

**Unlocking the potential of the emerging smallholder farming sector in South African
agriculture: An agent-based approach**

by

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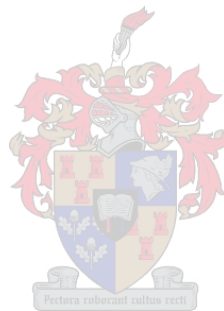
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Declaration

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Summary

This dissertation investigates how land redistribution can be achieved and how its main prospective beneficiaries, emerging farmers, can be integrated effectively in commercial farming in South Africa. A survey of 833 potential emerging farmers in three provinces with dense populations of smallholders is used together with a survey of 605 commercial farmers across the country. The dissertation first provides an overview of the prominent reasons why land redistribution has achieved little success. It then identifies five main reasons (insufficient post-transfer support, poor beneficiary selection, large farm size coupled with lacking or incompetent farming skills, and the reluctance of the state to give freehold titles to beneficiaries along with limited programme budget) often ascribed to the failure of land redistribution projects. The presented research study addresses two of these reasons directly and others partially as sub-questions through an array of methodologies. The study begins (first phase) by explaining the emerging farmer concept, showing how it is inappropriately used in the South African context and pointing out the dangers associated with this use. It then takes a multifaceted approach and finds that no single measure should be used alone in defining emerging farmers in the South African context. In the second phase, the study deepens this discussion by analysing attributes of the potential emerging farmers through a multivariate analysis and finds five distinct cluster groups of farmers who share similar attributes. It then gives relevant policy recommendations for each cluster. In the third phase, the study delves into land redistribution beneficiary-selection criteria based on the relevant literature, legislative and policy documents, and the profile of potential land redistribution beneficiaries. A suggestion for using a vacancy farm-advertising format for the selection of land reform beneficiaries is then proposed. Inspired by the outcome of the third phase, the study applies a stepwise binary logistic regression in the fourth phase to explore the determinants of the willingness to relocate among potential land redistribution beneficiaries and finds that proxy variables for aspirations and cultural innovation influence this decision among the study participants. Responding to the recommendations of the Advisory Panel on Land Reform and Agriculture appointed by the presidency and a wide array of researchers, the fifth and sixth phases explore the hypothesis of subdividing commercial farms intended for redistribution to emerging farmers. In the fifth phase, a viable farm size is determined based on viable farm household income. Viable farm sizes for the land reform farms were explored in a novel agent-based model. These farm sizes were validated in the sixth phase. The study finds that it is possible to subdivide commercial farms in a manner that satisfies the aspirations of the emerging farmers. It also finds a clear difference between number of farms created when redistribution farms are subdivided and when

they are not. This difference are also visible per farm type (enterprise) and have profound implications for land redistribution. Several other policy implications and how the results of the study can be used are discussed.

Opsomming

Hierdie proefskrif ondersoek hoe grondhervorming bereik kan word en hoe die vernaamste voornemende begunstigdes daarvan, nl. opkomende boere, doeltreffend in kommersiële landbou in Suid-Afrika geïntegreer kan word. 'n Opname van 833 potensiële opkomende boere in drie provinsies met digte bevolkings van kleinboere is gebruik, tesame met 'n opname van 605 kommersiële boere van regoor die land. Die proefskrif verskaf eers 'n oorsig van die vernaamste redes hoekom grondherverdeling so min sukses behaal het. Dit identifiseer dan die vyf vernaamste redes (onvoldoende ondersteuning ná oordrag, swak keuse van begunstigdes, groot plaasgrootte tesame met geen of onbevoegde boerderyvaardighede, die onwilligheid om begunstigdes eiendomsreg te gee, en 'n beperkte begroting vir die program) wat gereeld gegee word vir die mislukking van grondherverdelingsprojekte. Die navorsing wat hier aangebied word, spreek twee van hierdie redes direk aan en die ander gedeeltelik by wyse van subvrae deur middel van 'n verskeidenheid metodologieë. Die studie begin (eerste fase) deur die konsep van die opkomende boer te verduidelik deur te wys dat dit onvanpas in die Suid-Afrikaanse konteks gebruik word en wys op die gevare wat verband hou met hierdie gebruik. Dit neem dan 'n veelsydige benadering in en vind dat geen enkele maatstaf alleen gebruik kan word in die definisie van opkomende boere in die Suid-Afrikaanse konteks nie. In die tweede fase verdiep die studie hierdie gesprek deur die eienskappe van die potensiële opkomende boere deur middel van 'n meerveranderlike-ontleding te analiseer en vind vyf duidelike groepe boere wat soortgelyke eienskappe deel. Dit verskaf dan relevante beleidsaanbevelings vir elke groep. In die derde fase stel die studie ondersoek in na die kriteria wat gebruik is vir die keuse van begunstigdes van grondherverdeling op grond van die relevante literatuur, wetgewende en beleidsdokumente en die profiel van potensiële begunstigdes van grondherverdeling. 'n Voorstel word dan gemaak vir die gebruik van 'n advertensie vir 'n vakante plaas vir die keuse van grondhervormingsbevoordeeldes. Geïnspireer deur die uitkoms van die derde fase pas die studie dan 'n stapsgewyse binêre logistiese regressie in die vierde fase toe om die determinante van die gewilligheid van potensiële begunstigdes van grondherverdeling om te verhuis te verken en vind dat volmag veranderlikes vir aspirasies en kulturele innovasie hierdie besluit onder die deelnemers aan die studie beïnvloed. In reaksie op die aanbevelings van die Adviespaneel oor Grondhervorming en Landbou wat deur die presidensie aangestel is en van 'n verskeidenheid navorsers, verken die vyfde en sesde fases die hipotese van die onderverdeling van kommersiële plase wat bedoel is vir herverspreiding aan opkomende boere. In die vyfde fase word 'n lewensvatbare plaasgrootte bepaal op grond van lewensvatbare inkomste vir die plaashuishouding. Lewensvatbare plaasgroottes vir die

grondhervormingsplase is met behulp van die agentskapmodel ondersoek. Hierdie plaasgroottes is in die sesde fase bekragtig. Die studie bevind dat dit moontlik is om kommersiële plase so te onderverdeel dat dit die aspirasies van ontluikende produsente bevredig. Dit vind ook 'n duidelike verskil tussen die getal plase wat geskep word wanneer plase vir herverdeling onderverdeel word en wanneer hulle nie word nie. Hierdie verskille is ook sigbaar per tipe plaas (onderneming) en het verregaande implikasies vir grond herverdeling. Verskeie ander beleidsimplikasies en hoe die resultate van hierdie studie gebruik kan word, word bespreek.

Dedication

I dedicate this thesis to my parents and my late grandmother for always believing in me even when I doubted myself. I hope this would also serve as an inspiration to my younger sister, Athini, in whom I see enormous potential.

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I would like to extend my gratitude to Thabile again, to Dr Shepeherd Mudavanhu and to Khayaletu Sotsha for all the chats we had when I was stuck and had a writer’s block.

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Preface

This dissertation is presented as a compilation of eight chapters. Each chapter is introduced separately and is written according to the style of the journal to which it was submitted for publication, the data is also prepared for submission in *Data in Brief* journal:

Chapter 1 General introduction that draws from Zantsi (2019)

Chapter 2 Zantsi S, Greyling JC & Vink N. (2019). Towards a common understanding of ‘emerging farmer’ in a South African context using data from a survey in the Eastern Cape Province. *South African Journal of Agricultural Extension*, 47(2):81–93.

The chapter is based on the above article and is an up-scaled version of it. It presents conceptualisation of the term ‘emerging farmer’ and uses a multifaceted approach to reach a consensus on the criteria for defining emerging farmers in the South African context. The candidate was responsible for concept inception and analysis. Vink proofread the paper and Greyling helped with reproducing charts and addressing reviewer comments.

Chapter 3 Zantsi S, Pienaar LP & Greyling JC. (2021). Typology of emerging farmers in three rural provinces of South Africa: What are the implications for the land redistribution policy? *International Journal of Social Economics* (Accepted).

This chapter illustrates the diversity within the group of potential emerging farmers by using a multivariate analysis. It identifies five distinct cluster groups of potential emerging farmers. It then recommends, within the existing redistribution policies, an appropriate policy option for each cluster. The candidate designed the survey questionnaire, collected data and wrote the article. Pienaar cleaned the data and performed the multivariate analysis. Greyling helped with proofreading and validation of the results.

Chapter 4 Zantsi S & Greyling JC. (2020). Land redistribution beneficiary-selection criteria in the South African land reform policy – Challenges and possible solutions. A second revision has been submitted to *Agrekon*.

This chapter uses the dataset collected by the candidate together with a review of policy and legislative documents and of the relevant literature to identify loopholes in beneficiary-selection criteria. It then proposes suggestions to improve transparency and efficacy of the process. The first draft of the paper was written by the candidate. Greyling helped with modifying the charts, restructuring and improving the quality and readability of the content.

Chapter 5 Zantsi S, Mack G & Mann S. (2020). Cultural innovation, aspirations and success among smallholders in former homelands of the Eastern Cape Province of South Africa: Theory and evidence. *International Journal of Social Economics*, 47(3):404–422.

This chapter investigates the determinants of the willingness to relocate to commercial farms among potential land redistribution beneficiaries. The candidate conceived the concept and wrote part of the introduction, the methods of analysis and part of the conclusion. Mann assisted in writing the theoretical framework and introduction. Mack re-performed the binary regression model.

Chapter 6 Zantsi S, Mack G & Vink N. (2021). Towards a viable farm size – Determining a viable farm household income for emerging farmers in South Africa’s Land Redistribution Programme: An income aspiration approach. The paper has been conditionally accepted in *Agrekon*, subject to minor editorial revisions

This chapter uses the income aspiration approach to determine a viable income for an emerging farm household. It then uses this viable income to suggest a viable farm size. A typology of viable farm sizes is computed and matched to gross margins from commercial farms. The candidate conceived the idea and wrote the first draft of the manuscript. Mack and Vink helped with improving the content, flow and revising the first draft and the revisions resubmitted to *Agrekon*.

Chapter 7 Zantsi S (2020). ‘Land divided’: Exploring subdivision of commercial farms in South Africa, an agent-based approach. Manuscript prepared to be submitted to *Agrekon*.

This chapter expands on Chapter 6 by applying an agent-based model to test the sensitivity of three random subdivision factors. It then matches both physical farm size and income to those determined in the previous chapter. The candidate wrote the paper from results of the joint Impacts of Land Use Patterns in South Africa project, in which he works as a principal assistant in analysing model results. The commercial farm data were collected by Cloete and Greyling. The agent-based model was developed by Möhring, Mack, Cloete, Zantsi, Greyling and Mann.

Chapter 8 General conclusions, summary, and recommendations

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Chapter 1:

Introduction

Land reforms as remedial steps to redress unjust colonial land policies have been implemented by several countries in Africa, Latin America and Asia (Binswanger-Mkhize et al., 2009). Evidence has shown that this process is not frictionless, and poor implementation can have devastating effects on the economy, as has been the case in Zimbabwe (see Cliffe et al., 2014), but the evidence has also shown that successful land reform supports economic growth, a reduction in poverty, and equity (see Deininger et al., 2009).

South African land reform policy is guided by three pillars: land restitution, with the aim of restoring the land to those who were forcefully removed from it; land tenure reform, as strengthening the rights of farm workers and people living in the former homelands; and land redistribution, with the objective of correcting racially skewed land ownership (Department of Land Affairs [DLA], 1997). The importance of addressing the racial inequality in ownership of agricultural land in post-apartheid South Africa cannot be overemphasised. It is embedded in numerous envisaged goals of a reformed agrarian structure. These goals include the creation of vibrant and inclusive rural economies, economic growth, employment creation and food security (DLA, 1997; National Planning Commission [NPC], 2011). Besides providing these economic benefits, land redistribution must fulfil the ethical and social responsibility of redress and ensure peace and political stability (Van Zyl, 1996; Karaan, 2006; Moseley, 2007; Greenberg, 2015; Advisory Panel on Land Reform and Agriculture [LRAAP], 2019).

Although the importance of addressing skewed land ownership is widely acknowledged, progress to date with the redistribution programme has been disappointingly slow, and most of the transferred farms are no longer in operation (Vink & Kirsten, 2003; Lahiff & Li, 2012; Dlamini et al., 2013; Binswanger-Mkhize, 2014; Lyne, 2014; Dikgang & Muchapondwa, 2016; Kirsten et al., 2016; Hall & Kepe, 2017). The limited progress has contributed to political instability and policy uncertainty, which have reduced investor confidence, especially since the policy shift towards land expropriation without compensation (Bureau for Food and Agricultural Policy [BFAP], 2018; Lyne, 2014; Cousins, 2015; Akinola, 2020). In general, there is growing consensus among stakeholders that land redistribution has fallen short in delivering its goals of creating vibrant and inclusive rural communities (see, for example, Mantashe, 2012; Nkwinti, 2012; Binswanger-Mkhize, 2014; Kepe & Hall, 2018; Fuzile, 2018; Moosa, 2018). The failure of the redistribution programme has been attributed to several

factors, the most recent summary of which is provided by the report of the Advisory Panel on Land Reform and Agriculture (2019). To date, at least five key factors have been identified as the main contributors to the limited success of the programme.

Firstly, the lack of comprehensive farmer support is regarded as one of the main reasons for the failure of the land redistribution programme. Several studies have documented how a lack or inferior quality of land reform beneficiary support hinders progress and productivity on redistributed farms (see, for example, Jacobs, 2003; Van der Elst, 2007; Vink et al., 2012; Lahiff & Li, 2012; Keswell & Carter, 2014; Kirsten et al., 2016; Manenzhe et al., 2016; Hall & Kepe, 2017; Vink & Kirsten, 2019; Bunce, 2020).

Secondly, several researchers have acknowledged the failure of land reform projects because of poor beneficiary selection (see, for example, Terblanche, 2011; Dlamini et al., 2013; Binswanger-Mkhize, 2014; Schirmer, 2015). Important first steps have been taken to inform beneficiary selection. For example, Van Rooyen and Njobe-Mbuli (1996) provided insights into the criteria to be considered during the selection of land redistribution beneficiaries. Nevertheless, the hindrance to the success of the programme because of a lack of clarity and transparency in the criteria used for selecting beneficiaries is evident in the literature (e.g. Walker, 2007; Department of Rural Development and Land Reform [DRDLR], 2015; Hall, 2015; Kepe & Hall, 2018; Hebinck et al. 2011; Lyne, 2014; Hall & Kepe, 2017; Sihlobo & Kirsten, 2018; Sebola, 2018).

Thirdly, some researchers cite the state's reluctance to give land reform beneficiaries full rights of ownership in the redistributed land as a major constraint (Lahiff & Li, 2012; Mbatha & Muchara, 2015; Kepe & Hall, 2016; BFAP, 2013). This stands in contrast to the evidence that shows that secure tenure rights incentivise investments to increase the productivity of land (see Deininger & Ali, 2008). In addition, it enables beneficiaries to secure investment and production loans from commercial banks and other lenders (BFAP, 2013).

Fourthly, the other important factor is that the budget is insufficient not only because insufficient money is voted to it, but also because the expenditure is wasteful and this limit progress in land redistribution (Van der Elst, 2007; Walker, 2007; Lahiff & Li, 2012; Keswell & Carter, 2014; Aliber, 2015; Cousins, 2015; Manenzhe et al., 2016; Vink and Kirsten, 2019). Kepe and Hall (2016) have shown how the land reform budget has been declining over time, even though land reform is cited as a key priority of the state. It is under this premise that researchers blame insufficient land reform budgets for the slow redistribution, and poor financial resources are misused and mismanaged.

Finally, the fifth issue speaks to the structure of transferred farms, specifically the size thereof, since it has been argued that this is inappropriate for smallholder farmers as the intended beneficiaries. Whilst there are different opinions on the optimal farm size, one strand of the literature argues that establishing smaller farms should be the aim of reform, since they are more efficient, employ more labour and require less managerial skills compared with larger farms. Hence it is argued that smaller farms will increase the chances of successful land reform and achieve the aims of equity, growth, and employment (e.g. Van Zyl, 1996; Cousins & Scoones, 2010; Lahiff & Li, 2012; Binswanger-Mkhize, 2014; Cousins, 2015; Hall, 2015; Van den Brink et al., 2007).

