline on Securing Sustainable Small-Scale Fisheries.. [Online] Available at http://www.fao.org/fishery/ssf/guidelines/en [Accessed 15 August 2017].

Food and Agriculture Organisation, 2017. Water resource issues and agriculture. [Online] Available at: http://www.fao.org/3/t0800e/t0800e0a.htm [Accessed 16 July 2019].

Ferreira, T., 2015. Does Education Enhance Productivity in Smallholder Agriculture: Causal Evidence from Malawi, Stellenbosch University, Johanessburg.

Khoza, T., Senyolo, G., Mmbengwa, V. and Soundy, P., 2019. Socio-economic factors influencing smallholder farmers' decision to participate in the agro-processing industry in Gauteng province, South Africa. Journal of Cogent Social Sciences, 5(1): pp. 1-18.

Kirsten, J. and Sihlobo, W., 2019. Is South African agriculture dominated by big commercial farmers. [Online] Available at https://www.news24.com/Analysis/is-south-african-agriculture-really-dominated-by-big-commercial-farms-evidence-suggests-not-20190227 [Accessed 5 February 2020].

Larnyoh, K., 2019. An Assessment of the Implementation of the National Policy on Local Economic Development by District Assemblies in Ghana. Journal of Business and Economic Development, 4(1): pp. 1-10.

Lonah, M., 2019. Influence of Agro-pastoralism dynamics on food security among small scale farmers in chepareria division, west Pokot county, Kenya. [Online] Available at: http://erepository.uonbi.ac.ke/handle/11295/108626 [Accessed 12 August 2020].

Louw, D., 2018. The horticultural development plan for the Thulamela local municipality, OABS Development, Pretoria.

Lowder, S., Skoet, J. and Raney, T., 2016. The Number, Size, and Distribution of Farms, Smallholder Farms, and Family Farms Worldwide. World Development, 87(2016): pp. 16-29.

Nesengani, T., Mudau, M. and Neshandama, V., 2018. Contribution of food security projects on poverty alleviation to the communities of Limpopo Province, South Africa. *South African Journal of Agriculture Extension,* 44(1): pp. 113-119.

Towse, R. and Hernandez, N. T., 2020. Handbook of Culture Economics. [Online] Available https://www.elgaronline.com/view/edcoll/9781788975797/9781788975797.00033.xml [Accessed 12 August 2020].

Plessis, M. d., 2019. Agriculture: Facts and Trends in South Africa. [Online] Available at: http://awsassets.wwf.org.za/downloads/facts_brochure_mockup_04_b.pdf [Accessed 7 February 2020].

STATISTICS SOUTH AFRICA, 2017. Quarterly Labour Force Survey. [Online] Available at https://www.Statistics_South_Africa.gov.za/publications/P0211/P02111stQuarter2017.pdf [Accessed 23 May 2019].

United Nations Department of Political Affairs, 2015. A Regional Perspective on the Post-2015 United Nations Development Agenda. [Online] Available at: http://www.regionalcommissions.org/post2015regionalreport.pdf [Accessed 22 November 2017].

The United Nations Educational, Scientific Culture Organisation, 2009. Measuring the economic contribution of cultural industries. [Online] Available at: http://uis.unesco.org/sites/default/files/documents/measuring-the-economic-contribution-of-cultural-industries-a-review-and-assessment-of-current-methodological-approaches-en_1.pdf[Accessed 6 September 2017].

World Bank, 2018. Agriculture Finance and Agriculture Insurance. [Online] Available at: http://www.worldbank.org/en/topic/financialsector/brief/agriculture-finance [Accessed 23 June 2019].

CHAPTER TWO: REVIEW OF LITERATURE

2.1 Introduction

In this chapter, a review of the literature regarding the rationale around small-scale commercial farming enterprises and its pivotal role in rural areas is presented. Considering the recent renewed attention given to small-scale commercial farming after the International Year of Family Farming in 2014, it is fundamental to understand this type of farming from a global perspective. To clearly understand the role of small-scale commercial farming on economic development, the study reviews the Local Economic Development Strategy (LEDS) Framework in Vhembe District Different concepts and programmes designed to promote rural development through small-scale commercial farming were also reviewed. The empirical literature on scale-scale commercial farming at both the national and international level was also reviewed. It is essential to define small-scale commercial farming according to South African literature vs international narration. A transparent reflection of a considerate depiction of small-scale commercial farming is explained in the following subsection. LED Strategy from a global perspective is reviewed in the following section.

2.2. Local Economic Development

Local Economic Development (LED) has taken the centre stage in development economics mainly in rural areas. The processes by which local governments and businesses make use of resources to generate income sustainably and improve the welfare of local citizens has been a mandate in emerging countries (Alibasic, 2019; Malizia *et al*., 2020). In the bid to alleviate poverty and unemployment, LED is about creating jobs, securing livelihoods, managing local resources and improving infrastructure (Malizia *et al.,* 2020). Thus, LED has taken the centre stage in development economics for both developed and developing countries.

In China, the imbalances and divergences in its economic development as caused by geographical differences, led to the government focus on LED strategies which are driven in local communities (Zheng *et al*., 2016). Considering the transition of China's industrial base has created chances for local governments to create job opportunities through local economic development. Thus, the promotion of integrated employment creation led to the development promotion to economic growth hence became the top priority of China's government.

Subsequently, the rise of China's economy is attributed to good economic reforms which in turn led to the initiation of trade liberalization which was maintained by strong policy reforms (Kroeber, 2020). In this regard, China's economic reforms for local development has positively contributed to its real GDP growth. Nguyen (2020) state that innovation in local economic development became a top priority through comprehensive economic planning in China. As such, the government invested in skills development and business growth for both small, medium and large businesses.

In the United States of America, local economic development is mainly centred on the provision of incentives which constitute essential aspects of urban development economic policies (IvyPanda, 2019). The main aim of the USA development agenda under the Trump administration is to develop the so-called underdeveloped cities and communities (IvyPanda, 2019). In the government in the USA provides enticements for financial development in different ranks which includes homes and state echelons to countrywide ranks (Schrock & Wolf-Powers, 2019). This shows that the efforts in the USA economy to develop its cities are mainly focused on improving the urban level of industrialisation through the facilitation of property value growth. Thus, the key goal of offering development incentives (local financial enticement) is to foster economic development in certain targeted cities. IvyPanda (2019) further stated that the use of government incentives in industrial development helps in employment creation in the underdeveloped cities.

Employment creation is also supported through cost-effective mechanisms of inducing economic growth in underdeveloped urban areas. While local economic development in urban areas is centred on the provision of industrial incentives, in rural areas, inter-municipal and interstate economic competition are the focus in the USA. Inter-municipal and interstate economic competition has greatly intensified local economic development in rural-bases economies in the USA. The economic competition led to the local governments in rural areas plunging so deeply into marketing themselves to receive business investments (Leigh & Blakely, 2016). As such, the USA rural local development ideology is focusing on creating employment through inter-municipal and interstate economic competition. The business investments are also extended to supporting entrepreneurship through the provision of financial support to create employment and improve industrial development (Halseth & Ryser, 2019). While local economic development is centred on improving, the industrial base is the USA urban and rural communities, other developed countries such as Canada, German and Spain used different development avenues. In Germany, economic promotion approaches are centred on poverty alleviation through community-based groups in

economic development (Bikwibili *et al*., 2019). Sustainable development is further extended to a community-based approach in which local authorities are mandated to contribute to the rise of Germany's industrial development. As stated by Bikwibili *et al.,* (2019) the government in Germany fosters for local self-government to improve regional economic policies and promote public economic development in the three-tier systems in Germany.

In Spain, a general policy approach is used to enable local and regional development which is mainly centred on financing development from Inter-Territorial Compensation Funds and Regional Incentives Programme (OECD, 2019). The National Ministry in co-operation with the National Framework of Rural Development as stated European Network for Rural Development (ENRD) (2019) is mandated to;

i. Prioritise investments to improve climate change and innovation schemes
ii. Prioritise investments in the EU development Programmes in urban areas,
iii. The approval and supporting Spanish Urban Development projects,
iv. To improve the streamlining and sustainability of Local Governments in the service delivery by local public sector
v. Support the European Agricultural Fund for Rural Development (EAFRD) and 17 Rural Development Programmes

The abovementioned strategies have several common goals which are to alleviate poverty, create employment and sustainable economic development in urban and rural economies (ENRD, 2019). Thus, urban and rural development approaches in Spain are part of a broader framework of European Structural and Investment Funds (ESI Funds), including also Regional Development, Social, Cohesion, and Fisheries Funds (OECD, 2019). Thus, local economic development in Spain is a multi-faceted development agenda which also integrates the rural economy into national development policies to improve livelihoods at the same time sustainable economic development. Similar approaches are practised in emerging economies in Africa such as Egypt, Nigeria, Kenya and South Africa. Most emerging countries place importance on activities in the cities, district and local economies which are directly or indirectly linked to socio-economic development (Fan *et al*., 2019). As such, the majority of these countries put policies which adds more to micro-economic development measures at local level aiming at supporting the macro-economic measures such as employment creation, income generation and poverty alleviation (Meyer, 2019). In this regard, the approach used involves small to large businesses, residents, the private sector and the government at large.

South Africa as one of the emerging economies in Africa, intends to maximise the economic potential of all municipalities. As mentioned in the report by Cooperative Government and Traditional Affairs (COGTA) (2019) South African municipalities together with its citizens work together to enhance the resilience of the macro-economic growth. Thus, the focus is placed on increasing local economic growth, poverty alleviation and employment creations. In this regard, local economic development points to the fact that economic and political jurisdiction in all local municipalities is usually the most effective place for economic intervention (Leigh & Blakely, 2016). This is in line with Rogerson (2020) who stated that local economies are the most appropriate place for economic intervention as it permits accountability and transference in development activities. As such, COGTA (2019) started areas in which LED provides support in economic development which are;

- Development and review of national policy, strategy and guidelines on LED;
- Assisting with LED capacity building processes;
- Providing direct and hands-on support to provincial and local government;
- Management and Technical Support to Nodal Economic Development Planning;
- Management of the Local Economic Development Fund, and
- Facilitating the coordinating and monitoring of donor programmes.

The above-mentioned areas are implemented in either similar or different ways as local economies usually have different policies, planning processes and implementation plan. This is since South Africa has nine provinces which vary in population, economic setups and conditions (Meyer, 2019). Each province is composed of districts which further subdivides into local municipalities. For instance, Gauteng is subdivided into six districts, North West province four districts and Limpopo province into five districts (Mphahlele *et al.,* 2019; Gavhi *et al*., 2020). Each district has its own LED strategy which speaks to poverty alleviation, job creation and local economic growth. The LED strategies are guided by the National Framework for Local Economic Development (NFLED) which is the overall outline in South Africa (Malizia *et al*., 2020). Furthermore, the NFLED is designed to stimulate economic development in local municipalities in South Africa (Department Provincial and Local Government (DPLG), 2020). Thus, the objectives of the NFLED are to;

- To shift towards a more strategic approach to the development of local economies and overcome challenges and failures in respect of instances where municipalities themselves try to manage a litany of non-viable projects or start-ups.
- To support local economies in realising their optimal potentials and making local communities' active participants in the economy of the country.
- To elevate the importance and centrality of effectively functioning local economies in growing the national economy.
- To wage the national fight against poverty more effectively through local-level debates, strategies and actions.
- To improve community access to economic initiatives, support programmes and information
- To improve the coordination of economic development planning and implementation across government and between government and non-governmental actors.
- To build greater awareness about the importance and role of localities and regions which globally are playing an increasingly significant role as points of investment facilitated by supportive national policies.

In line with the above-mentioned objectives especially objective ii which aims at supporting local economies in realising their optimal potentials, rural-based districts have been in the centre of development in South Africa. Tourism and agriculture sectors have been pinpointed as strategic sectors for local economic development (DPLG, 2020). These sectors are expressed as domicile in rural areas where poverty and unemployment are increasing. As stated in the vision for District Rural Development Plans, all spatial and sector plans for Limpopo province point to agriculture and tourism as the hearts of economic transformation (Rural Development and Land Reform (RDLR), 2016).

In line with objective v which aims at improving community access to economic initiatives, support programmes and information, Limpopo province was accorded the local economic development pilot projects to alleviate triple challenges of poverty, unemployment and lack of service delivery (Nhemachena *et al*., 2015). As such, Limpopo province has been challenged to improve the livelihoods of its citizens as the province has also been acknowledged as unique due to its population dynamics and economic development (RDLR, 2016). Since agriculture is one of the leading sectors, districts such as Vhembe has been expressed as an ideal district to link agriculture and local economic development. Vhembe District has a good production of citrus, macadamia, avocado, litchi, banana and garlic (Humbulani, 2018). Furthermore, Vhembe District

has also been recognised as an economic potential for trade and commerce (RDLR, 2016). To this end, the vision for rural economic development in Vhembe District is shared and espoused in National Development Plan (NDP), Agriculture Policy Action Plan (APAP) and the Comprehensive Rural Development Plan (CRDP) (DPLG, 2020).

In line with Vhembe District agriculture, the sector is dominated by large scale commercial farmers who produce not less than 4.4% of South Africa's total agriculture output and are characterised as labour intensive (Humbulani, 2018; DPLG, 2020). Large scale commercial farmers are prolific fresh produce growers with large scale exports. While that is the case in large scale commercial farmers, small-scale commercial farmers produce and sell much of their products in local markets. According to a report by Vhembe District Municipality (VDM) (2020), small-scale agriculture has been included in the District's LED Strategy. The inclusion of small-scale farmers in alluded to the fact that the farmers can contribute positively to employment creation, food security and income generation for households in the district. Considering the increase in the number of these farmers as revealed in the GHS by StatsSA (2018), the LED strategy least is known about these farmers. As such, it is imperative to understand more about what characterises small-scale commercial farmers, what is the current level of production and how much are they contributing to the GDP of Vhembe District. To answer these questions, the study sought to understand more about small-scale commercial farming as expressed in the following subsections.

2.3. Defining Small-Scale Commercial Farming

Several definitions for small-scale commercial farming have been developed around the globe. Land size, farm ownership, methods of farming and market motives are some of the features used to defining small-scale commercial farming in a different place. Thus, it is important to have a common understanding of this type of farming.

2.3.1. Understanding small-scale commercial farming: Global perspective

The concept of small-scale commercial farming is contingent on national and regional economic conditions, and it is difficult to have a single definition on an international context. What is considered as small-scale commercial farming varies from one continent to another? A farmer who is using ancient farming methods instead of modern technology is considered small in Europe

(Klynveld *et al*, 2012; Hilson, 2016). In Asia, a farmer who operates on small pieces of land and highly depended on traditional methods is regarded as a small-scale farmer. This is not how small-scale commercial farming is defined as in Africa. Methods of farming used and land size are mainly used to describe small-scale commercial farmers in Africa (Food and Agriculture Organisation (FAO), 2016a).

Farming in Asia and the Pacific region is characterised by diverse family farming, predominantly small-scale and subsistence farmers (FAO, 2016b). This region has the most significant number of family farms which accounts for at most 74 % of the world family farming (FAO, 2016a). The commonly used term to describe a wide range of small-scale commercial farming, subsistence and peasant farming in Asia and the Pacific is family farming (AGRA, 2017). Due to diverse farming methods, family farming is adequately characterised by how agriculture is managed and operated by a family who relies on family capital, labour (FAO, 2016a). Subsequently, Abdul-Salam and Phimister, (2016) state that family farming in Asia is linked to agricultural production, which co-evolve with producing for family consumption and sell the surplus. These are some of the significant characteristics used to define small-scale commercial farming (family farming) in Asia and the Pacific. Furthermore, several studies in literature focus on land size and farming methods to define a wide range of small-scale commercial farmers in this region (Bureau for Food and Agricultural Policy (BFAP), 2018). Because agriculture is regarded as the prime engine of growth in this region, family farming is barely profit orientation but producing to meet diverse households needs. As such, the scope of family farming in this region is a combination of livestock, fodder crops, grain crops, vegetables and forestry all focused on satisfying family needs. Family farming extends to the production of silkworms, poultry production and fish farming (Lowder *et al*., 2016). As mentioned by Hison (2016), sustaining farm productivity is one dimensional which are to meet diverse family needs such as food and income.

In Africa, small-scale farming forms most rural agriculture and is practised on small pieces of traditional lands using traditional methods (Hasan, 2015). FAO (2017) states that small-scale commercial farming is generally characterized by intensive labour and the use of animal traction, limited use of agrochemicals, technology and supply to the local or nearby marketplaces. Unlike large-scale commercial agriculture, small-scale commercial farming plays a dual role of being a source of domestic food security as well as income from the sale of excess farm produce (AGRA, 2017). Economically, small-scale commercial farming is considered a significant source of income and employment for rural dwellers since these farmers are labour-intensive. Furthermore, some

farmers in Africa are highly dependable on government support for inclusive farming (Adenle *et al.,* 2016). This shows that small-scale commercial farmers are regarded as major players in food security and income generation. Countries such as Kenya, Nigeria, Tunisia, Uganda and Morocco have been supportive of rural small-scale commercial farming over the past decade (NEPAD, 2018; Organisation for Economic Corporation and Development (OECD), 2019). Consequently, another challenge limiting defining these farmers is land ownership. Small-scale commercial farmers are known to be occupying small farms on freehold, and community land. As such, defining small-scale farming from an African context is primarily based on different characteristics such as land size and ownership, type of farming, farming methods and motive of farming.

In South Africa, small-scale commercial farmers are defined as intensive producers of livestock, poultry, fish and crops on small pieces of land using prehistoric and semi-modern technology (Bennett *et al.,* 2015; AGRA, 2017). South Africa has approximately 2.76 million hectares of cultivated land, and nearly 1.45 million hectares (53%) of this land is used for commercial farming mainly by two broad categories of farmers which are small-scale and large-scale farmers (Agriculture Skills Education Training Authorities: Agri SETA, 2015; DAFF, 2016a; Cousins, 2016; FAO, 2016b). In Limpopo province, a total of 468 494 households are involved in small-scale commercial farming (DAFF, 2016b; StatsSA, 2017). This shows that small-scale commercial farming is the backbone of rural households. The current understanding of the role played by small-scale commercial farming in the rural economy is incomplete. The need to update existing knowledge and to assess the role of small-scale commercial farming in bringing about a significant rural development is an ongoing concern. Small-scale commercial farming, however, is classified under small businesses which are expected to contribute to fundamental socio-economic issues, such as jobs, poverty alleviation, economic stability and to be a thriving economic tool in rural areas (Oyeranti & Olayiwola, 2005; Azadi *et al.*, 2016; Olivier, 2016).

Against this background, a reflective exposition of different approaches used to develop small-scale commercial farming is worthily clarified. This follows the belief that there is no standard definition for small-scale commercial farming from across the globe. Limiting the definition for small-scale commercial farming may not give a true reflection of who this farmer is in the context of agribusiness. Should small-scale commercial farming be defined in terms of land size, if so, what differentiates between small and large scale? Also, small-scale commercial farming is defined differently in various statistical systems, and there are different indicators revealed in the study. These indicators are not limited to production structures, turnover and standard gross

production, hamper the international comparisons. As such, these questions are not addressed in the current literature. However, to fulfil such potential, the need arises to understand small-scale commercial farming from a rural background persist.

2.4. Characteristics of Small-scale commercial farmers in Rural Areas

The size of the land and farming methods have become a general concept to define small-scale commercial farmers. Several definitions were observed in different regions across the globe, and the majority of authors covered different aspects of small-scale commercial farming hence created the gap in the literature regarding small-scale commercial farming. In the livelihood analysis within the small-scale commercial farming framework, household demographics play an important role in understanding diversity in this farming production (Pienaar and Traub, 2015). Social relations such as gender, education level and farming systems form the central critical elements for characterizing small-scale commercial farmers. These variables inevitably govern the performance of small-scale commercial farming. The size of the land occupied by these farmers is one of the most used features to describe small-scale commercial farming (Page and Sunjo, 2017). This follows a common practice across rural households who convert the backyards of their homes into farming land and produce for the market. Burnete *et al,* (2015) assert that small-scale commercial farmers are usually producing on small pieces of land less than 10 hectares. Khapayi and Cellers (2016) state that the size of the land used to grow different crops and types of livestock farming kept are used to characterised small-scale farmers.

The type of agriculture practised depends on several factors, such as geographical location, rainfall patterns, and available resources. For instance, Fris and Nielsen (2016) mentioned that small-scale commercial farmers are a day to day and all year round producers whose decisions rely mainly on geographical location and climatic conditions. In terms of technology, Azad (2016) state that many small-scale commercial farmers practice agriculture using traditional methods and less technology due to high costs. Also, Sirajuddin *et al.* (2017) revealed that many small-scale commercial farmers are reluctant to adopt more advanced technology due to high purchasing, installation and maintaining costs. A substantial number of small-scale commercial farmers are labour intensive (AgriSETA, 2010; FAO, 2016a). Thus, human capital has been the most used asset by many of these farmers due to the availability of cheap family labour as a result of unskilled elderly rural populace in the agriculture sector.

This view spanned into a common understanding that youth participation in small-scale commercial farming is low. Larson *et al.* (2016) mentioned that youth are reluctant to be involved in agriculture activities which also contributes to high levels of youth unemployment in rural areas. Devising strategies to attract youth participation may yield far-reaching results since the majority of farmers are approaching retirement age and therefore, the need for new skills and the young generation may improve this sector. Agarwal (2018) states that the main challenge leading to low youth participation is with regards to ownership of farming. Since the majority of small-scale commercial farmers emerged from all other types of farming such as smallholder farming, youth are not proprietors of the Sirajuddin *et al.* (2017). Small-scale commercial farmers are perceived as producers who sell most of their produces in local markets and use some for family consumption (AGRA, 2017). Thus, limited market scope exerts high competition for the small market share since large scale commercial farmers usually sell high-quality products and due to economies of scale, they often undercut prices making it more difficult for small-scale agribusinesses to compete with them (Amadeo, 2017; Agarwal, 2018).

At this point, several inferences may be deduced. First, small-scale commercial farming has been, to a greater extent defined in terms of land size. Small-scale commercial farmers are identified by the farming methods they use and to some extent, the production motives. Production motives are generally linked to producing for the market. Furthermore, these farmers are defined by the amount of product measured in monetary terms. However, these definitions may not clearly define small-scale commercial farming from a rural perceptive. Because these farmers are evolving from survivalist farming into commercial farming, different characteristics may arise, and it is imperative to understand the nature of small-scale commercial farmers in rural areas. Thus, Table 2.1 summarizes small-scale commercial characteristics in rural areas.

Table 2.1: Characteristics of small-scale commercial farming in rural areas

	VARIABLES	CHARACTERISTICS	SOURCE
DEMOGRAPHIC AND SIZE OF THE LAND USE	Size of the land used for farming	Less than 10 hectares	(DARD, 2016; Leoper *et al.*, 2016)
	Gender	Partially female and mostly male farmers	(Pienaar and Traub, 2015)
	Education level	No Formal education	(Leoper *et al*. (2016)
	Location	Peripheral areas	(Hilson, 2016; DAFF, 2016a)
TYPE OF AGRICULTURE PRACTISED	Livestock farming (Dairy and meat farming)	Practised throughout the year	(Leoper *et al.* 2016; Macaskill, 2017)
	Crop production	Seasonal farming, Practised throughout the year for commercial purposes	(Hilson, 2016)
	Mixed farming	Practised throughout the year and some use irrigation systems	(Hilson, 2016; Ndlovu, 2017)
PLANTING AND HARVESTING	Cropping Patterns	Irregular, row	DAFF (2016a)
	Harvesting frequency	Daily, seasonal	DAFF (2016b)
SOCIO-ECONOMIC AND INSTITUTIONAL CHARACTERISTICS	Aggregate output	Not known	None
	Economic role	Not known	None
	Technology	Tradition methods highly depended on rain-fed production	Sirajuddin *et al.* (2017); Chauke *et al.,* 2013; Azad (2016)
	Distribution Patterns	Haphazard	(DARD, 2016)
	Financial assistance	Family contributions and government handouts	(DAFF, 2016b; DRDLR, 2016; Tshilowa, 2016)
	Factors of production	Leased land, communal land and own capital	(Meliko *et al.,* 2012; Sirajuddin *et al.* (2017); Ndlovu, 2017)
	Labour source	Family and community members	
	Record keeping	Some times	(Academy of Science of South Africa (ASSAF), 2016)
PRODUCTION CAPACITIES	Markets	Domestic and partially national markets	(NGOP, 2012)
	Profit margins	Less profits acquired	(Mapedza *et al*., 2016)

2.5. Small-Scale Commercial Farming Efficiency

There are several fundamental factors which are documented in literature as instrumental in the determination of the capacity level of production practices and efficiency of small-scale commercial farming. These factors are significant inputs for production processes of small-scale commercial farming in rural areas. Because small-scale commercial farmers rely on traditional farming methods, issues revolving land size, quality of human capital, use of natural resources and capital investments are the critical determinants of production processes and estimating technical efficiency in this subsector.

The use of human capital and ancient farming methods in production processes of small-scale commercial farming has been an integral part of this subsector (ASSAF, 2016). There are several other inputs which are very crucial factors in farm production, and these depend on the composition of the population (Muyanga *et al.*, 2014). Factors such as the level of farming education and training, farm experience, work ethics and the state of health of the rural populace are essential for productive farming in marginalized areas (Lunner-Kolstrup & Ssali, 2016). Thus, productive farming highly depends on the ability to combine the above-mentioned inputs, external investments such as government hand-out and the use of modern technology. Klerk *et al*. (2013) conducted a study on the importance of agriculture support and the use of technology in small-scale farming in South Africa, and the results revealed that the quantity of liquid capital is very crucial for developing rural farming. However, the use of modern technology was found to be minimal. Small-scale commercial farming requires strategies to introduce technology depending on the production system available.

Considering the significant evolution in technology, Bruinsma (2017) and Gordon (2018) identified technology as a crucial factor for productive farming in rural areas. Under the 2030 Agenda for Sustainable Development, increased investments, including through enhanced rural infrastructure, agriculture research and extension services and technology development were found to have expansionary effects on economic growth (Bruinsma, 2017). Thus, rural farming technology can be one factor that can lead to enhanced agriculture productive capacity in developing countries (Gordon, 2018). The goal for developing agriculture and attaining sustainable growth can be achieved if the combination of the above-mentioned resources is used efficiently. In this regard, understanding how productive these farmers help to find ways to improve rural farming through the amalgamation of the above-mentioned resources. Technical

efficiency is regarded as the effectiveness of a firm or economy producing the highest level of output given a set of resources (Ajibefun *et al*., 2016). However, to clearly understand production efficiency and ways to improve productivity in small-scale commercial farming, the following section reviews the literature on the technical efficiency of small-scale commercial farming.

This section reviews different literature and traces the proposed methods used to measure efficiency in small-scale farming in emerging economies. These studies focused mainly on technical and economic efficiency for small-scale commercial farmers across the globe. The current study focuses mainly on empirical literature on technical efficiency.

2.5.1. Small-scale Commercial Farming Technical Efficiency

Small-scale commercial farming productivity is essential in development economics for emerging countries (Musaba & Bwacha, 2014). Several studies assessed the technical efficiency in small-scale agri-businesses in different economies across the globe.

Maliza *et al.,* (2007) conducted a review study on the productivity, technical efficiency and farm size in Paraguayan agriculture. The review was focused on assessing the relationship between farm size and productivity of smallscale farmers in Paraguayan agriculture. The data collected was analysed using nonparametric and parametric methods to derive technical efficiency measures. The results revealed that small farmers operating at less than five hectares had higher net farm income per hectare and more technically efficient in terms of production as compared to larger farmers operating at more than ten hectares of land. The study, however, did not reveal the socio-economic characteristics and production processes used and the contribution to local economic development. As such, this calls for further research to identify what constitutes small-scale farmers in terms of production processes, economic contribution and challenges impeding growth in this sub-sector.

First, Musaba and Bwacha (2014) assessed technical efficiency of small-scale maize production in Masaiti district in Zambia. Maize is a major staple food crop in Zambia and is predominantly produced by small-scale agribusinesses in rural-urban agriculture. Structured questionnaires were used to collect data from 100 randomly selected maize producers in Masaiti district in Zambia. Descriptive statistics and a stochastic frontier production function approach were used to analyse the data. The results from the estimated stochastic frontier Cobb-Douglas production

function revealed that fertilizers, maize seeds and land size were the significant factors that affected maize production. Furthermore, the results on efficiency analysis indicated that farm-level technical efficiency ranged between 52.2% and 93.2% with a mean of 79.6%. As such, Musaba and Bwacha (2014) revealed that there is room to increase maize production by 20.4% if farmers can use technology in Masaiti district. However, Musaba and Bwacha (2014) limited the scope to improve efficiency to technology, yet other factors such as fertilizers, maize seeds and land size could be used to improve production efficiency. As such, this creates a gap in the literature, and there is a need to investigate how to land size and maize seeds can be used to improve production efficiency in small-scale agribusinesses.

Second, Itam and Ajah (2015) assessed the technical efficiency of small-scale cassava farmers in Cross River State in Nigeria. Cassava crop is one of the most consumed tubers in Nigeria. Itam and Ajah (2015) used the stochastic production frontier to analyse the technical efficiency of small-scale cassava farmers in Cross River State. A multi-stage random sampling technique was used to select 200 cassava farmers from Ikom and Ogoja Agricultural zones in the State. Structured questionnaires were used to collect data and a stochastic production function, using the Maximum Likelihood Estimating (MLE) technique, was used in estimating the farmer's technical efficiency and their determinants in the study area. Itam and Ajah (2015) computed a mean technical efficiency of 89% for the cassava farmers. Correspondingly, age and gender of the farmers were found to have a negative effect on cassava production technical efficiency. However, education, family size, farming experience and farm size had a positive influence on the farmer's technical efficiency. As such, Itam and Ajah (2015) suggested that policies which encourage experienced and educated farmers, especially women, to continue in cassava farming were recommended. However, limiting the scope of the study to only Cassava farming may not give a clear reflection on the overall small-scale farming spectrum. There is a need for further investigation on overall efficiency in the small-scale farming spectrum.