1.1 Homeland smallholders as potential land reform beneficiaries

South Africa is characterised by “two agricultures”, wherein the one is characterised by capitalist, technologically advanced, and mostly white commercial farmers on freehold titled land who account for 96% of agricultural output (Lipton, 1977; Karaan & Vink, 2014). The other is characterised by black small-scale farmers who are mainly situated in the former homelands,¹ and who mostly produce for a secondary source of income and food (Greenberg, 2019). Within this group, only a small fraction (8%), as so-called commercially orientated smallholders who specialise in the production of a marketable surplus (Statistics South Africa [StatsSA], 2018).

Several land reform policies (including the 1997 White Paper on Land Reform Policy, the Land Reform for Agricultural Development 2000-2010, the Pro-Active Land Acquisition Strategy 2006-present, and the State Land Lease and Disposal Policy 2013) and numerous studies (e.g. Van Zyl, 1996; Walker, 2007; Binswanger-Mkhize, 2014; Cousins, 2015; Bunce, 2020a) have identified commercially oriented smallholders, typically referred to as potential emerging farmers, both on communal land (emerging smallholders) and on private land, as one of the potential groups of beneficiaries of the land redistribution policy. The existing literature has also made a compelling case for selecting land redistribution beneficiaries from commercially oriented smallholders in communal areas because, despite the harsh conditions under which they farm, they are still motivated to farm for selling² (e.g. Cousins, 2015). Furthermore, the literature on land redistribution beneficiary selection emphasises the importance of farming

¹ Homelands, now former homelands, were self-governing states in which only black Africans could reside under colonial policies, mainly apartheid. Since 1994, these regions have been integrated into South African provinces, but they are still less developed compared to other parts of the country and are still occupied by non-whites.

² Several studies have documented such conditions; they include land constraints, insecure land tenure, non-existing markets, and difficult to secure production loans, among others (see e.g. Fenwick & Lyne, 1999; Khapayi & Celliers, 2016; Fourie et al., 2018).

experience, among other crucial characteristics for a land redistribution beneficiary (Van Rooyen and Njobe-Mbuli, 1996). Evidence of the potential in homeland farmers has been shown in at least two studies. Using 2010/11 Income and Expenditure Survey, Aliber and Mdoda (2015) estimated the contribution of homeland agriculture at R13 billion compared to R49 billion value of commercial agriculture in 2010/11. Gerwel and Conradie (2016) estimated modest efficiency performance amongst communal livestock farmers and echoed that such successful farmers should be targeted for land redistribution. Despite this, little is known in the literature about commercially oriented smallholders as potential beneficiaries and, where mentioned, little detail is provided on how to improve the design of effective policies.

This shortcoming emanates from several factors: small-scale farmers are viewed as a homogeneous group (see, for example, Aliber et al., 2006a; Olofsson, 2020) and, where a distinction is made, a clear classification criterion is lacking (see Rother et al., 2008; Gwiriri et al., 2019; Olofsson, 2020). Furthermore, there is a mismatch between emerging farmers' attributes and aspirations and the structure of commercial farms redistributed to them. This mismatch has been pointed out by authors such as Brown (2000) and Hart (2012). Another gap in the literature relates to the limited knowledge on the geographical location and number of commercially oriented smallholders. The analysis of the StatsSA General Household Surveys by Aliber et al. (2009), for example, provides a high-level overview of where smallholders live and farm, but the study does not pay specific attention to commercially oriented smallholders. This is despite the fact that numerous researchers have argued that the lack of disaggregation of smallholder research hampers the success of policy directives for supporting smallholders or including them in land reform (Aliber et al., 2006a; Cousins, 2016).

1.2 Farm size and structure

The role of smallholder agriculture in rural economic growth and development is widely recognised and well documented (see Machethe, 2004; Haggblade et al., 2009; Diao et al., 2010; Wiggins & Hazell, 2011; Dorosh & Thurlow, 2018). Most notable is the evidence from Asia's Green Revolution, which shows that agriculture can act as the engine for driving rural economic growth and development (Hazell, 2009:24). This is achieved through several mechanisms that include increasing rural incomes, creating demand for non-farm goods and improving food security. It is within this context that chapter six of the National Development Plan identifies agriculture as one of the industries that has the highest potential for job creation. It is envisaged that emerging farmers could create 165 000 primary and 82 500 secondary jobs (NPC, 2011). Using South African Social Accounting Matrix data and a computable general

equilibrium model, Mukarati et al.'s (2020) simulations of land redistribution have confirmed that land redistribution will increase household incomes of the rural poor.

Even though the importance of smallholder farms is highlighted by several authors (see Vink & Kirsten, 2003; Aliber & Cousins, 2013; Aliber, 2019; Vink & Kirsten, 2019), and the importance thereof has been reiterated in the recent report of the Advisory Panel on Land Reform and Agriculture (2019), these documents lack detail on how this potential can be unlocked. These studies are also typically focused on smallholder farmers in the homeland areas. However, if commercially oriented smallholders are to be targeted as beneficiaries for land redistribution, this would imply that the commercial farms which are to be transferred should be subdivided. Here too there is extremely limited detail on how the farms should be subdivided. For example, no criterion is suggested, and there are no suggestions for what it should be based on. In addition, although some researchers advocate the subdivision of land-reform commercial farms (Vink & Kirsten, 2003; Van den Brink et al., 2007; Cousins & Scoones, 2010; Aliber & Cousins, 2013; Aliber, 2019; Vink & Kirsten, 2019; Cousins et al., 2020), this is still hampered by the Subdivision of Agricultural Land Act of 1970. Thus, it can be argued that the issue of the subdivision of commercial farms has not been explored fully.

While there could be more than one way of implementing and testing the subdivision of commercial farmland, one possible option is to use ex-ante mathematical models. In this genre of mathematical models, one particular set of models that have gained popularity is the agent-based models (ABM). With their strength of mimicking complex real-world problems and their predictive ability, ABMs have been used to predict policy scenarios framed as hypothetical questions (see Berger, 2001; Happe et al., 2008; Möhring et al., 2016; Appel & Balmann, 2019; Möhring & Mann, 2020). Despite this overwhelming evidence of their applicability, only two attempts have been made to use ABMs for modelling South African land reform (see Bharwani et al., 2005; Woyessa et al., 2008). However, both studies followed a case study approach and hence their results shed little light on the broader South African problem and did not focus on the subdivision of farmland.

1.3 Research problem

This dissertation is a study of beneficiary selection and the subdivision of commercial farms as two major challenges within the land redistribution programme. As is evident from the discussion thus far, more needs to be done to better understand these challenges in order to inform the formulation of policies that facilitate the smooth transition of emerging farmers to the commercial sector. The primary research problem of this dissertation can, therefore, be

stated as follows: “How can the full potential of South Africa’s agricultural sector be unlocked through linking emerging farmers to land redistribution.” By “how” is meant what are the necessary and sufficient factors that should be considered for the formulation of improved policies that make a smooth transition possible. Of course, this question is broad and should be broken down into smaller, manageable sub-questions (Leedy & Ormrod, 2018). The main research question is addressed through the following sub-questions:

Who are the potential emerging farmers, where are they located, and what are their farming activities and intentions?³ This question first seeks to understand what is meant by the term ‘emerging farmer’ in the South African context. Various authors use different criteria to describe emerging farmers, and sometimes the term is used interchangeably with ‘subsistence farmer’. Some refer to the land reform beneficiaries as emerging farmers. Nevertheless, there is no consensus on the definition of emerging farmers in South Africa. This will be answered through the application of a multifaceted approach that draws from a survey of homeland smallholder farmers in three provinces.

The second sub-question is: **what are the different constituents of the large pool of potential emerging farmers?** This question is accompanied by the hypothesis that, although the land redistribution programme is focused on semi-commercial “emerging” smallholders, this group is not homogeneous, and therefore not all farmers in this category would be suitable beneficiaries. This sub-question will be answered by identifying typologies of emerging farmers through a multivariate analysis based on principal component and cluster analyses.

The third sub-question is: **how can the land redistribution beneficiary-selection criteria be improved to be more transparent and capture beneficiary aspirations?** At the national level, policies and the National Development Plan are clear on categories of beneficiaries. However, at the grassroots level, different bureaucratic models are used.

The fourth sub-question is: **what are the determinants of potential emerging farmers’ willingness to relocate?** It is not scientifically known which attributes of the beneficiaries can be used to predict their willingness to relocate. Yet beneficiaries in most cases must relocate to commercial farms far from their homestead, exposing them to the risk of losing access to existing social networks that act as a safety net. Therefore, understanding such factors could improve the design of support for land reform beneficiaries.

³ The term ‘potential emerging farmer’ is used here because the farmers under study are regarded as land reform beneficiaries and therefore, will be emerging farmers if they become land reform beneficiaries. However, this term is used interchangeably with ‘emerging farmer’ in some instances.

The fifth sub-question is: **what could be a ‘viable’ commercial farm size for an emerging farmer?** Seeing that the current commercial farm size is blamed for the mediocre performance of emerging farmers, and that many agricultural economists advocate subdivision of the commercial farms used for land redistribution, this calls for an important first step, which is to determine viable farm size. Viable farm size will be assessed by using an income aspiration approach.

Lastly, the seventh sub-question is: **what should the subdivision factors be for subdividing land reform farms to converge on the farm size and income aspirations of emerging farmers?** This sub-question addresses the differences in the physical properties and the economic potential of the farms. South Africa has different agroecological zones, where agroecological properties and farming enterprises differ, which translates into different economic potential (see Kirsten & Van Zyl, 1998). The novel agent-based model simulations will be used to answer this sub-question.

1.4 Data sources

The primary data source of this study is a survey of 833 commercially orientated smallholder farmers in the former homeland areas of the Eastern Cape, KwaZulu-Natal, and Limpopo provinces. Conducted during 2017 and 2018, the survey was focused on these three rural provinces of South Africa because they collectively make up more than 60% of all smallholders in South Africa (StatsSA, 2016). This study also draws from a survey of 605 commercial farmers that was carried out in 2017 and 2018. Both surveys were collected as part of the Impacts of Land Use Patterns in South Africa (ILUPSA) project, a joint research project between Stellenbosch University in South Africa and the Swiss Agroscope research institute. It was funded by the National Research Foundation of South Africa and the Swiss National Science Foundation.

1.5 Ethical considerations

Ethics form a fundamental ground on which research is built, because they guide the research to follow acceptable morals and an acceptable code of conduct that does not compromise the wellbeing of society and those directly involved in the study (Huysamen, 1994; Leedy & Ormrod, 2018). The consideration of ethical issues is of enormous importance in research because they can influence the data obtained, especially when the research depends primarily on primary data. Consequently, ethical issues can also influence the research findings. There are several important ethical issues that must be considered in research, but they differ

according to the type of research; for example, in applied research, the ethical issues to be considered may be different from those to be considered for basic research, which includes social research (Huysamen, 1994). For this study, the relevant ethical issues included **informed consent**, **confidentiality**, and **fatigue**. These were addressed in the following manner:

Firstly, an ethics clearance application was submitted to Stellenbosch University's ethics committee and it was approved (ethics clearance number: REC-2017-1856) before the commencement of the survey. To address the issue of informed consent, meetings were arranged with the chiefs to ask for permission to do the surveys, since chiefs and headmen are the gatekeepers to rural areas. Then, the researcher was introduced to the headmen and to the villagers of the villages concerned. The researcher explained the specific nature of the project in detail. This included how the participation of households was important to achieve the aims of the research. Furthermore, the researcher explained all the potential risks of participation, that participation was voluntarily, and that the participants were free to withdraw from the study at any time.

Secondly, to address confidentiality, the researcher protected the information of the participants, keeping it strictly confidential. Thus, only researchers involved in the study had access to the data, and personal information such as names that may link the information to the respondents was not required. After the data was coded, personal names were replaced with identification codes and the data was stored online on a drive to which only the principal investigators had access.

Thirdly, to address the issue of fatigue, the questionnaire was precise so that it took less than 45 minutes to answer the questions, and breaks were taken when necessary. Furthermore, because the questionnaire was administered by the researcher and trained enumerators who understood the survey objectives, the process was streamlined. In addition, the questions in the questionnaire and all the negotiations (informed consent, meetings, etc.) were translated into the local languages (isiXhosa, isiZulu and Tshivenda).

1.6 Delineation and structure of the dissertation

Land reform is a complex subject, multiple meanings are often attached to it, and such meanings are informed by the discipline and lens from which one looks at the process. In recent years there has been a growing body of literature advocating that land reform extend beyond the often-quoted commercial farm model to place making, social reproduction and small-scale farming (see e.g. Gibson, 2010, Aliber & Cousins, 2013; Brandt & Mkodzongi, 2018; Bank & Hart, 2019; Hornby & Cousins, 2019). While these dimensions are equally important, this

dissertation will mostly focus on the commercial farm model albeit on a smaller scale, since farms will be subdivided. Further, large tracks of land are envisaged to be allocated for food production despite the scale (see DRDLR, 2013; Aliber, 2019). Moreover, while there are many beneficiary targets for land redistribution, this study focusses solely on the commercially oriented smallholders because of their pronounced and envisaged potential of becoming commercial farmers (see NPC, 2011; DRDLR, 2013; Cousins, 2015; Khapayi & Celliers, 2016; Cousins et al., 2020). These multiple dimensions also inform how success in the realization of the land reform objectives is judged. Therefore, success of land redistribution in this study will be gauged by the same measure used in the National Development Plan, which is to select a favoured few land reform beneficiaries amongst a large population of poor people, who have a responsibility to use the land in a socially productive manner, which can be translated into creating agriculture - based livelihoods and maintaining food security of the country (NPC, 2011, Vink & Kirsten, 2019).

This dissertation consists of eight chapters. The second chapter is concerned with understanding the concept of “emerging farmers” in a South African context, trying to find consensus on the criteria for describing an emerging farmer. The third chapter analyses the potential emerging farmers in the former homelands in view of the current land redistribution policies. The fourth chapter sheds light on beneficiary selection, and the fifth chapter identifies determinants of the willingness to relocate among the emerging farmers. The sixth chapter is devoted to determining a viable farm size for an emerging farm household by using the income aspiration approach. The seventh chapter builds on the sixth chapter and addresses the hypothesis of subdividing commercial farms to best fit the potential and income aspirations of emerging farmers. Finally, the last chapter provides a general conclusion, including a summary and recommendations, as well as the study limitations.

Chapter 2:

Towards a common understanding of 'emerging farmer' in a South African context: insights from rural areas in three provinces

Abstract

The objective of this study is to improve our understanding of the diversity among emerging smallholders using various commonly used indicators. These were reviewed and applied to a sample of 833 emerging smallholders situated in the three major smallholding districts within the Eastern Cape, Limpopo and KwaZulu-Natal. We found that the typical emerging farmer has the following profile: He (61%) is black, situated in a former homeland and is 55 years old. The typical farmer cultivates field crops as a secondary source of food and income, but keeps livestock as primary and secondary sources of income. The average emerging smallholder mostly grows maize for own consumption given a crop commercialisation index (CCI) of 0.66 and sells a greater portion of his cabbage and potatoes given CCIs of 0.73 and 0.83 respectively. The average emerging farmer earns a nett income of R26.6 thousand per year, but there is an income inequality, since the most successful farmer earns 26.7 times the average income. This translates to a Gini coefficient of 0.48, which is high by international standards, but low compared to the South African average of 63.1. When speaking to his fellow farmers he finds that 68% of them feel constrained by farming in a homeland, but only 56% would be willing to move from their homeland, with most (35%) saying that they would only do so if they were provided with sufficient government support.

Key words: Small-scale farmer; Survey; Eastern Cape; South Africa.