Third, Ajibefun *et al.* (2016) conducted a study on the technical efficiency of small scale farmers in the Ondo State of Nigeria. The study employed a stochastic frontier production function to check the functionality of rural and urban farmers. Data were collected from 200 food crop farmers using structured questionnaires. Different statistical analysis methods where employed and the results revealed that crop farmers from rural and urban centres had wide differences in the socio-economic and production inputs. Farmers from rural centres were found to have relatively larger farms as compared to urban farmers. However, urban farmers were found to have better access

to production inputs such as fertilizers. In terms of technical efficiency, rural-based farmers had a mean technical efficiency of 0.66 as compared to urban farmers who computed a mean of 0.57. Ajibefun *et al.* (2016) further revealed that the level of education, farming experience and size of land had a negative effect on technical inefficiency for both rural and urban farmers. Though the study managed to measure technical efficiency for rural and urban farmers, the challenges faced by these farmers and their contribution to rural and urban development is not known. As such, the need to uncover the socio-economic challenges and the role small-scale farmers play to local economic development is of paramount importance.

Fifth, Pindiriri *et al.* (2016) assessed the impact of drought on technical efficiency for small-scale farmers in Hurungwe, Zimbabwe. Zimbabwe has recorded a series of dry seasons in the past decade, and the most affected were small-scale farmers in rural areas. As such, Pindiriri *et al.* (2016) used cross-sectional data collected from randomly selected 411 small-scale farmers. Stochastic frontier method (SFM) was used, and the findings revealed that there is a low level of technical efficiency for small-scale commercial maize producers in Hurungwe. A mean average of 45,3 % technical efficiency was attained for irrigation maize producers, and farmers in drought-prone areas attained an average of 19 % technical efficiency. Thus, Pindiriri *et al.,* (2016) stated that drought experience, education, farming experience, modern methods of forecasting and access to credit contributed positively to productivity for irrigation maize producers hence high technical efficiency. As such, Pindiriri *et al.,* (2016) suggested that there is the need to improve productivity for small-scale maize producers through building irrigation infrastructure in drought-prone areas or by reallocating farmers to wet ecological areas. Also, Pindiriri *et al.,* (2016) further suggested that the construction of irrigation infrastructure and enable financial inclusion of rural farmers through the development of rural financial institutions could increase productivity in rural areas.

Several studies were reviewed, and it can be deduced that the majority of small-scale agribusinesses are technically inefficient. This shows that there is room for improvement given literature reviewed in the current study. However, limiting productive farming to how farmers may maximise output using the least amount of resources may not give a clear reflective assessment for improving production capacity for small-scale commercial farming. Understanding how these farmers can increase output without affecting the given level of inputs (scarce resources) however, is fundamental to increase small-scale commercial farming productivity. Thus, the study further assessed technical efficiency in small-scale agribusiness in several developing countries.

2.5.2. Small-Scale Commercial Farming Efficiency

Economic efficiency refers to an economic state of a business in which every resource is optimally allocated to serve each individual or entity in the best way at the same time minimizing wastes and inefficiency (Biam *et al.,* 2016; Mack, 2017). Farming productivity is centred on the ability to use available resources optimally, and this is linked to the skills attributed to the farmers on how efficiently they use available resources. Thus, the current study reviewed several studies in the following sub-sections.

First, Eaj (2016) assessed the economic efficiency of small-scale soyabean farmers in the central agricultural zone, Nigeria. The study employed a Cobb-Douglas stochastic frontier cost function approach to measuring the level of economic efficiency and its determinants in the small-scale soyabean production in Central Agricultural Zone of Nigeria. A multistage sampling procedure was used, and a total of 485 soya bean farmers were selected. From this sample, input-output data and the prices of inputs and output were obtained using the cost-route approach. The parameters of the stochastic frontier function were obtained using the maximum likelihood method. The analysis revealed that average economic efficiency was 52 per cent and age, farm size and household size were found to be negatively and significantly related to economic efficiency at 5 and 1 per cent. Education, farming experience, access to credit and fertilizer use in the production were significantly and positively related to economic efficiency. No significant relationship was found between economic efficiency, extension contract, and membership of farmers' association. Thus, the Eaj (2016) recommended that policies which will increase farmers' economic efficiency level, should be targeted at improving their educational levels and easy access to credit and fertilizer, while experienced farmers should also be encouraged to remain in soya bean farming.

Second, Adeyemo *et al.* (2010) examined the efficiency of cassava production in Odeda Local Government of Ogun State in Nigeria. A random sample of 200 cassava producers was taken and subjected to budgetary and stochastic frontier analyses. The results indicated that 90% of the farmers were male and more than 53% were above 50 years of age. Landholding by inheritance was dominant at about 78%. The gross margin and profit were N105, 775 and N95. 738,10 respectively. Cost ratio of 1.8 and a percentage profit of 80% indicated that cassava farming was profitable in Ogun State. Total variable and labour costs were 91.6% and 68.2% of

the total cost respectively. The return to scale was 1.024. Farm size was 0.771 hectares and quantity of planting stakes was 0.203 and significant ($p \leq 0.01$) affected cassava production. Furthermore, age and farming experience contributed to technical inefficiency while the cost of fertilizer, cost of herbicides, membership of cooperative and level of education enhanced technical efficiency. The efficiency of cassava growers ranged between 88.69 and 100 with a mean of 89.4. Eventually, Adeyemo *et al.* (2010) concluded that cassava production was highly profitable in the area and farmers operated with maximum efficiency given the current technology. Farmers were advised to reduce labour costs and thus increase the profit margin.

Third, a study by Biam *et al.* (2016) on the economic efficiency of small-scale soyabean farmers in Central Agricultural Zone in Nigeria, employed the Cobb-Douglas stochastic frontier cost function to measure the level of economic efficiency and its determinants in small-scale soyabean production in Central Agricultural Zone of Nigeria. A multistage sampling procedure was used to select 485 soyabean farmers in the Zone in 2010. From this sample, a cost-route approach was used to obtain the input-output data and the prices. The parameters of the stochastic frontier function were obtained using the maximum likelihood method. The result of the analysis showed that average economic efficiency was 52%. Furthermore, the study found age, farm size and household size to be negatively and significantly related to economic efficiency at 5 and 1%. Education, farming experience, access to credit and fertilizer use were significantly and positively related to economic efficiency. No significant relationship was found between economic efficiency and extension contact and membership of farmers' association. In conclusion, Biam *et al.* (2016) recommended that policies that increase farmers' economic efficiency level should be targeted at improving farmers' educational levels and easy access to credit and fertilizer, while experienced farmers should be encouraged to remain in soyabean farming.

Fourth, Debele *et al.* (2015) conducted a study on the production efficiency of maize farmers in Ethiopia. The study used a multi-stage sampling technique to select 385 household heads. Data was collected using interviews and a structured questionnaire during 2013/2014 production year. Estimated, technical, allocative and economic efficiency using a parametric stochastic frontier production function (Cobb-Douglas). Furthermore, a two-limit Tobit regression model was used to analyze data, and the results showed that the mean technical, allocative and economic efficiency score was found to be 62.3, 57.1 and 39%, respectively. Debele *et al.* (2015) indicated that there was a substantial level of inefficiency in maize production. The results also depicted that several essential factors affected technical and economic efficiency are family sizes, level of

education, extension service, cooperative membership, farm size, livestock holding and use of mobile. Debele *et al.* (2015) suggested that the government should motivate and mobilize the youth in agricultural activities, invest in the provision of primary education and facilitate the necessary materials, strengthen the existing agricultural extension system, organize non-member farmers in cooperative association and due attention should be given to enhance the efficiency of farmers with large landholding size. Furthermore, government and stakeholders should promote the expansion of mobile networking in the study area.

Economic efficiency is a state at which all goods and factors of production in an economy or business are distributed or allocated to their most valuable uses, and waste is minimised (Eaj, 2016). Farmers should be trained on resource management so that they can be able to reduce the use of other less essential resources in favour of the most critical ones in farming. Various authors analysed technical efficiency for different small-scale farmers in different places. Majority of the studies conducted concentrated on a single type of farming that limits the scope to few farming types such as rice and maize growers. The need to investigate technical efficiency for all types of farming in one study is essential for policy formulation. They are considering the increase in the number of small-scale commercial farmer's development. Also, the consideration of small-scale commercial farmers in national development strategies for developing countries calls for research on how best these farmers can be assisted, and this includes assessing the overall productivity for all types (crop, mixed and livestock farmers) without limiting the scope to only one type of farming.

Furthermore, resource management is critical for the success of small-scale commercial farming in urban and rural areas. However, identifying entrepreneurial skills lacking in agribusinesses is fundamentals for the success of small-scale commercial farming. Additionally, helping these farmers to improve productivity is one crucial strategy, but it is not enough to improve rural agribusinesses by giving them resources. Hence the need to single out critical areas in which these farmers play a significant role necessitates the review of literature on the economic contribution from these farmers.

2.6. Contributions of Small-scale Commercial Farming to local economic development

The number of family farming producing for the market has increased over the past decade, and this is an indication that these farmers are capable of contributing to rural areas in developing economies. Existing statistical systems on small-scale commercial farming are organized generally by type of farming which can be crop farming, mixed, pastoral or stock breeding which in turn provides different information regarding the influence these farmers exerts in rural economies. FAO (2016b) stated that several regions across the globe are characterized by a dualism between market-oriented small-scale farmers and those mainly producing for household consumption. Thus, the existence of these farmers has been acknowledged and supported by several governments as an answer to chronic global challenges such as food insecurity, poverty and unemployment (Azadi, 2016; AGRA, 2017).

2.6.1. Contribution to Food Security

FAO (2017) and UNDP (2019) acknowledged the fact that small-scale farmers are contributing to household food security. This follows the rising population and shift in increasing global demand for food, yet food production is increasingly compromised by climate change (Proctor, 2014). FAO (2017) indicated that millions of small-scale commercial farmers were able to successively feed themselves and the broader communities around them. Given the fact that the majority of these farmers grow drought-resistant crops and traditional methods of farming can produce food for millions across the globe. In Brazil, small-scale commercial farmers are growing different range of products which are sold to day-care centres, hospitals and community associations at a cheaper price (Proctor, 2014). In other countries especially in developing economies, accurate data is not available, but it is feasible to say that small-scale commercial farmers provide a significant share of food supplies to domestic markets in marginalized areas (UNDP, 2017). Small-scale commercial farmers are considered active in low-value chains where there is an absolute advantage in direct sales or supply food (Abdul-Salam & Phimister, 2016). Thus, being active in low-value chains clearly shows that small-scale commercial farmers can cater for immediate food demands in rural areas.

2.6.2. Contribution to employment

Small-scale commercial farmers can contribute to employment creation and contribute to local economic development (UNDP, 2017). This perception follows the United Nations report on the importance of small-scale agribusiness. The report revealed that the majority of the rural populace is employed in small farms, and they form the largest band of cheap labour in rural economies (FAO, 2016b). As mentioned by Proctor (2018), most jobs in rural areas are provided by small-scale commercial farmers irrespective of large-scale commercial farmers influence in employment creation. Several studies agree that the majority of the rural employed labour force consists of temporary or permanent employed on small-scale farms. Glover and Kusterer (2016) and Chinamasa, (2017) mentioned that since there are several agribusinesses (crop, livestock, mixed) which co-exist and operating in small pieces of land, these are able to absorb manual labour in numbers hence creating multi-activity employment in rural areas. In South Africa, StatsSA (2014) revealed that agriculture is one of the largest sectors with the employment of more than 50% of the working population in rural areas. Against this background, the use of human capital has been considered the most feasible and cost-effective method in rural farming. Khapayi and Cellers (2016) state that it is easy to be employed in the agriculture sector because of less sophisticated skills required. As such, the development of agriculture sector may lead to more jobs created hence reducing the rate of rural unemployment.

2.6.3. Contribution to income generation

Small-scale commercial farming is generally recognized as legal entities which can create income for its employees or the business (South African Revenue Services (SARS), 2017). Thus, increased productivity in the small-scale commercial farmers is positively correlated to lead to more income, which in turn contributes to the household ability to stimulate the economy. Congruently, an increase in the number of small-scale commercial farmers can generate more taxable income which can be channelled towards poverty reduction and the implementation of other social programs such, as healthcare aids and social grant support. However, according to Adenle *et al.* (2016), agribusinesses can generate income since farmers can serve in the immediate markets and can adjust quickly to market demands. Furthermore, small-scale commercial farmers are considered as significant job creators in rural areas Department of Agriculture and Rural Development (DARD), 2018). Thus, an increase in employers and employee's income means more disposable income for spending; hence, increasing the buying

power of the rural populace. Increase in income stimulates spending, and it improves general living standards and conditions (Adeyemo *et al*., 2010). More so, the income can be reinvested into farming for growth, and this may lead to rural development.

2.6.4. Contribution to Infrastructure Development

The existence of roads, bridges and water bodies such as dams are enablers of the growth of businesses. Thus, the presence of such infrastructure stimulates investments and small-scale commercial farming being one of the leading businesses in rural areas have influenced government and private sector investment into infrastructure development (Mazibuko, 2018). The agricultural cooperatives among rural communities usually develop roads (Abdu-Raheem and Worth, 2011). Thus, infrastructure assists the entire community as it provides public services and goods. Globally, studies on development economics have found significant gains in public and private sector output, resulting from public infrastructure investment (Aliber & Mdoda, 2015). Furthermore, Mazibuko (2018) highlights that well-designed infrastructure investments have the potential to stimulate economic growth, productivity and land values. This shows that small-scale commercial farmers are capable of contributing to rural development.

The above-mentioned contributions emphasize the significant needs, opportunities and priorities involved in strengthening support for small-scale commercial farming. Thus, promoting small-scale commercial farming enables collaboration across regions on common issues regarding farming. However, it is fundamental to better assess and systematize existing data so that there is clear evidence of how much contribution is coming from this sub-sector in rural areas. Identify regional agrarian and global transformations and linked poverty, unemployment patterns call for systematic statistics on the role played by small-scale commercial farming. Regional policies and national development processes should be guided by evidence-based facts that small-scale commercial farming is capable of meeting development objectives. In the literature, there are partial quantified data and pointers which enable proper policy formulation for the development of small-scale commercial farming. As such, no detailed conclusion regarding how productive small-scale commercial farming is in a rural economy can be drawn in this regard. Further research is required, which focuses on providing quantified evidence regarding how effective small-scale commercial farmers are to the rural economy. Furthermore, the need to understand the challenges faced by small-scale commercial farmers can help in creating sustainable policies for agribusinesses in rural areas.

2.7. Challenges faced by small-scale commercial farmers in rural areas

Whilst South Africa is endowed with diverse natural resources, and the economy is facing a challenge of the skewed distribution of income and natural resources (Nwonwu, 2016). The imbalance in the distribution of productive resources affects rural agrarian development as compared to urban development (Long, 2016). More so, South Africa is facing chronic challenges such as inequality and poverty, and this is more prevalent in marginalized areas (Stull *et al.,* 2016). KPMG (2012) posits that agriculture sector in developing economies has been resisting the global economic challenges[1], and this is mostly attributed to the fact that agricultural demand is relatively inelastic and therefore less vulnerable to economic conditions. However, despite the survival of the Agriculture sector under stringent economic conditions, the sector has little room for small-scale commercial farmers to development (Khapayi and Cellers, 2016). Agricultural science scholars (Chauke *et al*., 2013; Mpandeli & Maponya, 2014) highlighted that inadequate access to productive resources, market access and transport costs are significant constraints for small-scale commercial farmers' development. Also, DRDLR (2016) postulates that large-scale farming has been shadowing the recognition for small-scale commercial farming sub-sector mostly in marginal areas. Thus, there is no plausible and distinct support available to assist disadvantaged small-scale commercial farmers (Chikazunga & Paradza, 2016). Similarly, Chauke *et al.* (2013) point to a lack of access to credit as one major constraint faced by small-scale commercial farmers. This is elaborated in the following sub-section.

2.7.1. Lack of access to credit

Credit[2] is considered an essential instrument for improving the welfare of the poor, directly through consumption smoothening that reduces their vulnerability to short-term income (Chauke *et al.,* 2013). Lack of access to factors of production, including credit, is a significant challenge faced by small-scale commercial farmers and has been one major limiting factor that is hindering growth (Khapayi & Cellers, 2016). Small-scale commercial farmers are financially constrained, and Chauke *et al.* (2013) also assert that many small-scale commercial farmers will not flourish if the government does not intervene. For instance, this type of farming originates from subsistence farming which depends on natural resources. As such, the only probable source of finance is via

[1] Global recession and increased food prices (KPMG, 2012).

[2] The ability of an individual to obtain goods, services and money before payment, based on the mutual trust that payment will be made in the future (Evans *et al.,* 2017).

access to credit (Khapayi & Cellers, 2016). However, financial intermediaries have not been able to accommodate small-scale rural farmers because it is risky, costly, and a difficult task which is associated with high transaction costs (Kitui, 2016). Apart from credit constraints, many commercial farmers are highly depended on erratic rain-fed agriculture.

2.7.2. Highly dependent on erratic rain-fed agriculture

According to KPMG (2012), rainfall is considered an essential resource for sustainable agriculture and with no viable substitute. With recent global climatic changes, small-scale commercial farmers have been facing a daunting task in farming as water is becoming a scarce commodity (Ascher & Mirovitskaya, 2017). Ever since the advent of agriculture, small-scale commercial farmers have been relying on erratic rain-fed agriculture and are therefore severely affected by water shortages (Misra, 2014). As noted by Hadebe and Mabhauchi (2017), rainfall has been one primary natural resource for agriculture and its development. In South Africa, provinces such as Limpopo, Free State, and Mpumalanga have a long dry spell season accompanied by arid soils in some parts (DAFF, 2013). Thus, small-scale commercial farmers in these provinces depend on erratic rainfalls which have negatively contributed to poor planning which, leads to inadequate crop production (DAFF, 2013; Hadebe & Mabhauchi, 2017).

2.7.3. Weak economic growth

Economic growth is positively correlated with business growth (Samila and Sorenson, 2017), and one leading indicator of economic growth is business development (Bravo-Biosca *et al.,* 2016). Recent statistics from StatsSA show that South African economic growth has decreased so as business progress, mainly in rural areas (Patridge and Wagner, 2016). Most small businesses in rural areas are within the agriculture sector, and most of them have been on the negative in the past decade. Agricultural sectors' contribution to GDP dropped, and the sluggish economic growth negatively affected this sector (Samila & Sorenson, 2017). A vibrant and expanded agricultural sector is a critical component of the overall economic growth, rural development, and land reform programme especially when the economy is going through the recession (DAFF, 2013; Rwelamira, 2015; Bravo-Biosca *et al.*, 2016). However, the case is different from small-scale commercial farming as the number of farmers participating in this sector is increasing (StatsSA, 2017). Also, the recent evolution in the technological world contributed to the slow agricultural

growth from the grassroots level (Hilson, 2016). Hence, the effect of technology on small-scale commercial farming development is fundamental.

2.7.4. Inadequate technology and access to productive resources

Agricultural technology around the globe has received overwhelming support on all levels of agrarian production internationally (Adenle *et al*., 2016). Few small-scale commercial farmers adopted modern farming technologies, which resulted in easing the burden of hard labour and inadequate crop production (Adenle *et al*., 2016). Few developing countries such as South Africa, Sudan, and Burkina Faso adopted the use of genetically modified technology to grow different crops (Larson *et al., 2016*). However, Hilson (2016) states that a more significant number of small-scale commercial farmers in developing economies still use traditional methods in their production, unlike large-scale commercial farmers. For instance, large-scale farmers are using up-to-date technology, which contributes to quality farming and outstanding farm produce (Adenle *et al*., 2016). On the contrary, small-scale commercial farmers are facing a challenge of higher costs on technology since it is continuously developed, nearly at all levels of food production and distribution channels (FAO, 2017). Adenle *et al*., (2016) also mentioned that necessary, appropriate technology needed to improve farming production capacity at the grassroots level is very expensive, due to its sophisticated performance and appeal. The food challenge in Africa is volatile, and population changes have made many governments in Africa to encourage farmers at all stages to adopt technology in their production systems (Hilson, 2016). The adoption of technology may improve food security, for example, improved hybrid seeds and other growing technologies that boost productivity. However, the cost of technology is nontrivial in the African context, particularly in small-scale commercial farming.

2.7.5. Poor Soils

Meaza *et al.* (2016) stated that too many farmers in marginal areas practice farming on degraded land, which is of poor quality and where land tenure policies work against investment in agriculture. Soil fertility is found to play a significant role in crop production, and it forms the foundation of the food system (FAO, 2016b). Much of the fertile soil in marginal areas are occupied by large-scale commercial farmers in South Africa (Pollan, 2016). For instance, DAFF (2016b) mentioned that large-scale farming system which uses the most advanced production technology occupy approximately 70% of fertile land in Limpopo province. Thus, most small-scale

commercial farmers are in the mountainous and unfertile land. Also, few small-scale commercial farmers who are located on fertile land are facing a challenge of poor ploughing methods (Pollan, 2016). Poorly managed tillage has a detrimental effect on the soil as it causes a compaction layer which can lead to decrease in water infiltration and cause soil erosion of the top layer (Meaza *et al*., 2016).

2.7.6. Lack of institutional support and access to the market

Small-scale commercial farmers are naturally served by ineffective institutional support from institutions which do not consider that meaningful agriculture comes from small-scale commercial farming in the rural economy (Chinamasa, 2017). This usually results in an institutional framework that is unfriendly to small-scale commercial farmers. Public sector agricultural supporting institutions have limited experience with small-scale commercial farming which leads to inadequately training offered, poor financial and human resources support, and are backed by limited research capacity (Khapayi and Cellers, 2016). Also, the marketing of agriculture proceeds is essential for the agricultural industry as it plays a significant role in transferring products from the producer to the end-user (FAO, 2016a). Marketing in agriculture begins typically at the level of the individual small-scale farmer to large-scale farmers. However, Hlongwane *et al.* (2014) state that small-scale commercial farmers find it difficult to participate in output markets because of a range of constraints[3] and barriers. Similarly, Mpandeli and Maponya (2014) revealed that barriers to the market deprive small-scale commercial farmers to enjoy economic benefits such as high-income generation. The following sub-section covers empirical literature which attempted to measure productivity within small-scale commercial farming.

2.7.7. Internal and external constraints

Economic constraints, as stated by Amadeo (2017), are twofold (internal and external). An external constraint is some factors in an agribusiness's external environment that is usually out of the farmer's control. As for internal constraints, there are limitations directly linked to the internal environment, usually linked to the farmer’s control. Different scholars as inscribed below identified different limitations to agribusiness.

[3] Selling in bulk (Hlongwane, et al., 2014)

A study by Dawood (2017) analyzed the socio-economic determinant of loan acquisition among small-scale rice farmers in Benue State, Nigeria. Data collected were analyzed using descriptive statistics and the logit model. The result of the logit model shows that age, household size, education, farm size, membership of cooperative and annual income were significant factors affecting the likelihood of farmers access to a loan. Based on these findings, Dawood (2017) recommended that there should be a deliberate policy to ensure easy access to loans at a soft interest rate, while agricultural extension education on loan acquisition should be intensified. Thus, policy inconsistency and lack of proper education to acquire loans are some of the constraints faced by farmers.

Mpandeli & Maponya (2014) Khapayi & Cellers (2016) researched the issues and constraints faced by emerging farmers in South Africa. It is revealed that the specific limiting factors faced by emerging farmers are poor physical infrastructure such as poor roads. Furthermore, lack of marketing skills, farm management skills, access to information and high transaction costs, are the most important limiting factors. Dorward (2013) and Mpandeli & Maponya (2014) emphasised that lack of financial literacy, high inputs prices, scarce inputs and high transport costs as all-inclusive constraints faced by many small-scale commercial farmers. Some of these constraints are presented in Table 2.2.

Table 2.2 shows several constraints faced by small-scale commercial farmers. Supply of inputs has become a challenge due to high transportation costs, poor storage facilities, high input costs and high transaction costs. Furthermore, lack of information and inferior quality products are affecting small-scale commercial farming accessibility to the market. Ultimately, access to finance is becoming a daunting task due to the lack of creditworthiness and collateral security.

Table 2.2: Constraints faced by Small-scale Commercial farmers

Crucial Constraints	Related Challenges
Inputs Supplies	High input costs High transaction and transport costs Poor storage facilities
Market Accessibility	Poor-quality products and Low quantities Lack of market information Lack of storage facilities and transportation
Accessibility to finance	Credit unworthiness No collaterals Inability to develop bankable business plans
Skills	Lack of technical skills Lack of training facilities

Source: Chauke *et al*., (2013) and Khapayi & Celliers (2016)

2.8. Summary of the Literature Review

In this chapter, the literature on small-scale commercial farming was reviewed. Several definitions for this type of farming were identified. Whilst other regions use land size as the main characteristic to describe small-scale commercial farming, methods of farming and market motives used elsewhere. It can be concluded that there is no standard definition used to describe small-scale commercial farming across the globe. Subsequently, small-scale commercial farming has been identified as the vehicle for local economic development, mainly employment creation, food security and income generation. However, there is no evidence to support this claim in the literature. Since this sub-sector is dominating in rural areas were unemployment, food shortages and hunger challenges persist, there is a need to measure the production performance and contribution by small-scale commercial farmers to local economic development.

The reviewed empirical literature revealed that the majority of small-scale farmers are technically efficient and operate on small pieces of land of fewer than ten hectares. However, there are few studies identified the challenges limiting small-scale commercial farming development. Furthermore, the role of these farmers to local economic development is not fully known. To understand the economic role of small-scale commercial farmers, there is a need to estimate their contribution to employment creation, income generation and food security in rural areas. In line with this narrative, the study is conceptualized from the farming budget enterprise framework, which shows the type of inputs commonly used to produce output. The farming enterprise budget system also shows a multi-dimensional understanding of how the inputs are converted into output using specific methods. In so doing, it is possible to measure technical efficiency and quantify the output. The framework also gives pointers which can be used to identify entrepreneurial challenges and skills limiting production efficiency in small-scale commercial farming.

References

Abdul-Salam, Y. and Phimister, E., 2016. Efficiency Effects of Access to Information on Small-scale Agriculture: Empirical Evidence from Uganda using Stochastic Frontier and IRT Models. Journal of Agriculture Economics, 68(2): pp. 1-15.

Adenle, A., Manning, L. and Azadi, H., 2016. Agribusiness innovation: A pathway to sustainable economic growth in Africa. Trends in Food Science and Technology, 59: pp. 88-104.

Adeyemo, R., Oke, J. and Akinola, A., 2010. Economic Efficiency of Small-Scale Farmers in Ogun State, Nigeria. Triculture, 28(2): pp. 84-88.

Agarwal, B., 2018. Can group farms outperform individual family farms? Empirical insights. World Development, 108(2018): pp. 57-73.

Agriculture Skills Education Training Authorities, 2010. Sector analysis of Agriculture. [Online] Available at: http://www.agriseta.co.za/downloads/news/AGRISETA_Sector_Analysis_290610-version_2.pdf. [Accessed 9 December 2017].

Ajibefun, I., Daramola, A. and Falusi, A., 2016. Technical efficiency of small-scale farmers: An application of the stochastic frontier production function to rural and urban farmers in Ondo State, Nigeria. International Economic Journal, 20(1): pp. 87-107.

Alibasic, H., 2019. *Sustainability and Resilience Planning for Local Governments.* 2nd ed. Florida: Springer.

Aliber, M. and Mdoda, L., 2015. The direct and indirect economic contribution of small-scale black agriculture in South Africa. Agricultural Economics Research, Policy and Practice in Southern Africa, 54(2): pp. 18-37.

Alliance for Green Revolution in Africa, 2017. The Business of Smallholder Agriculture in Sub-Saharan Africa. [Online] Available at: https://agra.org/wp-content/uploads/2017/09/Final-AASR-2017-Aug-28.pdf [Accessed 11 April 2019].

Amadeo, K., 2017. Economies of Scale. [Online] Available at: https://www.thebalance.com/economies-of-scale-3305926 [Accessed 26 August 2017].

Ascher, W. and Mirovitskaya, N., 2017. Confrontations over Natural Resources. [Online] Available at: https://link.springer.com/chapter/10.1057/9781137555120_9 [Accessed 12 August 2017].

Academy of Science South Africa, 2016. Poverty reduction proceedings report, Academy of Science of South Africa, Pretoria.

Azadi, D., 2016. Genetically modified crops and small-scale farmers: main opportunities and challenges. Journal of Critical Reviews in Biotechnology, 36(3): pp. 434-446.

Bennett, R., Hosegood, V., Newell, M.-L. and McGrath, N., 2015. Understanding Family Migration in Rural South Africa: Exploring Children's Inclusion in the Destination Households of Migrant Parents. Wiley Online Library, 12(4): pp. 310-321.

Bezat, A., 2009. Comparison of the deterministic and stochastic approaches for estimating technical efficiency: The example of non-parametric DEA and parametric SFA methods. *Journal of Methods,* 10(9): pp. 20-29.

Biam, C., Okerie, A. and Nwibo, S., 2016. Economic efficiency of small scale soyabean farmers in Central Agricultural Zone, Nigeria: A Cobb-Douglas stochastic frontier cost function approach. Journal of Development and Agricultural Economics, 8(3): pp. 52-58

Bikwibili, H. et al., 2019. Towards a pro-community-based water resource management system in Northwest Cameroon: practical evidence and lessons of best practices. *GeoJournal,* 12(4): pp. 1-15.

Bravo-Biosca, A., Criscuolo, C. and Menon, C., 2016. What drives the dynamics of business growth? Oxford Academic Economic Policy Journal, 31(88): pp. 703-742.

Bruinsma, J., 2017. World Agriculture: Towards 2015/2030. 1 ed. Routledge, London.

Bureau for Food and Agricultural Policy, 2018. Agriculture Outlook 20018-2027. [Online] Available at: https://www.bfap.co.za/ [Accessed 14 July 2019].

Chauke, P., Motlhatlha, M., Pfumaramba, T. and Anim, F., 2013. Factors influencing access to credit: A case study of smallholder farmers in the Capricorn district of South Africa. African Journal of Agricultural Research, 8(7): pp. 582-585.

Chikazunga, D. and Paradza, G., 2016. Smallholder farming: a panacea for employment creation and enterprise development in South Africa. [Online] Available at: http://www.carnegie3.org.za/papers/48_Chikazunga_Small%20holder%20farming%20-%20a%20panacea%20for%20employment%20creation%20and%20enterprise%20development%20in%20SA.pdf [Accessed 9 August 2017].

Chinamasa, G. F., 2017. Zimbabwe's evolving farming systems: contract-farming and alternative. [Online] Available at: http://scholar.sun.ac.za/handle/10019.1/101952 [Accessed 24 August 2017].

CooperativeGovernmentandTraditionalAffairs, 2019. *Local Economic Development (LED).* [Online] Available at: http://www.cogta.gov.za/?page_id=162 [Accessed 13 August 2020].

Debele, S., Haji, J., Goshu, D. and Edriss, A.-K., 2015. Technical, allocative, and economic efficiency among smallholder maize farmers in Southwestern Ethiopia: Parametric approach. Journal of Development and Agricultural Economics, 7(8): pp. 282-291.

Department of Agriculture Forestry and Fishery, 2013. Trends in the Agricultural Sector. [Online] Available at: http://www.daff.gov.za/docs/statsinfo/Trends13.pdf [Accessed 12 August 2017].

Department of Agriculture Forestry and Fishery, 2017. DAFF and Marine Living Resources Fund on their Annual Performance Plan; DPME input, with Minister. [Online] Available at: https://pmg.org.za/committee-meeting/24290/?via=cte-menu [Accessed 5 September 2017].

Department of Provincial and Local Government, 2020. *Stimulating and Developing Sustainable Local Economies.* [Online] Available at: http://www.cogta.gov.za/led/wp-content/uploads/2013/07/National-LED-Framework.pdf [Accessed 14 August 2020].

Department of Rural Development and Land Reform, 2016. Mandate and Outcome 7. [Online] Available at: http://www.ruraldevelopment.gov.za/about-us/mandate-and-outcome-7#.WYhYiYVOJik [Accessed 8 August 2017].

Dorward, A., 2013. Agricultural labour productivity, food prices and sustainable development impacts and indicators. Food and Agriculture Policy, 39(2): pp. 40-50.

Duguleana, L., 2019. Forecasting the economic growth in Romania with the Cobb-Douglas production function. *Bulletin of the Transilvania,* 12(6): pp. 1-18.

Eaj, 2016. Economic efficiency of small-scale soybeans farmers in a central agricultural zone, Nigeria. A Cobb-Douglas Stochastic Frontier cost function approach. European-American Journals, 23(12): pp. 231-243.

Economic and Social Survey of Asia and the Pacific, 2016. Economic and Social Survey Of Asia And The Pacific. Nurturing productivity for inclusive growth and sustainable development. [Online] Available at:https://www.unescap.org/sites/default/files/Economic.

European Network for Rural Development, 2019. *Rural development in Spain.* [Online] Available at: https://enrd.ec.europa.eu/country/spain_en [Accessed 12 August 2020].

Evans, J., Allan, N. and Cantle, N., 2017. A New Insight into the World Economic Forum Global Risks. The economic Society of Australia, 36(2): pp. 185-197.

Fan, P., Ouyang., Z., Nguyen, DN., 2019. Urbanization, economic development, environmental and social changes in transitional economies: Vietnam after Doimoi. *Landscape and Urban Planning,* 187(2): pp. 145-155.

Food and Agriculture Organisation, 2016b. *Marketing and its role in economic development.* [Online] Available at http://www.fao.org/wairdocs/ilri/x5547e/x5547e16.htm [Accessed 9 August 2017].

Food and Agriculture Organisation, 2016b. *International Guideline on Securing Sustainable Small-Scale Fisheries.* [Online] Available at: http://www.fao.org/fishery/ssf/guidelines/en [Accessed 15 August 2017].

Food and Agriculture Organisation, 2017. *Water resource issues and agriculture.* [Online] Available at: http://www.fao.org/3/t0800e/t0800e0a.htm [Accessed 16 July 2019].

Fris, C. and Nielsen, J. O., 2016. Small-scale land acquisitions, Large-scale implications: Exploring the case of Chinese Banana investment in Northern Laos. *ScienceDirect,* 57(2), pp: 117-129.

Gavhi, F., Kuonza, L., Musekiwa, A. & Motaze, V. N., 2020. *Factors associated with mortality in children under five years old hospitalized for Severe Acute Malnutrition in Limpopo province, South Africa, 2014-2018: A cross-sectional analytic study.* [Online] Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0232838 [Accessed 13 August 2020].

Glover, D. and Kusterer, K., 2016. *Small Farmers, Big Business: Contract Farming and Rural Development.* 12th ed. New York: Palgrave MacMillan.

Gordon, I., 2018. *Reproductive Technologies in Farm Animals.* 2nd ed. Wallingford: Oxfordshire.

Hadebe, S. and Mabhauchi, T., 2017. Water use of sorghum (Sorghum bicolour L. Moench) in response to varying planting dates evaluated under rainfed conditions. Science, School of Agricultural, Earth and Environmental Sciences, 43(1): pp. 92-103.

Halseth, G. and Ryser, L., 2019. *Towards a Political Economy of Resource-dependent Regions.* 2nd ed: Routledge, New York.

Hasan, A., 2015. The Least Developed Countries Report 2015. [Online] Available at: http://www.unescap.org/sites/default/files/1-Aynul-UNCTAD_LDCR2015_3Dec15.pdf [Accessed 10 August 2017].

Hilson, G., 2016. Farming, small-scale mining and rural livelihoods in Sub-Saharan Africa: A critical overview. Journal of Extractive Industries and Society, Volume 3, pp. 547-563.

Hlongwane, J., Ledwaba, L. and Belete, A., 2014. Analyzing the factors affecting the market participation of maize farmers: A case study of small-scale farmers of maize farmers: A case study of small-scale farmers in greater Giyani Local Municipality of the Mopani District, Limpopo Province. African Journal of Agricultural research, 9(10): pp. 895-899.

Humbulani, M., 2018. Determinants of competitiveness among smallholder avocado farmers in Vhembe District of Limpopo Province, South Africa, Polokwane: University of Limpopo.

Integrated Development Plan, 2020. 2019/20 IDP REVIEW, Vhembe District, South Africa.

Itam, K. O. and Ajah, A. E., 2015. Technical Efficiency Analysis of Small-Scale Cassava Farmers in Cross River State, Nigeria: A Stochastic Production Frontier Approach. Cross River State, Research Gate.

IvyPanda, 2019. Local Economic Development Incentives in the US. [Online] Available at: https://ivypanda.com/essays/local-economic-development-incentives-in-the-us/#ivy-csf-section [Accessed 13 August 2020].

Junyong, I., 2017. Introduction of a pilot study. Korean Journal of anesthesiology, 12(4): pp. 601-605.

Khapayi, M. and Celliers, P., 2016. Factors limiting and preventing emerging farmers to progress to commercial Agricultural farming in the King William's Town area of the Eastern Cape Province South Africa. Journal for Agriculture, 44(1): pp. 25-41.

Kitui, J. K., 2016. Factors Affecting Lending By Agricultural Based Financial Institutions: A Case Study of Agricultural Finance Corporation. The International Journal Of Business and Management, 3(5): pp. 142-165.

Klerk, M. d., Fraser, F. and Fullerton, K., 2013. The Status of Agricultural and Rural Finance in South Africa. [Online] Available at: http://www.finmark.org.za/wp-content/uploads/2016/01/Rep_statusAgrRurFin_SA_2013_FNL2.pdf [Accessed 6 December 2017].

Klynveld Peat Marwick Goerdeler, 2012. Small Enterprise Development Agency: Research on the Performance of the Agricultural Sector. [Online] Available at: http://www.seda.org.za/Publications/Publications/Research%20on%20the%20Performance%20of%20the%20Agriculture%20Sector.pdf [Accessed 12 August 2017].

Kroeber, A., 2020. *China's Economy: What Everyone Needs to Know®.* 3rd ed. OXFORD PRESS, Oxford

Larson, D., Muraoka, R. and Ostuka, K., 2016. Why African rural development strategies must depend on small farmers. Global Food Security Journals, 10(2016): pp. 39-51.

Leigh, N. G. and Blakely, E., 2016. Planning Local Economic Development: Theory and Practice. 6th ed. London: SAGE Publications.

Long. O., 2016. The allocation and management of critical resources in rural China under restructuring: Problems and prospects. Journal of Rural Studies, 47(2): pp. 292-412.

Lunner-Kolstrup, C. and Ssali, T. K., 2016. Awareness and Need for knowledge of Health and Safety among Dairy Farmers Interviewed in Uganda. Front Public Health, 4(137): pp. 1-10.

Macaskill, C., 2017. Animal husbandry. 2 ed. SAHB Publishing (Pty) Ltd, London.

Mack, S., 2017. Technical Efficiency. [Online] Available at: http://smallbusiness.chron.com/technical-efficiency-65019.html [Accessed 25 August 2017].

Malizia, E., Feser, E., Renski, H. and Drucker, J., 2020. Understanding Local Economic Development. 2 ed. Routledge, London.

Mapedza, E., Van-Koppen, B., Sithole, P. and Bourblanc, M., 2016. Joint venture schemes in Limpopo Province and their outcomes on smallholder farmers livelihoods. Science Direct, , 92 (3): pp. 92-98.

Mazibuko, N. V. E., 2018. Impact of agriculture infrastructure on the productivity of smallholder farmers in the north-west Province, South Africa. [Online] Available at: http://uir.unisa.ac.za/bitstream/handle/10500/25201/thesis_mazibuko_nve.pdf?sequence=1andisAllowed=y [Accessed 7 November 2019].

Meaza, H., Tsegaye, D. and Nyssen, J., 2016. Allocation of degraded hillsides to landless farmers and improved livelihoods in Tigray, Ethiopia. Norwegian Journal of Geography, 70(1): pp. 1-12.

Meliko, M., Chauke, P. and Oni, S., 2012. The Efficiency of Small-Scale Agriculture in Limpopo Province of South Africa. [Online]Available at: http://ageconsearch.umn.edu/bitstream/96801/2/176.%20Efficiency%20of%20small%20scale%20agriculture%20in%20South%20Africa.pdf [Accessed 7 August 2017].

Meyer, D. F., 2019. *Local economic development (LED), challenges and solutions: The case.* [Online] Available at: https://showme.co.za/vaal/files/2014/08/Local-economic-development-LED-challenges-and-solutions.pdf [Accessed 13 August 2020].

Misra, A. K., 2014. Climate change and challenges of water and food security. International Journal of Sustainable Built Environment, 3(2014): pp. 153-165.

Mpandeli, S. and Maponya, P., 2014. Constraints and Challenges Facing the Small-Scale Farmers in Limpopo Province, South Africa. Journal of Agricultural Science, 6(4): pp. 135-144.

Mphahlele, M. et al., 2019. Risk factors associated with the occurrence of anthelmintic resistance in sheep of resource-poor farmers in Limpopo province, South Africa. Journal of Tropical Animal Health and Production, 51(5): pp. 555-563.

Musaba, E. and Bwacha, I., 2014. Technical Efficiency of Small-Scale Maize Production in Masaiti District, Zambia: A stochastic Frontier Approach. Journal of Economics and Sustainable Development, 5(4): pp. 104-111.

Muyanga, M. and Jayne, T., 2019. Revisiting the Farm Size-Productivity Relationship Based on a Relatively Wide Range of Farm Sizes: Evidence from Kenya. American Journal of Agricultural Economics, 4(3): pp. 2-24.

Ndlovu, M., 2017. Rural transformation as a solution to poverty in South Africa. [Online] Available at: https://www.dailymaverick.co.za/article/2017-08-28-op-ed-rural-transformation-as-a-solution-to-poverty-in-south-africa/#.WhkuUoVOIb0 [Accessed 25 November 2017].

New Partnership for Africa's Development, 2016. UN Agriculture, Food Security and Rural Development Cluster Meeting. [Online] Available at: http://www.nepad.org/resource/un-agriculture-food-security-and-rural-development-cluster-meeting [Accessed 10 August 2017].

Nguyen, V., 2020. *Trade Liberalization, Economic Reforms And foreign Direct Investment.* [Online] Available at: https://osf.io/ba2q9 [Accessed 12 August 2020].

Nhemachena, C., Jonas, S. & Karuihe, S., 2015. Understanding of the current practices, challenges and opportunities of the green economy in Limpopo Province. *Journal of Public Administration,* 1(1):pp. 6-31.

Non-Governmental Organization PULSE, 2012. Small-scale Agriculture. [Online] Available at: http://www.ngopulse.org/article/small-scale-agriculture [Accessed 14 August 2017].

Nwonwu, F. O., 2016. The paradox of natural resource abundance and widespread underdevelopment in Africa. International Journal of African Renaissance Studies -Multi-inter-and Transdisciplinary, 11(2): pp. 52-69.

Okunlola, A., Ngubane, M., Cousins, B. and Du-Toit, A., 2016. Challenging the stereotypes: Small-scale black farmers and private sector support programs in South Africa. [Online] Available at: http://reospartners.com/wp-content/uploads/2016/07/Okunlula-et-al_Small-scale-farmers-and-private-sector-support_PLAAS_RR53_WEB.pdf[Accessed 7 August 2017].

Olivier, J.-P., 2009. Capital generation as a contribution to economic development: A proposed model for the measurement of capital generation by small businesses as a contribution to economic development. 1st ed. LAP Lambert Academic Publishing, Pretoria.

Organisation for Economic Co-operation and Development, 2019. *Regional Development Policy in Spain.* [Online] Available at: https://www.oecd.org/cfe/ Spain.pdf [Accessed 11 August 2020].

Oyeranti, O. and Olayiwola, K., 2005. Policies and Programs for Poverty Reduction In Rural Nigeria. [Online] Available at:

https://sarpn.org/documents/d0002274/Poverty_reductionpdf [Accessed 22 November 2017].

Page, B. and Sunjo, E., 2017. Africa's middle class: building houses and constructing identities in the small town of Buena, Cameroon. Urban Geography, 20(4): pp. 1-29.

Pienaar, L. and Traub, L., 2015. Understanding the smallholder farmer in South Africa: Towards a sustainable livelihoods classification. Milan, International Conference of Agricultural Economists.

Pindiriri, C., Mumbengegwi, C. and Zhou, H., 2016. The impact of drought on technical efficiency of smallholder farmers in hurungwe, Zimbabwe. Botswana Journal of Economics, 14(1):pp 71-92.

Pollan, M., 2016. Agriculture: Facts and Trends in South Africa. [Online] Available at: http://awsassets.wwf.org.za/downloads/facts_brochure_mockup_04_b.pdf [Accessed 9 August 2017].

Rogerson, C., 2020. Using Municipal Tourism Assets for Leveraging Local Economic. Bulletin of Geography Socio-economic Series, 48(4): pp. 47-63.

Rural Development and Land Reform, 2016. *District Rural Development Plan.* [Online] Available at: http://www.ruraldevelopment.gov.za/phocadownload/SPLUMB/Devlans2017.pdf [Accessed 14 August 2020].

Rwelamira, J., 2015. Strengthening Farmers Organizations and Civil Society Organizations. [Online] Available at: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Events/DakAgri2015/Strengthening_Farmers_Organizations_and_Civil_Society_Organizations.pdf [Accessed 12 August 2017].

Schrock, G. and Wolf-Powers, L., 2019. Opportunities and risks of localised industrial policy: the case of "maker-entrepreneurial ecosystems" in the USA. *Cambridge Journals of Regions, Economy and Society,* 12(3): pp. 369-384.

Sirajuddin, S. N., Rohani, H. and Kuirniawan, E., 2017. Level technology adoption and characteristic cattle breeders who following Bachelor Village Building. American-Eurasian Journal of Sustainable Agriculture, 10(5): pp. 28-47.

Statistics South Africa, 2017. Living Conditions of Households in South Africa. [Online] Available at http://www.Statistics South Africa.gov.za/publications/P0310/P03102014.pdf [Accessed 7 August 2017].

Stull, V., Bell, M. and Ncwadi, M., 2016. Environmental apartheid: Eco-health and rural marginalization in South Africa. Journal of Rural Studies, 55 (4) pp. 1-11.

Tagasovska, N. and Lopez-Paz, D., 2019. Single-Model Uncertainties for Deep Learning. [Online] Available at: http://papers.nips.cc/paper/8870-single-model-uncertainties-for-deep-learning [Accessed 14 August 2020].

Tshilowa, P. F., 2016. Land Utilisation By Small and Emerging Commercial Farmers in the Greater Tzaneen Municipality in Mopani District Of Limpopo Province. [Online] Available at: http://uir.unisa.ac.za/bitstream/handle/10500/20232/dissertation_tshilowa_pf.pdf?sequence=1 [Accessed 24 August 2017].

United Nations Department of Political Affairs, 2017. The roles and opportunities for the private sector in Africa's Agro-food industry. [Online] Available at: http://www.enterprise-development.org/wp-content/uploads/UNDP_AFIM_Agro-food-industry.pdf [Accessed 26 August 2017].

Vhembe District Municipality, 2020. *Mining and Agriculture,* Vhembe District, South Afria.

Zheng, G., Barbieri, E., Tommaso, M. & Zhang, L., 2016. Development zones and local economic growth: zooming in on the Chinese case. China Economic Review, 38(7): pp. 238-249.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

A detailed methodological approach used in the study is outlined. A description of the study area, the criteria for selecting the participants, sampling methods, data collection and techniques are comprehensively outlined. The research design and data analysis techniques used in the study are explained. Also, the instruments used for data collection and the procedures followed when collecting data are outlined. Lastly, included in this chapter are the tests and measures used to establish the validity and reliability of the study, ethical considerations and procedures followed.

3.2. Description of the study area

The study area constituted of four local municipalities found in Vhembe District namely Musina, Thulamela, Makhado and Collins Chabane (DRDLR, 2016). Vhembe District Municipality shares borders with Zimbabwe and Botswana in the northwest and Mozambique in the southeast through the Kruger National Park (Agriculture Outlook, 2018). The VDM covers a geographical area that is predominantly rural, and the district holds a legendary cultural hub and a catalyst for agricultural and tourism development (Limpopo Tourism Agency (LTA), 2017). The district covers 27 869 148 km^2 of land and a total population of 1 393 949 people (StatsSA, 2017). Makhado covers 8 310. 586 km^2 (831 058.64 hectares), 23° 00´ 00´´ S 29° 45´ 00´´ E), Thulamela covers 2 893.936 km^2 (289 393 hectares) 22° 57´ S 30° 29´ E, Collins Chabane covers 5 467. 216 km^2 (546 721.572 hectares), 22° 35´ S 30° 40´ E), Musina covers 11 297. 41 km^2 (1 129 740.773 hectares), 23° 20´ 17´´ S 30° 02´ 30´´ E. (DRDLR, 2016). The VDM receives approximately 150 crop growing days during the rainy season. Mid-season dry spells are experienced in this District, which makes it marginal for crop-based and livestock farmers. The area has light-textured sandy-loam soils that are sparsely covered with indigenous trees and tall tufted grasses. The District offices are in Thohoyandou which is the commercial, administrative and legislative centre for the District. Figure 3.1 illustrates the area demarcating the scope where the research was conducted.

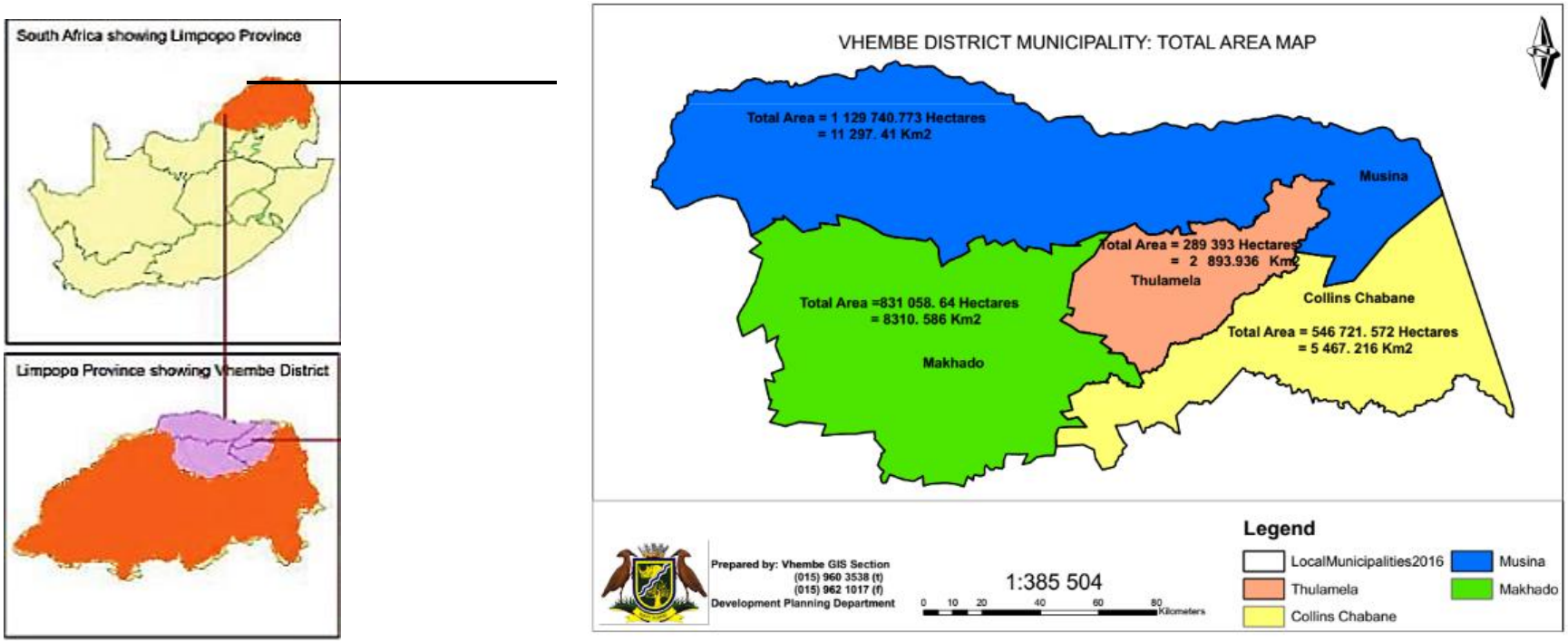

Figure 3.1: VDM (Four major local municipalities)

Source: Durowoju *et al.* (2018)

3.3. Research design

Korathi (2005) states that the significant step that follows the task of defining the research problem is the preparation of the research design of the research project. To characterise, measure efficiency, estimate the contribution and identify the challenges in the study, a descriptive correlational research design was used. This research design determines the extent of the relationship between two or more quantifiable variables. According to Quaranta (2017), descriptive correlational research design provides a snapshot of the current and it identifies relationships among variables as well as to allow the estimation of the current events and predict the future outcomes from present knowledge. A farm budget enterprise system was used to distil the data used by arranging inputs, production processes and outputs in corresponding segments. Farming systems comprise of the primary production unit, that is the farm, which in itself has its distinctive limitations and constrictions within a heterogeneous decision-making environment. Thus, given this diversity within agrarian schemes, various systems of classification have been developed and evolved. Several steps in developing farm systems are well documented in the literature and have followed one of, or a combination of, two main approaches which are a qualitative and quantitative system (Adeyemo *et al*., 2010; Aliber & Mdoda, 2015; Azadi *et al*., 2016). However, the study limited the approach to a quantitative system in which the above-mentioned design was adopted.

3.4. Research instruments

Quantitative analysis requires numerical data in the form of discrete variables (Korathi, 2005). In this study, structured questionnaires were used to collect data. Structured questionnaires are used to collect quantitative data and contain standardised questions with a fixed theme, allowing respondents to have explicit options to select from given answers (Quaranta, 2017). The structure of the questionnaire followed the objectives of the study, and the nature of questions were guided by the literature reviewed, and as such, the questionnaire had four sections (See Annexure 3). The instrument was pretested during the pilot study and amendments were made before the initial data collection stage. Also, the study consulted extension officers from DARD in the VDM to get information critical for designing a research questionnaire. This helped to get a clear understanding of the nature, location and types of farmers in the VDM. The instrument was also designed to collect agronomic statistics directly from small-scale farm owners to reduce uncertainty about accuracy in agricultural statistics.

3.5. Population, sample size and sampling procedures

The population for the study included small-scale commercial farmers (crop, livestock and mixed farmers) in VDM. Crop-based farmers are those producing vegetables (cabbages, onions, tomatoes etc), maize, potatoes sweet potatoes and fruits. Livestock farmers are those rearing cattle, pigs, sheep and chicken and mixed farmers are those producing a combination of crops and livestock mentioned above. Small-scale commercial farmers in VDM are recorded under clusters determined by the municipalities. Each municipality keeps a database of all the small-scale commercial farmers under its jurisdiction. Thulamela had a total of 171, Musina 95, Makhado 120 and Collins Chabane 115 which gave a total of 501 population size (DARD, 2016).

3.5.1. Sample size

Given a population size of 501, the study adopted Becker 1991 sample formula. This method of calculating an accurate sample size considers five steps, which is of paramount importance in determining reliable sample size. Firstly, the population size should be known and the study used a population size of 501 as provided DARD for all four the clusters Vembe District. Second, it is crucial to determine the critical value of the normal distribution as the required confidence level (Israel, 2016). Thus, the study used 95% (±5%) confidence level which gave a critical value of 1.96 and it is the most recommended (Andy, 2010; Israel, 2016). Third, the sample proportion determined for the study was 0.5 which would give the best possible and largest sample size considering the critical value of 1.95 (Williams, 2017). The main key point to note in determining the sample proportion is that in normally distributed data, the acceptable level of confidence is approximated at 95% (Kumar, 2008). Hence, a 95% level of confidence was selected in the study. Forth, Determining the margin of error which is the range in which the true population is expected to lie (Israel, 2016). In this regard, a 5% margin of error was considered since the smaller the margin of error, more is the precision and the exact sample size. In this regard, because the population is constituted of livestock, mixed and crop farmers the more heterogeneous the population is, hence a larger the sample size required (Israel, 2016). To this end, the formula used to calculate the sample size is presenting in equation 3.1 which gives a sample size of 217, However, a total of 235 questionnaires were administered and the sample apportionment is presented in Table 3.1. The study adapt Cochran sampling method and used a standard formula to determine the ideal sample size of the survey (99% confidence level, 50% standard of deviation and a 5% margin of error).

Becker's Sample size formula;

$$\text{Sample size, } n = N * \frac{\frac{Z^2 * p * (1-p)}{e^2}}{[N - 1 + \frac{Z^2 * p * (1-p)}{e^2}]} \quad (3.1)$$

Where;

N denotes Population size (501)

Z denotes Critical value of the normal distribution (1.96 at 95% confidence level)

P denotes Sample proportion (0.5)

e denotes margin of error (0.05)

$$n = 501 * \frac{\frac{1.96^2 * 0.5 * (1-0.5)}{0.05^2}}{501-1+(\frac{1.96^2 * O.5 * (1-0.5)}{0.05^2})}$$

$$n = 500 * \left[\frac{\frac{1.9208 * 0.5}{0.0025}}{499+\left(\frac{1.9208 * 0.5}{0.0025}\right)}\right]$$

$$n = 501 * (\frac{384,16}{500+(384.16)}$$

n = 501* 0.4344983

n = 217.683

Total Sample Size = 217 (Small-Scale Commercial Farmers)

A sample size of 217 small-scale commercial farmers was considered. However, in order to have an accurate response rate, a total of 235 questionnaires were administered. In line with Israel (2016), having a population of around 500 and allowing only 5% margin of error at a 95% confidence interval, a minimum sample size of 170 participants is generally acceptable. Also, considering that VDM is sub-divided into four clusters demarcated by four municipalities (Musina, Makhado, Collins Chabane and Thulamela), it was fundamental to apportion the sampling size using the municipal proportion as presented by DARD. To have an accurate response rate, a total of 235 questionnaires were administered Thus, the optimal sample allocation was used to accurately apportion the sample size of 235 between four distinct municipalities in VDM.

3.5.1. Sample apportionment and procedure

A finite population of 501 small-scale commercial farmers which gave a sample size of 217 participants at a 95% confidence interval, the study used an extended sample of 235 and the following apportionment is taken into consideration;

$$Var(\hat{T}_Y) = \sum_{h=1}^{H} Var(\hat{T}_h) = \sum_{h=1}^{H} N_h^2 \frac{N_h - n_h}{N_h} \frac{S_h^2}{n_h}. \quad \textbf{(3.2)}$$

Where;

T_y signifies sampling variance

N_h signifies finite population

H signifies sub-populations or clusters

Sample apportionment for the local municipalities used in the study is shown in Table 3.1. Vhembe District is constituted of four local municipalities and considering the proportional statistics presented in LRDR report of 2016, Thulamela encompasses 34%, Musina 19%, and Makhado 24% and 23% in Collins Chabane. Considering the extended sample size of 235 small-scale commercial farmers is favourable. Table 3.1 presents the sample apportionment. As for the sampling procedure, the use of cluster sampling necessitated dividing municipalities into clusters (See Figure 3.2). Each municipality represented a cluster and three groups were formed in each cluster (group A-livestock, B-crop and C-mixed farming). For each type of farming, the respondents were randomly selected, and the sample proportion from the database further used to calculate the number of farmers for each type of farming as shown in Table 3.1.