2.1 Introduction

South African agriculture is characterised by 'two agricultures' with the one consisting of highly capitalised, large-scale and mostly white farmers, and the other of black smallholders who mostly find themselves in the former homeland areas (Lipton, 1977). Whilst this dualism has a historic origin, it persists to the present despite the focus of the government to develop

and support smallholders. Whilst this failure can be attributed to various executional challenges such as weak agricultural extension services and limited support budgets (Aliber and Hall, 2012:552-3), it is also caused by poor project design because of the assumption that smallholders form one homogeneous group. The reality is that smallholders are members of a diverse group of farmers who range from a large group of subsistence farmers on one side of the spectrum to a smaller group of commercially-oriented smallholders on the other. The main difference between these two groups, other than the scale of production, is the reason for engaging in production: the former produces to improve their household food security whilst the latter produces to sell, given that it serves as their primary or secondary sources of income (Nieuwoudt, 2000:284; Van Averbeké & Mohamed, 2006:137). Between these extremes is a group of so-called ‘emerging smallholders’ who are market-orientated produce sellers who aspire to commercialise their produce (Nieuwoudt, 2000:284; Van Averbeké & Mohamed, 2006:137; Senyolo, 2007:2). This categorisation is not unique to South Africa since it is also present among Asian farmers (see Pingali & Rosegrant, 1995:173).

While this categorisation intuitively makes sense, there is a fair degree of confusion in the literature. For example, some studies use the terms of emerging and subsistence farmers interchangeably (see for example, Khapayi & Celliers, 2016:25-37) while others equate emerging farmers to land reform beneficiaries (see for example Macleod, McDonald & Van Oudtshoorn, 2008:75; Xaba & Dlamini, 2015:154; Mohlatlole, Dzomba & Muchadeyi, 2015; Gwiriri, Bennett, Mapiye & Burbi, 2019) or simply view all “...black farmers who are operating in disadvantaged circumstances compared with their white counterparts...” as emerging farmers (Rother, Hall & London, 2008). Hence, more should be done to improve the definition of the respective farmer groups.

To improve the understanding of the diversity among smallholders as well as the way in which such diversity is distinguished between them is important for several reasons: Firstly, it will enable improved programme design and provide targeted extension support. Secondly, knowing the number of smallholders who find themselves in the respective sub-groups will enable policymakers to prioritise support spending. Thirdly, it will improve the process of incorporating emerging smallholders in the land reform programme since they have been identified as well-suited potential beneficiaries (Cousins, 2015). Whilst this is not the first study concerning itself with the definition of smallholders (see for example Kirsten and Van Zyl, 1998; Cousins, 2010), this is the first that focusses on emerging smallholders. To avoid the pitfalls of some of the previous studies, the present study takes a multifaceted approach, thereby

minimising the risk of misallocation, and improving the framework's ability to shed more light on the characteristics of emerging smallholders.

2.2 Objectives and structure

The objective of this study is to improve the understanding of the diversity among emerging smallholder farmers (this also includes commercial smallholders) using various commonly used indicators. To this end the commonly used smallholder classification measures is reviewed and applied to sample of emerging smallholders where after these are integrated into a unified framework. The sample consists of 833 emerging smallholder households, which were randomly selected in eight major smallholder districts within the Eastern Cape, KwaZulu-Natal and Limpopo. This article is divided as follows: section two presents a review of literature on the importance of the emerging farmers, while section three describes the methodology of the research and identifies the commonly used measuring sticks of emerging farmers and lastly, in section four a discussion, a conclusion and policy implications are given.

2.3 Why do emerging farmers matter?

The South African agricultural sector is in a process of transformation – decolonising the sector from decades of neglect, suppression, and discrimination against black farmers through instruments that excluded them from participating in the mainstream economy and from legal ownership of land, such as the 1913 Land Act (Vink & Van Zyl, 1998). After the democratically elected government in 1994, transformation policies were put in place to remedy the injustices of the past. These transformation policies manifest through the Land Reform Policy and the other support measures intended to aid previously disadvantaged farmers. In the land redistribution pillar of the Land Reform Policy, emerging farmers are identified as the potential beneficiaries (see DRDLR, 2013), although not much is understood about who they are. Hence, this section emphasises the importance of emerging farmers in the South African agricultural sector.

2.3.1 Poverty reduction

The South African communal farming areas (where most of the emerging farmers live) are characterised by poverty and a lack of employment opportunities. As such it has been argued that, since many poor people live in the rural areas and many are already engaged in some form of farming activities, agriculture is a viable tool to fight rural poverty (Machethe, 2004:11; World Bank, 2007; Diao, Hazell & Thurlow, 2010:7; Dorosh & Thurlow, 2018). Evidence from Asia's Green Revolution has shown that agriculture can be used as a motor to drive rural

economic growth and development (Hazell, 2009:24). This can be achieved along many avenues of which one is increasing rural incomes, as agriculture creates a demand for non-farm goods and a supply of food which improves food security.

2.3.2 Creating employment opportunities

The commercial agricultural sector in South Africa has shown a strong trend of job shedding in the past few decades. This can be the result of many factors such as intensive use of machinery, which reduces unskilled labour and minimum wage, among other factors (e.g. Conradie, 2007:192; Sandrey, Punt, Jansen & Vink, 2011: 31; Bhorat, Kanbur & Stanwix, 2014). Given this trend in commercial agriculture, the smallholder who tends to be labour intensive can contribute towards creating jobs in agriculture. Since emerging farmers use fewer machines, they require more labour compared to their commercial counterparts. Moreover, there are more emerging farmers than commercial farmers, therefore, although they employ fewer workers individually, the collective number of labourers is significantly high. Finally, empirical research has found that smallholder farming, both livestock and crop production, has the capacity to create jobs for the rural poor, and in livestock farming, the Eastern Cape has the highest capacity compared to other provinces (Mmbengwa, Nyhodo, Myeki, Ngetu & Van Schalkvyk, 2015; Bunce, 2020a; Cousins et al., 2020). One way to increase employment opportunities is to stimulate the rural economy through demand-led growth. According to chapter six of the National Development Plan (NDP), agriculture is one of the industries that has the highest potential for job creation. It is envisaged that emerging farmers will create 165 000 primary jobs and 82 500 jobs in secondary employment (National Planning Commission [NPC], 2011).

2.3.4 Demand-led growth

There is a link between the agricultural and the non-agricultural sectors created by the market forces of supply and demand. As such, the expansion of the agricultural sector has the ability to stimulate growth in the non-agricultural sector and has a poverty reducing effect. Hendricks (2002) has shown that an increment in rural households' income has the potential to stimulate spending in non-tradable goods and thus contributes to local economic growth. Browne, Ortmann, and Hendriks (2007:566) substantiated this evidence and found that expenditure of tradable and non-tradable goods and services have the greatest potential for demand-led growth with expenditure elasticities of 2.88 and 2.91, respectively.

Furthermore, Rosegrant and Hazell (2000:45) found a strong impact of agriculture in rural development in countries where small-scale farms dominate. In this respect increasing productivity of emerging farmers can increase the demand for inputs used in production such

as fertilisers, pesticides and labour, if the constraints facing them are addressed and given well-developed support. Moreover, this will reduce unemployment and increase the supply of food contributing to rural food security, which is a serious problem in rural areas of South Africa. However, for this to happen, there has to be efficient use of resources, among other factors.

2.3.4 Efficient use of resources

The farm size and efficiency topic has been extensively studied across the globe. Evidence shows that indeed smaller farms are efficient. In the South African context as well, this has been a topic of much academic study (see: Van Zyl, 1996; Van den Brink et al., 2007; Cousins & Scoones, 2010; Aliber & Cousins, 2013) and has been used to provide evidence of creating small family farms to achieve the goals of land redistribution. The argument is based on the fact that smaller farms are more efficient, employ more labour and require average managerial skills than larger farms (Van Zyl, 1996; Van den Brink et al., 2007).

Empirical evidence from the Eastern Cape shows that small-scale farmers are at least competitive and efficient in some activities such as horticultural, field crops and livestock products (Ngqangweni, 1999:26; Gerwel & Conradie, 2016, Gusha et al., 2018). In addition, the Bureau for Food and Agricultural Policy (BFAP) (2017) shows that small-scale communal broiler farmers achieve better profit margins than their large commercial counterparts. Ngqangweni (1999: 24) also found a strong growth linkage between farming and the rural non-farm economy, which he describes as one that can lead to under-utilised resources being put into production if well-developed support is given and the barriers are removed.

However, there is overwhelming evidence of under-utilised land in most parts of the former homelands (see: Fenwick & Lyne, 1999; Andrew & Fox, 2004:687; Connor & Mtwana, 2018:82; De la Hey & Beinart, 2016:7; Shackleton, Mograbi, Drimie, Fay, Hebinck, Hoffman, Maciejewski & Twine, 2019:697) that can be put under production if emerging farmers' challenges are addressed and a well-developed farmer support system is designed. The poor productivity and underutilisation of land among smallholders is a result of policies that tended to promote large capital-intensive farming over smallholder farming (Van Zyl, 1996; Cousins, 2015). Some authors have blamed the absence of efficient land rental markets for the underutilised and fallow land while some potential emerging farmers have appetite for expanding cultivated area (Fenwick & Lyne, 1999; Aliber & Popoola, 2018). In order for emerging farmers to achieve the roles outlined in the preceding sections, right policies have to be put in place, agricultural extension as well would have to play a role.

2.3.5 Role of agricultural extension in developing emerging farmers

The NDP emphasises the need to train extension officers who can respond to the needs of smallholders (NPC, 2011). This highlights the importance of addressing the needs of a specific group of farmers by paying attention to getting to know them better. This is important because understanding the client determines the appropriateness and relevance of the advisory service to be rendered by an extension officer. However, the literature shows a different picture about the common understanding of what an emerging farmer in South Africa actually is. In the study of Rother et al. (2008:407) extension officers were asked what an emerging farmer is to their knowledge, and they all gave different definitions. Therefore, a common understanding of what emerging farmers are, is important to the agricultural extension field, as they have an important role to play in developing emerging farmers by rendering a relevant and appropriate advisory service. The next section will outline the methodology used in this paper.

2.4 Data and Methods

2.4.1 Data

Non-subsistence smallholders were interviewed during 2017 and 2018 in three provinces of South Africa namely, Eastern Cape, KwaZulu-Natal and Limpopo. These provinces were chosen because jointly they house the majority (61%) of smallholders in the country according to the Statistics South Africa's Community Survey of 2016 (StatsSA, 2016). Therefore, they arguably offer a large pool of potential land redistribution beneficiaries. Within these three provinces, district municipalities which have high density of smallholders were chosen. According to Aliber and Hart (2009)' analysis of Income and Expenditure Survey and the Labour Force the following districts have high density of smallholders: in the Eastern Cape, Amathole, Chris Hani, and Oliver Tambo district municipalities were chosen, while in KwaZulu-Natal, Umkhanyakude, King Cetshwayo and Harry Gwala districts were chosen. In Limpopo province only Vhembe was selected. A sample of 833 farmers was randomly chosen from eight districts of the three provinces, Table 2.1 below shows sample size in each selected districts and provinces.

Table 2. 1: Summary of sample size per selected district

Eastern Cape	(n)	KwaZulu-Natal	(n)	Limpopo	(n)
Amathole	175	Umkhanyakude	125	Vhembe	89
Chris Hani	120	King Cetshwayo	80		
OR Tambo	84	Harry Gwala	56		
		Zulu Land	104		
Total	379	Total	365	Total	89

None subsistence farmers were randomly selected and interviewed in each of the districts. In order to qualify they had to have sold produce during the previous season. This was to ensure that farmers who at least had some degree of commercial orientation were interviewed. A semi-structured questionnaire compiled in English and translated in local languages spoken in the study areas was used for the interviews with farmers.

2.4.2 Approach and data analysis methods

No single criteria gives a meaningful definition and characterisation of smallholder farmers, only when we use combined features that we can come to a reliable criteria and nuanced typologies of smallholders (see Olofsson, 2020: 39-41). Based on the national and international literature, South African smallholders can be categorised according to four themes: i) population group, farm location and land size, ii) main reason for farming, iii) farm turnover and iv) commercial orientation. The literature relevant to each theme is introduced within each sub-section of Section 4 followed by its application to the survey results. In addition, a fifth theme: the willingness to move to a land reform project is introduced and analysed.

2.5 Results and Discussion: Smallholder Characterisation

2.5.1 Population group, age, sex, farm location and size

Smallholding farming is generally associated with black farmers (see for example, Cousins, 2010; MacLeod et al., 2008; Xaba & Dlamini, 2015; Khapayi & Celliers, 2016). This is also reflected in government programmes that target emerging farmers, for example the Comprehensive Agricultural Support Programme (CASP) (Department of Agriculture, Forestry and Fisheries [DAFF], 2015). We find that 61% of emerging farmers are men, and the average age of farmers surveyed is 55. The oldest respondent was 86 years and the youngest was only 21 years old with a deviation of 11.42 from the mean. These results are not far from the smallholder Agricultural Household Survey (2016), which reported an average age range of 45-

54. Further, Sinyolo, Mudhara and Wale (2016) have also found similar results in KwaZulu-Natal. Moreover, these results show that the potential emerging farmer is on average four years younger than his commercial counterpart (DAFF, 2017).

A smallholding is often associated with being a backward, unproductive, and non-commercial endeavour that is undertaken as a means of subsistence on small pieces of land in the former homeland areas (Kirsten & Van Zyl, 1998). After the democratic transition, this definition has been extended to also include land reform beneficiaries (Cousins, 2010). Hence, to qualify as a smallholder, a person must be black and situated in a former homeland or on a land reform farm. Therefore, all the farmers surveyed in this study would qualify as smallholders. However, these assumptions can be easily refuted. For example, Kirsten and Van Zyl (1998) show that even though all white farmers were deemed commercial, large homeland farmers were bigger than the smallest subgroup of “commercial” farmers who cultivated less than 10 hectares. This is also echoed by Pienaar and Von Vintel (2014) who use the StatsSA General Household Surveys to show that, whilst most homeland smallholders cultivate an area of less than a hectare, there is a subclass of about 5 300 who cultivate more than 10 hectares. This is also in line with our results since on average farmers cultivated an area of 2.7 hectares, whilst the largest farmer had 30 hectares under production.

2.5.2 Income and turnover

Whilst distinguishing between farmers based on farm size or cultivated land has the advantage of simplicity, it is flawed from an economic perspective since it does not take differences in land quality or enterprise into account. For example, one hectare of irrigated land used for vegetable farming will have a much higher profit potential than 500 hectares of land used for extensive livestock farming in the Karoo. Hence, turnover, or net farm income should preferably be used to distinguish between farms (Kirsten & Van Zyl, 1998). Subsequently Kirsten (2011) used income to distinguish between farmers, arguing that annual turnover of R500 thousand marks the threshold between a smallholding and commercial farms. Whilst classifying farmers by turnover is a better gauge than physical farm size, it is still a sub-optimal indicator since it is subject to enterprise-specific structural properties. For example, dairy farms typically have a high turnover but a low profit margin, whilst the opposite is true for an extensive sheep farm during a normal year. Therefore, it is better to use net farm income as the distinguishing metric if available.

Figure 2.1 shows the 2016 net farm income of the respective smallholders surveyed for this study. It is sorted in ascending order, with the sample average and median indicated by the

dashed and dotted lines respectively. It shows that the worst performing smallholder lost a total of R67 thousand whilst the best performing farmer netted a total of R776 thousand. Collectively smallholder profit exhibited a highly unequal return, which can be categorised as a pareto distribution seeing that most smallholders earn a relatively low net farm income relative to the best performing farmer. This is also evidenced by the relatively low average net farm income of R45.2 thousand in 2016 and median net farm income of R29.6 thousand given the skewed distribution.

The extent of the farmer income inequality as shown in Figure 2.1 can be quantified through calculating the Gini coefficient of the farmers surveyed. First devised by the Italian statistician Corrado Gini in 1912, the Gini coefficient is commonly used by economists for comparing income inequality of countries. Per definition the coefficient can take a value of between 0 and 1, with the former reflecting a population wherein income is distributed equally whilst the latter shows a highly unequal income distribution wherein a select few earn most of the income. For comparative purposes: during the ten years ending 2017, South Africa, Botswana and Namibia had the highest average Gini coefficients of all countries tracked by the World Bank globally at 63.1, 60.5 and 60.0 respectively. Inversely the Czech Republic, Slovenia and Ukraine had the lowest average of 25.0, 25.2 and 26.2 respectively during this period (World Bank, 2018). The coefficient is calculated by fitting a so-called Lorenz curve to the data and comparing it to the ideal situation wherein the income is distributed equally within the population. The coefficient is calculated as follows (Dorfman, 1979):

$$G = \frac{A_e - A}{A_e}$$

where G represents the Gini-coefficient, A_e shows the area under the Lorenz curve of a population with an equal income distribution and A shows the area under the Lorenz curve of the actual income distribution. The income inequality of the farmers' surveys was calculated at 48.9⁴, thus the distribution of smallholder net farm income is not as unequal as South Africa as a whole. It must be noted that this does not represent the income distribution of households, since it would have to include non-farm income, remittances and grants. This finding simply underscores the fact that the net farm income of emerging smallholders shows substantial diversity, and the relatively large incomes both challenge the notion that smallholders are backward and provide extension officers with a benchmark.

⁴ The negative returns were excluded from the calculation

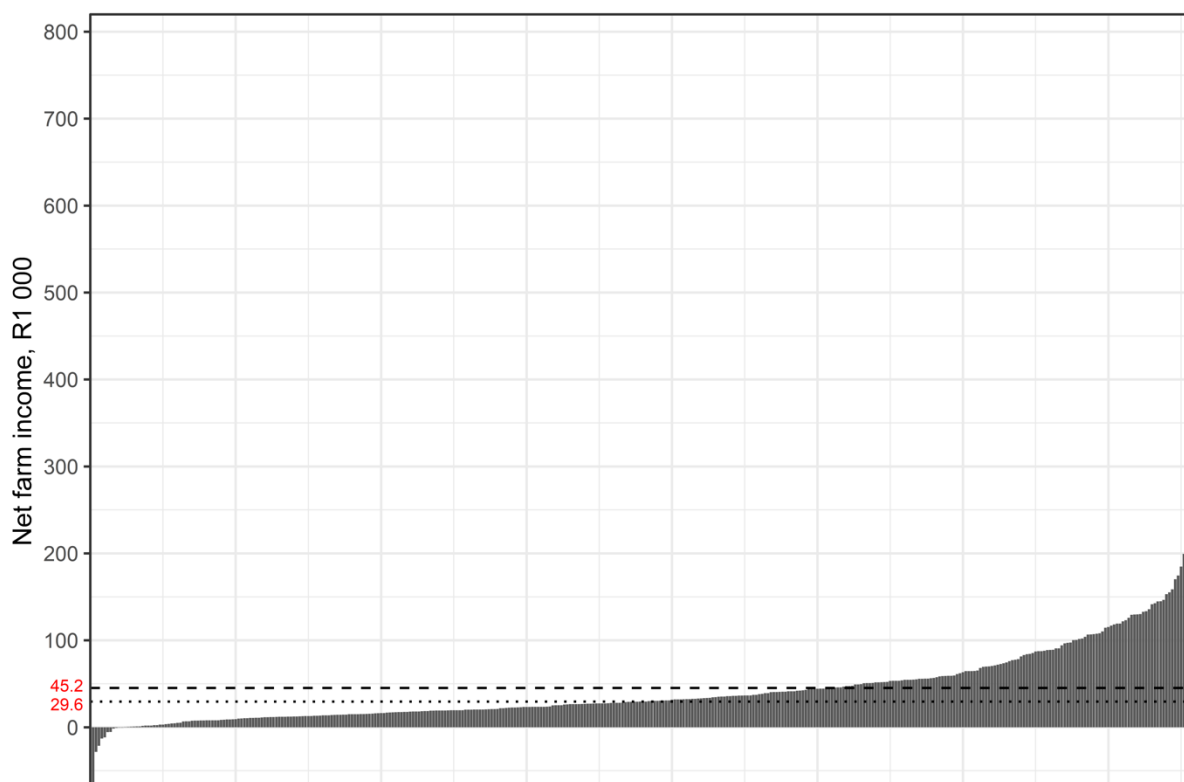


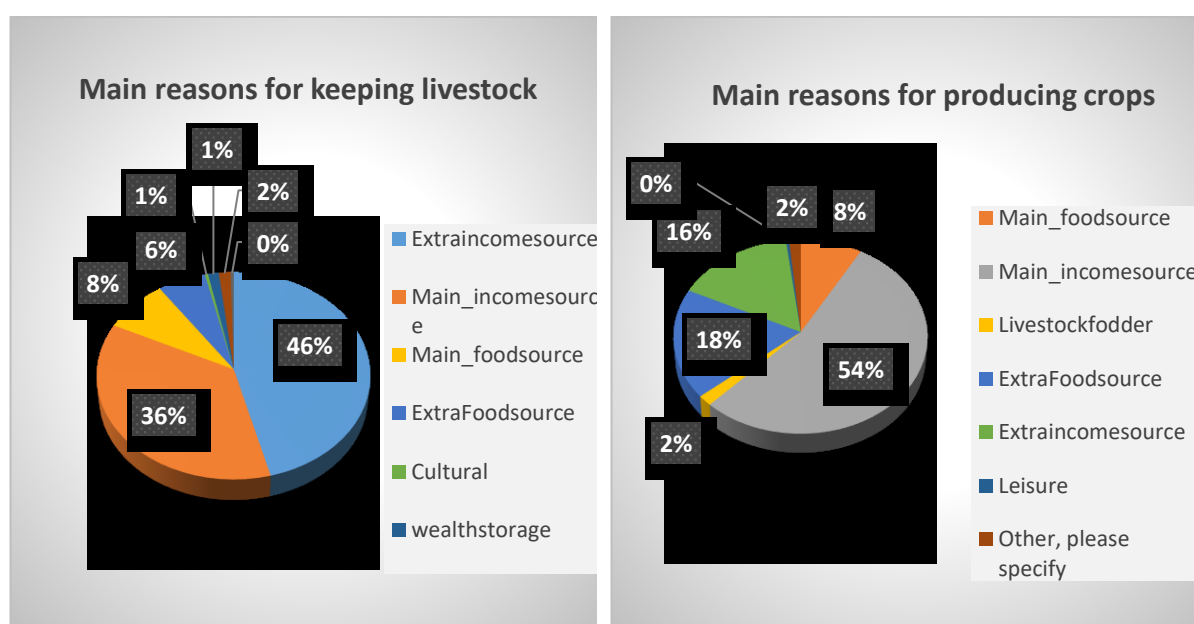
Figure 2. 1: Household net farm income

2.5.3 Main reason for farming

The classification of smallholders according to their primary reasons for engaging in farming has been widely used in South Africa (see for example Aliber & Hart, 2009:439; StatsSA, 2016:5; Pauw, 2007). This is a good measure since it portrays the intent of farmers by distinguishing between subsistence and non-subsistence households based on their motivation for engaging in agricultural production. However, it cannot be used in isolation since it has to be viewed in combination with the percentage of produce sold. A smallholder who is motivated to engage in production, but sells a small portion of his/her produce cannot be classified in the same category as the converse hence in the next section we explore market participation.

Gebremadhin and Jaleta (2012) makes a distinction between market orientation which they argue its basing production decision on market signals and market participation which is significantly participating in both input and output market. We have followed Gebremadhin and Jaleta (2009) approach and the results from the survey are summarised in Figure 2.2 below. The results show that respondents keep livestock for extra (46%) and main income sources (36%). While about more than two thirds, grow crops mainly for attaining main and extra income sources.

This suggest that farmers in our sample are generally commercial oriented (i.e. the initial decision to produce is directed to market) but the commercial orientation is stronger in crops than in livestock. The possible explanation for this, may be linked to the fact that most grown crops are grown often where there is irrigation thus making it a more reliable source of income, while livestock is sold once or twice a year, therefore one may rely on livestock as extra income source rather than main income source. This may be particularly true in our sample since most owned small to medium herds/flocks and few relied on livestock products such as dairy but rather wool that is sold once a year. However, although market orientation is the first step in the commercialisation process it does not always translate to market participation as argued by Gebremadhin and Jaleta (2012), in the following section we look at market participation.



a) Main reasons for keeping livestock

b) Main reasons for producing crops

Figure 2. 2: Reasons for engaging in crop and livestock production

Source: Authors calculations from survey data

The importance of crop production as a food source is to be expected given that farmers mainly produce staple crops such as maize, cabbage and potatoes. The finding that livestock farming serves as a commercial endeavour for most farmers is important and should be incorporated in the design of farmer support programmes and extension strategies. The positive impact of such initiatives has already been proven by the National Wool Growers Association (NWGA) with the smallholder wool project that has improved both quality and quantity of smallholder wool production (De Beer & Terblanché, 2015).

2.5.4 Market participation

Internationally various measures have been used to gauge the commercialisation of smallholders (see Von Braun, 1995; Jaleta, Gebremedhin & Hoekstra, 2009; Gebremedhin & Jaleta, 2010). Following Gebremadhin and Jaleta (2012) and Tiprasqa and Schreinemachers (2009), we have measured market participation in addition to market orientation reported above. Market participation in both input and output was measured. In terms of output, six agricultural activities that most of the household in our sample were involved in were used, three crops, Maize, Cabbage and Potatoes and three livestock activities, Cattle, Sheep and Goat production. Figure 2.3 provides a summary of the average commercialisation indexes for all the above mentioned activities expressed as percentages. In all the activities on average our sample of potential emerging farmers is above the cut-off point between subsistence and commercial orientation. Cattle, Cabbage and Sheep had the highest averages in all the activities. Besides these activities reported in Figure 2.3, there are other activities which are only produced for cash by default such as Sugar cane and wool (Markelova et al., 2009). In these commodities all the production is marketed hence there was no need to compute the CCI or LCI.

While a majority of farmers participated in output market, however, they sold around their villages and to nearest towns and few (mostly irrigating) sold to retailers such as Spar and local middlemen who normally come with bakkies. In terms of livestock, most farmers sold around their villages for traditional ceremonies and funeral, and few (mostly in Jozini) sold in auctions and only a very few sold to abattoirs. The other important feature worth noting about the characteristics the studied sample is that most sold old animals rather than young animals as their commercial counterparts do, due to the nature of their market. Only a few who sold to abattoirs sold young animals e.g. steers.

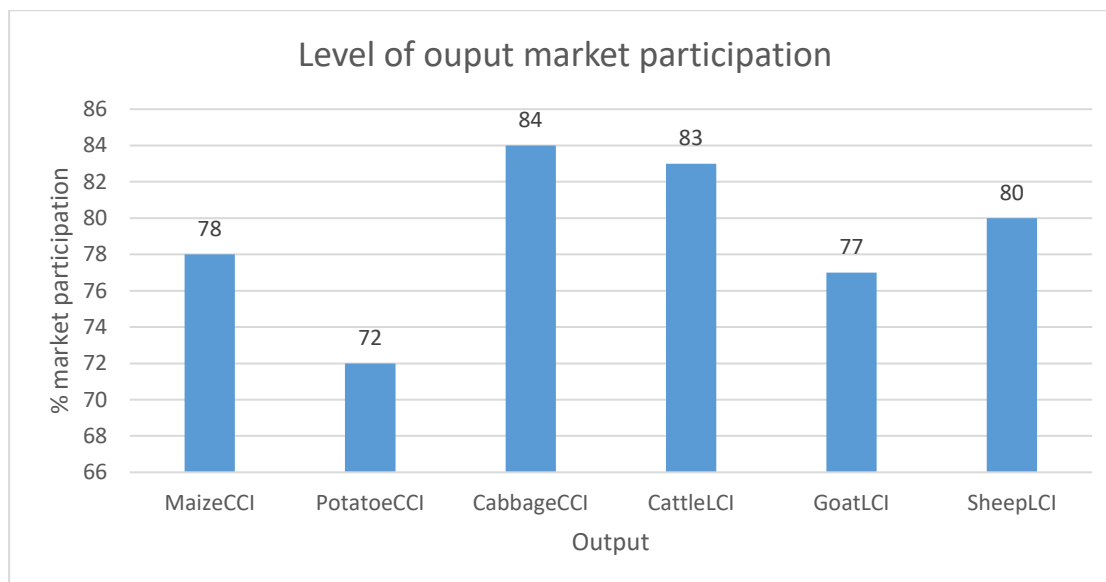


Figure 2.3: Output market participation

Source: Authors calculations from survey data

2.5.5 Intentions for expanding production

Numerous studies have argued that poor beneficiary selection is one of the major causes for the failure of land reform projects (Binswanger-Mkhize, 2014; Hall, 2015) with some authors reasoning that emerging smallholders in the former homelands are better suited potential beneficiaries (Cousins, 2015; DRDLR, 2013). Whilst the aspirations of smallholders have been taken into account by some studies (see, for example, Nieuwoudt, 2000; Senyolo, 2007; Chipfupa & Wale, 2018), few have considered whether smallholders would be willing to move from their communal farm, and if so, under what circumstances. In this instance Walker (2007) have lamented that this issue has been ignored in the land reform. While Cousins (2007) have suggested area based land reform i.e. targeting commercial farms next to the former homelands to avoid long distance relocation. However, Cousins (2007) suggestion would not always work because proximity to commercial farms does not automatically translates to willingness to move/relocate, one way or another relocation will have to happen.

Nonetheless, it is assumed that they would be willing to participate in land reform projects given the constraints faced by them such as limited access to capital due to insecure property rights (Fenwick & Lyne, 1999; Cousins, 2015), high transaction costs (Fenwick & Lyne, 1999; Khapayi & Celliers, 2016), smallholding size (Fourie, Mahlako & Van der Westhuizen, 2018) and the overutilisation of shared rangeland (Vetter, 2003). Respondents were asked whether they feel constrained by these factors.

A majority (57%) in deed felt constrained by farming in the homelands citing a variety of reasons such as land shortage both for grazing and arable land, while some pointed drawbacks of unsecure property rights as they have no title deeds on the land they are currently using which they can use to secure loans from the private commercial banks. In regards to shortage of land, this finding is interesting concerning the overwhelming literature on abandoned arable field cultivation in most rural former homelands of the country (see: Andrew & Fox, 2004:687; Connor & Mtwana, 2018:82; De la Hey & Beinart, 2017:753).

While majority felt constrained, a small proportion of 32% (as depicted in Figure 2.4 below) did not share the same sentiment and others were not sure about how they felt, claiming they have never thought about it. However, they did share sentiments about poor and/ or lack of agricultural support from the government including agricultural extension service.

In the total sample of this study, a majority (57%) were willing to relocate while the remaining 43% were not willing. Furthermore, in terms of provinces, in the Eastern Cape, 72% were willing to relocate and only 28% were not. While in KwaZulu-Natal, there were only a slight difference of 1% between those willing to relocate and those who were not. In Limpopo 51% were not willing to relocate while 49% were willing.

Moreover, to take this discussion a step further, respondents were asked an open-ended question to the respondents as to under which conditions are they willing to relocate. A vast majority (43%) were not interested in relocating at all, while 35% were willing to relocate if there is government support which is what is currently happening with the land redistribution pillar. Interesting is the minority group of 22% who are willing to move even if it means they must rent land. The other interesting feature about this group is that they also express that they only need land, then they will be able to finance production going forward.