Table 3.1. Sample apportionment in VDM

Location	Apportionment (%)	Total app	Livestock	Crop	Mixed
			12	17	26
Collins Chabane Municipality	23	0,23 X 235 = 54			
Makhado municipality	24	0.24 X 217 = 56	14	18	22
Thulamela municipality	34	0.34 X 217 = 80	21	24	33
Musina Municipality	19	0.19 X 217= 45	20	12	15
Total number of 235 questionnaires were distributed					

Source: Author's Survey 2019

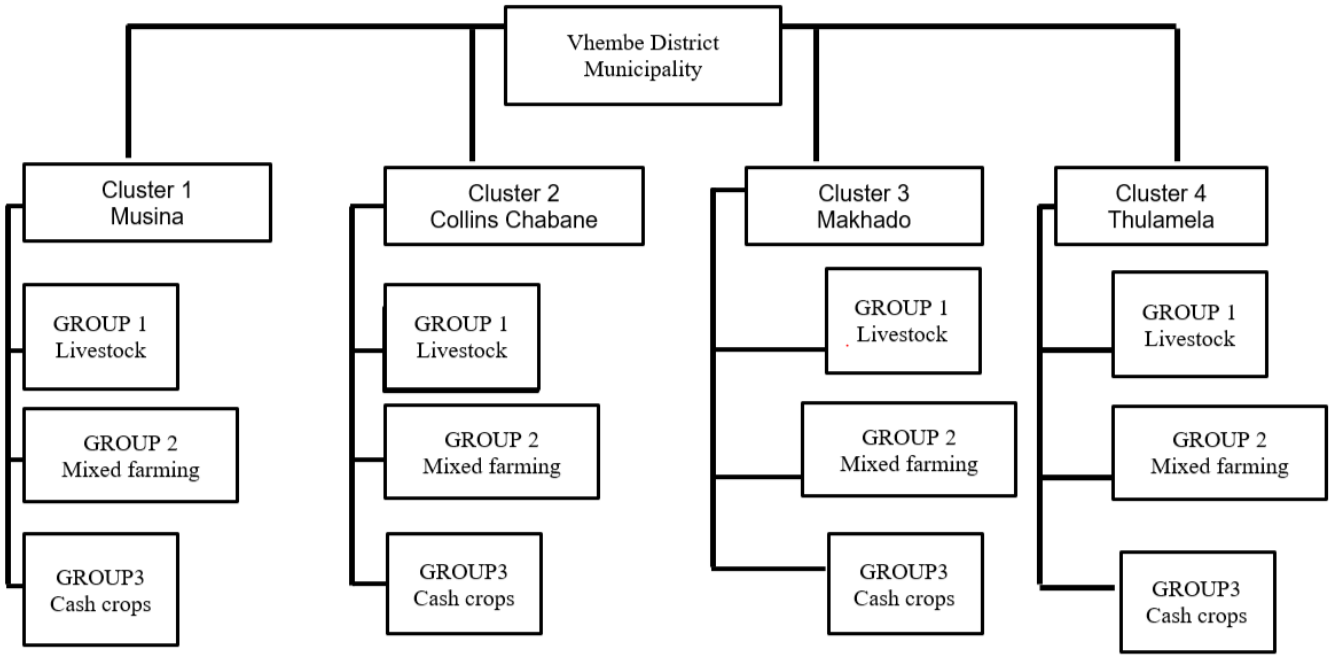

Figure 3. 2: Cluster Sampling in VDM

Source: Author's Survey 2019

Crop producers denote crop-based farmers producing vegetables (cabbages, onions, tomatoes etc), maize, potatoes, sweet potatoes and fruits.
Livestock producers denote small-scale animal farming including cattle, pigs, sheep, goat and chicken (broilers and egg layers)

Mixed farmers are those producing a combination of crops and livestock mentioned above

3.6. Description of the respondents and data collection processes

The respondents of the study were small-scale commercial farmers from four local municipalities in VDM. A total sample of 235 farmers, which included crop, livestock and mixed farmers producing for the market was used. To ensure the inclusion of all participants, the study kept track of all the farmers bearing in mind the sample apportionment statistics. Before data collection, two research assistants were trained on data collection skills during the pilot study. The pilot study was done in which a total of 30 farmers was used to pre-test the instrument so that mistakes such as wrong wording and question construction could be identified and rectified. During the pilot study, a sample size of 30 respondents was used and it is acceptable as it givens a clear picture of what is likely to come out from the actual quantitative data to be collected (Gale *et al*., 2013). Thus, quantitative data was collected and concerns observed by the research team and those raised by the farmers where considered when formulating a final research questionnaire. During the second phase of data collection, out of 235 questionnaires distributed, the study only used 217 after carefully excluding those with errors and incomplete one.

The quantitative data collection was then initiated after a schedule was drawn considering that farmers were divided into four clusters each cluster representing one municipality. The use of clusters assisted the study and research assistants to schedule appointments with the respondents (See Annexure Annexure 4). Guided by the data collection schedule, farm visits were initiated after securing appointments with the respondents. In some cases, respondents requested to complete the questionnaire during their spare time since they were busy during the day. Some of the respondents brought the questionnaires at the University of Venda after calling and arranging with the study. To ensure that all questions in all the questionnaire have answered a checklist was used which further assisted the research team to identify the right respondents and those who had questions were assisted accordingly. In some cases, respondents would request for more time. Hence, ample time was given, and questionnaires were collected during a convenient time for both the study and the respondents. The questionnaire was subdivided into three sections which include section A 1-16, demographic statistics and challenges faced by farmers (Objective one and three), Section A 17-20, B and C were used to collect quantitative data which was then used to estimate the economic contribution to local economic development and Technical efficiency.

3.7. Data analysis

Data analysis involves the use of an essential scientific method to attain results which are meaningful and can be interpreted as essential recommendations (Korathi, 2005). Before data analysis, it was crucial to code, capture and cleaned the data which was done on IMB SPSS and Microsoft Excel depending on the analysis choice. Shakeel (2013) mentioned that data processing is essential for a scientific study to ensuring that the study has all the relevant data for the objectives of the study. Test of normality was conducted in IBM SPSS version 26, and the Kolmogorov-Smirnov test was used. A p-value of 0.001 ($p<0.05$) was computed. As such, it was concluded that the data is normally distributed. As such, the assumption of equal means regarding the number of employees in mixed, crop and livestock farming was assessed using descriptive statistics and one-way ANOVA test. Like cost ratios, the farming type was used as an independent variable and number of employees as the dependent variable.

Objective one: Characterising Small-scale commercial farming enterprises

To determine the socio-economic characteristics, descriptive statistics were used, in which frequencies and percentages were utilized. Variables such as gender, age and education level were used to describe characteristics of the respondents. The data on types of farming, systems, land ownership, agriculture training and sources of income was used to further identify the economic characteristics of the respondents. These characteristics bring an understanding of who these farmers are and how best they can be defined.

Objective two: To measure technical efficiency levels of Small-scale commercial farming enterprises

To measure technical efficiency levels, a stochastic frontier analysis based on the input-output model was used (See equation 4.4). The maximum likelihood analysis was used to identify the determinants of technical efficiency in small-scale commercial farmers in VDM (see equation 4.9). Furthermore, Ordinary Least Square (OLS) was used to determine factors that affect the productivity of the farmer (See analytical models in section 3.10). The study also used the Analysis of Variance (ANOVA) to assess the most cost-efficient type of farming in VDM. Gender was used to if there are any differences in male or female-headed farms in the study area.

Objective three: Estimating the economic contribution of small-scale commercial farming enterprises

To estimate the economic contribution of small-scale commercial to local economic development, the study used descriptive statistics to measure the average number of employees per farm. Ratio analysis was used to estimate the level of employment creation and income contribution to GDP in VDM. Furthermore, multilinear regression analysis was used to estimate how expenditure on employment and inputs affects GDP in VDM. This was done to check the most effective type of farming in terms of the above-mentioned variables.

Objective four: Identifying economic challenges faced by small-scale commercial farmers

To assess the entrepreneurial challenges faced by small-scale commercial farmers and the skills lacking, descriptive statistics were used to derive means from the data. Freidman means ranking method was then used to rank the means in ascending orders to identify the critical challenges experienced and the skills lacking in small-scale commercial farming in VDM. Ultimately, Pearson Chi-square method was used to assess the causal relationship between the challenges experienced and the skills lacking in small-scale commercial farming. The specific analytical methods used in the study are explained in detail in chapter 4,5,7 and 8. Chapter 4 presented the specification of the models used to estimate efficiency and linear regression models used to determine the factors which affect efficiency in small-scale commercial farming. Also, the model which shows the effect of small-scale commercial expenditure on salaries, inputs and access to credit on GDP in VDM was presented.

3.8. Validity and reliability

Considering that the study used quantitative methods to collect data, it is essential to discuss how validity and reliability were guaranteed. Validity is defined as the accuracy of the design and methods used in the process of the research (Paul, 2003). Reliability refers to the extent to which the same answer can be obtained using the same approach and instruments more than one time (Zhou *et al.,* 2017). In terms of validity, the research approach used ensured that the respondents could provide data at their own convenient time, given the fact that farmers are usually busy during the day. The use of structured questionnaires necessitated the research to collect quantitative data suitable for the study. This speaks to the use of an enterprise budget system approach which

captures data that can be used to measure levels of efficiency and profitability of the small-scale commercial farming. Also, the research approach used ensured that trust was built between the study and the respondents through eloquently explaining the purpose of the study and the confidentiality of the data collected. Furthermore, the sample size of 217 small-scale commercial farmers was credible to give the data which can give proper meaning to the results of the study. In terms of reliability, Cronbach's Alpha which measures for internal consistency (reliability) or the goodness fit of the instrument was used. In this study, the scale reliability analysis in IMB SPSS version 26 was used, and Cronbach's alpha value score of .87 was attained. The general rule of reliability states that a Cronbach's alpha of .70 and above is regarded as good (Zurano-Cerevello *et al., 2018*). Thus, a Cronbach's alpha of .87 rendered the instrument used well for the study.

3.9. Ethical Considerations

Ethical clearance (SARDF/18/IRD/10/2106) was issued by the University of Venda Research Ethics Committee. Subsequently, a written consent to conduct the study was issued by local municipality's offices in VDM. Furthermore, to ensure that participation is voluntary, all the data collection tools were accompanied by a written agreement form which summarized the study and its objectives. The form contained a clause that informed the participants that they could choose to continue or stop participating at any time. A confidentiality and anonymity declaration was also included on the form. Besides informed consent, the participants were made aware of what and how the collected data will be used. Eventually, upon completing the study, feedback in the form of a workshop with all designated small-scale commercial farmers will be conducted.

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Table 3.1: Conclusion of the Methodological Approach

The objective of the study	Research question	Variables for measurement	Data sources	Data collection method, Techniques, and tools	Data analysis method and tools
To characterize the small-scale commercial farming enterprises in VDM	What are the socio-economic characteristics of small-scale commercial farming enterprises in VDM?	-type of cash crops grown, -Type of animals kept, -methods of farming, - land ownership, -farming seasons, -small-scale commercial farmers' demographics	- Small-scale commercial farming enterprises and Department of Agriculture records	-Survey, -desktop study	Descriptive statistics and Cumulative frequency IMB SPSS version 26 software Excel version 2016
To measure technical efficiency levels of small-scale commercial farming enterprises in VDM.	What is the level of technical efficiency for small-scale commercial farming enterprises in VDM?	Accumulated variable and fixed costs	Small-scale commercial farming enterprises and Department of Agriculture records	- Survey and desktop study	Limited Dependent Variable Mod (LIMDEP) version 11
To measure the economic contribution of the small-scale commercial enterprises in VDM.	What is the economic value of small-scale commercial farming enterprises to the rural economy in VDM	-Number of employees per farm, -units produced for the market, -income from farm produce, -size of land used for farming, -Farm size, expenditure on inputs by the farmers, farm and off-farm income.	Small-scale commercial farming enterprises and Department of Agriculture records	- A Survey and intrevews (structured questionnaires),	IBM SPSS version 24 (Descriptive statistics) Limited Dependent Variable Mod (LIMDEP) version 11: linear regression – least squares

To identify the economic challenges faced by small-scale commercial farmers in VDM of Limpopo Province	What are the significant challenges faced by rural-based small-scale commercial farming enterprises in VDM	-Access to water, -access to financial support, -access to inputs, - access to credit, -transporting costs, - access to the market and availability of market information.	- Small-scale commercial farming enterprises and Department of Agriculture records	-A Survey (structured questionnaires)	Freidman means ranking t-test. IBM SPSS version 26 software Excel version 2016

Source: Author's Survey 2019

3.10. A detailed explanation of the analytical model

Analytical model specification implies determining the critical variables and regressing models from a theoretical point of view. In this section, a farm enterprise budget used to segment several aspects of the study is explained. Subsequently, the incorporation of farm enterprise budget and input-output method is consciously explained to show how the study analysed small-scale commercial farming performance. Methods for data analyses used to determine efficiencies were presented. Thus, the farm enterprise budget was presented and linked with the structural model to identify critical variables for the study.

3.10.1. Farm Enterprise Budget

Estimating the economic contribution to the local economic development of small-scale commercial farming informs how an enterprise can be managed effectively. Thus, an enterprise budget system shows how a farm is subdivided into financial, production and farming management segments (Ajibefun *et al.,* 2016). Subsequenlty, Adenle *et al*. (2018) state that producing the correct amount of products, managing the finances of the farm and running a profitable enterprise are critical elements for lucrative agribusiness. Thus, the farm enterprise budget entails all the costs accruing for a given level of production and corresponding output which is measured in monetary value (profit levels) of agribusiness (Aliber and Mdoda, 2015). In this regard, an enterprise budget is a listing of estimated revenue and expenses associated with variable and fixed costs which provides an estimate of farms' gross margins.

Also, the data derived from the farm enterprise budget was then used for ratio analysis which shows costs and profit margins of the agribusiness. In this regard, Table 4.1 shows to total income received, variable costs and fixed costs accrue in a farming enterprise.

Total Receipts

Total receipts encompass total sales or income received by the farmer before deducting other expenses paid or incurred during the farming season. In the study, total receipts are calculated as the addition of all income received by small-scale commercial farmers.

Variable Costs

Variable costs are expenses that vary with the level of output. The study considered variable costs but not limited to fertilizers, pesticides, transport, seeds and feeds into the farm enterprise model.

Fixed costs

Fixed costs are agribusiness expenses such as rent, depreciation, insurance, property tax, salaries and utilities (Samila, and Sorenson, 2017). The study used the fixed costs incurred during the 2017/2018 farming season.

Total Costs

Total costs refer to the total expenses incurred in producing a particular level of output that if variable costs added to fixed costs during the 2017/2018 farming season.

Total profits/loss

Total profit/loss in the study is a measure of agribusiness success which is derived from total sales/receipts minus total costs. The farm enterprise model is designed in a such a way that it gives the level of returns to inputs after capturing the data indicated in Table 4.1 which shows certain sections of a farm enterprise model and are explained in the following subsections.

Table 3. 2. Farm Enterprise Budget

Item	**Value**		
Income:			
Total income (Sales)		XXX	
Variable costs: (Fertilizers, labour, pesticides, transport, seeds, feeds, equipment hire etc.)	**XXX**		
Fixed costs: (deprecation, insurance, rent, salaries, interest expenses, equipment etc.)	**(XXX)**		
Total costs Less (Variable + Fixed cost)	**(XXX)**		
Total Profit/loss	XXX		XXX

Source: DAEDE (2019)

3.11. Farm enterprise variables

A farm enterprise incorporates inputs such as variable costs (labour, cost of inputs, and utility bills) and fixed costs (rent, taxes and fixed insurances) invested into a farm to produce a certain level of outputs as stated in Table 3.3. Thus, a distinctive farm is expected to produce a certain level of output from a given combination of inputs. These inputs are usually converted on a farm to produce output which is usually sold in perfectly competitive local and national markets. Because to produce a certain level of output *(Y),* a farmer should use several inputs ($X_1 + X_2 + X_3 +$ .....Xn). In this regard input-output approach, equation 3.1 shows a combination of inputs which can be converted to give an output.

$$Y = f(X_1 + X_2 + X_3 + \ldots\ldots\ldots\ldots X_n) \quad (3.1)$$

Where;

Y denotes aggregate output per farm

X_1 - X_n denote farm inputs

Given equation 3.1, it is feasible to check the productivity at the farm level and its profitability which is generally associated with different costs incurred by a farmer. Therefore, it is plausible to examine the causal relationship between inputs against farm aggregate output. Adeyemo *et al.* (2010) state that there is an inverse relationship between inputs elements and aggregate output in a given enterprise. To validate this claim, the study examined the relationship between inputs (fixed and variable) and total output using Multiple Linear Regression (MLR). Thus, an MLR was used to check the linear associations between costs associated with producing a certain level of output and the aggregate costs incurred during a specific farming season. Thus, the MLR model is expressed as follows;

$$U = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots\ldots\ldots\ldots \beta_n X_n + \varepsilon \quad (3.2)$$

Where;

U = dependent variable

β_0 = constant-coefficient

$\beta_1 - \beta_n$ = standard co-efficient of independent variables

$x_1 - x_n$ = Farm costs (See Table 3.3)

Table 3. 3. Farm Expenses

Variable costs	Fixed Costs
Feeds, seeds and seedlings (Measured in ZAR)	Rental payments (Measured a total rent paid per annum in ZAR)
Fertilizers and chemicals (Measured as total costs incurred in ZAR)	Insurances (Measured money used in real terms)
Farm maintenance costs measured as total costs in ZAR (fence, irrigation equipment and kraal repairs)	Bank loans payments (Interests payable in ZAR)
Labour expenses (Measured as monthly wages in ZAR)	Utilities (measured as total costs paid in ZAR).
Marketing, transport, expenses (Measured as total costs used for marketing and transport in ZAR)	

Source: Author's Survey 2019

Given equation 3.2, MLR should meet certain assumptions for the results to hold.
Following are the assumptions to be met:

i. The error terms are normally distributed
ii. The error terms are independent of past errors terms
iii. All populations have equal variance
iv. There is no correlation between independent variables

Equation (3.2) is estimated using the OLS approach, which is used to estimate the development contribution by small-scale commercial farmers to the rural economy in VDM. In terms of estimating the technical efficiency levels of small-scale commercial farmers in VDM, input-out model was employed and is described in detail in the following sub-section.

3.12. Specification of the empirical model

Generally, the model specification for a regression model is anchored on relatively the theoretical contemplation than experiential or methodological basis (Arik, 2015). Considering the farming typology in the study, Stochastic production frontier was carefully considered as splits the deviation (error term) into two parts to accommodate factors which are purely random

and are out of the control of the farm (Tagasovska and Lopez-Paz, 2019). Subsequently, the stochastic production frontier was then calibrated to accommodate the input-out model following the assumptions of Cobb-Douglas production function which shows the relationship between the amounts of two or inputs which can be used to produce the measurable amount of output (Duguleana, 2019). Also, the Cobb-Douglas function is used to characterise the output side of any business given a certain level of inputs. Thus far, the farm enterprise model which shows a range of inputs used to produce a certain level of out was used to structure the data and the input-output model necessitated the estimation of technical efficiency. Technical Efficiency (TE) as explained by Adeyemo *et al.* (2010) denotes the ability to maximize output from a given set of inputs (Adeyemo *et al*., 2010; Chikazunga & Paradza, 2016). Thus, the product of allocative efficiency and TE provides overall economic farming efficiency hence production efficiency.

Production Efficiency is a situation in which an economy is not able to produce more of one good without reducing the production of another good (Kothonen *et al*., 2018). Subsequently, for an economy to efficiently produce, factors such as inputs supply trends and factor endowments should be considered. Inputs supply trends as described by Manson and Roberts (2016) entails trends in the supply of inputs used in production. Factor endowment is commonly understood as the amount of land, labour, capital and entrepreneurship that a country possesses and can exploit for manufacturing (Nagel and Burnete, 2018). As such, the input-output model helps in identifying input variables which can best be used to produce a certain level of output. Thus, the study used an input-output approach to identify the variables which would best estimate productivity and efficiency based on methods developed to estimate frontier production using Stochastic Frontier Analysis (SFA) as described by (Nagel and Burnete, 2018). Unlike, Data Envelope Analysis which uses non-parametric methods to construct the best practice frontier and requiring the use of robust Time series data, SFA as a parametric approach requires assuming a specific function which shows how outputs can be derived from and multiple inputs (Bezat, 2009). As such, a set of variables (inputs and outputs) that are necessary for production efficiency measurements are described below. The two-error component stochastic frontier production function suggested to represent technical inefficiency was employed as shown below:

The cost of inputs is expressed as;

$$C = f(x_1 + \ldots . x_n)$$

Aggregate output is thus expressed as;

$$Y = f(x_1 + \ldots . x_n) \qquad 3.3.$$

Where;

C denotes total cost per each farm

$X_1 \ldots X_n$ denotes a combination of fixed and variable cost

Given equation 3.3, the current study further made use of input-output approach to determine Technical Efficiency. The efficiency of a farm/production unit can be measured using allocative efficiency (reflecting the capability of a farm to use inputs in optimal proportions, given their corresponding prices. In this study, the TE is the ratio between the actual and potential output of a production unit used to develop commercial farming in rural areas. To measure technical efficiency, gross production value (in South African Rand) was used to measure aggregate total output variable (OP_I) as indicated in equation 3.4 below. Furthermore, inputs comprised of four categories which are land, chemical fertilisers, labour and cost of gross inputs excluding chemicals). Thus, TE is defined as the ability to produce a certain level of output with a minimum amount of inputs (Kasabov, 2016; Kirschen & Strbac, 2019). The study calculated aggregate average sales and total costs incurred by farmers using budget enterprise data and data collected from DARD in Thulamela municipality. The study used the stochastic frontier production function models, and the frontier production function is defined as the maximum feasible or potential output (Y) as described in equation 3.4. Thus, the analytical framework for efficiency assumed that production frontier model assuming that as farm uses inputs (X_1, X_2,……..X_n) to produce output Y is presented as;

$$Y = f(X_n) \qquad (3.4)$$

Where Y denoted aggregate output and X_n is a combination of farm inputs.

The production function which is used to characterise the efficient transformation of inputs into ideal output is expressed as f (X_i). This production function shows the potential maximum output produced from a given level of farm inputs. Thus, applying the stochastic frontier production function, the function is presented as;

$$Y = f(X_i, \beta) \exp(Z_I - U_i) \qquad (3.5)$$

Where i = 1,2,3,…….,n;

Y denotes the total output of the farmers,

X denotes the total input variables

β's denotes production coefficients,

Zi is a random error, which factors such as a change in weather and abrupt increase in the cost of production which is not directly controlled by the farmer, while Ui captures the inefficiency measure such as omissions and mistakes in the study.

In this regard, the production efficiency model is such that the potential production Y is constrained by stochastic quantity f (X_i, β) exp (Z_I) justifying the term stochastic frontier. Furthermore, the random error U_i is independent and identically distributed. In this regard, the production frontier is thus given as;

$$Y = f(X_p) \qquad (3.6)$$

Where;

Y denotes output and X_n is a vector of variable inputs

The TE input vector (X_I) for a predicted level of output (Y) is derived by solving concurrently the equation (3.6) and the input $X_P/Xi = M_i$ (i is greater than 1) and M_i is the ratio of the inputs X_n and X_i at output Y. In the instance when the production frontier is self-dual as assumed under Cobb-Douglas function, the cost frontier is expressed as;

$$Cs = f(G, O) \qquad (3.7)$$

Where;

Cs denotes the lowest cost associated with farm production of output O

G denotes input prices vector.

In this regard, applying differentiation technique which allows estimating the rate of change, we obtain,

$$\Delta Cs / \Delta G = X_p (G, O) \qquad (3.8)$$

Substituting a firm's input costs and output quantity into equation 4.8, the computed equation gives economic efficiency (X_n 'G) and (X_i' G) input combination for a farm' output. Equations 4.6, 4.7 and 4.8 for measuring costs, they can be used to derive TE and EE indices as;

$$TE = (X_n \text{ 'G}) / (X_i \text{' G}) \qquad (3.9)$$

$$EE = (X_p \text{ 'G}) / (X_i \text{' G}) \qquad (3.10)$$

Thus far, equation 3.12 and 3.13 describe aggregate Cost-Efficiency (CE) and Cost-inefficiency (CI).

$$CE = (1-\dot{X}) / MaxG \quad (3.12)$$

$$CI = (1-\dot{X}) / MinG \quad (3.12)$$

Where CE denotes cost-efficient farmer (3.6), and CI denotes cost-inefficient farmer (3.7). $\dot{X}$ denotes average efficiency (mean efficiency), MaxV denotes the maximum value of the economic efficiency of the farmer. MinV denotes the minimum value of the economic efficiency of the farmer.

The data used for the analysis were distilled from the enterprise budget data to calculate the efficient production[4]. Efficient production is usually represented by an index value of 1.0 (Biam *et al*., 2016); the lower value indicates a greater degree on inefficiency. To cleary comprehend technical efficiency and its determinants for small-scale commercial farmers, the study employed a multilinear regression approach as described in section 3.2 above and 7.3.2.2. Thus, the linear regression equations used is expressed as;

$$\mathbf{AI_i = \beta_0 + \beta_1 \dot{Y}_1 + \beta_2 \dot{Y}_2 + \beta_3 \dot{Y}_3 + \beta_4 \dot{Y}_4 + \beta_5 \dot{Y}_5 + \beta_6 \dot{Y}_6 + \beta_7 \dot{Y}_7 + \beta_8 \dot{Y}_8 + \beta_9 \dot{Y}_9 + \varepsilon_i} \quad (3.13)$$

Where; AI_i is aggregate output per farmer, $\dot{Y}_1$ (Farming experience), $\dot{Y}_2$ (age), $\dot{Y}_3$ (education level) $\dot{Y}_4$ (land size), $\dot{Y}_5$ (household size); $\dot{Y}_6$ (household size); $\dot{Y}_7$ Credits/Loans $\dot{Y}_8$ (Government grants) and ε_i denote error term.

3.5. Conclusion

Economic contribution constitutes a change in economic characteristics associated with an industry, event or policy in an existing regional economy. There are different economic activities, namely, business production (output or sales volumes), value-added products, wealth (including property values), personal income (wages) and jobs. Thus, the essential purpose of economic activities is to promote the socio-economic well-being of community members. Based on this narrative, the following parameters were considered in the farm enterprise budget. Total sales, fixed and variable costs and autonomous income provide an

[4] Economic efficiency of the farmer

understanding of how small-scale commercial farmers can conduct productive Agri-businesses. In this study, only technical efficiency was measured considering the data collected and the objectives of the study. Thus, the following chapter presented data analysis and results interpretation.

References

Adenle, A., Manning, L. & Azadi, H., 2016. Agribusiness innovation: A pathway to sustainable economic growth in Africa. Trends in Food Science & Technology, 59 (4): pp. 88-104.

Adeyemo, R., Oke, J. & Akinola, A., 2010. Economic Efficiency of Small-Scale Farmers in Ogun State, Nigeria. Tropicultura, 28(2): pp. 84-88.

Agriculture Outlook, 2018. BFAP Baseline agricultural outlook 2018 - 2027, Pretoria: BFAP.

Ajibefun, I., Daramola, A. & Falusi, A., 2016. Technical efficiency of small scale farmers: An application of the stochastic frontier production function to rural and urban farmers in Ondo State, Nigeria. International Economic Journal, 20(1): pp. 87-107.

Aliber, M. & Mdoda, L., 2015. The direct and indirect economic contribution of small-scale black agriculture in South Africa. Agricultural Economics Research, Policy and Practice in Southern Africa, 54(2): pp. 18-37.

Allaire, G. & Daviron, B., 2019. Ecology, Capitalism and the New Agricultural Economy: The Second Great transformation. 1st ed. Routledge, Abingdon.

Andy, M., 2010. *Ordinary Least Squares (OLS) and Geographically Weighted Regression (GWR) woes.* [Online] Available at: https://community.esri.com/thread/5167 [Accessed 14 December 2017].

Arik, M., 2015. Economic Impact or Contribution: Essays on Business and Community Relations. 2nd ed. London: Lexington Books.

Azadi, D., 2016. Genetically modified crops and small-scale farmers: main opportunities and challenges. *Journal of Critical Reviews in Biotechnology,* 36(3): pp. 434-446.

Biam, C., Okorie, A. & Nwibo, S., 2016. Economic efficiency of small-scale soyabean farmers in Central Agricultural Zone, Nigeria: A Cobb-Douglas stochastic frontier cost function approach. Journal of Development and Agricultural Economics, 8(3): pp. 52-58.

Chikazunga, D. & Paradza, G., 2016. Smallholder farming: a panacea for employment creation and enterprise development in South Africa. [Online] Available at: http://www.carnegie3.org.za/papers/48_Chikazunga_Small%20holder%20farming%20%employment%20creation%20and%20enterprise%20development%20in%20SA.pdf[Accessed 9 August 2017].

Cox, K., 2018. Economic Efficiency Comes by Sharing Profits. [Online]
Available at: https://medium.com/@kevin_34708/economic-efficiency-comes-by-sharing-profits-6ed53f20cef7[Accessed 1 August 2019].

Kasabov, E., 2016. Investigating difficulties and failure in early-stage rural cooperatives through a social capital lens. European Urban and Regional Studies, 23(4): pp. 895-91.

Department of Agricultural, Environmental, and Development Economics., 2016. *Farm Management Enterprise Budget.* [Online] Available at: https://aede.osu.edu/research/osu-farm-management/farm-finance/enterprise-budgets [Accessed 15 August 2020].

Department of Rural Development and Land Reform, 2018. *Vhembe District Municipality Final Report Agri-Park Master Business Plan.* [Online] Available at www.ruraldevelopment.gov.za/phocadownload/Agri-parks/Business-Plans/Limpopo/Vhembe%20DM%20Final%20Master%20Agri-Park%2 [Accessed 6 February 2020].

Durowoju, O. S., Odiyo, J. O. and Ekosse, G.-I. E., 2018. Geochemistry of Siloam and Tshipise Geothermal Springs, Limpopo Province, South Africa, American Journal of Environmental Sciences , New York

Gale, N. et al., 2013. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. [Online] Available at https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/1471-2288-13-117 [Accessed 9 September 2017].

Israel, G., 2016. Derteming Sample Size, IFAS, Florida

Korathi, C., 2005. Research Methodology: Methods and techniques. 7th ed. New International publishers, Jaipur.

Kirschen, D. & Strbac, G., 2019. Fundamentals of Power System Economics. 1st ed. John Wiley & Sons, New Jersey

Kumar, R., 2008. *Research methodology.* 2nd ed. APH Publishing Corporation, New Dehli.

Limpopo Tourism Agency, 2017. The cultural adventure of Limpopo. [Online] Available at http://www.golimpopo.com/experience/tourist-routes/cultural-adventure-limpopo [Accessed 9 September 2017].

Mapedza, E., Van-Koppen, B., Sithole, P. & Bourblanc, M., 2016. Joint venture schemes in Limpopo Province and their outcomes on smallholder farmers livelihoods. ScienceDirect, Volume 92, pp. 92-98.

Ncube, B., 2017. Institutional support systems for small-scale farmers at the new forest Irrigation Scheme in Mpumalanga, South Africa: constraints and opportunities. South African Journal of Agricultural Extension, 45(2): pp. 1-13.

Paul, O., 2003. *Ethical and research process.* [Online] Available at: http://libguides.sun.ac.za/content.php?pid=426346andsid=3486771 [Accessed 9 September 2017].

Samila, S. & Sorenson, O., 2017. Community and Capital in Entrepreneurship and Economic Growth. SAGE Journal, 82(4): pp. 770-795.

Shakeel, N., 2013. *Data editing: In research methodology.* [Online] Available at https://www.slideshare.net/npshakeel/data-editing-in-research-methodology [Accessed 9 September 2017].

STATISTICS SOUTH AFRICA, 2017. *Quarterly Labour Force Survey.* [Online] Available at https://www.Statistics South.gov.za/publications/P0211/P02111stQuarter2017.pdf [Accessed 23 May 2019].

Zhou, Y., Morita, H. & Maruyama, Y., 2018. The measurement of productive performance with consideration for allocative efficiency. Elsevier, 5(2): pp. 1-19.

Zurano-Cervello, P. and Guillen-Gosalbez, G., 2018. Eco-efficiency assessment of EU manufacturing sectors combining input-output tables and data envelopment analysis following production and consumption-based accounting approaches. *Journal of Cleaner Production,* 174(10): pp. 1161-1189.

CHAPTER FOUR: DATA ANALYSIS

4. Introduction

The subsequent chapters' present data analysis guided by the objectives of the study. The first chapter presents results on the characterisation of small-scale commercial farming enterprises in Vhembe District Municipality and descriptive statistics were used to characterise small-scale commercial farming. Chapter five presents result on technical efficiency of small-scale commercial farming enterprises in Vhembe district. Stochastic Frontier Analysis was used to determine the combination of inputs used to produce a certain level of output. Chapter six presents the results on the economic contribution of small-scale commercial farming enterprises to the local economy in VDM. Chapter seven presents the results on the challenges limiting small-scale commercial farming productivity in the study area. Ultimately, chapter eight presents a synthesis of the study in which major findings of the study are discussed and recommendations are presented

4.1. Characterisation of Small-Scale Commercial Farming Enterprises in Vhembe District Municipality

The subsequent chapters' present data analysis guided by the on the characterisation of small-scale commercial farming enterprises in Vhembe District Municipality. Descriptive statistics were used to characterise small-scale commercial farming. Small-scale commercial farming is taken as an integral part of rural development strategy through its potential contribution towards the provision of employment, food security and income generation (Abdu-Raheem and Worth, 2011; DAFF, 2016a; FAO, 2017). The year 2014 was declared by the United Nations as the 'Year of Family Farming' in which small-scale commercial farming is expected to be a pillar for sustainable food and nutrition security and poverty reduction in rural areas (Abdu-Raheem & Worth, 2017; Sutherland & Andrew, 2017). However, these farmers are defined differently across the globe, which makes it difficult to fully comprehend these farmers and further yet to estimate their economic contribution to rural local economic development.

In China and India, small-scale commercial farming is delineated by their scale of production which is influenced by land size and methods of farming adopted (Zhigang, 2017; Tandi & Mawere, 2018). In Europe, the small scale commercial farming also known as agri-businesses, are characterized by the number of workers and land ownership (Zhigang, 2017).

In Africa, small scale commercial farming is described by a wide range of factors and this farming sub-sector is looked at from various angles, namely survivalists, emerging farmers, and smallholder farming (DAFF; 2016a; FAO, 2016a). what is not disputed is that the sub-sector is present in all African countries whose definition of the subsector seems to revolve around land size. For instance, in East Africa, small-scale commercial farming is defined as agricultural production carried out on pieces of land less than 10 hectares and selling much of their produce in local markets (Doss, 2018; Cox, 2018). In Southern Africa, small-scale commercial farming is characterized by the size of land size though there is no uniform hectarage of the land used by the subsector (Pienaar & Traub, 2015; FAO, 2016a). This lack of a uniform definition of what small scale commercial farming makes it difficult if not impossible to measure their economic contribution as well as to measure their level of technical efficiency across the globe.

Against this background, the current study analysed the activities of small-scale commercial farming in Vhembe District Municipality of South Africa by assessing their operations concerning gender, land size, type of farming and farming systems used. The analysis of the above-mentioned variables determined how such socio-economic characteristics of small-scale commercial farmers may assist in understanding their potential contribution to local economies. This provided possible areas of support to be directed in assisting their contribution to rural areas' economies.

4.2. Materials and Methods

4.2.1. Study area

The study was carried out in four municipalities of Vhembe District, Limpopo province which are Thulamela, Makhado, Collins Chabane, and Musina. More on the methodology is outlined in chapter three.

4.1.2. Study participants, data collection and analysis

A total of 235 small-scale commercial farmers in all four local municipalities in Vhembe District were considered during data collection. However, due to errors and omissions in some of the questionnaires, only 217 completed questionnaires were considered which translated to a response rate of 99%. According to Korathi, (2005), approximately 60% response rate is generally acceptable for quantitative study hence 99% response rate was considered excellent for the study. The collected data was captured and coded and analysed using SPSS

version 24 and excel version 2016 whereby descriptive and inferential statistics were used (See Chapter Three for a detailed research methodology).

4.3. Results and discussions

4.3.1. Gender dynamics of the Respondents

Gender is a significant determinant of performance and participation in farming as was also noted by Agarwal (2018) who established that generally, the global population of small-scale commercial farming is male-dominated. However, the results in Table 4.1 contradicts findings by Agarwal (2018) as there was a balanced representation of male and female farmers in Vhembe District Municipality (52 % male farmers and 48 % female farmers). This observation could be because historically, in South Africa like in the rest of Africa male farmers had an upper hand in access to productive land and other factors of production compared to female farmers who in most cases were relegated to the provision of labour. The changes could be due to government deliberate policies to address gender inequalities as well as the rural to urban migration trends that have seen most households in rural areas to be female-headed households as was also supported by the General Household Survey conducted by StatsSA in 2018.

4.3.2. Age of the participants

The age of a farmer is a major determinant of productivity in a farm enterprise as it influences the level of experience and knowledge stock of the farmer. The results in Table 4.1 show that on 7% of the respondents are 35 years and younger which concurs with the general observation that few young people are interested in farming businesses. Of all the respondents, 47% were between the ages 36-50 years, with 46% being 51 years and above. The study's observation that there are few youths involved in small scale commercial farming is worrisome given the high youth unemployment levels among the youth in South Africa. The DAFF (2016b) also observed that despite heavy investment in programmes to support youth involvement in agriculture, the youth are reluctant to start agribusinesses predominantly in rural areas. This is despite the assumption that youth participation in agribusiness can reduce unemployment in rural areas at the same, contributing to the growth of the rural economy.

4.3.3. Education Level of the respondents

The majority of the respondents have some formal education with 51% having at least a diploma, 31% having matric education, 15% having a degree and only 3% not having any formal education. The education level of a farmer is crucial as it has been positively associated with the level of skills and human capital needed to make informed decisions about farming. What can be deduced from the results on education is that the respondents in the study have the basic education needed to make informed decisions about the farming enterprises all other things being equal. The importance of education has also been supported by Agarwal (2018) who argues that farmers with a certain threshold of formal education are better placed to make informed decisions on how best to improve productivity at their farms. The results are contrary to observation in a study by Azadi *et al.,* (2016) whereby the majority of farmers in rural areas did not have formal education as the majority grew up in farming oriented households.

Table 4. 1: Demographic statistics for Small-scale Farmers

Variables	Categories	Frequencies	Proportion (%)
	Male	113	52
Gender	Female	104	48
Age (years)	≤35	15	7
	36 to 40	48	22
	41 to 50	54	25
	51 to 60	52	24
	61+	48	22
Education (Level)	No education	7	3
	Matric	28	31
	Diploma	111	51
	Degree	33	15

Source: Author's Survey 2019

4.3.4. Characteristics of small-scale commercial farming enterprises

Of all the respondents 53 % were practising mixed farming whereby they grow crops and keep livestock. Those practising livestock production were 24% of the total sample (13% being male and 12% being female) whilst those producing the only crop made up 23% of the sample size (12% being male and 11% being female). There was a fair representation in terms of gender though male respondents were slightly more than female in all types of farming. The gender dynamics among the studied small scale commercial farming shows that the involvement of women in farming is increasing as was also supported by findings by household survey report by StatsSA (2018). This trend was also noted by Chiputwa & Qaim (2016) who established that the number of female farmers is increasing perhaps due to policies to redress gender imbalances in terms of access to land. Other things being equal the full participation by women in smallscale commercial farming will go a long way in addressing gender inequality and the achievement of Sustainable Development Goals number 1, 2 and 5 as well as Zero Hunger Challenge of which South Africa is a signatory member.

Of all the respondents 77% (41% males and 36% females) practise farming throughout the year with the remaining being seasonal farmers. The remaining are dryland farmers who mainly practice rainfed farming and these are mainly in crop farming. The need for increasing the numbers of female farmers in small scale commercial farming has also been supported by FAO (2014) as a viable strategy to redress gender entrenched poverty, especially in rural areas. The farmers are practising mixed farming to diversify income sources as well as to spread the risk associated with farming. As was also established by MacAskill (2017), mixed farming experience less exposure to risk than mono-crop or livestock producers through risk spreading through engaging in both crop and livestock production. In terms of the period of farming, the results in the current study support Pienaar & Traub (2015); DAFF (2016b) who concluded that the majority of small-scale commercial farmers are all-year-round producers. Thus, it can be concluded that the farmers in the study practice mixed farming type of agri-business to mitigate against agriculture-related risk.

4.3.4.1. Agriculture Training

The majority of the farmers (63% of which 37% are males and 23% are females) did not receive any agriculture training. Subsequently, 37% (22% males and 15% female) received agriculture training. The implication is that the majority of the respondents still need training. The lack of training may have negative impacts on the level of technical efficiency of these respondents which will be fully explored in the chapters to follow. Agriculture training is a

cornerstone for productive farming (as it is positively associated with levels of technical and economic efficiency of farmers Carlucci & Schiuma, 2018). The lack of training negatively affects the skills levels which will be reflected by the inability to make informed decisions on allocating resources in combinations that will aid productivity. The results of the study support conclusions by Ferreira (2018) who investigated the difference between trained and untrained farmers. The study concludes that given that most the respondents are not trained, their technical efficiency levels could be low thereby justifying the need for more focused training that will lead to more productivity, which in turn contribute positively to rural economies. Source of income was found to be a significant characteristic in defining small-scale commercial farming. This is in line with Pienaar and Traub (2015); Biam *et al*. (2016); Carlucci & Schiuma (2018) who mentioned that the majority of rural farmers rely upon agribusinesses as a significant source of income. Thus, empowering and investing in rural women farmers as stated by FAO (2017), has shown a significant increase in productivity in rural areas.

4.3.4.2. Source of Income

The results in Table 4.2 show that most the farmers (88% of which males constitute 49% and females 39%) depend on farming and the major source of income. This is in line with the report by FAO (2019) which revealed that rural households depend on farming for income and employment. Furthermore, the results are in line with the General Household Survey by StatsSA (2018) which show that around 70% of rural households depend on agriculture for income generation hence survival. In this regard, small-scale farming plays a major role in the livelihood of rural households and the average land size was found to be 11 hectares per single farm (Table 4.2).

Table 4.2. Small-Scale Commercial Farming Socio-Economic Statistics

Variables	Descriptors	Proportion (%)	Gender disaggregation (%)	
			Male	Female
Farming type	Crop farming	23	12	11
	Mixed farming	53	27	25
	Livestock	24	13	12
Farming system	All year round	77	41	36
	Seasonal	23	11	12
Agriculture training	Trained	37	22	15
	Not trained	63	37	23
Major source of income	Farming income	88	49	39
	Off-farm income	12	8	4
Average land size		**10 hectares**		

Source: Author's Survey 2019

4.4. Land Ownership and Gender statistics

Land ownership is one of the contemporary issues in South Africa. While Women Economic Empowerment is advocating for women to be prioritised in land reform programmes, constitutional and international obligations still promote equality on both genders with regards to accessing fertile land (DNTSA, 2018). This is an indication of the value placed on land ownership for both genders. The study assessed land ownership against gender, and the results are presented in Table 4.3.

The majority of the farmers (55% of which 27% are female and 28% are male) are practising farming on community land. This shows that some farmers (male and female) do not own land on which they are currently farming. Subsequently, around 35% (17% females and 18% males) indicated that they are practising small-scale agribusinesses on freehold land. Furthermore, 10% (5% both males and females) are farming on leased land. The study concludes that the majority of the farmers (male and female) do not own land they are farming on. The results are in line with Ramutsindela *et al.,* (2016) who stated that the majority of households in rural areas practice farming on community land and this limits infrastructure development which in turn weighs down progressive small-scale commercial farming. Small-scale commercial farmers have been recognised as potential contributors to food security and employment (Agarwal, 2018). However, without land rights (ownership), it becomes a daunting task to invest and convert community land into productive, fertile land which can be beneficial to rural economies. Thus, without land ownership, small-scale commercial farmers are limited to produce. However, the report by DARD (2018) revealed that land ownership remains a sensitive fault for rural households residing in communities led by traditional leaders. As such, rural households practising commercial farming are caught up between the tribal authorities who control much of rural lands and the government's snail pace in land allocation negotiations in tribal areas.

Table 4. 3. Gender and Land Ownership Crosstabulation

GENDER	COMMUNITY LAND	LEASING	FREEHOLD	FREQ
FEMALE	59 (27%)	11 (5%)	36 (16%)	**106 (48%)**
MALE	62 (29%)	11 (5%)	38 (18%)	**111 (52%)**
TOTAL	121 (55%)	22 (10%)	74 (34%)	**n=217**
Asymp Sig: 0.002				

Source: Author's Survey 2019

4.5. Market Access

The results in Table 4.4 show that 13% (7% males and 6% females) of crop farmers sell much of their produce in local markets, and 10% (5% males and 5% females) extended to national markets. In terms of mixed small-scale commercial farmers, 37% (17% males and 17% females) sell in the local markets, and 20% (11% males and 8% females) extend to the national markets. As for livestock, small-scale commercial farmers, 16% (8% males and 8% females) are selling in local markets, and 3% (2% males and 1% females) are selling nationally. Noting the increase in the number of women in commercial agriculture as stated in GHS conducted by StatsSA in 2018, results show that women can contribute to the food supply in local and national markets. Subsequently, taking note of the modern market societies, Mbabu (2017) states that small-scale farming has increasingly produced for local markets, but the produces are not sold in formal markets such as Spar, Pick n Pay and boxer. These retail outlets get supplies a distribution network coordinated from the national offices. Similarly, the report by FAO (2017) states that small-scale farmers are adding value in the local markets and are finding it difficult to penetrate national markets due to economies of scale and food quality regulations. More so, issues such as the fact that transport costs and regulatory issues in the national markets, AgriSETA (2017) also mentioned that small-scale agribusinesses (at most 10 hectares) find it challenging to compete with large scale farmers (more than 10 hectares) who use economies of scale to outcompete new entries. However, selling in local markets has its advantages for small-scale agribusinesses.

The study shows that participating in local markets increases food supply in rural areas. This is in line with the report by FAO (2017) which stated that the importance of household farming in rural areas is the provision of food and nutrition security which enable sustainable local economic development in rural areas. Thus, small-scale commercial farmers are increasingly engaged in many interrelated markets, indicating that they can play an essential role in ensuring the availability of nutritious foods. Furthermore, the results of the study show that access to local markets makes it easy for these farmers to reduce transport costs which is essential for business growth (Loeper *et al*., 2016). Correspondingly, if small-scale commercial farmers are linked with buyers, they can contribute to food security and create more employment hence contributing to rural economies. In this regard, enhancing the market access of small-scale commercial farming, as stated by FAO (2016b) may improve the capacity of self-reliance and enable farmers to produce high-value products. Improving capacity and quality gives small-scale commercial farmers a competitive advantage in national and international markets.

Table 4. 4. Farming type and market access statistics

		LOCAL MARKETS	NATIONAL MARKETS	TOTAL
CROP FARMERS	Male	**16 (7%)**	**10 (5%)**	**50**
	Female	**14 (6%)**	**10 (5%)**	
MIXED FARMERS	Male	**37 (17%)**	**23 (11%)**	**115**
	Female	**37 (17%)**	**19 (8%)**	
LIVESTOCK	Male	**18 (8%)**	**9 (4%)**	**52**
	Female	**17 (8%)**	**8 (4%)**	

Source: Author's Survey 2019

4.6. Conclusion

This section revealed that the Thulamela municipality has the highest number of small-scale commercial farming. This is because the municipality has the highest number of households as compared to the other three municipalities and it has considerably good climatic conditions as compared to other municipalities. The increase in several small-scale commercial farming enterprises is also supported by the fact that the municipality is considered as the economic hub of the district and has farming depots which attract several farmers. Subsequently, there is gender balance in small-scale commercial farming in rural areas which shows that women participation in commercial farming has increasing defying the previous belief that men were dominating in small-scale commercial farming due to easy access to factors of production. Thus, the results of the current study states otherwise. The study thus concludes that small-scale commercial farming is characterized predominantly by full-time farmers, and the majority are farming throughout the year since agriculture is the major source of income for household survival. Furthermore, since the majority of the farmers are farming on freehold and community land and one different size of farms, the study concludes that land size and ownership are not reliable parameters to define small-scale commercial farming in South Africa, as it is the case the international level. More so, access to national and international markets mainly by female farmers seem to be stumbling block for market expansion. Since the majority of small-scale commercial farmers depend on farming as a source of income, the need to address challenges to market access is of paramount importance.

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References

Abdu-Raheem, K. and Worth, S., 2011. Household food security in South Africa: evaluating extension's paradigms relative to the current food security and development goals. South African Journal of Agricultural Extension, 39(2): pp. 91-103.

Abdul-Salam, Y. and Phimister, E., 2016. Efficiency Effects of Access to Information on Small-scale Agriculture: Empirical Evidence from Uganda using Stochastic Frontier and IRT Models. Journal of Agriculture Economics, 68(2), pp. 1-15.

Adenle, A., Manning, L. and Azadi, H., 2016. Agribusiness innovation: A pathway to sustainable economic growth in Africa. Trends in Food Science and Technology, Volume 59 (4): pp. 88-104.

Agarwal, B., 2018. Can group farms outperform individual family farms? Empirical insights. World Development, 108(28): pp. 57-73.

Agriculture Skills Education Training Authority, 2017. Sector analysis of Agriculture. [Online] Available at: http://www.agriseta.co.za/downloads/news/AGRISETA_Sector_Analysis_290610-version_2.pdf. [Accessed 9 December 2017].

Azadi, H., Samiee, A., and Hossein, M., 2016. Genetically modified crops and small-scale farmers: main opportunities and challenges. Critical Reviews in Biotechnology, 36(3): pp. 434-446.

Biam, C., Okerie, A. and Nwibo, S., 2016. Economic efficiency of small scale soyabean farmers in Central Agricultural Zone, Nigeria: A Cobb-Douglas stochastic frontier cost function approach. Journal of Development and Agricultural Economics, 8(3): pp. 52-58.

Carlucci, D. and Schiuma, G., 2018. The power of the arts in business. Journal of Business Research, 85(2018): pp. 342-347.

Cox, K., 2018. Economic Efficiency Comes by Sharing Profits. [Online] Available at: https://medium.com/@kevin_34708/economic-efficiency-comes-by-sharing-profits-6ed53f20cef7 [Accessed 1 August 2019].

Department of Agriculture Forestry and Fisheries, 2016a. Abstract of Agricultural Statistics. [Online] Available at: http://www.daff.gov.za/Daffweb3/Portals/0/Statistics%20and%20Economic%20Analysis/Statistical%20Information/Abstract%202016%20.pdf [Accessed 9 September 2017].

Department of Agriculture Forestry and Fisheries, 2017. *DAFF and Marine Living Resources Fund on their Annual Performance Plan; DPME input, with Minister.* [Online] Available at: https://pmg.org.za/committee-meeting/24290/?via=cte-menu [Accessed 5 September 2017].

Department of National Treasury South Africa, 2018. *Minimum wage.* [Online] Available at: http://www.treasury.gov.za/documents/national%20budget/2018/enebooklets/Vote%2012%20Statistics%20South%20Africa.pdf [Accessed 1 April 2019].

Doss, C., 2018. Women and agricultural productivity: Reframing the Issues. Development Policy Review, 36(1): pp. 35-50.

Food and Agriculture Organisation, 2014. A review of experiences of establishing emerging farmers in South Africa. [Online] Available at: http://www.fao.org/3/i1385e/i1385e.pdf [Accessed 17 July 2019].

Food and Agriculture Organisation, 2016a. Marketing and its role in economic development. [Online] Available at: http://www.fao.org/wairdocs/ilri/x5547e/x5547e16.htm [Accessed 9 August 2017].

Food and Agriculture Organisation, 2017. Water resource issues and agriculture. [Online] Available at: http://www.fao.org/3/t0800e/t0800e0a.htm [Accessed 16 July 2019].

Food and Agriculture Organisation, 2016b. International Guideline on Securing Sustainable Small-Scale Fisheries.. [Online] Available at ttp://www.fao.org/fishery/ssf/guidelines/en [Accessed 15 August 2017].

Korathi, C., 2005. Research Methodology: Methods and techniques. 7th ed. New International publishers, Jaipur:

Macaskill, C., 2017. *Animal husbandry.* 2 ed. s.l.: SAHB Publishing (Pty) Ltd.

Pienaar, L. and Traub, L., 2015. *Understanding the smallholder farmer in South Africa: Towards a sustainable livelihoods classification.* Milan, IOAE.

Ramutsindela, M., Davis, N. and Sinthumule, I., 2016. Diagnostic Report on Land Reform in South Africa Land Restitution. [Online] Available at: https://www.parliament.gov.za/storage/app/media/Pages/2017/october/High_Level_Panel/Commissioned_Report_land/Commissioned_Report_on_Land_Restitution_Ramutsindela_et_al.pdf [Accessed 2 July 2019].

Statistics South Africa, 2017. Category Archives: Work and Labour Force. [Online] Available at: http://www.statssa.gov.za/?cat=31 [Accessed 24 August 2017].

Statistics South Africa, 2017. Quarterly Labour Force Survey. [Online] Available at: https://www.statssa.gov.za/publications/P0211/P02111stQuarter2017.pdf [Accessed 23 May 2019].

Sutherland, L., Madureira, L., and Dirimanova, V, 2017. New knowledge networks of small-scale farmers in Europe'speripheryy. *ScienceDirect: Land Use Policy,* 63(20): pp. 428-439.

Tandi, C. and Mawere, M., 2018. *People-Centred Works Programmes: Astragey for poverty alleviation.* 1st ed. Langaa Research and Publishing Common Initiative Group, Bamenda.

Zhigang, X., 2017. *Smallholders in China: Past, Present, and Future.* [Online] Available at: http://www.oxfam.org.hk/filemgr/2946/smallholderreport_ENG.pdf [Accessed 19 March 2019].

CHAPTER FIVE: MEASURING TECHNICAL EFFICIENCY OF SMALL-SCALE COMMERCIAL FARMING ENTERPRISES IN VHEMBE DISTRICT MUNICIPALITY

5.1. Introduction

South African agriculture sector is dual, dominated by a well developed commercial farming sub-sector on the one hand and the communal farming sub-sector mainly practised by resource-poor small-scale commercial farmers (Dessale, 2019). Small-scale commercial farming is, however dominating in rural areas where about 70% of the most impoverished population are found (Dessale, 2019). The commercial sub-sector consists of large-scale farmers using well-advanced technology and machinery (Khapayi & Cellers, 2016). Small-scale commercial farming has been earmarked as a strategic sub-sector for inclusive growth in rural areas. As envisioned in South Africa's National Development Plan Vision 2030, Sustainable Development Goals 1 and 2, and Agenda 2063, small-scale commercial farming can play a significant role in rural development (AGRA, 2015; Casazza & Chulu, 2016; Dhlamini, 2017). Thus, improving small-scale commercial farming productivity can help to achieve the aforementioned national programs.

The productivity of small-scale commercial farmers continues to be very low compared with that of large commercial farmers (Khapayi & Celler, 2016). In Zambia, a study by Musaba and Bwacha (2014) on technical efficiency of small-scale maize production revealed that the majority of farmers in this band are inefficient. As such, there is potential for growth in maize production in Zambia. A study by Idgekele *et al.* (2018) revealed that rural farmers are found to be more technically efficient than farmers in urban areas in Nigeria. Even though farmers from urban centres have better access to production inputs such as fertilizers, rural farmers have relative large farms and were found to be more efficient (Idgekele *et al*., 2018). Furthermore, a study by Ngombe (2017) revealed that some regions in Zimbabwe were more technically efficient than in other regions. Regions with more maize production were found to be more efficient due to industry-wide specific environmental factors such as access to cheap inputs. However, regions with low efficiency had no access to cheap inputs which affected their production costs hence lower technical efficiency.

Elsewhere, economic contribution by small-scale commercial farming is dependent on their level of technical, allocative and economic efficiency. Considering the scale and ambition of the national programs as alluded by (Dhlamini, 2017), it is imperative to investigate the level of efficiency in this subsector so that recommendations can be made. There is a consensus

that the subsector's growth can make a significant impact on the inclusive green growth in terms of building strong economies and in the process reducing poverty, unemployment and nurturing natural resources (Moshi, 2014). Dhlamini (2017) also noted that the nature of rural poverty in most developing countries could only be addressed through strategic resource allocation and systematic use of resources in rural development. South Africa has managed to achieve its national commitment in line with CAADP of 2013 to invest at least 10% of its GDP towards agriculture sector (Agriculture Outlook, 2018; Market Intelligence Report (MIR), 2018). As such, small-scale commercial farming has been earmarked as one strategic sector for rural development (AGRA, 2017). However, there is limited information regarding small-scale commercial farming productivity in rural areas such as the VDM in Limpopo, South Africa.

Small-scale commercial farming productivity as the optimal use of resources can be regarded as a comprehensive way to reduce poverty, hunger and unemployment in rural areas (MIR, 2018). Introducing productive farming in small-scale commercial farming can help in achieving the expected impact, and this can be achieved if factors associated with inefficient farming among farmers are known and addressed as such. While several studies have been conducted across Africa, (Musaba & Bwacha, 2014; Ngombe, 2017; Dessale, 2018), no evidence supports the role of the small-scale commercial farming subsector. Thus, the study aimed to estimate the level of technical and economic efficiency of small-scale commercial farmers in the VDM.

5.2. Materials and Methods

This chapter follows the methods and models which are explained in chapter three. Study area, participants and data collection methods were carried out in the same manner as spelt out in chapter five. Data were also collected using surveys in which a structured questionnaire was used to collect quantitative data. A total of 235 small-scale commercial farming enterprises participated but only 217 were considered due to errors and omissions in some of the questionnaires and 92% response rate was attained in the study. However, a total sample size of 217 was attained as shown in equation 3.1 in chapter three.

5.2.1. Profitability of small-scale commercial farmers

A farm enterprise budgetary analysis was used to measure the profitability of all forms of farming in VDM. A budgetary was used as it shows the total costs (Variable costs and fixed costs) incurred by the farmers. The computed values in South African Rands were converted

to USD for international comparisons. Thus, all costs incurred, and revenue generated was further used to measure the technical efficiency of farmers as described in the succeeding sections. The Analysis of Variance (ANOVA) was further used to check if there are any cost variations amongst crop, mixed and livestock farmers in the study.

5.3. Data Analysis

5.3.1. Stochastic Frontier Analysis

In terms of technical efficiency, the study utilized a Stochastic frontier production approach to derive the potential output (total estimated revenue from the output produced) and corresponding Inputs (labour, utilities, seeds, pesticides, fertilizers etc.) used by both male and female farmers. Thus, technical efficiency on all small-scale commercial farmers was calculated using ratio analysis as described by Ngombe (2017);

$$TE = (X_n\,'G) / (X_i'\,G) \qquad (4.9)$$

Using the equations above, the study made use of ratio analysis (profitability ratio and financial ratios) in Microsoft Excel 2016 was used to compute the efficiencies of small-scale commercial farmers in VDM. The results were cross-tabulated using gender to check in there any differences between male-headed and female-headed small-scale commercial farming.

5.4. Results and Discussion

The efficiency of a farm/production unit can be measured as technical efficiency (maximising output from the lowest possible level of inputs). Thus, TE for small-scale commercial farmers is estimated in this section and gender is used as disaggregating variable since the ratio of women to men in this type of farming has increased. Furthermore, the study also sought check if there is any difference between female and male farmers in terms of productivity and profitability. Thus, to check the profitability and costs associated with small-scale commercial farming, an aggregate farm budgetary analysis was conducted.