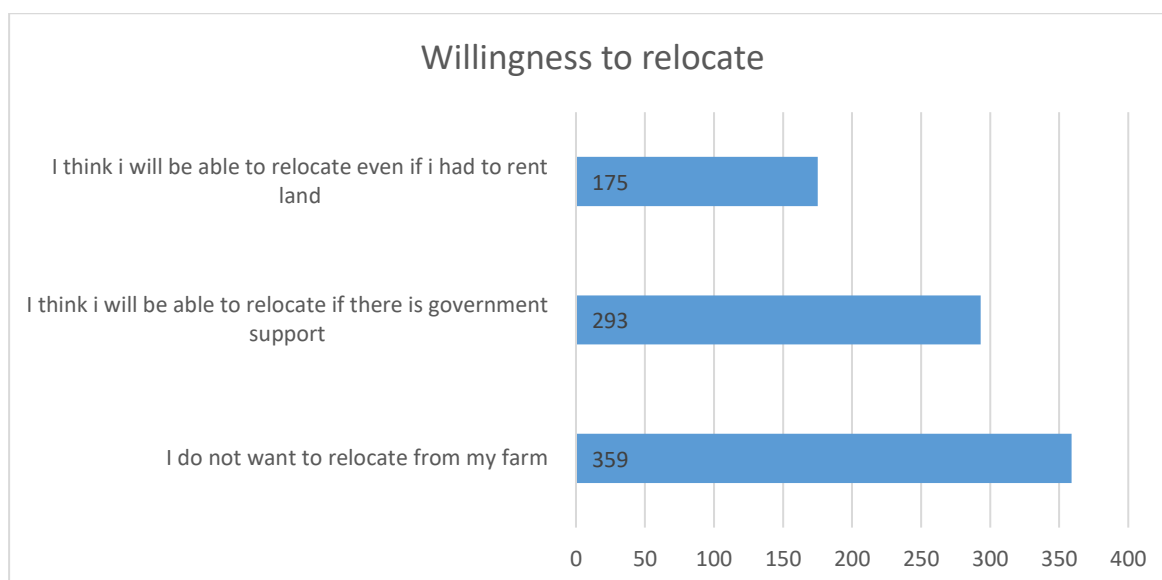


Figure 2.4: Distribution of willingness to relocate

Source: Authors calculations from survey data

2.6 Conclusions and Recommendations

The objective of this study is to improve our understanding of the diversity among emerging farmers using various classification measures. This was motivated by the inconsistent use of the term, ‘emerging farmer’; the importance of emerging farmers in transforming the South Africa agricultural sector and the potential contribution of emerging farmers to rural economy. Five commonly used measures used to describe emerging farmers in the South African context were identified and applied. The analysis found that no single measure should be used as the definitive indicator, but all five collectively.

The study found that the profile of the typical emerging farmer in the three provinces is as follows: emerging farmers are mostly male (61%), black, situated in the former homeland and have an average age of 55 years old. The typical farmer cultivates field crops as a secondary source of food and income, but keep livestock as primary and secondary sources of income. The average emerging smallholder mostly grows maize for own consumption given a crop commercialisation index (CCI) of 0.66 and sells a greater portion of his cabbage and potatoes given a CCI of 0.73 and 0.83 respectively. The average emerging farmer earns a nett income of R26.6 thousand per year, but there is an income inequality among them since the most successful farmer earned 26.7 times the average income. This translates to a Gini coefficient of 0.48 that is high by international standards, but low compared to the South African average of 63.1. The researcher found that 68% of his fellow emerging farmers feel constrained by farming

in a homeland, but only 56% would be willing to move from their homeland, with most (35%) saying that they would only do so if they are provided with sufficient government support. Interesting is the minority group of 22% who are willing to move even if it means they have to rent land. The other interesting feature about this group is that they also express that they only need land, then they will be able to finance production going forward.

It is of the utmost importance that project planners, the extension advisory service and policymakers take differentiated view on smallholder farmers to ensure that projects are focussed to the needs of specific groups. This is especially important with respect to emerging smallholder farmers seeing that they are an important pool of potential land reform participants.

Chapter 3:

A typology of emerging farmers in three rural provinces of South Africa: What are the implications for the Land Redistribution Policy?

Abstract

Purpose

Understanding diversity among potential land redistribution beneficiaries is of critical importance for both the design and planning of successful land reform interventions. This study seeks to add to the existing literature on farming types, with specific emphasis on understanding diversity within a sub-group of commercially oriented or emerging smallholders.

Methodology/approach

Using a multivariate statistical analysis—principal component and cluster analyses applied to a sample of 442 commercially oriented smallholders—five distinct clusters of emerging farmers are identified, using variables related to farmers' characteristics, income and expenditure, farm production indicators and willingness to participate in land redistribution.

Findings

The results suggest there are distinct differences in farming types, and each identified cluster of farmers requires tailored support for the effective implementation of land reforms. The identified homogenous sub-groups of smallholders allow us to understand which farmers could be a better target for a successful land redistribution policy.

Originality

Most of the existing typology studies in South Africa tend to focus on general smallholders and the Eastern Cape province. This study extends the literature by focusing on specific prime beneficiaries of land reforms in three provinces. The inquiry use a more detailed dataset than the general agricultural household surveys conducted by Statistics South Africa.

Keywords: typology; emerging farmer; multivariate analysis; land redistribution; South Africa

3.1 Introduction

Several studies have identified poor beneficiary selection as one of the main reasons for the failure of land reform projects (e.g. Lahiff and Li, 2012; Binswanger-Mkhize, 2014; Sebola, 2018; Department of Rural Development and Land Reform [DRDLR], 2020), while emerging smallholder farmers have been identified as a distinct group of farmers believed to be more suitable as land reform beneficiaries (e.g. the Pro Active Land Acquisition Strategy [PLAS] (DRDLR, 2006). The literature on South African smallholder farmers focusses on aspects such as household income composition (Modiselle *et al.*, 2005; Perret *et al.*, 2000); farmers on irrigation schemes (Wale and Chipfupa, 2018); risk attitudes (Tshoni, 2015; Olofsson, 2020); climate change impacts (Mkuhlani *et al.*, 2019); and smallholder diversity (Pienaar and Traub, 2015). Since the onset of democracy in 1994, South African agricultural policy has been focused on the development of smallholder farmers (Vink, 2001), although support programmes have had limited success (Aliber and Hall, 2012). Aliber, *et al.* (2006) argued that this is largely due to the failure to disaggregate and quantify target beneficiaries. Bienabe and Vermeulen (2011) also emphasised the importance of incorporating farmer diversity into appropriately designed support instruments. This is particularly true in the case of smallholder farmers in South Africa, where around 2.2 million households are involved in some form of agricultural production and, of these, only 10% sold any of their produce (Statistics South Africa [StatsSA], 2018).

These households can be classified into various clusters as will be shown later. Each can be further differentiated into smaller and more homogeneous sub-groups with similar features and livelihood strategies. For example, emerging smallholders represent a diverse group of farmers who do not produce solely for subsistence, since some sell some of their produce, whilst fewer aspire to commercialise their production to the point where almost all is sold and farming becomes their main source of income (see Nieuwoudt, 2000; Shackleton and Hebinck, 2018). Emerging farmers therefore can be plotted on a continuum between subsistence and commercial, and their position on the continuum is not fixed in time.

To date, the differences and needs of farmers within the group of emerging farmers have largely been ignored (Aliber, 2019). This is important, since emerging farmers are not a homogeneous

group that faces similar challenges or operates the same, as argued by, for example, Tihanyi and Robinson (2011). This leads to a one-size-fits-all approach, which is bound to fail (Anseeuw *et al.*, 2001; Essa and Nieuwoudt, 2003; Modiselle *et al.*, 2005; Nieuwoudt and Vink, 1989; Wale and Chipfupa, 2018). It is therefore imperative to improve our understanding of the diversity that exists among smallholder farmers, especially now that the South African agricultural sector is in a process of transformation (Louw *et al.*, 2017).

This transformation is facilitated through a three-pronged land reform – land tenure, land restitution and land redistribution (see Department of Land Affairs [DLA], 1997). However, to date all stakeholders seem to agree that there has been little progress on redistribution. The Bureau for Food and Agricultural Policy [BFAP] (2018) estimates that only 10 per cent of the 78 million hectares of agricultural land has been redistributed. In this portion of redistributed land productivity has been stagnant in some with literal no production taking place (Kirsten *et al.*, 2016). Various factors are cited for this poor performance of redistributed farms and one of the factors relate to poor selection of beneficiaries with potential and competence (see Sebola, 2018; Dlamini *et al.*, 2013). Cousins (2016) has blamed this to the failure of policy to acknowledge and embrace diversity in the group of smallholders intended as land redistribution beneficiaries. For example, the most recent land redistribution policy, State Land Lease and Disposal Policy (DRDLR, 2013), although it identifies categories of potential land redistribution beneficiaries, it assumes that commercially oriented smallholders are homogeneous.

Whilst several studies have illustrated smallholder diversity by developing typologies, there is a gap in the literature that this paper seeks to fill. First, no study has specifically analysed the diversity within this sub-group of farmers referred to as “emerging smallholder” farmers, even though they have been identified as the prime beneficiaries of land reform. The analysis is also unique in the sense that it is a ‘farmer’ typology, and is not done at the household level, which allows the inclusion of farmer characteristics such as their risk attitudes and level of training, amongst others. Second, few of these studies have been done at an inter-district level and across provinces; they mostly tend to be aggregated to the district/regional level using a limited survey (e.g. Perret *et al.*, 2000), or at the national level using public data such as the income and expenditure survey (Pienaar, 2013).

The objective of this study was to address this gap in the literature by improving our understanding of the typology of emerging smallholder farmers surveyed in seven districts, four in KwaZulu-Natal, three in the Eastern Cape and one in Limpopo provinces. Collectively, these provinces represent more than 60 per cent of all smallholder farmers in South Africa (StatsSA,

2016). For eligibility as an “emerging smallholder”, and thus for inclusion in this study, farmers had to market at least 20 per cent of their produce.

The paper is structured as follows: Section 3.2 contextualise the diversity of land reform beneficiaries and expands on the principal component analysis (PCA) and cluster analysis (CA) techniques used to construct the farmer typology; Section 3.3 provides more detail on the data and how the analytical techniques were applied; the results are discussed in Section 3.4; followed by a discussion of the implications of the findings as they relate to land reform policies, specifically the selection of beneficiaries, in Section 3.5.

3.2 Theoretical framework

This sub-section attempt to build a theoretical and analytical framework for developing an emerging farm typology. However, emerging farmers do not exist in isolation. Land reform cater for a group of farmers under different farming strategies. A brief overview of such land redistribution farming strategies will be reviewed to contextualise the study premises.

Since its inception in after 1994, the South African land redistribution has evolved. In its early stages under the Settlement Acquisition Grant [SLAG], where it catered for a group based farming (co-operative farming) on commercial farms (Lahiff, 2005). Other group farming pursued with land reform even to-date is commonage, which is more of communal farming, where grazing land is shared. The SLAG group farming was then abandoned for a programme that supports creation of black commercial farmers from aspirant smallholders, the Land Redistribution for Agricultural Development [LRAD] (Aliber *et al.*, 2018). The Pro-active Land Acquisition [PLAS] followed on the footsteps of LRAD, but with lease agreements instead of freehold titles (DRDLR, 2006). Most recently the State Land Lease and Disposal Policy [SLLDP] also works on land lease but cater for a category of beneficiaries, ranging from land-less households to black medium commercial farmers (DRDLR, 2013). Furthermore, SLLDP, prioritise selection of youth and women, who are already farming. In some of these models such as SLAG and PLAS, joint ventures – where farm workers co-own a commercial farm with the aim of gaining farm management expertise and minimise the risk of project failure. This has been mostly adopted in labour intensive industries such as wine, fruit and dairy farming (see e.g. inquiries of these joint ventures and BEE: Janssens *et al.* 2006; Bunce, 2020b). Overall, land redistribution cater for a variety farming strategies ranging to subsistence farming, contract farming via joint ventures, communal farming via commonages and emerging commercial farming. While all these groups of farmers and farming strategies are important, this study is limited to emerging commercial farmers.

3.2.1 Objective of typology formulation and variable selection

Developing a typology can be defined as the process of reducing and simplifying a large heterogeneous collection of elements into smaller, meaningful elementary types through the application of selection criteria in order to better classify, describe and interpretation of the data (Kluge, 2000). It has been widely applied in formulating smallholder farmer typologies (Alvarez *et al.*, 2018).

To date, various non-statistical methods (e.g. Laurent, *et al.*, 1999; Mkuhlani *et al.*, 2019) as well as statistical methods have been used to develop farm typologies. The non-statistical methods include expert opinions and qualitative farm-system classification methods, while the statistical methods often use principal component analysis (PCA) and cluster analysis (CA). A number of studies have made use of qualitative methods exclusively (e.g. Modiselle *et al.*, 2005; Nkonki, 2006; Shackleton and Hebinck, 2018), or have combined both statistical and non-statistical methods (e.g. Landais, 1998; Van Averbeké and Mohamed, 2006). Nevertheless, most studies make use of statistical methods, specifically PCA and CA, where a two-step process is employed whereby the dataset is condensed using PCA to the point where a meaningful CA can be applied (e.g. Alvarez *et al.*, 2018; Makate and Mango, 2017; Pienaar and Traub, 2015; Wale and Chipfupa, 2018; Priegnitz *et al.*, 2019). In this study a quantitative approach using both PCA and CA is employed.

While the selection of the analytical technique has a substantial impact on the intended typology analysis, the objective or hypothesis is also an important consideration, since it guides the selection process of the variables initially included in the analysis (Kuivanen *et al.*, 2016). Hence, variable selection is regarded as one of the important steps in typology formulation, as it affects the outcome of the typologies (Kobrich *et al.*, 2003). In this regard, the objective of the present study was to identify farmers with similar characteristics within the large pool of potential emerging farmers. This was done through a careful selection of important variables that are regarded as important in land reform beneficiaries (see van Rooyen and Njobe-Mbuli, 1996). They have identified farmer characteristics—age, education level and health, net worth of farmer—income and assets, farmers aspirations and their managerial and entrepreneurial skills. To find such similar variables in our study, we included demographic characteristics, production orientation, and income and expenditure broad variables as proxy for the variables identified by van Rooyen and Njobe-Mbuli (1996). To measure the aforementioned variables in this study we adapted the measures from Zantsi *et al.* (2020a). Demographic farmer characteristics and income and expenditure are common in research and in typology studies (see for example, Van Averbeké and Mohamed, 2006; Olofsson, 2020).

However, production orientation and risk are not measured in the same way and that can influence the results. To start with the production orientation, in the three broad categories of smallholders – subsistence, emerging or semi-commercial and commercial smallholders, the main reason of engaging in agricultural production is often used to make the categorisation (see for example, Rosegrant and Pingali, 1995; Aliber and Hart, 2009; Zantsi *et al.*, 2019a).

Risk is an inherent and crucial factor characterising of agricultural production. There are mainly five types of risks associated with agricultural production. These are production risk, market risk, institutional risk, personal risk, and financial risk (Komarek *et al.*, 2020). While there is more than one measures of risk, one that we found to suitable for our survey is global willingness to take risk (Dohmen *et al.*, 2011). This is a self-assessment measure that asks survey respondents, questions like “How willing are you to take risks, in general?” “How willing are you to take risks of borrowing money from a commercial bank for financing production?” “How willing are you to take risks, of planting a crop that you have never planted before?” Respondents rate their willingness on a scale from 0 to 10, where 0 denotes totally unwillingness and 10 fully willing. This measure has been tested for validity and found to produce stable results among survey respondents (Dohmen *et al.*, 2011). Further, this risk measure was supplemented with a general risk preference measure initial used in climate risk studies. For example, Di Falco (2014: 422). *In order to elicit each participant’s risk preference, the respondents were presented with a hypothetical farming scenario involving alternative levels of output depending on the weather. The hypothetical agricultural scenario consisted of two plots the productivity of which differs depending on if the rains are good or bad each at 50 percent probability. As can be seen in appendix 1, a series of six choices were presented to the respondents with each choice consisting of a payment with higher spread and higher payoff versus a choice with lower spread and lower payoff.*

Previous studies such as the one by O'Neill *et al.* (1999) have reported that some smallholder households, some of which might fall in the category of potential emerging farmer, feel constrained by farming in former homelands and need extra land. Shackleton and Hebinck (2018) also reported farming households need of extra land in Gatyana in the Eastern Cape. Following these studies, we wanted to first ask if farmer felt constrained by farming in the former homelands. Further, potential emerging farmer aspiration with respect to land demand has been asked in Aliber *et al.* (2006b) while aspirations of farming activities have been asked in Mearns (2011), such questions and approaches were followed in this study as well. Both these variables arose from a question that was asked adapted from Zantsi *et al.* (2020), of whether smallholder household heads would be willing to relocate to commercial farms if by

chance they can be selected for land redistribution. Where they will rent the farms for 10 years paying a rent of 5 per cent of their turnover. After 10 years, the respondent would be allowed to buy the rented land for R1, 000 per ha. Following this hypothetical question, those who were willing, were then asked how much land they will need and what farming activities would they pursue from the redistribution farms.

3.2.2 Theory

Typology formulation is the product of both theory and practice. In what follows, we briefly synthesise theoretical perspectives for formulating typologies.

To generate synthesised datasets, a statistical technique is used that condenses the selection of initial sets of variables into a smaller number of discrete, non-correlated components or sets of factors (Nainggolan *et al.*, 2013). The resulting absence of correlation between the factors is a useful property indicating different dimensions in the data (Manly, 1986).

The analysis starts by taking p variables, X_1, X_2, \dots, X_p , across n households and finding combinations of these to produce a new set of indices, Z_1, Z_2, \dots, Z_n , which are uncorrelated (Manly, 1986). The first principal component is then the linear combination of the variables X_1, X_2, \dots, X_p , and is given by:

$$Z_{1i} = \alpha_{11}X_{1i} + \alpha_{12}X_{2i} + \dots + \alpha_{1p}X_{pi}, \quad (3.1)$$

where

$$\alpha_{11}^2 + \alpha_{12}^2 + \dots + \alpha_{1p}^2 = 1. \quad (3.2)$$

This linear combination maximises the variance for the X variables amongst all such linear combinations, and the coefficients are found as the eigenvectors (of the sample covariance matrix (Everitt *et al.*, 2011). The first component contributes the most to the variance as contained in the n number of the original variables (Essa and Nieuwoudt, 2003). The second principal component, Z_2 , is defined as the linear combination of the original variables that accounts for the remaining variance, subject to being uncorrelated with the first principal component, i.e.:

$$Z_2 = \alpha_{21}X_{1i} + \alpha_{22}X_{2i} + \dots + \alpha_{2p}X_{pi}. \quad (3.3)$$

CA groups farming households in such a way that households in the same cluster are more similar to each other than to farming households in the other clusters (Hair *et al.*, 2010). This is appropriate here because it is more objective than qualitative methods, thereby also reducing the chance of bias. It is also more appropriate for exploratory studies (Makhura *et al.*, 1998).

Qualitative analysis methods are heavily based on key informants and knowledgeable experts (Landais, 1998). However, humans are particularly susceptible to errors and have different views about the farmers studied in the South African context (see, for example, Kirsten and Van Zyl, 1998; Rother, *et al.*, 2008; Gouse *et al.*, 2016).

The resulting z-scores from the PCA can now be used for cluster analysis and are ordered in the usual $n \times p$ multivariate data matrix given by equation 3.4 below. The different values of each explanatory variable are given by \mathbf{Z} , which describes each household to be clustered:

$$\mathbf{Z} = \begin{pmatrix} Z_{11} & Z_{12} & Z_{1P} \\ Z_{21} & Z_{22} & Z_{2P} \\ Z_{33} & Z_{32} & Z_{3P} \end{pmatrix} \quad (3.4)$$

In this matrix, Z_{ij} in \mathbf{Z} gives the z-score of the i_{th} variable in the j_{th} household. The rows correspond to the variables of interest (in this case the factors from the PCA output), while the columns correspond to the different households in the data. In order to understand the closeness between different households, proximity measures are used to identify dissimilarities, similarities and distance between elements in the data (Everitt *et al.*, 2011; Pienaar and Traub, 2015). In clustering households in the data, the units of proximity are usually expressed as a distance and will be dependent on the format of the specific data used in the clustering procedure. In the case of using the components from the PCA results, the distance measure most commonly used is the Euclidean distance, which is also employed here. It is given by:

$$D_{12} = [\sum_{k=1}^p (Z_{k1} - Z_{k2})^2]^{0.5}, \quad (3.5)$$

where D is the Euclidean distance between the 1st and 2nd households in the data matrix, determined by the p number of z variables within the d -dimensional dataset. This commonly used distance function satisfies all the conditions for a metric similarity measure according to Xu and Wunsch (2009), including symmetry, positivity, triangle inequality and reflectivity. The last step after clusters have been formulated is validation of the clusters. In this regard, there is no general rule, as contended by Kobrlich *et al.* (2003). However, analysis of variance (ANOVA) is performed to test whether or not the groups differ in terms of specific quantitative variables, while the Chi² test is performed for quantitative variables in the analysis, and this approach was followed in this study. In the next section we present the outcome of the methodological approach described here.

3.3 Data: Study area and sampling

This study was conducted in selected rural areas of the Eastern Cape, KwaZulu-Natal and Limpopo provinces of South Africa, chosen because they are understudied, despite the fact that

they are home to more than 60% of all smallholders nationally (StatsSA, 2016). Most studies of this type in South Africa focus on the Eastern Cape (e.g. Eckert and William, 1995; Laurent *et al.*, 1999; Perret *et al.*, 2000). With only few in Limpopo (Olofsson, 2020) and KwaZulu-Natal. The present study opted to improve typology in the Eastern Cape and extend the literature to other provinces and to study municipalities with a high density of smallholders, following Aliber *et al.* (2009). In this case the Amathole, O.R. Tambo and Chris Hani in the Eastern Cape; Umkhanyakude, King Cetshwayo, Harry Gwala and Zululand districts in KwaZulu-Natal, and Vhembe district in Limpopo. However, the sample sizes were not equally distributed across districts and province, because of unequal population and resources of carrying out the survey, therefore, we will not compare the provinces and districts.

A multi-stage sampling technique was used, combining purposive and random sampling. The provinces and the districts were selected purposively, while at the household level, selection was random. Within the selected districts, key stakeholder interviews were held to find villages with a high density of smallholders. These included extension officers, smallholder farmers' organisations such as the African Farmers' Association of South Africa, and nongovernmental organisations serving small-scale farmers, such as Lima Rural Development. Across the selected villages, we skipped four homesteads, when moving along the main roads and asked for permission to interview the available household head if they had produced agricultural products in the previous season and had sold at least 20 per cent of them (Van Averbeke and Mohamed, 2006; Zantsi *et al.*, 2020a).

A total of 762 commercially oriented smallholder farmers were randomly selected and surveyed through an in-person interview using a semi-structured questionnaire. The questionnaire was compiled in English but conducted in the language spoken in the area. Local agricultural postgraduate students who speak local languages (e.g. isiXhosa in the Eastern Cape, isiZulu in KwaZulu-Natal and TshiVenda in Limpopo) were recruited to assist in the data collection. This was to ensure questions were understood by the respondents. Only household who have sold a minimum of 20 per cent of their produce in previous season were included in the study. The imposition of this rule, together with the exclusion of incomplete and inconsistent entries, reduced the sample to 442 smallholders (see Table 3.1).

Given the lack of consensus on the definition of smallholders in South Africa, there is also a lack of consensus on their exact number⁵ (see, for example Kirsten and van Zyl, 1998; Rother *et al.*, 2008; Gouse *et al.*, 2016). Given this limitation, this study does not purport to present the

⁵ With limited evidence Cousins (2015) estimate the commercial oriented smallholders to be around 200 000-250 000

results of a representative sample, but rather reports the results of a typology analysis of a purposively chosen sample of smallholder farmers who sell more than 20 per cent of their produce and who farm in the important but understudied Limpopo and KwaZulu-Natal provinces.

Table 3.1: Study areas and sample size distribution

Province	District	Surveyed	Included in study
KwaZulu-Natal	Umkhanyakude	125	125
	King Cetshwayo	80	10
	Harry Gwala	57	57
	Zululand	104	100
Limpopo	Vhembe	90	90
Eastern Cape	Amathole	178	178
	OR Tambo	84	83
	Chris Hani	120	118
	Total	838	761

3.4 Results and discussion

3.4.1 Farmer characteristics and risk

As argued earlier, because our data set is not equal across provinces and districts and unclear issue of sample representativeness, we are unable to compare our results across provinces or districts. The characteristics of emerging farmers detailed in this study show that, on average, farmers were 51 years old, and the gender balance between male and female farmers was slightly skewed towards male. Average education was nine years of schooling, whilst around 51% had received at least some agricultural training. Around 62% of the respondents considered themselves full-time farmers and had a moderate risk preference. For example, with regards to taking the risk of relocating to another region if selected as land reform beneficiary and taking a loan from a formal financial institution they had a mid-score of 5 out of 10. While they showed a slightly higher (6 out of 10) willingness on planting a cash crop and general trust towards others. All these mean scores had similar deviations suggesting a level of homogeneity at the higher level, probably because all are farming in the homelands. They also indicated a large need for additional land of 33 hectares. This demand is much higher than the one reported in Aliber *et al.* (2006) of 1-1.5 hectares in Limpopo, Eastern Cape and Free State. This might be probably because they did not focus on the group of commercially oriented smallholders as we did. These characteristics of farmers resemble the findings in the existing literature, for example the age of the general agricultural household (45 to 54 years) is within this range (StatsSA,

2016). However, concerns have been raised about the age of potential beneficiaries of the land redistribution policy. Such concerns stem from the points of view of sustainability and physical potential. Van Rooyen and Njobe-Mbuli (1996), for example, suggest that beneficiaries between the ages of 30 and 45 have higher chances of success than beneficiaries who are younger or older than this age range.

The other interesting feature of emerging farmers is that they are about seven years younger than their commercial counterparts (DAFF, 2017). Moreover, these emerging farmers are willing to take risks by competing against well-established and mechanised commercial farmers in the market (Cousins, 2015). Many are also willing to go for training and to venture into new farming methods, unlike their subsistence counterparts, who are largely risk averse.

3.4.2 Income and expenditure

The emerging farmers had an annual household income of close to R 122 288, whilst gross income from crops and livestock was R 30 091.65 and R 20 571.90 respectively. To realise these average incomes from farming activities, farmers used crop inputs valued at R, 5955.56 whilst expenditure on livestock was much lower, at R4 435.69. It is evident that emerging farmers tend to receive more income from crops than from livestock activities and are willing to invest current income to raise net farm income of around R73 000 per annum.

Table 3 2: Descriptive statistics of variables used in the formation of PCA and CA

Grouping	Variable Name	Units	Mean	Standard Deviation
Farmer Characteristics	Gender	% Male	56.79	49.59
	Nr of Agricultural Trainings attended	# Number	0.51	0.70
	Fulltime Farmer	% Yes	61.54	48.71
	Age	Years	52.88	12.21
	Education	Years	8.67	4.46
Income and Expenditure	Annual HH income	Rand	122 288.64	18 7259.76
	Expected future HH Income	Rand	368 197.68	25 5698.52
	Crop Income	Rand	30 091.65	89 266.91
	Livestock Income	Rand	20 571.90	46 733.24
	Expenditure: Crops	Rand	5 955.56	13 172.84
Production Orientation	Expenditure: Livestock	Rand	4 435.69	13 652.30
	Hectares: Area planted	Hectares	2.06	2.95
	Number of large stock	Head count	9.86	24.41
	Number of small-stock	Head count	40.16	66.21
	Reason for Farming: Main source of income	% Yes	55.43	49.76
Land Reform & Risk	Number of external labourers utilised	Employed persons	2.43	4.06
	Owns a tractor	% Yes	12.90	33.55
	Feel constrained in your homeland farming activities	% Yes	64.03	48.05
	If chosen for as a Land Reform beneficiary, are you willing to move	% Yes	66.29	47.33
	Hectares willing to farm if chosen as beneficiary	Hectares	32.56	39.18
Risk: Willing to move to another region to expand production	1-10 scale	4.87	3.45	
Risk: Willing to risk taking an agricultural loan	1-10 scale	5.24	3.36	
Risk: Willing to risk planting a crop that you cannot consume if there is a good market	1-10 scale	6.52	3.35	
Risk: Willingness to take risks in your trust with others	1-10 scale	5.56	2.85	

Source: Own calculations from survey data

This shows that emerging farmers can at least make a living solely from farming, although this requires start-up capital, which is the reason emerging farmers tend to be relatively better off than subsistence farmers, whom mainly depend on state transfers and off-farm income (Aliber and Hart, 2009). However, around 14% of these farmers had a negative net farm income, which points to the risk involved in investing in farming activities in rural South Africa. Regarding the goal of job creation, emerging farmers spent around R2 000 per year on wages for external labour.

3.4.3 Production orientation

One of the characteristics of emerging farmers that sets them apart from subsistence smallholders is their commercial orientation (Pienaar, 2013), which is not only shown by selling produce, but by a slightly bigger scale. Vink and Van Rooyen (2009) have shown that the general smallholder farms sizes range from less than half a hectare to more than 20 hectares. Estimating land area of arable fields and gardens is a problem to smallholder farmers (see for example McAllister, 2000). To reduce such bias in this study, we used an example of a rugby field to few respondents who had trouble quantifying their land size. In the sample, the average area used for crop cultivation was 2.06 hectares, which is around two to four times that of their subsistence counterparts in the same areas (Pienaar and Von Fintel, 2014). Furthermore, in the General Household Survey, those households that produce for selling tend to cultivate more hectares and own relative larger herds (10 to 20 cattle, 20 to 60 small ruminants) (StatsSA, 2016).

Emerging farmers had on average ten head of large ruminants and forty head of small ruminants. Naturally, this is a somewhat skewed statistic, since a proportion of the sample only farmed with crops. Amongst those that farmed with cattle, the average number owned was 38. To get a sense of the reason for production, a Likert scale is used to indicate to what extent farmers produce to sell their produce (1 = main source of food; 2 = extra source of food; 3 = extra source of income; 4 = main source of income). As expected, 55% farmers in this group tend to produce largely to secure their main income.

The other characteristic that sets the emerging farmers apart from subsistence farmers is their moderate use of hired labour, compared to the predominant use of family labour by subsistence smallholders. The survey specifically included questions on the use of both family and hired labour. On average, emerging farmers used two external (hired) labourers.

Lastly, to capture the degree of machinery use among farmers in the study sample, we found that emerging farmers make extensive use of contractors and do not in general own machines

themselves, as indicated by only 13% in the sample who owned tractors. This is understandable since most farmers cultivate less than three hectares and do not have secure property rights to take a loan to buy machinery such as a tractor.

3.5 Results of the principal component analysis (PCA)

Following similar studies (Makate and Mango, 2017; Pienaar and Traub, 2015), the Kaiser-Meyer-Olkin (KMO) (Kaiser, 1970) measure for sampling adequacy, and Bartlett's test of sphericity were used to test whether the dataset could be used in PCA. The results from the KMO give a value of 0.75 (> 0.5), while Bartlett's sphericity test was highly significant (p -value < 0.001). These results are therefore indicative of the appropriateness of the selected variables.

Table 3.3 provides the PCA factor loadings of the respective variables. These were transformed from the original dataset by only retaining factors or components with Eigen values greater than one. The results yielded eight principal components, explaining 66% of the variation within the data. For ease of interpretation, factor loadings greater than 0.3 are shown in **bold**, and each component is summarised briefly below.

The first component explained 10.8% of the variation and had high factor loadings on land area planted, crop income, expenditure and hired labourers. The factor loadings suggest that intensive crop farming households are the main components here. Component 2, the second largest component, only explains risk attitudes of farmers without any production, farmer characteristics and production orientation whatsoever. This component explained 9.1% of the variation in the data. Component 3, similar to component 1, mainly consist of livestock farming households shown by higher factor loadings on livestock numbers and livestock income variables. Component 4 explains about 7.5% of the variation and is much related to farmer characteristics and attitudes on land reform. Component 5 is also related to farmer characteristics age and education of the farmer. Component 6 describes the extent to which farming occupation is practiced and the prime reasons behind it. Component 7 describes farmer income and income aspirations. The last and least component has only one dimension receiving of agricultural training.

The results of the PCA point to important dynamics in the classification of emerging farmers, and the resulting z-scores will be used further to define distinct farmer clusters.