5.4.1. Small-Scale Commercial Farming Budgetary Technique and Cost Returns

The establishments of farming budgetary techniques are crucial requirements for effective farming planning (FAO, 2018). The budgetary technique shows the revenues received by

farmers and the costs incurred when producing. Thus, the data obtained were analysed using budgetary techniques, and the results are presented in Table 5.1.

The results in Table 5.1 show results for small-scale commercial farming budgetary analysis. Considering the computed average costs incurred by small-scale commercial crop, livestock and mixed farmers, the results show that variable costs form the largest portion of the total cost. Small-scale commercial livestock farmers recorded the largest variable costs of 75%, followed by crop farmers (74%) and mixed farmers (67%). In terms of crop producers, costs of inputs (32%) recorded the largest costs followed by the cost of labour (17%). As for Livestock producers, household expenses recorded the highest cost in this type of farming. Mixed farmers' inputs cost recorded the highest (29%), followed by the cost of inputs (16%). As for fixed costs, the results in Table 5.1 show that the computed average costs are less than variable costs with the crop, livestock and mixed farmer computing 17%, 25% and 33% respectively. Thus, small-scale commercial farmers are incurring more costs from variable expenses rather than fixed expenses.

In terms of profits, crop farmers recorded an average positive profit of R4018 (USD 268) which marked the cost ratio of 0.029% and the gross ratio of 34.8%. Similarly, mixed farmers computed an average profit of R76 663 ($5110), which gave a cost ratio of 0.55% and the gross ratio of 1.8%. However, on average, livestock producers recorded a loss of R34 176 ($2277) and the household expenses (35%) accumulated the most considerable portion of variable costs. The variation on revenue generated may be linked to high variable costs across all types of small-scale commercial farmers in the study.

Considering that VDM is predominantly rural; the majority of the farmers uses intensive labour which may be the reason for high labour costs as shown in Table 5.1. Similarly, Dorward (2013) states that rural agriculture is highly dependable on family labour which is exacerbated by a lack of relevant capital to buy machinery. In this regard, the use of intensive labour for farming may seem feasible for small-scale commercial farming, but in turn, it leads to high variable costs which ultimately reduce the profits. Likewise, costs of inputs were also high across all types of farming.

Fertilizer, seeds and chemicals are essential for small-scale commercial farming, but the corresponding costs incurred are indeed leading to low-profit margins. Khapayi and Cellers (2016) state that high input costs are some of the limiting factors preventing emerging farmers from progressing to commercial agricultural farming. Thus, it is evident that small-scale

commercial farmers are affected by high input costs which limits them from developing their businesses. In turn, high variable costs have also affected their profitability as these costs are above 60% of the total costs incurred. Considered as such, Total Variable Costs formed the bulk of Total costs as compared to Total Fixed Costs which shows that small-scale commercial farming in VDM can be improved if these farmers are cost-efficient. The government and other private investors can invest in small-scale commercial farming to generate more income and create employment for rural dwellers. Considering the computed average cost ratio of 2.15 shows that an R1 investment into small-scale commercial farming can realize R2.15 returns. This may be achieved if the government subsidises the cost of inputs. In this regard, the study further assessed if there is any difference between the costs incurred by these farmers. The Analysis of Variance (ANOVA) was used, and the results are presented in Table 5.2 and 5.3.

The farming type was used as an independent variable and total costs as the dependent variable. The first step taken was to check sample information (descriptive statistics results). As shown in Table 5.2, the average score for the crop, mixed, and livestock farming of 112217, 112245, 123052 respectively are relatively equal. This shows that livestock farmers expressed more total costs as compared to mixed and crop farmers. In terms of mixed farming and crop, the computed average scores were relatively equally. However, all farming types means are in-between the lower and upper bound interval at 95% confidence level. All three types of farming had relatively equal means. The computed standard deviations of 54667 (crop), 65318 (mixed) and 64775 (livestock) show that the deviations between mixed and livestock farming. Table 5.3. shows the results for ANOVA, which measures if there is any statistical difference, the total costs incurred by these farmers. The computed p-value of 0.56 is greater than 5%. Hence, the study concludes that there is no statistical difference in total costs incurred by all types of farmers. This implies that small-scale commercial farmers incur relatively equal costs regardless of the type of farming practised.

Several factors have been identified in literature which prevents small-scale farmers from developing. The results support Khapayi and Celliers (2016), who revealed that high transaction costs which include high inputs and transport costs are hindering small-scale farmers from developing. Chauke *et al.* (2013) also stated that a lack of skills to interpret market information in small-scale farming is resulting in high operational costs in this subsector. The study concludes that high costs incurred in this sub-sector might be caused by a lack of financial skills. Therefore, the study further assessed entrepreneurial skills lacking in small-scale commercial farming and the results are presented in chapter 8.

Table 5. 1. Small-scale Commercial Farming Enterprise Budget

		CROP		LIVESTOCK		MIXED FARMING	
	Description	**Value (R)**	**%**	**Value (R)**	**%**	**Value (R)**	%
Variable Costs	Average labour cost	24 000 ($1600)	17	33 000 ($2200)	20	21 546 ($1436)	16
	Average inputs cost (Water, electricity, fertilizers, pesticides and seeds)	45 130 ($3009)	32	21 087 ($1406)	13	40 040 ($2669)	29
	Average utility cost	15 000 ($1000)	11	12 435 ($829)	7	17 865 ($1191)	13
	Average household Expenses	18 800 ($1254)	14	57 896 ($3860)	35	13 245 ($883)	10
	Average total Variable Costs	**102 930 ($6862)**	**74**	**124 418 ($8295)**	**75**	**92 656 ($6177)**	**67**
Fixed Costs	Average drawing costs	15780 ($1052)	11	19 876 ($1325)	12	34 532 ($2302)	25
	Average other fixed Costs (insurance, life insurance and credit payments)	21000 ($1400)	15	21 908 ($1462)	13	10 363 ($691)	8
	Average total fixed cost	**36780 ($2452)**	**26**	**41 784 ($2786)**	**25**	**44 895 ($2993)**	**33**
	Average total cost	139 710 ($9314)		166 202 ($4413)		137 551 ($9170)	
	Average total sales	143 728 ($9582)		132 035 ($8802)		214 214 ($14 281)	
	Gross Margins	2,79%		-25%		35,8%	
	Profit (ATR - ATC)	**R4020 ($268)**		**(-34167) ($2277)**		**76 663 ($5110)**	

Source: Authors Survey 2019

$ denotes United States Dollars (USD)

R denotes South African Rand (ZAR)

Exchange = R15 is equivalent to $1 (flexible exchange rate according to Reserve Bank of South Africa in October 2019)

Table 5.2.Total Cost variation in small-scale commercial farming

Farming type	N	Mean	Std. Deviation	Std. Error
Crop	50	112217.26	54664.988	7730.797
Mixed	116	112244.64	65318.487	6064.669
Livestock	51	123052.75	64775.189	9070.341
Total	217	114778.48	62783.744	4262.038

Source: Author's Survey 2019

Table 5.3. Total costs variation among mixed, livestock and crop farming

ANOVA					
Small-scale commercial farming total costs					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4564390256.094	2	2282195128.047	.577	.563
Within Groups	846864081826.100	215	3957308793.580		
Total	851428472082.194	217			

Source: Author's Study 2019

5.5. Analysis of Small-scale Commercial Farming Enterprises' Technical Efficiency

The computed statistics of TE estimates are presented in Table 5.4. The results show that the TE of small-scale commercial farmers ranges between 10.18 and 98.39, with an average of 54.25% (Table 5.2). The efficiency distribution level indicates that 41% of the farmers are in the category 31–50% TE level. Important to note is the gender dimension which shows that more male farmers (27%) are in the range of 31– 50% TE level compared to 17% of the female farmers. Concerning those having the lowest TE level (1-30%,) there are more male farmers (23%) compared to female farmers (12%) implying that female farmers'enterprises are more efficient given the same quantity of resources and working under same conditions. Similar trends were noted within the 51-70% TE level where there were more female farmers (11%) compared to 4% male farmers. Furthermore, within the 71-100%, TE level there were also more female farmers (7%) compared to male farmers (2%). To this end, the majority of the farmers (both male and female) are operating below the production frontier which shows that there is still more room to improve their production processes by 43.75% given the mean score of 43.75% and the available resources in VDM. Also, female farmers were found to be technically efficient as compared to male farmers. This shows that females optimally use inputs better than man. This reasoning is supported by Bailey *et al,* (2018) who states that females are regarded as good planners as compared to men taking into account women's daily experiences and their informal theorizing into account. Also, the results are in line with Department of Economic and Social Affairs report of (2009) which mentioned that women control economic resources better than men hence the application of resources for a productive use differ.

The results in Table 5.4 imply that small-scale commercial farmer's productive capacity factors could be influenced by their inability to utilise the available resources such as inputs, education, government subsidised inputs and financial support. However, most of the farmers were found to be technical inefficient (Table 5.4). The study results support, Lekunze and Luvhengo (2016); Glover and Jones (2019) surveys which revealed that the majority of emerging commercial farmers are technically inefficient. Also, Glover and Jones (2019) revealed that small-scale commercial farmers can improve their productivity through training on cost-effective methods in farming. To this end, the average technical efficiency mean as indicated above shows that there is room for female and male small-scale commercial farming to increase output through efficient use of resources at their disposal. The study further assessed technical efficiency to check the production state of small-scale commercial farmers in rural areas. The results are presented in Table 6.5.

Table 5.4. Distribution of technical efficiency of small-scale commercial farmers

TECHNICAL EFFICIENCY INTERVAL	GENDER	TOTAL	Proportion (%)
1 - 30	Male	49	23%
	Female	**27**	**12%**
31 - 50	Male	53	24%
	Female	**36**	**17%**
51 - 70	Male	8	4%
	Female	**23**	**11%**
71 - 100	Male	4	2%
	Female	**18**	**7%**
Mean = 54, 25			
Min = 24, 37			
Max = 98, 34			

Source: Authors Survey 2019

5.6. Determinants of Technical Efficiency

Table 5.5 shows the results for estimates of the frontier production function. the results were obtained using OLS estimates of the average production function for the sampled small-scale commercial farmers in VDM. The computed results revealed that aggregate small-scale commercial farming output is significantly affected by several variables. The Coefficients of farmers' age, education, land size, farming experience, labour, and government grants were positively associated with farm output at 5% level of significance. Subsequently, the likely hood ratio of production efficiency of the model of 76% had an asymptotic significance value of 0.01. This implies that at most 76% or the variation in the given variables is explained by the model. As such, the age of the farmer is usually associated with farm experience. Both age and experience were positively correlated to farm output. Since most of the farmers are above 41 years (Table 4.1). Thus, age may have contributed to the positive effect since these farmers are considered experienced due to many years of practising farming. Similarly, Omotayo *et al*., (2017) noted that farmer's experience is directly linked to the age and the higher the age, the more experienced the farmer becomes. Agarwal (2018) also conducted a comparative study between-group farms and individuals family farmers, and the results revealed that the age of the farmer contributed positively to both group farms and individual farms. Thus, the study concludes that age and farm experience are correlated and can positively influence farming productivity

Subsequently, education level is directly linked to skills acquisition. Since the majority of the farmer does have at least a certain form of education (See Table 4.1). Education is regarded as a significant element for productivity in farming since different skills such as farm management and bookkeeping are often taught in agrarian training. The results concur with Ferreira (2017) who states that there are positive returns to eduction in agricultural productivity and the overall value of farming produce. Similarly, Oduro-ofori *et al*. (2015) study revealed that as the educational level increases, farming output increases. Thus, the education level was found to be the third-highest variable which positively influences aggregate farm income.

In terms of land size, farm size is directly linked to bigger output since the farmer can cultivate different types of crops and livestock. Most rural farmers are practising farming on community and freehold land which in turn reduces the cost of production. Thus, land size can play a significant role in farming productivity. Rural farmers usually use cheap foreign cheap labour and family members to work on the farms. As such, the use of cheap foreign and family labour reduces the variable cost incurred by the farmer hence increases the returns to farm output.

Thus, as stated by Notle and Ostrernmier (2017), farmers target cheap foreign labour instead of local labour which is not formally recorded. This may be the reason for the high unemployment rate in rural areas due to unrecorded foreign labour. Most farms are employing cheap foreign labour, and the reluctance of youth to work in farms or start agribusinesses may be another reason for high youth unemployment rates in rural areas.

Government support is in the form of grants and subsidies inputs are regarded as cash injections in small-scale farming. Access to these grants means an increase in farm production finances hence may positively affect farm production leading to an increase in output. Financial support expedites Agribusinesses as it permits farmers to purchase inputs and cover operating expenses (World Bank, 2018). Accordingly, the results of the study show that government support and farmer's aggregate income are highly correlated. A study by Sumner (2019) on agricultural subsidy programs revealed that government intervention in farming is fundamental for farming development.

Table 5.5. Determinants of technical efficiency in small-scale commercial farming productivity

Variables	Coefficients	SE	T-static value	Sig. (p-value)
Age (years of the farmer)	0.6123	0.200	3.059	0.023
Education level	0.372	0.029	2.483	0.034
Household size	-0.047	0.083	0.566	0.231
Land size (hectare)	0.239	0.092	2.591	0.031
Farm experience (years)	0.347	0.154	2.253	0.047
Farm Labour (Monetary costs, ZAR)	0.453	0.198	2.543	0.021
Access to Credit	0.021	0.034	0.617	0.895
Government support	0.712	0.231	3.082	0.01
Likely hood ratio	0.76			
Asymp Sig:	0.01			

Source: Author's Survey 2019

5.7. Conclusion

The study revealed several outcomes regarding the efficiency of small-scale commercial farming in VDM. First, high costs of production are incurred by small-scale commercial farmers in VDM. These costs are mostly derived from variable costs. As for technical efficiency, the implication of the study on small-scale commercial farming productivity, the majority of the farmers are technically inefficient. Furthermore, majority of the farmers were also found to be economically inefficient. This is a true reflection of the fact that there is vast room for improvement in small-scale commercial farming productivity. The results on determinants of technical efficiency revealed that the age of the farmer, education level, farm experience, farm labour and government grants were found to have a significant positive effect on aggregate farm output. However, family labour and credit computed the least effect on farm output. The study concludes that small-scale commercial farming productivity can be improved through better allocation of the available resources, mainly land, labour and farm inputs. Access to better markets and training in farm management and marketing can improve productivity in small-scale commercial farming. In this regard, having identified the level of efficiency in this sector, the study further estimated the contribution of small-scale commercial farming to local economic development in VDM and the results are presented and explained in chapter seven.

References

Agarwal, B., 2018. Can group farms outperform individual family farms? Empirical insights. World Development, 108(8): pp. 57-73.

Agriculture Outlook, 2018. BFAP Baseline agricultural outlook 2018 - 2027, BFAP, Pretoria.

Alliance for Green Revolution in Africa, 2017. The Business of Smallholder Agriculture in Sub-Saharan Africa. [Online]. Available from: https://agra.org/wp-content/uploads/2017/09/Final-AASR-2017-Aug-28.pdf [Accessed 20 June 2019]

Bailey, B., Leo-Rhynie, E., and Morris, J., 2018. [Online]: Available from: https://www.idrc.ca/sites/default/files/openebooks/272-4/index.html [Accessed 20 June 2019]

Casazza, A. & Chulu, O., 2016. "Aligning the Sustainable Development Goals (SDGs) to the National Development Plan (NDP): Towards domestication of the SDGs in South Africa, Wits School of Governance, Johannesburg.

Chauke, P., Motlhatlha, M., Pfumaramba, T. & M, F., 2013. Factors influencing access to credit: A case study of smallholder farmers in the Capricorn district of South Africa. African Journal of Agricultural Research, 8(7): pp. 582-585.

Dessale, M., 2019. Analysis of technical efficiency of smallholder wheat-growing farmers of Jamma District, Ethiopia. Journal of Agriculture & Food Security, 8(1): pp. 2-8.

Department of Rural Development and Land Reform, 2016. Spatial Planning and Land Use Management: Rural Development, Department of Rural Development and Land Reform, Pretoria

Department of Land Reform South Africa, 2019. National Minimum Wage. [Online]. Available from: http://www.labour.gov.za/DOL/legislation/acts/national-minimum-wage/national-minimum-wage [Accessed 20 June 2019]

Dhlamini, L., 2017. Integrating agenda 2030 for Sustainable Development Goals (SDGs) into regional and national development plans and strategies, UNDP, Pretoria.

Dorward, A., 2013. Agricultural labour productivity, food prices and sustainable development impacts and indicators. Food and Agriculture Policy, 39(3): pp. 40-50.

Fraccascia, L., Albino, V. and Garavelli, C., 2017. Technical efficiency measures of industrial symbiosis networks using enterprise input-output analysis. International Journal of Production Economics, 183(2): pp. 273-286.

Ferreira, T., 2015. Does Education Enhance Productivity in Smallholder Agriculture: Causal Evidence from Malawi, Stellenbosch University, Johannesburg.

Food and Agriculture Organization, 2018. Budgetary control: [Online]. Available from: http://www.fao.org/3/w4343e/w4343e05.htm [Accessed 20 June 2019]

Glover, S. & Jones, S., 2019. Can commercial farming promote rural dynamism in sub-Saharan Africa? Evidence from Mozambique. World Development, 114(12): pp. 110-121.

Gwebu, J., 2018. Metafrontier analysis of commercial and smallholder tomato production: A South African case. Scielo, 114(7):pp. 55-68.

Idgekele, A., Daramola, A. & Falusi, A., 2018. Technical efficiency of small scale farmers: An application of the stochastic frontier production function to rural and urban farmers in Ondo State, Nigeria. International Economic Journal, 20(1): pp. 87-107.

Khapayi, M. and Celliers, P., 2016. Factors limiting and preventing emerging farmers to progress to commercial Agricultural farming in the King William's Town area of the Eastern Cape Province South Africa. Journal for Agriculture, 44(1), pp. 25-41.

Kem, S., 2017. Commercialization of Smallholder Agriculture in Cambodia: Impact of the Cassava Boom on Rural Livelihoods and Agrarian Change. Queensland, University of Queensland.

Lekunze, J. & luvhengo, U., 2016. Measuring Technical Inefficiencies in Small-scale Small Stock Production in Dr Ruth Segomotsi Mompatsi District, North-West Province, South Africa. Trends in Agricultural, 9(1-3): pp. 13-20.

Market Intelligence Report, 2018. Sustainable Agriculture. [Online]. Available from: https://www.greencape.co.za/assets/Uploads/GreenCape-Sustainable-Agriculture-MIR-FINAL-WEB-24-5-2018.pdf [Accessed 20 June 2019]

Moshi, H., 2014. Sustainable and inclusive growth in Africa: Industrialization a must. [Online]. Available from: http://www.tips.org.za/files/sustainable_and_inclusive_growth_in_africa_-_moshi.pdf [Accessed June 27 2019]. [Accessed 20 June 2019]

Musaba, E. & Bwacha, I., 2014. Technical Efficiency of Small Scale Maize Production in Masaiti District, Zambia: A stochastic Frontier Approach. Journal of Economics and Sustainable Development, 5(4): pp. 104-111.

Ngombe, J., 2017. Technical efficiency of smallholder maize production in Zambia: a stochastic meta-frontier approach. Agricultural Economics Research, Policy and Practice in Southern Africa, 21(3): pp. 347-365.

Notle, K. and Osternmeir, M., 2017. Labour Markets Effects of Large-scale Agricultural Investment: Conceptual Considerations and Estimated Employment Effects. World Development Journals, 98(12): pp. 430-446.

Oduro-ofori, E., Aboagye, P. A., Acquaye, N. and Aku, E., 2015. Effects of education on the agricultural productivity of farmers in the Offinso Municipality. [Online] Available at: https://www.researchgate.net/publication/281032030_Effects_of_education_on_the_agricultural_productivity_of_farmers_in_the_offinso_municipality [Accessed 23 June 2019]

Sumner, D., 2019. Agricultural Subsidy Programs. [Online] Available at: https://www.econlib.org/library/Enc/AgriculturalSubsidyPrograms.html [Accessed 23 June 2019].

World Bank, 2019. GINI index (World Bank estimate). [Online] Available at: https://data.worldbank.org/indicator/SI.POV.GIN [Accessed 27 March 2019].

CHAPTER SIX: ESTIMATING THE ECONOMIC CONTRIBUTION OF SMALL-SCALE COMMERCIAL FARMING ENTERPRISES TO LOCAL ECONOMY IN VHEMBE DISTRICT MUNICIPALITY

6.1. Introduction

Small-scale commercial agriculture is a sustainable strategy for the reduction of poverty and food shortages and inclusive local economic growth. South Africa still considers agriculture as one of the strategic arms for advancing development in rural areas as articulated in NDP 2030 (DAFF, 2016b; FAO, 2016a). The government through its local economic development programmes continue providing financial support to the sector through Micro Agricultural Financial Institutions of South Africa (MAFISA), Comprehensive Agricultural Support Programme (CASP) and LIMA-Rural Development Foundation (DAFF, 2016b). These programmes promote rural development through comprehensive agriculture financial support (DAFF, 2017). Thus, the South African government invested over R10 billion to finance Small-Scale Commercial Farming in rural areas across South Africa as from 2014 (Mpumalanga Provincial Government: MPG, 2016). Also, several government programs such as Agricultural Broad-Based Black Economic Empowerment (ABBBEE) were established to support rural-based small and large-scale commercial farmers who aim at contributing towards food security, job creation and poverty alleviation through income generation (AGRA, 2017; DAFF, 2016a). This shows that small-scale commercial farming has been considered as an economic drive to advance rural economies.

The government has been supporting small-scale farming subsector to reduce poverty and unemployment (ASSAF, 2016). Various reform measures implemented would, to some extent, contribute to agricultural growth through agriculture prices and income. Abdul-Salam and Phimister (2016) stated that non-pricing factors such as organizational and institutional factors are essential for small-scale commercial farming sustainability and inclusive agricultural growth. Thus, the efficiency of small-scale commercial farming is crucial for output growth, making use of the existing resources in the best manner. Dessale (2019) stated that if the existing resources could be used more resourcefully, which would yield the highest possible output for the given technological constraints. Therefore, the need to estimate the economic performance and contribution of the small-scale commercial farming to the rural economy is of paramount importance. Lack of performance information is crippling the comprehensive agrarian policies for

sustainable development in rural areas. The ongoing relentless efforts by the government of South Africa to end extreme poverty and hunger in rural areas through inclusive agriculture calls for immediate intervention.

6.2. Materials and Methods

This chapter follows the methods which are explained in chapter three. Study area, participants and data collection methods were also carried out in the same manner as spelt out in chapter three. A survey was used in which a structured questionnaire was used to collect quantitative data for four objectives of the study. A sample size of 217 small-scale commercials was considered in the study. Upon completion of data collection, the data was captured by IBM SPSS version 24 and Microsoft Excel 2016.

6.3. Data Analysis

6.3.1. Estimating economic contribution for small-scale commercial farming to rural local economic development

To estimate the economic contribution of small-scale commercial to local economic development, the study used descriptive statistics to measure the average number of employees per farm. The IBM SPSS version 24 was used for descriptive statistics. Subsequently, to estimate the economic contribution of small-scale commercial farming, ratio analysis is a common statistical analysis that is usually used to estimate the performance of a firm or any sector in and economy. Furthermore, fixed change ratio analysis was used to estimate the employment and income contribution by small-scale commercial farmers in VDM. Multilinear regression analysis was used to estimate the relationship between GDP in VDM and total farm expenditures. The ANOVA was also used to check if there are any variations in the estimated contributions among crop, livestock and mixed farming**.**

6.3.1.1. Fixed coverage ratio analysis

Fixed covered ratio analysis estimates the change in the predictor variable holding the control variable constant. Fixed coverage ratio model is presented as follows;

$$\mathbf{Y = (m/x)\ x\ 100}$$

Where;

Y denotes the estimated change

m denotes the predictor variable

x denotes the control variable

thus, to estimate the economic contribution in terms of employment and income generated, the study employed equation

$$A = (r^x/n\,B) \times 100$$

Where;

A denotes the % contribution (employment and income generation)

r denotes total employment (for employment statistics) or total revenue (for overall contribution to GDP in VDM) by small-scale commercial farming

n denotes constant employment statistics in base year / GDP in the base year in VDM

x denotes change in total employment / income at 5% - 50%

6.3.2.2. Linear regression model

The linear regression model used is expressed as follows;

A multiple linear regression model with m predictor variables X_1, X_2, X_3…….X_m

$$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots\beta_m x_m + \mu \qquad (7.1)$$

Where;

Y denotes Gross Domestic Product in VDM

$\boldsymbol{\beta_o}$ denotes the intercept

$\boldsymbol{\beta_1 - \beta_m}$ denote the regression coefficients

$\boldsymbol{X_1 - X_{mb}}$ denote predictor variables

Thus, the multiple linear regression model after infusing the predictor variables comes;

$$GDP = \beta_o + \beta_1 expS + \beta_2 expIn + \beta_3 expUB + \beta_4 AC + \mu \quad (7.2)$$

Where;

expS denotes expenditure on Salaries

expIn denotes expenditure on inputs

expUB denotes Expenditure on Utility bills

AC denotes access to credit

μ denotes the error term

6.4. Results and Discussion

This section presents results on employment and income contribution by small-scale commercial farmers in VDM. The overall contribution on the district level was presented thereafter.

6.4.1. Small-scale Commercial Farming Employment Statistics

The results in Table 6.1. show that on average, each farmer is employing at least 91 employees annually. The employees are sourced from family and community members who usually are foreigners looking for employment in rural-based farms (Bennett *et al*., 2015). Table 6.2 presents results on small-scale commercial farming employment contribution to local economic development in VDM. A community survey conducted by Statistics South Africa revealed that a total of 339 347 employees were registered in 2017. In the same year, a total of 19800 employees was derived from the sample frame of 217, which translated to 6% of total employment in VDM. Taking note of Technical efficiency mean of 54,25 (Table 5.4) shows that there is room for improvement in this subsector. Thus, if efficiency increases by 15% in small-scale commercial farming, contribution to employment increase by 1%. An increase in efficiency by 30%, contribution to employment increases by 2%. Furthermore, a 50% increase in efficiency, contribution to employment increases by 3% using the resource currently available in this subsector.

The computed results in Table 6.2 show that small-scale commercial farming can play a significant role in reducing unemployment in rural areas considering the current level of efficiency. Increasing investment in access to inputs, productive land and government support, improves production efficiency in small-scale commercial farming. As such, small-scale commercial farming subsector can contribute positively to employment creation. The results support Abdul-Salam and

Phimister (2016); Glover & Kusterer (2016); Chinamasa, (2017) stated that small-scale agribusinesses that co-exist in rural areas can reduce unemployment in the local economy. Also, considering the NDP's vision for growth and employment (Glover and Kusterer, 2020), small-scale commercial farming can achieve employment creation, decent work and sustainable livelihoods in local economic development. In this regard, the current study concludes that small-scale commercial farming can be a sustainable vehicle to drive local economic development through employment creation in rural areas. The study further assessed if there is any difference in employment contribution between crop, mixed and livestock farming, and the results are presented in Table 6.3 and 6.4).

Descriptive statistics results show that the computed means are relatively equal. Table 6.3 shows that the average scores of 13.88 for crop farming, 12.88 for mixed farming and 13.41 for livestock farming are slightly different but close to each other. As such, a one-way ANOVA test was conducted to check if the difference between the means is statistically significant. The computed sig-value of 0.682 is greater than 5% significance level, and it is concluded that all farming types have equal means; therefore, there are similar employment creation competences.

Employment creation has been one of the priorities in many developing countries. In South Africa, the government came up with several programmes such as Employment Promotion Programme (EPP), Broad-Based Black Economic Empowerment (BBBEE) and Agro-Processing Support Schemes (APSS) (Adenle *et al.,* 2016). Considering the mandate of the above-mentioned programmes, the results of the study show that small-scale commercial farming can create more jobs in rural areas since there is still room for production improvement in this subsector. Furthermore, the results of the current study are in line with Aliber & Mdoda (2015), who revealed that small-scale farming businesses in rural areas can create decent jobs given the current level of efficiency.

Table 6.1. Employment contribution

Employment measuring parameters	Mean	Minimum	Maximum	St Div.
Family members	3	2	8	4.15
Community employees	4	3	15	5.36
Permanent employees	9	1	15	4.71
The total average number of employees per farm = 13				
n = 217				

Author's Survey 2019

Table 6.2. Small-scale commercial farming contribution to employment in VDM

Parameters		Assuming that technical efficiency increases by;			
Base Year Statistics		**5%**	**15%**	**30%**	**50%**
Small-scale commercial farming employment statistics	19800*	20790	22770	25740	29700
VDM municipality total employment statistics	339 347**	990***	2970***	5940***	9900***
Employment contribution	**6%**	**6%**	**7%**	**8%**	**9%**

Author's Survey 2019 with 2018 as the base year

*denotes Small-scale commercial farming total employment calculated as the average number of employees per farm X estimated number of small-scale commercial farmers in VDM Municipality.

****** denotes total employment in VDM Municipality using 2018 as the base year.

******* denotes a proportional increase in employment if technical efficiency increases by 5% - 50% ceteris Paribas.

Table 6.3. Employment contribution variation in small-scale commercial farming

Farming type	N	Mean	Std. Deviation	Std. Error
Crop	76	13.88	6.654	.941
Mixed	91	12.88	7.071	.657
Livestock	50	13.41	6.989	.979
Total	217	13.24	6.939	.471

Source: Author's Survey 2019

Table 6.4. ANOVA of total employment created by small-scale commercial farming

Employment contribution mixed, crop and livestock farming					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	37.071	2	18.535	.383	.682
Within Groups	10361.943	215	48.420		
Total	10399.014	217			

Source: Author's Survey 2019

6.4.2. Contribution to farmers' Income

Small-scale commercial farming revenue generation involves the total proceeds produced by a farmer which adds up the overall income in each geographical location. Thus, the study estimated the income generated by small-scale commercial farmers and estimated the proportion of GDP in VDM. Agriculture in this district plays a significant role in household livelihoods.