Table 3 3: Results of principal component analysis showing factor loadings

Variable	Principle Component Factors							
	C1	C2	C3	C4	C5	C6	C7	C8
Clusters								
Gender	0.1	0.1	0.1	0.5	0.3	-0.3	0.0	-0.2
Nr of Agricultural Trainings attended	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.6
Fulltime Farmer	0.0	0.0	0.0	0.1	0.2	0.6	0.0	0.1
Age	0.1	0.0	0.0	0.0	0.7	-0.1	0.0	0.1
Education	0.1	0.0	0.0	0.0	-0.5	-0.2	0.0	0.1
Annual HH income	0.2	0.0	-0.1	0.2	0.0	-0.1	0.6	-0.1
Expected future HH Income	0.0	0.1	0.0	-0.2	0.0	0.0	0.6	0.2
Crop Income	0.4	0.0	0.0	-0.2	0.0	0.1	0.1	0.2
Livestock Income	0.0	0.0	0.6	0.0	0.0	0.1	0.0	-0.1
Expenditure: Crops	0.4	-0.1	-0.1	0.0	-0.1	0.0	0.2	-0.1
Expenditure: Livestock	0.0	0.1	0.4	-0.2	0.0	-0.2	0.2	0.1
Hectares: Area planted	0.5	0.0	0.0	0.0	0.0	0.0	-0.1	0.1
Number of large stock	0.0	0.1	0.5	0.0	0.0	0.0	-0.2	-0.1
Number of small-stock	0.0	-0.2	0.4	0.1	0.0	0.1	0.1	0.2
Reason for Farming: Main source of income	0.1	0.0	0.1	-0.1	-0.1	0.6	0.0	-0.1
Number of external labourers utilised	0.4	0.0	0.0	0.1	0.1	0.0	0.1	-0.1
Owens a tractor	0.3	0.2	0.0	0.0	0.1	-0.1	-0.4	0.3
Feel constrained in your homeland farming activities	-0.2	0.0	-0.1	0.6	0.0	0.1	0.0	0.1
If chosen for as a Land Reform beneficiary, are you willing to move	0.0	0.1	0.0	0.4	-0.2	0.0	-0.1	0.3
Hectares willing to farm if chosen as beneficiary	0.1	-0.1	0.2	0.3	-0.1	0.1	0.0	0.3
Risk: Willing to move to another region to expand production	0.1	0.4	0.0	0.2	-0.2	0.0	-0.1	-0.1
Risk: Willing to risk taking an agricultural loan	0.0	0.5	0.1	0.1	0.0	0.0	0.1	0.0
Risk: Willing to risk planting a crop that you cannot consume if there is a good market	0.1	0.4	0.0	-0.1	0.0	0.1	-0.1	-0.3
Risk: Willingness to take risks in your trust with others	-0.1	0.5	0.0	-0.1	0.2	0.0	0.1	0.3
Eigen Value	2.6	2.3	2.2	1.8	1.6	1.6	1.5	1.5
% of variance explained	10.8	9.4	9.1	7.5	6.8	6.5	6.2	6.1

Source: Own calculations from survey data

3.6 Results of cluster analysis

The results of the hierarchical cluster analysis are shown in the dendrogram in Figure 3.1. It indicates the number of cluster solutions available as one moves from the top to the bottom. The cluster solution is given by dissecting the dendrogram at a linkage distance of 50, at which five cluster groups emerge. This step points to relatively homogenous clusters to be formed in the next step, namely non-hierarchical clustering, which will ultimately yield the five-cluster solution. A previous similar study in Limpopo (Olofsson, 2020), which studied, only crop commercial-oriented smallholder diversity, have identified four clusters. Since we included both crop and livestock farmers, it made sense to select five clusters. Table 3.4 shows the results of the non-hierarchical K-means clustering procedure. It shows the mean values within clusters to understand differentiation within the farming household cluster. Each cluster is defined by its main characteristics, and remarks will be made in relation to land redistribution.

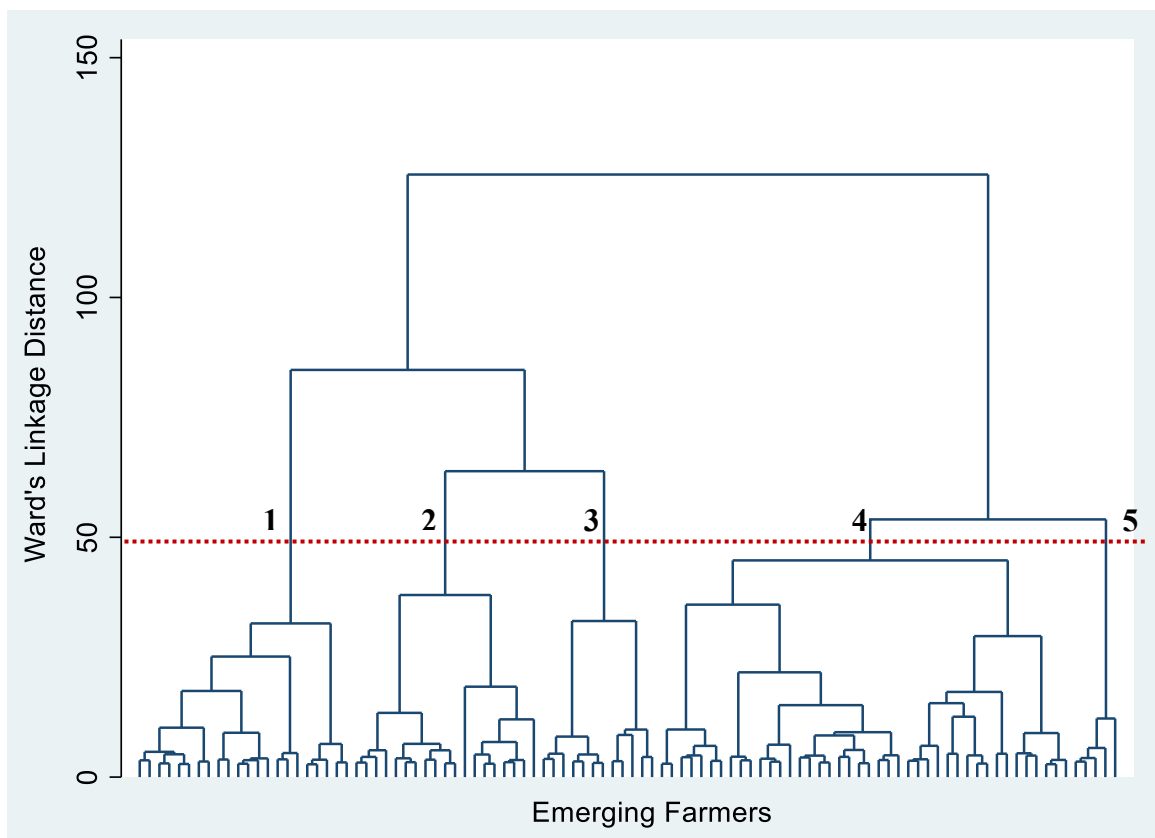


Figure 3. 1: Dendrogram for the hierarchical cluster analysis

Source: own compilation

3.6.1 Cluster 1: Male, educated, full-time livestock farmers:

Cluster 1 represents 8% of all the sampled farmers and is the smallest cluster. In terms of demographic structure, farmers in this cluster a vast majority are males of about 51 years old—seven years younger than their commercial counterparts (DAFF, 2017) and within the middle, in the range (45-54) of an average smallholder farmer (StatsSA, 2016). Further, farmers in this cluster have an average school years equivalent to grade 11, one year less to matriculation. Regarding orientation, more than half of the farmers in this group are full-time farmers and 60 per cent farm for attainment of main household income. This suggest that livestock income contributes significantly to their total household income. Livestock holding (on average, 155 small-ruminants and 53 large ruminants) and livestock income (R119, 471) clearly show that these farmers are inclined towards livestock probably because they have comparative advantage in livestock than in crop because they have small arable land (2 ha).

Given this profile, these farmers would be suitable for livestock redistribution farms. As they feel constrained by farming in the homelands probably because of shortage of grazing land due to higher livestock numbers. This substantiate government programmes such as the Animal and Veld Management Programmes, which seeks to ease pressure on overstocked communal grazing. This is achieved by identifying communal farmers with larger herds, which are then allocated to commercial farms available for land redistribution (DRDLR, 2016). Nevertheless, literature reporting on the details of farmers are identified and the outcomes of this programme is scarce.

Moreover, they have quite a moderate risk attitudes (5 and 6 out a maximum scale of 10) for relocating to commercial farms outside their homestead farms. Farmers in this group also shows high income ambition as the gap between their current income and expected future income is quite wide (R12 000 more). However, given their livestock number, they relatively demand smaller land about 87 ha. This could be attributed to poor background of stocking density and livestock carrying capacity. Some training in this skillset might be useful in addition to the training they have already received.

3.6.2 Cluster 2: Intensive crop producers with high-risk preference and hired labour.

Cluster 2 is the second smallest cluster and represents around 9% of emerging farmers in our sample. Farmers in this group have similar demographics features as those in farmers in cluster one. They are mostly males and farm on a full-time basis. Their average age is on the higher range of general smallholder age range and they are four year younger than their commercial

counterparts. This underscores the importance of farming skills as there is less room in terms of age for more time to learn. Sihlobo and Nel (2016) argued that settlement farmers (synonymous with emerging farmers in this case) need more years to master the art of farming commercial and added that this could take up to thirty years, in some cases.

However, their education is within the secondary education recommended by van Rooyen and Njobe-Mbuli (1996). As of the goals of redistributing agricultural land is to increase employment as outlined in Chapter 6 of the National Development Plan (National Planning Commission [NPC], 2011), farmers in this cluster they already employ 9 labourers other than their family labour. In terms of orientation, farmers in this cluster are the most commercial oriented farmers in the sample with high inclination to crop, shown by higher income and expenditure as well as arable farm size. They are the most likely group to own tractors than any other cluster, however, a majority of them do not necessarily feel much constrained farming in their homestead farms, but those who feel constrained and are willing to relocate would want an average of only 29 ha.

One of their distinct features of the farmers in this group is their willingness to take risk. In taking the risk of relocation, planting new crop they have never planted before to make more profit and taking production loan they have a higher score of seven out of ten. Combining this with the farm enterprise they have comparative advantage in (crop), which is also riskier than livestock make these farmers more desirable for higher value crops such as orchards

3.6.3 Cluster 3: Female, risk averse, small ruminant with high land demand.

The farmers in this cluster have similar age and education as farmers in cluster 2. However, this is the second largest cluster is distinguishable from other clusters by the combination of risk aversion, higher numbers of small ruminants and wanting relatively higher pieces of land. The later probably result from owning very small pieces of land, only a hectare and keeping high small ruminants. As such, a vast majority of these farmers feel much constrained farming in former homelands than any other cluster. Like the land demand of farmers in cluster 1, the amount of land seems to be lower than the carrying capacity of the owned stock. While these farmers feel much constrained, but their risk aversion makes them unattractive for commercial farming, where they will have to take much more risk than where they currently farm. This might prove to be more difficult when they are away from their social networks for support as Zimmermann (2000) argued regarding smallholder risks of relocating to commercial farms.

3.6.4 Cluster 4: Young, full time, crop farmer risk takers.

Being among the largest clusters in our sample, this cluster is distinguished by having the younger farmers. Farming mostly on full-time basis and being more commercial oriented as 72 per cent farm for attainment of main household income. Despite owning smaller arable land (less than 2 hectares) these farmers make a significant income by selling crops. They are the second highest cluster employing on average, three labourers. Their overall willingness to take risks is the highest among all the clusters and express high feelings of being constrained by their farming location. Noting that the draft policy on beneficiary selection makes the youth and females high priorities of land redistribution, makes these potential beneficiaries more attractive for land redistribution. Since they demand relatively smaller farm size, this emphasise the need to subdivide commercial farms intended for redistribution as some researchers have argued (e.g. Binswanger-Mkhize, 2014).

The emerging farmers in this group are arguably the most suitable candidates for land redistribution – of course if given the necessary training and support. In addition to being relatively young, which has advantages in terms of learning and training, farmers in this group are willing to take financial risks, which is a required competency for commercial farming.

3.6.4 Cluster 5: Resource poor retired females, with low education and not willing to relocate to commercial farms

This is the largest cluster in our sample, it accounts for 29 per cent and is dominated by pensioner females. These farmers are inclined towards crop farming on mostly full-time basis. In her study, Olofsson (2020) has also identified a similar cluster, one that is made-up of resource poor pensioners being the largest cluster. They expect higher future income probably because they make more money on farming despite owning or working smaller parcels less than two hectares. Their unwillingness to relocate can be explained by two factors, their age and risk aversion. Existing theory on characteristics for best land redistribution candidates is against both afore mentioned traits (van Rooyen and Njobe-Mbuli, 1996). Existence of potential emerging farmers with these features underscores the need for policies that will cater for a range of support other than the sole focus of redistributing land as highlighted in the National Development Plan's vision for rural development.

Table 3 4: Results from k-means clustering showing mean values for all variables used

Variables	Cluster1	Cluster2	Cluster 3	Cluster 4	Cluster 5
Gender	94.59	65.85	66.94	47.83	41.41
Nr of Agricultural Trainings attended	0.43	0.56	0.69	0.52	0.32
Fulltime Farmer	56.76	75.61	52.07	64.35	64.84
Age	50.78	54.54	53.40	44.06	60.38
Education	11.30	9.39	9.25	10.26	5.71
Annual HH income	8195.95	25542.68	6783.88	13703.9	5914.06
Expected future HH Income	20798.65	40036.59	21393.8	40073.9	30888.6
Crop Income	4802.70	194005.7	1991.33	28617.5	12785.9
Livestock Income	119471.4	5274.39	22723.1	8077.17	6075.90
Expenditure: Crops	1878.65	32898.78	1155.14	6023.51	2980.63
Expenditure: Livestock	16671.35	573.17	6936.45	2639.81	1385.53
Hectares: Area planted	2.39	7.84	1.04	1.67	1.42
Number of large stock	53.03	3.32	11.72	3.70	3.25
Number of small-stock	155.30	5.93	73.07	10.57	13.32
Reason for Farming: Main source of income	0.59	0.73	0.29	0.72	0.59
Number of external labourers utilised	1.54	8.56	0.56	2.98	2.00
Owens a tractor	0.22	0.46	0.11	0.11	0.03
Feel constrained in your homeland farming activities	0.86	0.41	0.90	0.64	0.40
If chosen for as a Land Reform beneficiary, are you willing to move	0.89	0.73	0.97	0.83	0.13
Hectares willing to farm if chosen as beneficiary	86.61	29.66	61.51	19.66	2.10
Risk: Willing to move to another region to expand production	5.54	7.44	3.03	8.04	2.74
Risk: Willing to risk taking a agricultural loan	6.05	7.24	2.96	7.73	4.29
Risk: Willing to risk planting a crop that you cannot consume if there is a good market	6.16	8.59	3.12	8.56	7.34
Risk: Willingness to take risks in your trust with others	5.51	6.37	4.32	6.76	5.42
Observation (n)	37	41	121	115	128

Source: Author's calculations

3.7 Summary of the clusters

The results of the five clusters confirm the diversity that can be found even within a subgroup of smallholder farmers who are commercially inclined, in this case better known as emerging farmers. The most salient feature is that emerging farmers differ with respect to their household characteristics, income and expenditure, and production orientation. It was also observed that emerging farmers tend to make more money by specialising in either livestock or crops, although we have seen diversification and mixed farming systems.

One also observed that farmers in these five distinct clusters can fit into different policies and forms of support. For example, although all the farmers were targets for land redistribution, not all of them had the same farm-size aspiration and all had different risk behaviour. Finally, land demand from potential emerging farmers is much lower than the average commercial farm size of 2000 hectares (Liebenberg, 2013). The most striking part about this is that land demand among livestock farmers is lower than crop farmer despite what we know about larger farm size in extensive grazing. This raises two issues, capability of determining farm size from the potential smallholders (as argued in Zantsi, 2019) and consideration of subdividing commercial farms intended for redistribution (Binswanger-Mkhize, 2014).

3.8 Discussion: Land distribution policy implications

Poor selection of land reform beneficiaries and a lack of post-settlement support are among the cited reasons for the failure of many land reform projects (Binswanger-Mkhize, 2014), making them the important issues in ensuring a successful land redistribution programme. An understanding of the diversity of the target beneficiaries is therefore of the outmost importance for both design and planning. In this regard, it is worth reflecting on the existing land redistribution policies among this diverse group of potential emerging farmers under study. Let us consider the categories of beneficiaries proposed in the State Land Lease and Disposal Policy [SLLDP] (presented in Box 1). Farmers in our sample can be fitted in category two and three. Wherein category two, farmers in cluster five can be best fitted. Farmers in other clusters can be fitted in category three.

Category 1: Households with no or very limited access to land, even for subsistence production.

Category 2: Small-scale farmers who have been farming for subsistence purposes and selling part of their produce on local markets. This may be land in the communal areas, on commercial farms, on municipal commonage or on church land.