As noted in Table 6.5, 5% (11), respondents could generate income below R5000,00 per month. Subsequently, at most 51% (109) farmers earn between R5000 and R10 000 and 42% could generate income between R10000 and R20000 and 6% could earn more R20000 per month. This shows that most small-scale commercial farmers are earning more than the minimum wage thresh hold in South Africa. However, the results of the current study contradict General Household Survey conducted by StatsSA (2018) revealed that farming led households in rural areas earn an average monthly income less than the national minimum wage rate of R3000 per month. Furthermore, the results of the current study contradict Khaphayi and Celler (2016) who mentioned that small-scale commercial farmers are not capable of running productive farming hence unable to earn a decent income. As such, the current study further assessed the income contribution on GDP in VDM.

6.4.3. Small-scale commercial farming Income contribution on District level

The results in Table 6.6 revealed that on average small-scale commercial farming subsector contributes around 9% of GDP in VDM. The calculated technical efficiency mean of 54% (Table 5.2), shows that there is room to improve efficiency by 46% in this subsector. As such, increasing efficiency in small-scale commercial farming by 5%, the total GDP in VDM increases by 1% (R4 526 880 / $301 792). Holding GDP in VDM constant, a 10% increase in efficiency results in GDP increasing by 2% (R13 580 640/ $905 376). Furthermore, the results revealed that if technical efficiency by 30%, GDP increases by 3% (R27 161 280/ $1 810 752). Eventually, increasing efficiency by 50%, GDP increases by 5% (R45 268 800/ $3 017 920).

There is potential to improve the productivity of small-scale commercial farming, which in turn can lead to increase returns to the farmer in the form of income. As noted from the results above, if productivity increases due to either better resource application of production processes, total income per farm is expected to increase. In this regard, considering a 46% possible room of

improvement, small-scale commercial farmers may contribute significantly to income generation in VDM. This, in turn, supports results support the National Youth Policy report in 2018 which speaks to the role of small-scale farming role in economic transformation, inclusive growth and decent income in the South African economy. Ultimately, the results of the study also support Adenle *et al*., (2016) who stated that investing in small-scale commercial farmers may significantly improve local economic development through income generation and food security in marginalized areas. As such, the study further assessed the relationship between small-scale commercial farming expenditure and GDP in Vhembe District. The study further assessed if there is any difference between the revenue generated by livestock, crop and mixed farming. Descriptive statistics and ANOVA were used, and the results are presented in Table 6.7 and 78, respectively.

Descriptive statistics in Table 6.7 show that mixed farming computed the highest mean of 160088.79 followed by livestock with a mean score of 149224.49. Crop farmers computed the least mean score of 141552.30. The computed means among the farmers are not equal (Table 6.7). To confirm if the revenue generated was indeed not equal, the ANOVA test was used, and the results are presented in Table 6.8. The computed p-value of 0.22 is greater than 5% significance level; hence the study concludes that there is no statistical difference in revenue generated among all types of farmers. The results support FAO (2016b) report on the characterisation of mixed farmers which revealed that mixed farming is most profitable and commonly practised agribusiness across the world. Despite the advantages such as reduced risk, the spread of labour and re-utilizing resources (Cox, 2018), the results of the study show that revenue generated among all types of agribusinesses are not statistically different. In this context, the study concludes that small-scale commercial farming is generating relatively equal revenue considering the level of production capacities.

Table 6.5. Financial contribution: (Average Monthly Income)

Interval (ZAR)	Proportion (%)
<R5000,00 (<$333)	5
R5000 - R10000 ($333 - $667)	51
R10001 - R20000 ($667 - $1333)	41
R20001 ($1400) +	3
Average monthly income per farm = R14 813 ($988)	

Source: Author's Survey 2019

Table 6.6. Small-scale commercial farming income contribution to GDP

Parameters	Base year statistics	Assuming that technical efficiency increases by;			
		5%	15%	30%	50%
Income generated by small-scale commercial farmers	R90 537 600* $6 035 840	R95 064 480 $6 337 632	R104 118 240 $6 941 216	R117 698 880 $7 846 592	R135 806 400 $9 053 760
VDM GDP	R975 423 764** ($65 028 250)	-	-	-	-
Contribution to GDP VDM	9%	10%***	11%***	12%***	14%***

Source: Author's Survey 2019 using GDP in 2018 as the base year

* denotes Small-scale commercial farming total income calculated as;

(The average income per farm X the sample size).

**the proportional increase in income, assuming that small-scale commercial farming efficiency increases by 5% -50% *ceteris paribus*.

***denotes GDP in VDM as reported by Regional Explore (2018).

Table 6.7: Mean scores revenue variation in small-scale commercial farming

Farming type	Total Revenue			
Farming Type	**N**	**Mean**	**Std. Deviation**	**Std. Error**
CROP	76	141552.30	89908.215	12714.942
MIXED	91	160088.79	116377.283	10805.359
LIVESTOCK	50	132035.29	75313.010	10545.931
Total	217	149224.49	102490.277	6957.493

Source: Author's Survey 2019

Table 6. 8. ANOVA of revenue generated by small-scale commercial farming

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31703853682.117	2	15851926841.059	1.516	.222
Within Groups	2237215619362.120	214	10454278595.150		
Total	226891947304.240	216			

Source: Author's Survey 2019

6.4.4. Small-scale commercial farming expenditure in Vhembe District Municipality

Small-scale commercial farmers have increased in number over the past decade in VDM (DARD, 2018). This increase is attributed to households coming up with different means to generate income and employment. To run a productive business, expenditure on inputs, salaries and a day to day activities is essential for the success of the business. While that is the case for the business, the economy benefits from consumption by these farmers through income generation to firms supplying different inputs. Also, expenditure on salaries increases household for employees in this subsector. Increase in disposable income leads to an increase in consumption and turn, demand is created, which is good for an economy. Thus, the current study assessed the effects of small-scale commercial farming expenditure on salaries, inputs and access to credit on GDP in VDM and the results are presented in Table 6.9.

Table 6.9 presents regression output on farm expenditure and GDP in VDM. Considering the computed R-squared value of 0.51 explains that at most 51% variance of GDP in VDM is explained by the predictors given in Table 6.5. Subsequently, a *p*-value of 0.0023 shows that the joint effect of the dependent variable (GDP) and the corresponding predictors is statistically significant; hence the results can be interpreted. First, expenditure on salaries for farm workers was found to be statistically significant since the computed *t-statistic* value of 12.311 is higher than three. Thus, a 1% increase in expenditure on salaries leads to an increase in VDM GDP by 1.1% and it can be concluded that expenditure on salaries by small-scale commercial farmers in VDM. Similar results were computed on expenditure on inputs since the computed t-statistic of 4.775 is greater than two; hence the results are statistically significant. As such, a % increase in farmers expenditure on inputs may lead to a 1.3% increase in GDP in VDM. This confirms the fact that an increase in several farmers and support in small-scale agribusinesses may positively contribute to the overall GDP in VDM.

Expenditure on credit results are statistically significant; hence a 1% increase in credit expenditure leads to a 1.1% increase in overall GDP in VDM. In this regard, it can be concluded that small-scale commercial farming credit facilities enable farmers to increase their production levels and capital which is usually not used in banks can, however, used productively in agri-business. Conclusively, it can be deduced that small-scale commercial farming in rural areas is positively contributing to GDP in VDM through expenditure on variable costs.

Table 6.9. Regression analysis for Small-scale commercial expenditure and GDP

Variables	β	Standard Error	t-statistic	Prob
Expenditure on Salaries	1.108	0.09	12.311	0.001
Expenditure on Inputs	1.318	0.276	4.775	0.032
Expenditure on Utility bills	1.209	0.932	1.297	0.654
Access to Credit	1.12	0.301	3.7209	0.021
$R^{2 =}$ 0.51 F-statistic = 29.3163; DW stat = 1.68814				

Source: Author's Survey 2019

6.5. Conclusion

Estimating the economic contribution of small-scale commercial farmers was conducted in four successive sections. The first segment estimated small-scale commercial contribution to employment creation in VDM. The results revealed that small-scale commercial farmers are significantly contributing to current employment creation in VDM. Increasing investments in this subsector can increase employment creation in rural areas. This is in line with SDG No. 8, which speaks to creating decent work and economic growth. In terms of income contribution, it is concluded that small-scale commercial farmers are generating income in rural areas and if the government increases financial support to these farmers, it can lead to increase the level of income generated hence positively impacting GDP in VDM. The majority of small-scale commercial farmers earns income higher than the minimum wage rate of R3000 in South Africa. Comparatively, small-scale commercial farmers can generate income which can sustain their families hence fulfilling the Economic Transformation Inclusive Growth Agenda in South Africa. Ultimately, expenditure on production activities by small-scale commercial farmers was found to have a positive effect on to GDP in VDM. This is a clear indication that small-scale commercial farming can improve local economic development in the VDM in Limpopo Province.

References

Abdul-Salam, Y. and Phimister, E., 2016. Efficiency Effects of Access to Information on Small-scale Agriculture: Empirical Evidence from Uganda using Stochastic Frontier and IRT Models. Journal of Agriculture Economics, 68(2): pp. 1-15.

Academy of Science South Africa, 2016. Poverty reduction proceedings report, Pretoria: Academy of Science of South Africa.

Adenle, A., Manning, L. and Azadi, H., 2016. Agribusiness innovation: A pathway to sustainable economic growth in Africa. Trends in Food Science and Technology, 59(8): pp. 88-104.

Aliber, M. and Mdoda, L., 2015. The direct and indirect economic contribution of small-scale black agriculture in South Africa. Agricultural Economics Research, Policy and Practice in Southern Africa, 54(2): pp. 18-37.

Alliance for a Green Revolution in Africa, 2018. Africa agriculture Status report 2018, Nairobi: AGRA

Charmes, J., 2019. Trends and Characteristics of the Informal Economy and Its Components. 2nd ed, Springer, Cham.

Chinamasa, G. F., 2017. Zimbabwe's evolving farming systems: contract-farming and alternative. [Online] Available at: http://scholar.sun.ac.za/handle/10019.1/101952 [Accessed 24 August 2017].

Cox, K., 2018. Economic Efficiency Comes by Sharing Profits. [Online] Available at: https://medium.com/@kevin_34708/economic-efficiency-comes-by-sharing-profits-6ed53f20cef7[Accessed 1 August 2019].

Department of Agriculture Fishery and Forestry, 2017. DAFF & Marine Living Resources Fund on their Annual Performance Plan; DPME input, with Minister. [Online] Available at: https://pmg.org.za/committee-meeting/24290/?via=cte-menu[Accessed 5 September 2017].

Dessale, M., 2019. Analysis of technical efficiency of smallholder wheat-growing farmers of Jamma District, Ethiopia. Journal of Agriculture and Food Security, 8(1): pp. 2-8.

Food and Agriculture Organisation United Nations, 2016. *International Guideline on Securing Sustainable Small-Scale Fisheries.* [Online] Available at: http://www.fao.org/fishery/ssf/guidelines/en [Accessed 15 August 2017].

Glover, D. and Kusterer, K., 2016. Small Farmers, Big Business: Contract Farming and Rural Development. 12th ed. Palgrave Macmillan, New York.

Kem, S., 2017. The commercialisation of Smallholder Agriculture in Cambodia: Impact of the Cassava Boom on Rural Livelihoods and Agrarian Change. Queensland, University of Queensland.

Khapayi, M. & Celliers, P., 2016. Factors limiting and preventing emerging farmers to progress to commercial Agricultural farming in the King William's Town area of the Eastern Cape Province South Africa. Journal for Agriculture, 44(1): pp. 25-41.

Mpumalanga Provincial Government, 2016. Comprehensive Rural Development Programme (CRDP). [Online] Available at: http://www.mpumalanga.gov.za/projects/crdp.htm[Accessed 23 November 2017].

Organisation for Economic Corporation and Development, 2018. Science and innovation: South Africa. [Online] Available at http://www.oecd.org/southafrica/sti-outlook-2012-south-africa.pdf
[Accessed 27 March 2019].

Reilly, G. O., 2019. Sustainable Development: Vulnerability and Crises. 2nd ed. Springer, Cham

Rogan, M., Miller, J., Lindsay, P. & McNutt, W., 2018. Socioeconomic drivers of illegal bushmeat hunting in a Southern African Savanna. Journal of Biological Conservation, 226(2018): pp. 24-31.

Schumpeter, J., 2017. *Theory of Economic Development.* 1st ed. New York: Routledge.

Statistics South Africa, 2017. *Category Archives: Work and Labour Force.* [Online] Available at: http://www.Statistics South Africa.gov.za/?cat=31 [Accessed 24 August 2017].

Wily, L. A., 2018. Compulsory Acquisition as a Constitutional Matter: The Case in Africa. *Journal of African Law,* 62(1): pp. 77-103.

World Atlas, 2019. *Countries Most Dependent on Agriculture.* [Online] Available at: https://www.worldatlas.com/articles/countries-most-dependent-on-agriculture.html [Accessed 27 March 2019].

World Bank, 2019. *Agriculture, forestry, and fishing, value added (% of GDP).* [Online] Available at: https://data.worldbank.org/indicator/nv.agr.totl.zs
[Accessed 27 March 2019].

CHAPTER SEVEN: THE CHALLENGES LIMITING SMALL-SCALE COMMERCIAL FARMING PRODUCTION EFFICIENCY

7.1. Introduction

The world's food security has been squeezed by the rising population and strenuous shifts in agriculture production. While food demands are increasing, the pressure is upon the governments to realise means to improve food security. Small-scale commercial farming has been identified as one important sub-sector in achieving SDGs number 1 and 2 (FAO, 2017; UNDP, 2017). Issues revolving around eradicating extreme poverty, hunger, and reducing unemployment make small-scale commercial farming a strategic subsector to improve livelihoods in rural areas (Ascher and Mirovitskaya, 2017). In 2014, (the year of agriculture in Africa), several African countries committed to investing at most 10% of their annual Gross National Income into agriculture sector (FAO, 2017; AGRA, 2017).

The importance of small-scale commercial farming in contributing to food security and employment creation has been reflected in its prioritisation in the development agendas for most African countries. Agriculture oriented programmes such as The Comprehensive African Agricultural Development Programme (CAADP) is an integral part of the New Partnership for Africa's Development (NEPAD) envisioned small-scale commercial farming as a significant player towards food security, income generation and employment creation (FAO, 2017). Furthermore, small-scale commercial farming has been identified as a vital agribusiness for inclusive economic development in rural communities (Abdul-Salam and Phimister, 2016; Biam *et al*., 2016). Thus, Small-scale commercial farming is regarded as a significant player in developing countries.

The South African government committed to investing 10% of its gross national income into the agriculture sector after the Malabo declaration in 2014 (FAO, 2017). This found expression in the Zero Hunger Challenge, Agenda 2063, SDGs and National Development Plan 2030. As such, small-scale commercial farming has been recognized as an economic transformation path. The Department of Agriculture, Forestry and Fishery (DAFF) through Micro Agricultural Financial Institutions of South Africa (MAFISA) injected over R10 billion to finance small-scale commercial farming in rural areas across South Africa ever since 2014 (DAFF, 2017). Despite the efforts by the South African government to end extreme poverty through commercial farming, there are

several challenges faced by small-scale commercial farming in rural areas. Several agronomic constrictions such as lack of farming entrepreneurial skills, drastic climate change, drought, lack of access to capital and water shortages are central constraints identified and affecting the development of small-scale commercial farming (Mpandeli and Maponya, 2014; Ferreira, 2017). The aforementioned challenges are linked to lack of intellectual skills to use the available resources by small-scale commercial farmers (Adeyemo *et al.,* 2010; Ncube, 2017). The study assessed different challenges and entrepreneurial constraints faced by small-scale commercial farmers in VDM.

7.2. Study area and methods

The study was conducted in Vhembe District Municipality which is constituted of four local municipalities (Makhado, Thulamela, Musina and Collins Chabane). A correlational descriptive research design which is quantitative was used. Qualitative data was collected using a structured questionnaire and a sample size of 217 farmers was selected. Cluster sampling method was used to select the respondents to the study. First, four municipalities in Vhembe District were divided into clusters and purposively selected depending on the type of farming practised (small-scale mixed, crop and livestock farming). Second, since the target population small-scale farmers producing for the market were further purposively selected based on the farming motive[5] and type of farming practised.[6] Third, respondents were randomly selected with Thulamela having 74, respondents Makhado 52, Collins Chabane 50 and Musina 41 giving a total sample size of 217. Subsequently, structured questionnaires were used to collect data in different phases. The first phase involved a pilot study (information seeking and testing the survey instrument) in which primary data was collected from few randomly selected farmers across Vhembe District using structured questionnaires and secondary data (location, contact details and types of farmers in Vhembe District) was obtained from DARD database in Thulamela municipality. The collected data from phase one was objectively pretested and a structured questionnaire was constructed to meet the objectives of the study.

[5] Small-scale farmers were selected as study respondents

[6] Small-scale mixed, pure crop and pure livestock farming

7.3. Data analysis

The data were subdivided into three sections, socio-economic characteristics[7], farming statistics[8] and enterprise budget[9], farming entrepreneurial skills and challenges section. To identify the challenges faced by small-scale commercial farmers, descriptive statistics were used in which the computed means were ranked using Friedman Mean Ranking method in Microsoft excel 2016. The variable with the lowest mean was regarded as the most faced challenge and was scored as one while the least experienced challenge with the highest mean score was scored as ten. Subsequently, the study employed a multiple response technique to rank the entrepreneurial skills lacking in small-scale commercial farming in which binary responses were used in this regard. Pearson Chi-square was also used to check the association between the skills lacking and challenges experienced by these farmers.

7.4. Results and Discussion

Quantitative data was captured and analysed to identify economic challenges and entrepreneurial constraints faced by small-scale commercial farmers in VDM. First, descriptive statistics were carried out to derive the means for the variables used. The study employed the Friedman Test ranking method using Microsoft excel 2016 was then used to rank the computed means in ascending order starting from the lowest mean as number one until the last one as number 10. The challenge ranked number 1 signifies the most experienced and pressing challenge in small-scale commercial farming. The results are presented in Table 7.1 (economic challenges) and 8.2 (entrepreneurial challenges). Thus, the subsequent section presents results on economic challenges faced by small-scale commercial farming.

7.4.1. Economic challenges faced by small-scale commercial farming

This section presents the results on the Friedman Test for economic challenges experienced by small-scale commercial farming (Table 7.1) Considering the computed Asymptotic Significance of 0.0012 which is less than 0.05, thus, the study concluded that the computed means were not equal. Financial challenges computed the lowest mean (2.1), hence, the most experienced constraints by small-scale commercial farmers. Subsequently, water challenges were ranked

[7] Gender, education level and marital status

[8] Land ownership, agriculture training, farming type, farming season and nature of employment.

[9] Farming inputs, expenses and income.

second with a mean score of 2.8, hence the subsequent experienced economic challenge by small-scale commercial farmers. Furthermore, access to the market challenge was ranked third with a mean score of 4.6 and access to information as fourth with a mean score on 4.7. Consequently, electricity with a mean score of 8.5 and theft 8.6 was the least experienced economic challenges by small-scale commercial farmers in VDM. Having identified economic challenges calls for strategic intervention such as government handouts and training were possible. Thus, the study further assessed entrepreneurial skills lacking in small-scale commercial farming and the results are presented in Table 7.2.

Table 7. 1. Freidman mean ranking test: Economic challenges

Parameters	MEAN RANK
Financial challenges	2.1
Water challenges	2.8
Access to Markets challenges	4.6
Access to Information challenges	4.7
Crop and Animal diseases challenges	5.7
No Support from the government	6.3
Expensive Inputs	6.5
Transport challenges	7.7
Electricity challenges	8.5
Theft challenges	8.6

Source: Author's Survey 2019

7.5. Entrepreneurial skills in small-scale commercial agriculture

Table 7.2 shows the results for business entrepreneurial skills challenges faced by small-scale commercial farmers in VDM. The study analysed the entrepreneurship skills attained by small-scale commercial farmers. Dichotomous responses (no and yes) were given, and multiple response frequencies were used to analyse the data collected, as shown in Table 7.2. The results in Table 7.2 show that most of the respondents gave almost the same response to all entrepreneurship skills. These include financial management skills (74%-No and 26%-Yes), marketing skills (60%-No and 40%-Yes), packaging skills (62% No and 38% Yes), crossbreeding skills (71%-No and 29%-No) and human management skills (75% - no 25%). The results in Table 7.2 further revealed that information management, farm management, bookkeeping, computer and waste management skills are lacking in small-scale commercial farming. Additionally, water management and new technology management skills are deficient in small-scale commercial farming. This shows that small-scale commercial farmers lack critical skills to run a productive farm. In line with the economic challenges identified in this section, the study further assessed if there is any association ship between the challenges and the entrepreneurship skills identified.

Table 7.3 presents Chi-square results for economic challenges and entrepreneurial skills. Pearson Chi-square technique states that if the computed p-value is less than 5%, the null hypothesis, which claims that there is no relationship between the variables is rejected. As such, the computed p-value of 0.021 shows that there is a relationship between financial challenges and financial management skills in small-scale commercial farming. Thus, it can be concluded that the lack of financial management skills leads to financial challenges in small-scale commercial farming. The study assessed if there is an association between access to market challenges and marketing skills. The computed p-value of 0.027 is less than 5% hence the null hypothesis which states that there is an independent association ship was rejected. As such, the study concluded that access to market challenges are influenced by lack of marketing skills. In terms of access to information challenges and information management skills, the computed p-value of 0.543 is greater than 5% hence the null hypothesis which claims independent association is not rejected. Thus, the study concluded that information management skills do not have an association with access to information challenges.

The study further assessed if there is an association between crops and animal diseases challenges and crossbreeding skills. The computed p-value of 0.038 is less than 5% hence the

rejection of the null hypothesis. The study concluded that the lack of crossbreeding skills might lead to crop and animal diseases challenges. Furthermore, the computed p-value of 0.039 is less than 5% between water challenges and water management skills. As such, the null hypothesis, which claims that there is no association, was rejected, and it is concluded that the lack of water management skills may lead to water challenges in small-scale commercial farmers. Ultimately, the computed p-value of 0.048 between computer skills and access to information challenges led to the rejection of the null hypothesis. Hence, the study concluded that the lack of computer skills leads to access to information challenges in small-scale commercial farming. In this regard, the most experienced challenges are discussed below.

i. Financial challenges

Results in Table 7.1 revealed that financial challenges are the most experienced constraints of small-scale commercial farming. Similarly, Table 7.2 revealed that the majority of small-scale commercial farmers do not have financial management skills. Thus, Table 7.3 further revealed that the lack of financial management skills leads to financial challenges in small-scale commercial farming. The results acknowledge Khapayi &Cellers (2016) and Kitui (2016), who stated that lack of capital is a significant challenge limiting farmers' development in rural areas of developing nations. However, these studies did not link the challenges and the corresponding entrepreneurial skills. As such, the study was able to associate the challenges experienced and the attributing skills in small-scale commercial farming.

ii. Water challenges

Water challenges were identified as the second experienced challenge by the small-scale commercial farmers (Table 7.1). The study further revealed that the majority of the respondents do not have water management skills. Lack of water management skills was found to be associated with water challenges hence the study concluded that water challenges in rural areas are not only caused by climate change conditions but also the lack of water management skills in small-scale commercial farming. However, the study acknowledged the fact equipment necessary to draw irrigation water to farms is expensive, which may be another cause of water challenges in rural areas (Franco-Crespo & Vinas, 2017).

iii. Access to the market challenges

Access to the market has been identified as another persistent challenge experienced by small-scale commercial farmers. Because farming requires stable and reliable markets, it is pragmatic to establish sustainable market channels. Small-scale commercial farmers are well known as producers of perishable products (FAO, 2017). Thus, the need to have marketing skills may help in these farmers to penetrate local, national and international markets. Thus, market access is crucial for small-scale commercial farmers development.

iv. Access to farming information challenges

Access to information is essential for small-scale agriculture development (Abdul-Salam and Phimister, 2016). Small-scale commercial farming as a lucrative rural agribusiness requires access to funding, markets, farming methods information for the betterment of their farming. The computed results in Table 7.2 revealed that information management skills are lacking in small-scale commercial farming. The study further revealed that lack of information management skills leads to information access challenges in small-scale commercial farming. These results support Ncube (2017), who revealed that access to institutional information challenges are impeding growth in agribusiness since the majority of the farmers fail to meet their expectations. Thus, access to information is a pivotal element for productive small-scale commercial farming in rural areas.

v. Crops and animal diseases challenges

Outbreaks of diseases have been a challenge for small-scale agriculture. The results in Table 7.1 show that crop and animal diseases challenges are experienced by small-scale commercial farmers in rural areas. However, results in Table 7.3 revealed that lack of cross-breeding skills leads to crops and animal diseases management challenges. The results, however, contradicts a report by FAO (2016) which states that small-scale commercial farmers in developing countries can use biophysical methods to reduce crop and animal diseases outbreaks. Thus, the study concluded that crops and animal diseases management skills are crucial for the development of small-scale commercial farming in rural areas.

Table 7. 2. Multiple responses entrepreneurship skills

Parameter	FREQ (NO)	FRQ (YES)
New Technology management skills	192 (88%)	25 (12%)
Waste Management skills	184 (85%)	33 (15%)
Water Management skills	181 (83%)	36 (17%)
Bookkeeping skills	180 (83%)	37 (17%)
Computer Skills	175 (80%)	42 (20%)
Human Management skills	163 (75%)	54 (25%)
Finance management skills	161 (74%)	56 (26%)
Information Management skills	158 (72%)	59 (28%)
Cross Breeding skills	155 (71%)	62 (29%)
Farm Management skills	150 (69%)	67 (31%)
Packaging skills	135 (62%)	82 (38%)
Marketing skills	132 (60%)	85 (40%)
N = 217		

Source: Author's Survey 2019

Table 7.3. Economics challenges and entrepreneurial skills association

Financial challenges * Financial management Skills			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.077**	8	.021
Likelihood Ratio	20.309	8	.009
Access to market challenges * Marketing Skills			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13.410	11	.027
Likelihood Ratio	13.079	11	.003
Access to information challenges* Information management skills			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9.85	11	.543
Likelihood Ratio	11.414	11	.409
Crop and Animal diseases management challenges * Cross breeding skills			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.834	11	.038
Likelihood Ratio	15.569	11	.016
Water challenges * Water management skills			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	10.590	10	.039
Likelihood Ratio	11.579	10	.021
Access to information challenges * Computer Skills			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18.635	11	.048
Likelihood Ratio	18.291	11	.035

Source: Author's Survey 2019

7.6. Conclusion

Small-scale commercial farming has been recognised as a congruent strategy to alleviate poverty, hunger and chronic unemployment. However, the study revealed that several challenges are still hampering probable development in this subsector. Several challenges were identified in the current study. These are but not limited to financial, water, access to markets, access to information challenges and crop and animal diseases challenges. Correspondingly, the study further revealed that the above-mentioned challenges are caused by lack of farming skills such as financial management, marketing, packaging, cross-breeding and information management skills. Immediate intervention in small-scale commercial farming is required. Given different farming opportunities such as income-generating, employment creation and food security, it is imperative to suggest that small-scale commercial farming has the structural and functional capability of adding to local economic development. As such, it is fundamental to note that improving skills in this subsector can lead to productive farming which in turn can add on to food security and employment creation in rural areas. Subsequently, improving skills in small-scale commercial farming is recommended for the success of small-scale commercial farming. In this regard, the study suggests small-scale commercial farming skills development should be emphasised across the rural farming spectrum.

References

Abdul-Salam, Y. & Phimister, E, 2016. Efficiency Effects of Access to Information on Small-scale Agriculture: Empirical Evidence from Uganda using Stochastic Frontier and IRT Models. Journal of Agriculture Economics, 68(2): pp. 1-15.

Adeyemo, R., Oke, J. & Akinola, A, 2010. Economic Efficiency of Small Scale Farmers in Ogun State, Nigeria. Tropicultura, 28(2): pp. 84-88.

Alliance for Green Revolution in Africa, 2017. The Business of Smallholder Agriculture in Sub-Saharan Africa. [Online] Available at: https://agra.org/wp-content/uploads/2017/09/Final-AASR-2017-Aug-28.pdf [Accessed 11 April 2019].

Ascher, W. & Mirovitskaya, N, 2017. Confrontations over Natural Resources. [Online] Available at: https://link.springer.com/chapter/10.1057/9781137555120_9 [Accessed 12 August 2017].

Biam, C., Okorie, A. & Nwibo, S, 2016. Economic efficiency of small-scale soyabean farmers in Central Agricultural Zone, Nigeria: A Cobb-Douglas stochstic frontier cost function approach. Journal of Development and Agricultural Economics, 8(3): pp. 52-58.

Department of Agriculture Fishery and Forestry, 2017. DAFF & Marine Living Resources Fund on their Annual Performance Plan; DPME input, with Minister. [Online] Available at: https://pmg.org.za/committee-meeting/24290/?via=cte-menu[Accessed 5 September 2017].

Ferreira, T, 2017. Does Education Enhance Productivity in Smallholder farming. Johanessburg, Stellenbosch University.

Franco-Crespo, C. & Vinas, S., 2017. The Impact of Pricing Policies on IrrigationWater for. Madrid, Center for Studies and Research for Agricultural and Environmental Risk Management.

Food and Agriculture Organisation, 2017. Water resource issues and agriculture. [Online] Available at: http://www.fao.org/3/t0800e/t0800e0a.htm[Accessed 16 July 2019].

Khapayi, M. & Celliers, P., 2016. Factors are limiting and preventing emerging farmers from progressing to commercial Agricultural farming in the King William's Town area of the Eastern Cape Province South Africa. Journal for Agriculture, 44(1): pp. 25-41.

Kitui, J. K., 2016. Factors Affecting Lending By Agricultural Based Financial Institutions: A Case Study of Agricultural Finance Corporation. The International Journal Of Business & Management, 3(5): pp. 142-165.

Mpandeli, S. & Maponya, P, 2014. Constraints and Challenges Facing the Small Scale Farmers in Limpopo Province, South Africa. Journal of Agricultural Science, 6(4): pp. 135-144.

Ncube, B, 2017. Institutional support systems for small-scale commercial farmers at the new forest Irrigation Scheme in Mpumalanga, South Africa: constraints and opportunities. South African Journal of Agricultural Extension, 45(2): pp. 1-13.

United Nations Development Plan, 2017. The roles and opportunities for the private sector in Africa's Agro-food industry. [Online] Available at: http://www.enterprise-development.org/wp-content/uploads/UNDP_AFIM_Agro-food-industry.pdf [Accessed 26 August 2017].

CHAPTER EIGHT: SYNTHESIS OF THE STUDY

8.1. Introduction

This chapter presents the summary, conclusion, recommendations and areas for further studies. As such, this study estimated the economic performance and contribution of small-scale agri-businesses to the local economy in VDM. A brief summary for each objective is addressed below. Determine the socio-economic characteristics of small-scale commercial farmers in VDM. Several characteristics were identified, Land size, gender, farming systems and types, the use of human capital and level of education are crucial in characterizing small-scale commercial farming. The level of production efficiency and the current contribution to the rural economy was estimated. Furthermore, the entrepreneurial challenges and skills limiting small-scale commercial farming productivity were identified. Thus, a synthesis is provided to give a clear and concise comprehensive finding from the objectives of the study. Significant findings of the study are synthesized, and conclusions are presented, followed by recommendations.

8.2. Summary

The summary of the study is given guided by the objectives of the study.

Objective one: Characterization of small-scale commercial farming

The first specific objective was;

"*To determine the socio-economic characteristics of small-scale commercial farming in VDM.*"

The main findings are;

Women participation in small-scale commercial farming has increased. This is an indication that female farmers have yielded to the national call for women involvement in agri-businesses. The increase was mainly noted in crop production and mixed farming. Subsequently, the study revealed that most the farmers were found to be between 40 and 60 years of age and the more significant portion approaching 60 years. However, the number of youth (34 years and below)

participating in small-scale commercial farming in rural areas was found to be very low. Ultimately, the study revealed that on average, the land size is around 11 hectares, farmers are labour intensive, and farming is the primary source of income to most the respondents.

Objective two: Technical efficiency of small-scale commercial farming enterprises

The second specific objective was;

"To measure the technical efficiency of small-scale commercial farming enterprises in VDM."

The main findings are;

The budgetary analysis results revealed that the costs incurred in crop, mixed and livestock farming are relatively the same and variable costs constituted the highest expenses sustained in all forms farming in the study. The stochastic frontier production approach revealed that the majority of the agribusinesses are technically inefficient. Also, the technical efficiency of 54% was revealed, implying that on average, farmer's output can be increased by 46% with the existing resources. Furthermore, nearly 80% (175 out of 217) of farmers are technically inefficient, implying that the majority are underperforming in Vhembe District. Moreso, female farmers were found to be more technically and economically efficient as compared to male farmers. In this regard, the study concludes that the majority of farmers in VDM are operating below the production frontier hence there is vast room to improve productivity in Vembe District. Ultimately female farmers are better in terms of optimising the use of resources. The current study further revealed that age, education level, land size, labour (human capital) and government grants are positively correlated with farming productivity. However, family labour and access to credit are negatively correlated to farm productivity.

Objective three: Small-scale commercial contribution to local economic development

The third specific objective was;
"*To estimate the development contribution by the small-scale commercial farming subsector in VDM.*"
The main findings are;

The study revealed that small-scale commercial farmers are contributing around 6% to current employment (permanent and seasonal) in VDM. Subsequently, given the current level of technical efficiency in small-scale commercial farming, there is room for this subsector to employ more employees. The study further revealed that small-scale commercial farmers are generating income which is fundamental for local economic development. On average, small-scale commercial farming subsector is contributing around 9% of the total GDP in VDM Municipality. Furthermore, the study revealed that on average, each farmer generates R14 813 ($988), which is above the minimum wage rate of R3000 ($200) in South Africa. Small-scale commercial farming expenditure on employees' salaries, inputs, and access to credit is positively correlated to GDP in VDM.

Objective four: Economic challenges faced by small-scale commercial farming in VDM

The fourth specific objective was;

"*To identify major entrepreneurial and socio-economic challenges faced by small-scale commercial farmers in VDM of Limpopo Province.*"

The main findings are;

Lack of finance is the most experienced challenge in small-scale commercial farming subsector in VDM. Despite various financial support provided by the South African government to agriculture, much of small-scale commercial face access to finance challenges. However, financial management skills are also lacking in this sub-sector. In this regard, it can be concluded that the lack of financial management skills is leading to mismanagement of finances hence financial challenges. Water challenges are regarded as the second most experienced challenges in small-scale commercial farming. Agribusinesses such as crop, citrus and fishery require a constant supply of water. Lack of water management skills was found to be associated with water challenges. Access to the market was ranked as the third experienced challenge by small-scale commercial farmers in VDM. The study further revealed that marketing skills are lacking in the majority of the farmers in VDM. The findings of the study further indicate that access to information is one critical challenge experienced by small-scale commercial farmers. Information is a critical component for productive farming as it provides the current economic affairs hence allowing proper planning by the farmers. The study further revealed that 72% of farmers do not have

information management skills. Also, lack of computer skills was found to influence access to information hence intensifying access to information for productive farming

8.3. Conclusion

The study concludes that land size; methods of farming and market motives are crucial variables in defining small-scale commercial farming in rural areas. The study concludes that the number of women participating in agribusiness has increased in VDM. Furthermore, most the participants in the study are elderly; hence the study concludes that youths participating in agribusinesses are few. In line with the above conclusion, the study recommends that small-scale commercial farming can be an avenue for empowering women in rural areas. Subsequently, The majority of small-scale commercial farmers are technically inefficient. Thus, it can be concluded that if these farmers receive training in farm management may improve productivity in this sub-sector. Land size, education level, human capital and government grants are significant determinants of productivity. In the regard, human capital as a crucial determinant of productivity can be used to increase productivity by extending training to farm employees. Female farmers were found to be more productive than male farmers. This shows that empowering women through access to subsidised inputs and farm management training may not only lead to increased productivity but improve food security in rural areas.

Estimating the economic contribution of small-scale commercial farmers gave a clear reflection that these farmers are can positively contribute to the local economy in VDM Municipality. The efficiency results indicated that there is potential to increase production levels in this subsector. Thus, supporting these farmers in farming skills development may improve the productivity which leads to more income generated and employment created. The provision of employment in small-scale commercial farming supports the Economic Transformation, inclusion growth, competitiveness policy by National Treasury to improve job creation in South Africa. Furthermore, the Job Summit Conducted in 2018 in which President Cyril Ramaphosa highlighted the need to create decent jobs for youth and women in rural areas. As such, targeting small-scale agribusinesses systems and promoting a multi-functionality of agriculture support structures can lead to the creation of decent jobs in rural areas hence supporting SDG goal 8[10]. Ultimately, the

[10] Creation of decent work

current study findings show that small-scale commercial farming needs immediate intervention in skills development. The challenges identified in the study are caused by the lack of entrepreneurship skills in this sub-sector.

8.4. Recommendations

Obective one;

- In line with the Women Economic Empowerment programme launched in 2014, it is fundamental for the government of South Africa to increase the support in rural farming with specific emphasis to empower women in agribusinesses. The Department of Women, Youth and Persons with Disabilities (DWYPD) also launched the social transformation and economic empowerment programme in 2018. The purpose of the programme is to provide intervention mechanisms on policies and programme implementation for mainstreaming the economic empowerment and participation of women towards economic transformation and development. Thus, the current study recommends that DWYPD should encourage more women to participate in agribusiness by channelling more financial and administrative support.

- Since land size was found to be one of the determinants of TE, I recommend that the government should put small-scale farming at the centre of land redistribution and consider issues such as the ability & capacity of the farmer to increase efficiency and prioritise full-time farmers since 88% of the farmers rely on farm income for survival. Democratic South Africa inherited a highly unequal and dualistic pattern of landholding and a beset small-scale farming sector, hence access to land may not only lead to increase in efficiency but empower the previously disadvantaged black farmers especially women in terms of access land and resources. Empowering farmers in terms of access to land ownership may help in increasing efficiency hence boosting food security, in turn, achieving Vision 2030, Zero hunger challenge NDP 2030 which all speaks to sustainable means food production.

Objective two;

- At present, Project Consult Institute of South Africa is offering training to large-scale commercial farmworkers. Thus, the study recommends that the government should have partnerships with such institutions so that the training can be extended to small-scale farming. Skills acquisition is in line with NDP 2030 which advocates for skills development through improving the quality of education, skills development and innovation. Education level has a positive effect on farming productivity.

- Around 70% of the respondents were found to be technically inefficient and the 63% lack agriculture training hence I recommend that the government should invest in training SSCF on skills development with specific focus to harnessing modern technology in their production targeting production components such as farm management technology, improve methods of farming, the pathway to manage energy and water efficiently, techniques of cultivation and offering farm management software which helps in information management. Training on harnessing technology and investing SSCF mechanisation are holistic strategies which may not only improve the face of small-scale farming efficiency but increase the level of connectivity, climate action, job creation, poverty reduction and covering the gap in local, national and global food provision hence achieving one of the 4th Industrial revolutions which aim at transforming small-scale farming to a global conglomerate in terms of food production.

- Empowering these farmers with modern farming technology may improve productivity and it supports the fourth industrial revolution through harnessing technology in production systems such as agriculture. To this end, agricultural technology training is a holistic strategy which can improve the face of small-scale farming productivity in this sub-sector. Lastly, small-scale commercial farming should be included in the LED strategy of VDM.

Objective three;

- Sustainable income generation as one of the NDP 2030 agenda, is a significant component of livelihood survival and reducing inequality in South Africa. Taking note of

the fact that income generated by the sampled small-scale commercial farmers contributed around 9% of the total GDP in VDM. As such, supporting these farmers through skills development, access to markets and access to credit can increase the income contribution to GDP in VDM. Thus, the study recommends that the government should target small-scale agricultural systems such as innovative public-private partnerships which focus on increasing investments in Agri-prenuers research. This can unlock more productive methods in farming which is in line in with UNDP agenda on the new vision of food security and rural development. Also, unlocking new paths for sustainable development through small-scale farming supports the Agenda 2063, CAADP, and Malabo Declaration to fulfil national agriculture and Food Security Investment Plan in which South Africa has over 70 agricultural programmes put in place.

- The vision of rural development must extend to small-scale agribusinesses through merging rural local economic development strategies with small-scale agribusinesses as it encourages integrated food security networks and income generation. Furthermore, the Government and NGOs should focus on promoting cooperatives, businesses, farming organisations, and research organisations overtly supporting the needs of small-scale commercial farming. Conclusively, expenditure on salaries, expenditure on inputs, and credit payments depict that small-scale commercial farmers have can positively contribute to GDP in VDM. Thus, investing in small-scale commercial farmers can be used as a path pathway to achieve SDGs and national programmes such as NDP 2030 and Agenda 2063.

Objective four;

- The current study findings show that small-scale commercial farming needs immediate intervention in skills development. The challenges identified in the study are caused by the lack of entrepreneurship skills in this sub-sector. As such, the study recommends aligning agriculture training programmes offered to contemporary challenges faced by small-scale agribusinesses. In this regard, rural development practitioners need to first clearly identify the prevailing and formulate training programmes which is directly related to actual challenges. Furthermore, there is a great need for computer literacy among

farmers. Computer literacy enables a blanket of solutions as it connects farmers to the outside world.

- Realising the multiple constraints faced by small scale farmers and skills lacking thereof, I recommend that the government should form collaborations with academic institutions and other training boards for off-farm and on-farm training to SSCF. At present, Project Institute of South Africa is offering training to large-scale commercial farm-employees. As such, it is pragmatic to the extent of such partnerships to small-scale commercial farmer's employees. Skills development may form the basis for land redistribution hence allowing the government to allocate land efficiently which in turn supports land allocation policies in South Africa.

8.5. Areas of future research

Considering the scope of the current study, new research areas merged. Thus, the following areas are recommended for further researches;

i. The study recommends that a similar study should be conducted in other provinces with similar characteristics to VDM for comparative purposes. This will enable better decision making if a similar study is conducted at a national level.

ii. Because youth participation in small-scale commercial farming is low, there is a need to investigate how modern technology can be made more accessible in this subsector to attract youth involvement in agribusiness.

iii. The study recommends further investigation on if there any significant difference in productivity between female and male farmers in agribusinesses.

iv. A detailed comparative study between small-scale commercial and large-scale commercial farming

v. There is a need to carry out a national-wide study which encompasses a wider scope of small-scale farmers more than the current one as it will enable better decisions at a national level.

LIST OF APPENDICES

Appendix A: Ethical clearance letter (UHDC)

RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:
Mr M Muzekenyi

Student No:
11618348

PROJECT TITLE: **Estimating the contribution of small-scale commercial farming to the rural economy in Vhembe District, South Africa.**

PROJECT NO: **SARDF/18/IRD/10/2106**

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Dr J Zuwarimwe	University of Venda	Promoter
Dr B Kilonzo	University of Venda	Co - Promoter
Mr M Muzekenyi	University of Venda	Investigator – Student

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: June 2018
Decision by Ethical Clearance Committee Granted
Signature of Chairperson of the Committee: .....
Name of the Chairperson of the Committee: Senior Prof. G.E. Ekosse

UNIVERSITY OF VENDA
DIRECTOR
RESEARCH AND INNOVATION
2018 -06- 25
Private Bag X5050
Thohoyandou 0950

University of Venda
PRIVATE BAG X5050, THOHOYANDOU, 0950λ LIMPOPO PROVINCEλ SOUTH AFRICA
TELEPHONE (015) 962 8504/8313 **FAX** (015) 962 9060
"A quality driven financially sustainable, rural-based Comprehensive University"

Appendix B: Published Article

Research & Reviews: Journal of Agriculture and Allied Sciences

e-ISSN:2347-226X
p-ISSN:2319-9857

Review of South Africa's Small-scale Farming Entrepreneurial Constraints and Opportunities: A Rural Perspective

Mike Muzekenyi*, Jethro Zuwarimwe and Kilonzo Beata

University of Venda, Limpopo, South Africa

Review Article

Received date: 12/03/2019
Accepted date: 25/04/2019
Published date: 03/05/2019

***For Correspondence**

Mike Muzekenyi, Master of Commerce in Economics, University of Venda, Limpopo, South Africa.

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Tel: +2776 554 6644

Keywords: Small-scale farmers, Rural development, Entrepreneurial constraints, Vhembe district

ABSTRACT

The small-scale farming subsector is now seen as a critical player in the rural development drive and sustainable inclusive rural economic growth. This has found expression in the Agenda 2063, Zero Hunger Challenge and the National Development Plan 2030 for South Africa. However, for the small-scale farmers to play their role it is imperative that there is a clear understanding of the constraints they still face. Most previous studies have focused on assessing marketing, access to finance and capital and related production inhibiting constraints but few have focused on agronomic entrepreneurial constrictions. This study reviews agronomic entrepreneurial constrictions faced by small-scale farmers in South Africa. Agronomic constraints include lack of access to credit, strenuous climate change, lack of irrigation water among others have been discovered. Water constraints is however, regarded as a major constraint in rural areas and empirical studies have shown that the impacts can be very severe. Empirical interaction on a variety of constraints in rural agriculture revealed generalised evidence which, however, created loopholes in order to quantify the gist of the matter. Thus, the premise of the study is to clearly single out entrepreneurial constraints faced by small-scale farmers in Vhembe District of South Africa.

BACKGROUND

Small-scale farming (Small-scale commercial farmers producing from small pieces of land and mainly for the market [1,2]) has been pinpointed to be a crucial avenue for inclusive economic development for rural communities [3-5]. This found expression in the Zero Hunger Challenge, Agenda 2063, SDGs and National Development Plan 2030. The government has committed itself to fund small-scale farming through a number of programs. The Department of Agriculture, Forestry and Fishery (DAFF) through Micro Agricultural Financial Institutions of South Africa (MAFISA) injected over R10 billion to finance small-scale farming in rural areas across South Africa ever since 2013 [2,6]. Furthermore, South Africa committed to investing at most 10% of its income into the agriculture sector after the Malabo declaration in 2014. Evidently, small-scale farming has been identified as a comprehensive approach to boost food security and poverty reduction in rural areas. The Correspondingly, the General Household Survey (GHS) conducted by Statistics South Africa in 2014 revealed that the number of small-scale farmers in rural areas has decreased by 6.1% from 2,880,000 in 2011 to 2,330,000 in 2016. The decrease in the number of small-scale farmers was mainly due to the severe drought experienced in 2014/15 which hindered production extensively.

Similarly, several agronomic constrictions such as lack of farming entrepreneurial skills, drastic climate change, drought, lack of access to capital and water shortages are central constraints identified [7-9]. Despite the government's effort to improve rural farming through development programs such as CASP, MAFISA and LIMA, there remains a big challenge in rural farming which is hindering significant growth by small-scale farming subsector. As mentioned by DAFF [2], the government is providing much-needed support in order to eradicate the aforementioned challenges to improve rural farming, however, small-scale farmers lack the intellectual capacity to use the available resources [10,11].

Undeniably, much ground has been covered in order to lessen farming constraints mainly in rural areas. Most farmers have been receiving different support ranging from financial supports, inputs and farming training through DAFF regional offices but still many are failing to convert such assistance into productive farming [12]. Considered as such, entrepreneurial constrictions and opportunities form the basis of this review paper.

Appendix C: Published Article

Advances in Agricultural Technology & Plant Sciences
ISSN: 2640-6586

Research Article *Volume 3 Issue 3*

Economic Challenges Limiting Small-Scale Farming Enterprises Development in Rural Areas of South Africa

Muzekenyi M*, Zuwarimwe J and Kilonzo BM

Institute for Rural Development, University of Venda, South Africa

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Received Date: August 27, 2020; **Published Date:** September 10, 2020

Abstract

Small-scale commercial farming has been recognised as a congruent strategy for local economic development. However, there are entrepreneurial challenges that are aggravated by the state of the economy, natural factors and weak agrarian edification system limiting growth in this sector. Therefore, the paper assessed the challenges and entrepreneurial constraints faced by small-scale commercial farmers in rural areas of South Africa. Multiple stage sampling technique was used to select 217 small-scale commercial farmers. Quantitative data were collected through a survey in which structured questionnaires were used. IMB SPPS version 26 and Microsoft Excel version 2016 software were used as data analysis tools. Friedman means ranking technique was used to categorize the challenges in ascending order. Pearson chi-square was used to determine the relationship between the variables. The computed results revealed that financial, water, access to the market, crops and animal diseases challenges are the most prevalent. Subsequently, financial management, marketing, packaging, cross-breeding and human management skills are lacking from these farmers, hence the challenges. Based on the results of this investigation, the paper recommends that the establishment of training programmers to improve entrepreneurship skills should be offered to these farmers, depending on the type of farming.

Keywords: Small-Scale Commercial Farming; Economic Challenges; Entrepreneurial Constraints

Introduction

The world's food security has been squeezed by the rising population and strenuous shifts in agriculture production. While food demands are increasing, the pressure is upon the governments to realize means to improve food security. Small-scale commercial farming has been identified as one important sub-sector in achieving SDGs number 1 and 2 [1,2]. Issues revolving around eradicating extreme poverty, hunger, and reducing unemployment make small-scale commercial farming a strategic subsector to improve livelihoods in rural areas [3]. In 2014, (the year of agriculture in Africa), several African countries committed to investing at most 10% of their annual Gross National Income into agriculture sector FAO (2017) [7].

The importance of small-scale commercial farming in contributing to food security and employment creation has been reflected in its prioritization in the development agendas for most African countries. Agriculture oriented programs such as the Comprehensive African Agricultural Development Program (CAADP) is an integral part of the New Partnership for Africa's Development (NEPAD) envisioned small-scale commercial farming as a significant player towards food security, income generation and employment creation FAO (2017) [1]. Furthermore, small-scale commercial farming has been identified as a vital agribusiness for inclusive economic development in rural

Muzekenyi M, et al. Economic Challenges Limiting Small-Scale Farming Enterprises Development in Rural Areas of South Africa. Adv Agri Tech Plant Sciences 2020, 3(3): 180052.

Appendix D: Book Chapter

AkiNik Publications

Printing Press License No.: F.1 (A-4) press 2016

Acceptance Letter

Ref. No.: RTAS-22-03
Date: 11-03-2020

To,
Dear Mr. Muzekenyi Mike

The book chapter titled **"Review of South Africa's Small-Scale Farming Entrepreneurial Constraints and Opportunities: A Rural Outlook"** is very well written and has been accepted for publication in edited book titled **"Research Trends in Agriculture Sciences (Volume - 22)"**.

Yours Sincerely,

Akhil Gupta

Akhil Gupta
Manager
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Annexure D: Research Questionnaire

TOPIC: ESTIMATING ECONOMIC CONTRIBUTION OF SMALL-SCALE COMMERCIAL FARMING TO RURAL ECONOMY IN VHEMBE DISTRICT.

Mike Muzekenyi
PhD Candidate Institute for Rural Development

Small Scale Farming Questionnaire

Respondent: Small-scale commercial farmers

Location: Vhembe District Municipalities (VDM) [Musina, Makhado, Thulamela and Collins Chabane]

- My name is Mike Muzekenyi, a PhD student at the University of Venda in Limpopo, South Africa. I am conducting a study on Estimating the contribution of small-scale commercial farming to the rural economy in Vhembe District. I would like to ask you some questions related to your farming to get more information about the study if you are willing to participate.
- Please, note that the results of the study from the information you will provide will be used for academic purpose ONLY.
- Please note that your participation in this survey is voluntary. Thus, you can choose to or not participate. Ultimately, should you decide to participate, please also note that you are free to withdraw from the survey at any point as the study progresses.
- Please feel free to ask any questions if you happen to have questions regarding this survey.

General information

Date:/……/…….....

Municipality: ……..

Ward:…….....

Consent …….....

A1. DEMOGRAPHIC CHARACTERISTICS

A1.1 Gender of the Farmer	A1.2 Farming Type	A1.3 Marital Status	A1.4 Age of the Farmer	A1.5 Education Level	A1.6 Employment
Male =1 Female =2 Other = 3	Crop production = 1 Mixed farming =2 Animal husbandry = 3 Citrus farming = 4 Fish farming = 5	Single =1 Married =2 Divorced =3 Widowed =4	≤ 35 = 1 36 - 60 = 2 61 ≥ = 3	No education = 1 Metric = 2 College = 3 Tertiary =4	Self-employed farm=1 Self-employed other =2 Pensioner = 3 Retrenched = 4 Formal employment = 5

A2. FARMING BACKGROUND and CHARACTERISTICS

A2.1 Size of the land	A2.1.2. Farming system	A2.1.3. Land Ownership	A2.1.4. Harvesting frequency
≤3 hec =1 4 -10 hec = 2 10 ≥ hec = 3	Seasonal = 1 All year = 2	Leasing = 1 Title deeds = 2 Community land =3	Daily = 1 Weekly = 2 Monthly = 3 Seasonal = 4

A3. BACKGROUND CONTINUES

A2.1.5. Who does the record-keeping	A2.1.6. Source of labour	A2.1.7. Number of years in Farming
Myself = 1 Employee = 2 A family member = 3 Other =4 specify	Family members = 1 Community members =2 family and community members = 3	<1 year = 1 1-5 years = 2 6-10 years = 3 10 years > = 4

A4. WHAT IS YOUR SUCCESSION PLAN FOR YOUR FARM (PLEASE TICK THE APPLICABLE?

A2.1.8	
Sell the Farm	
Transfer of ownership to a family member or relative	
Still to Decide	
Lease It	

A5. TYPE OF TRAINING OFFERED

1 = Farming Methods	**2 = Financial Literacy**	**3 = Marketing management**	**4 = Human Resource Training**	**5= Other Please Specify**

A6. FUNDING

A2.1.9. SOURCES OF FUNDING AVAILABLE TO YOU: Please tick the applicable	
Bank Loans	
Government Grants	
Government Loans	
Community Stokvel	
Farmers Contributions	
Non-Governmental Organisation Support	
Other Please Specify	

A7. HAVE YOU APPLIED FOR A LOAN FROM A FINANCIAL INSTITUTION IN THE PREVIOUS YEAR?

Yes ☐ **No** ☐

A8. FOR WHAT PURPOSES, DID YOU USE ANY FINANCIAL SUPPORT RECEIVED FROM ANY INSTITUTION BEFORE? Tick the applicable

1	Purchase of inventories/ goods for sale	
2	Purchase fixed assets (building, equipment, livestock)	
3	Purchase agricultural products (seeds, fertilizer, pesticides, animal feeds etc.)	
4	Personal / household expenses	
5	Pay off other debts	
6	Start new business	
7	Other (Please specify)	

A9. CHALLENGES FACED BY SMALL-SCALE COMMERCIAL FARMERS

A3.1. Challenges faced Please rate from 1 to 12 (1 being the most experienced challenge and 12 being the least)	
Water challenges?	
Financial challenges?	
marketing skills challenges?	
Access to information challenges?	
No support from the government?	
Crop and animal diseases challenges?	
Transport challenges	
Theft challenges	
Electricity challenges	
Low rainfall challenges	
Expensive inputs	
Other (specify):	

A10. Entrepreneurial challenges; Do you have the following skills?	**Yes**	**No**
Financial management skills		
Marketing skills		
Packaging skills		
Crossbreeding skills		
Human management skills		
Water management skills		
Information management Skills		
Organizational skills		
Bookkeeping skills		
Computer skills		
Waste management skills		
Water management skills		
Are you able to use modern technology in agriculture?		
Other (specify):		

A11. ECONOMIC PRACTICES

Please tick the applicable: What share of your production do you and your family sell (and not consume yourselves)?	
1. We sell nearly everything	
2. We sell half of our produce	

3. We sell less than half	
4. We do not sell at all	

A12. PLEASE SPECIFY BY GIVING AN ESTIMATE (%) OF YOUR MARKET SHARE? FOR EXAMPLE, LOCAL MARKETS 70%

Sold at the local markets	
Sold nationally	
Sold internationally	
Donated to local schools or hospitals	
Given to relatives or neighbours	
Used for household consumption	

A13. PLEASE FILL ESTIMATED VALUES IN THE FOLLOWING TABLE ABOUT YOUR FARMING ACQUISITION

Value of Building/Land Owned	**R**
Values of Equipment and Vehicles Owned	**R**
Value of Livestock	**R**
Value of Inventory (Raw Materials, Semi-Finished Goods, Finished Goods)	**R**
Value of Personal and Family Expenses	**R**
Value of Debt	**R**

A14. LAST SEASON SALES

HOW MUCH DID YOU SELL IN YOU LAST SEASON OF FARMING?

ITEMS SOLD	**VALUE**
1.	**R**
2.	**R**
3.	**R**
4.	**R**
5.	**R**
6.	**R**
7.	
8.	

A15. LAST SEASON FARMING EXPENSES

PLEASE PROVIDE ESTIMATES (IN RANDS) OF ALL THE EXPENSES YOU INCURRED LAST SEASON

Seeds and Plants	**R**
Purchased feeds	**R**
Fertilizers, chemicals and Lime	**R**
Veterinary and medicines	**R**
Repairs on fence and farming equipment	**R**
Marketing expenses	**R**
Transport costs	**R**
Irrigation expenses	**R**
Fuel and chemicals	**R**
Labour expenses	**R**
Water and electricity expenses	**R**
Other (Please specify)	**R**
Other (Please specify)	**R**
Other (Please specify)	**R**

A16. HOW MUCH EACH OF THESE SOURCES CONTRIBUTE TO THE REVENUES OF YOUR FAMILY LAST SEASON?

TOTAL ANNUAL REVENUE FROM OTHER SOURCES THAN FARMING	**IN RANDS**
Government Services or Pension	**R**
Outside Job of Other Family Members in The Household	**R**
Profit from Livestock	**R**
Profit from Other Non-Agri-Business	**R**
Other Sources	**R**
Other Sources	**R**
Other Sources	**R**

B1. CONTRIBUTION OF PRIVATE AND PUBLIC ORGANIZATIONS TO SMALL-SCALE FARMING DEVELOPMENT (SOCIAL CAPITAL)

B1.1. FINANCIAL CAPITAL

INCOME AND REMITTANCE	**1=<R5000**	**2 = R5000-R10000**	**3 = R10000-R20000**	**4 = R20000+**
On average, how much do you get from farming per month?				

How much non-agricultural related income do you get per month?				
How much do you save after all the expenses per month?				

C. HUMAN DEVELOPMENT

C1. HOW MANY IMMEDIATE FAMILY MEMBERS AND EXTENDED FAMILY MEMBERS ARE YOU SENDING TO SCHOOL THROUGH FARMING?

Immediate family members …….. Extended family members ……

C2. EMPLOYMENT

PLEASE SPECIFY THE CURRENT NUMBER OF PERMANENT EMPLOYEES YOU HAVE ON YOUR FARM

Male …… Female …….

C3. PERMANENT EMPLOYEES WHO ARE HOUSEHOLD MEMBERS

Male…….. Female……...

C4. SEASONAL EMPLOYEES (ONLY THOSE YOU HIRED DURING THE LAST FARMING SEASON)

Male……. Female…….

C5. SEASONAL EMPLOYEES WHO ARE HOUSEHOLD MEMBERS

Male…… Female……

<<<<<<<<<<<<<<<<<Thank you for participating God bless you>>>>>>>>>>>>>>>>>>>>

Appendix D: Questionnaire collection Checklist

Questionnaire No.	Municipality	Location	Pending Collection	Collected