Category 3: Medium-scale commercial farmers who have already been farming commercially at a small scale and with aptitude to expand, but are constrained by land and other resources

Category 4: Large-scale or well established commercial farmers who have

Box 2.1: State Land Lease and Disposal policy land redistribution categories

Source: DRDLR, 2013:13

The other important lesson from our clusters is that the categorisation of potential land reform beneficiaries presented in Box 1 lacks details of each of these categories and this might be the reason for the pronounced poor selection. In this study's analysis, the shortcoming of the DRDLR (2013) was partially addressed, by bringing up further details of the constituents of clusters. For example, farmers in cluster five and category two need support and more land within or close to their homestead because of their age. While farmers in other clusters are willing to relocate. These are important details needed to improve beneficiary selection.

These categorisations have been made in other studies for example, Conradie (2019) and Aliber (2019). See for example land redistribution proposal made in Aliber (2019:6) in Box 2 below. What is more interesting and important about this proposal is the target share, which is important in policy planning. Further, land appetite is considered. Results of the present study support this grouping that farmers wanting smaller pieces of land account for the larger share in the sample.

Type		Number share	Hectares share	Expenditure share
Smallholders	Settlement-oriented	75%	3%	15%
	Small-scale farmers	22%	26%	32%
Large-scale farmers		3%	71%	53%

Box 3.2: Land redistribution beneficiary categories

Source: Aliber, 2019:6

Based on the results of the present study, livestock farmers could be fitted under the category of large-scale because they would need larger pieces of land for grazing. This also contributes in the goal of Animal and Veld Management Programme of easing pressure on communal rangelands (DRDLR, 2016). Crop oriented clusters could be fitted under small-scale farmers. Unfortunately, settlement farmers are beyond the scope of this study. As highlighted before, since most farmers in this study's sample want small farmland parcels, redistribution farms would need to be subdivided. Zantsi, Mack and Vink (2020 - Chapter 6 in this dissertation) provides initial steps of subdividing farmland and estimated viable farm sizes for different categories of emerging farmers. Zantsi (2020 – Chapter 7 in this dissertation) goes further to estimate the possibility of implementing subdivision of commercial farms for emerging farmers and test different subdivision factors. In the event, that farm subdivision is approved, such information would be useful.

Seeing that some farmers in these clusters have higher off-farm incomes and some are part time farmers should not be taken as a form of condoning part time farming, but rather as a survival strategy adopted by land reform beneficiaries as it is already happening in some areas (see Anseeuw and Laurent, 2007). This is also practiced by current commercial farmers (see Lyne, 2014).

Lastly, the latest policy, SLLDP, involves the government leasing the commercial farms to emerging farmers in return for 5 per cent of their turnover as rent over a 50-year period (DRDLR, 2013). This policy clearly needs rethinking, as the most beneficiaries are already in their 50s. It is highly unlikely that this will lead to sustainable land reform unless children can be counted as successors. This could work for young farmers in cluster 4.

3.9 Conclusions, implications, and recommendations

After a careful review of the different broad smallholder categories and land redistribution policies, it was noted that the group of commercially oriented smallholders were the primary target of the different land redistribution policies currently being implemented. However, on the basis of similar studies and the failure of land redistribution to meet its target objectives (equity, employment, improving rural livelihoods and redistributing 30 per cent of land by 2014), was the questions whether, even within this broad group of emerging farmers, small subgroups could be found, despite this element being neglected in the design of land

redistribution policies? Indeed, diversity was found through the implementation of multivariate analysis, which finally resulted in five distinct cluster groups. **Cluster 1** consisted of Male, educated, full-time livestock farmers; **Cluster 2** was composed of intensive crop producers with relatively high risk preference and hired labour; **Cluster 3** was made up of female, risk averse, small ruminant with relatively higher land demand; while **Cluster 4** comprised young, full time, crop farmer risk takers. Lastly, **Cluster 5** consisted of resource poor retired females, with low education and not willing to relocate to commercial farms. It is recommended that redistribution policies be improved to appreciate this diversity. It will also be necessary to formulate clear beneficiary selection criteria to attract the potential emerging farmers with important qualities.

Farmers in cluster 3 and 5 could be regarded as less well-suited potential land reform beneficiaries since they engage in farming mostly as additional source of income using communal grazing. These clusters are categorised by female pensioners who farm intensively on small area, with little apparent willingness to move. The production strategy of these farmers is typically to produce crops to support household income and other family needs. Producer support to these farmers should focus on increasing their output. Whether farmers in cluster 1 should be target for land reform beneficiation is up for debate. Given that they are education individuals who farm with livestock on a part time basis one can argue that farming alone cannot compensate them for the opportunity cost of their labour and thus they are forced to supplement their income with non-farm activities. Their relatively lower risk preference could be because of the difference in the nature of livestock versus crop farming. Irrespective of these somewhat speculative claims which warrants further research, land reform projects that target individuals in cluster 1 for beneficiation must be structured substantially differently to those targeting farmers in clusters 2 and 4. The South African land redistribution is complex and cater for a variety of beneficiaries and different farming strategies. This study was only limited in exploring diversity within one group of potential land reform beneficiaries. Future studies could focus on other groups. Since data is the limiting factor, it is recommended that some of the questions regarding land redistribution be included in Statistics South Africa's general household survey.

Chapter 4:

Land redistribution beneficiary selection criteria in the South African land reform policy – challenges and possible solutions

Abstract

Sound and clear land redistribution beneficiary selection criteria contribute to the success of a land reform policy. However, such criteria are clearly lacking in South African land redistribution, which partially follows a market-led approach. Although the National Development Plan clearly identifies land redistribution beneficiaries and their selection process, the actual implementation of the plan is vague and problematic at the grassroots level. Ensuring a clear and transparent beneficiary selection process was one of the recommendations in a recent report by the Land Reform and Agriculture Advisory Panel (LRAAP) appointed by the presidency. To respond to the LRAAP report and expand on a proposal by the draft Beneficiary Selection Policy, this study provides a comprehensive review of the relevant policies and legislative documents as well as a detailed review of the literature on beneficiary selection. The study highlights the flaws in the existing selection methods and suggests an improvement to these methods based on the proposal by Vink and Kirsten (2019). The proposed improvement is meant to reduce inefficiencies and promote an inclusive and transparent selection process. The proposed improvement is meant to reduce inefficiencies and promote an inclusive and transparent selection process and is based on the aforementioned literature review and the insights from a profile of 833 potential land redistribution beneficiaries, randomly selected from three provinces in South Africa

Key words: land redistribution; emerging farmers; beneficiary selection; South Africa

4.1 Introduction

Sound and clear criteria for selecting land redistribution beneficiaries are an essential component of a successful land reform (Sebola 2018). Researchers regard poor beneficiary

selection as one of the main factors contributing to the dismal performance of the South African land distribution programme (e.g. Lahiff and Li 2012; Binswanger-Mkhize 2014; Hall 2015; Aliber 2019; Vink and Kirsten 2019; Bunce 2020a). This was echoed in a recent report by the Land Reform and Agriculture Advisory Panel (LRAAP 2019), which both highlighted the importance of beneficiary selection and stressed the urgency of improving the process already in place. With respect to beneficiary selection, several land redistribution policies – such as the Land Reform White Paper (Department of Land Affairs [DLA] 1997), the National Development Plan (National Planning Commission [NPC] 2011) and the State Land Lease and Disposal Policy (Department Rural of Development and Land Reform [DRDLR] 2013) – explicitly identify the different categories of land redistribution beneficiaries while providing little to no guidance regarding the actual selection criteria for individuals. This lack of guidance has been one of the main contributors to the beneficiary related failures of the land redistribution programme, resulting either in the unintentional selection of ill-suited beneficiaries or the selection of politically connected individuals at the expense of the deserving ones (Hall and Kepe 2017; Aliber 2019; Mtero, Gumede and Ramantsima 2019). The problem of unduly privileging politically connected individuals has also been stressed in the LRAAP (2019, 94) report: “Beneficiary selection has not been transparent and there is evidence of so-called ‘elite capture’ as businesspeople or those with personal or political connections acquire land ahead of farmers from communal areas or farm dwellers who have experience.”

While the policy documents provide limited guidance on beneficiary selection criteria, this issue has been investigated by numerous academic studies (e.g. Van Rooyen and Njobe-Mbuli 1996; Groenewald 2004; Randela 2005; Sebola 2018). However, this literature is also afflicted by various shortcomings.

To begin with, much of the literature draws on international experiences, whose direct application for the South African context is limited (e.g. Van Rooyen and Njobe-Mbuli 1996). Whilst several studies and policy documents highlight emerging or commercially oriented smallholders as well-suited land reform beneficiaries for the purposes of agricultural land use⁶ and employment creation (see, e.g., DRDLR 2013, 2020; Aliber 2019; Cousins et al. 2020), little is known about these emerging or commercially oriented smallholders (see, e.g., Olofsson 2020). As a result, the literature and the policy documents do not adopt the approach centred on commercially oriented smallholders when designing land reform projects or formulating

⁶ There are numerous categories of land reform beneficiaries, and all are important, serving a specific purpose. However, our study is limited to this specific group of land redistribution beneficiaries.

selection criteria. At the same time, some recommendations in the literature are based on results of detailed area-specific studies, which cannot be generalised. For example, Cousins (2015) based his recommendations for South African smallholders on the single case of Tugela Ferry – a small irrigated land in Msinga, KwaZulu Natal. Another example is Randela (2005), who focused solely on cotton farmers in a single region of Mpumalanga. Lastly, studies tend to neglect beneficiary screening – for example, Keswell and Carter (2014) described the steps in beneficiary selection but did not expand on the key attributes that should be considered in beneficiary selection. The same is true of Dawood’s (2018) analysis.

Recently, Vink and Kirsten (2019) and the DRDLR (2020) have examined selection criteria in more detail. Regarding the selection process, the aforementioned studies emphasised the importance of transparency, doing away with state bureaucracy and the use of local land reform committees. Regarding beneficiary selection, Vink and Kirsten (2019) suggested a tender or a job-application process but did not provide specific details on what this would entail. The Beneficiary Selection Draft Policy (DRDLR 2020), though explicit about the fact that women, children and people with disabilities should benefit, also did not provide sufficient details.

This study responds to LRAAP’s (2019) call to address the challenge of beneficiary selection and takes up the Draft Beneficiary Selection Policy’s (DRDLR 2020, 12) objective to “create a credible and transparent system of land allocation and beneficiary selection.” The present study contributes to the beneficiary selection literature by contrasting the beneficiary attributes identified by said literature with the results of a survey of 833 commercially oriented smallholder farmers, as potential land reform beneficiaries, across three provinces. The present study argue that the beneficiary selection criteria identified in the literature are not sufficient to inform the beneficiary selection process. This study attempts to improve the effectiveness and transparency of the beneficiary selection process, the aspirations of potential beneficiaries must be considered with project and beneficiary selection criterion design. In addition, we propose that the beneficiary attributes should be translated into a clear and concise standard vacancy description. Such vacancy farm description should be advertised publicly, allowing aspiring farmers to apply for beneficiation.

In the following section, we contextualise the land reform, reflect on the current status quo and discuss the land reform beneficiary categories. Section 4.3 provides an overview of the current beneficiary identification process, both at the national and local levels. The section also consider the legislative environment and review the relevant academic literature. Sections 4.4

and 4.5, describes the data and analysis method, respectively. Section 4.6, discusses the concept of a vacancy farm application for land reform beneficiary. Section 4.7 concludes the paper.

4.2 An overview of the South African land reform and its beneficiaries

Several countries in Africa, Latin America and Asia have implemented land reforms to redress unjust land policies (Binswanger-Mkhize et al. 2009). The South African land reform rests on three pillars (DLA 1997). The first pillar is land tenure security reform, which seeks to strengthen the land rights of farm workers and people living in communal areas. The second pillar is land restitution, which seeks to provide redress to the people from whom land was forcefully taken, either by restoring their ownership of the land or providing monetary compensation according to the value of their land. The third and last pillar is land redistribution, whose objective is to correct the racially skewed distribution of land ownership in South Africa. Although all three pillars are equally important, ensuring successful land redistribution is essential to transforming the racial composition of agricultural land ownership (Kirsten et al. 2016).

Numerous land redistribution policies have been implemented since the inception of the land reform programme in 1994. These policies include the Settlement Land Acquisition Strategy (SLAG) of 1997–2000, the Land Reform for Agricultural Development (LRAD) of 2000–2010, the Proactive Land Acquisition Strategy (PLAS) of 2006–present and the State Land Lease and Disposal Policy (SLLDP) of 2013. Most of these policies identified several beneficiary categories and often recommended commercially oriented smallholder farmers as highly suitable candidates for agricultural land redistribution. For example, the SLLDP (DRDLR 2013), the most recent land redistribution policy, identified four categories of households as landless households: commercially ready subsistence producers, expanding commercial smallholders, well-established black commercial farmers and financially capable aspiring farmers. While all the different categories of land redistribution beneficiaries are equally important, we will focus on the commercially oriented smallholders because they are regarded as the well-suited beneficiaries (e.g. in DRDLR 2013; Aliber, 2019).

Land reform is a complex issue with numerous meanings; as such, there have been repeated calls to take all these meanings into account (see, e.g., Sihlobo 2020; Bank and Hart 2019; Hornby and Cousins 2019; Brandt and Mkodzongi 2018). The meanings include social justice, equity, the place-making perspective, the small-scale farming model and the commercial

farming model, among others. The wide range of meanings have resulted in contrasting judgments regarding the success of land reforms. For example, anthropologists, who often judge land reforms based on social justice outcomes and the place-making perspective, evaluate the success of land reforms differently (e.g. Bank and Hart 2019; Hornby and Cousins 2019) than agricultural economists (e.g. Sihlobo 2020), who often judge land reforms based on the commercial farming model. Regardless of the importance of other models, we adopted the commercial farming model due to the kind of beneficiaries that our study deals with.

Since the inception of the South African land reform, progress on land redistribution has been slow. For example, BFAP (2018) and LRAAP (2019) have estimated that the land redistributed through land redistribution amounted to 10% of the total agricultural land in the country. The slow pace of land redistribution has been accompanied by low productivity on the redistributed farms. Evidence from a longitudinal study in North West showed that production on the redistributed farms had declined, with no production taking place in some instances (Kirsten et al. 2016). This situation is not unique to the North West province. Mtero et al. (2019) reported that in 27% of the 62 SLLDP-redistributed farms surveyed in the Eastern Cape, the Free State, KwaZulu-Natal, North West and the Western Cape production has ceased. Whilst the reasons for the poor performance of land reform farms are multi-dimensional, several authors have identified poor beneficiary selection as a key contributor (see, e.g., Dlamini, Verschoor and Fraser 2013; Binswanger-Mkhize 2014; LRAAP 2019). The government itself has also acknowledged poor beneficiary selection, with the DRDLR (2020) recently stressing in its draft Beneficiary Selection Policy that improved beneficiary selection criteria need to be developed.

4.3 Beneficiary identification and selection

4.3.1 Approaches to beneficiary identification

Scholars have argued that balance must be struck between the market-led and the bureaucratic methods for the identification of beneficiaries (see Van Zyl 1996; Karaan 2006; Binswanger-Mkhize, Bourguignon and Van den Brink 2009). Various studies e.g. (Van Rooyen and Njobe-Mbuli 1996; Sihlobo and Kirsten 2018; Mtero et al. 2019) have argued that the market-led approach excludes the poor and the bureaucratic process allows for corruption and political interference, which could result in the selection of beneficiaries who already have land and have lower interest in farming (Lahiff, Borrás and Kay 2007).

According to Binswanger-Mkhize, Bourguignon and Van den Brink (2009, 16), “the characteristics of the targeted beneficiaries are largely shaped by the objectives of the redistribution [programme], and they directly influence the performance of the beneficiaries.” While some authors have specified the required attributes for suitable land reform candidates, other researchers have encouraged beneficiary selection criteria to be flexible enough to accommodate different categories of beneficiaries (e.g. Aliber 2019; Vink and Kirsten 2019), arguing that a single criterion would not fit all farms in all regions. However, these researchers do agree on the need for broad beneficiary-selection guidelines that would be flexible enough to be adapted by local stakeholders to accommodate regional farm attributes.

Section 25 of the South African Constitution states that the State must take reasonable legislative and other measures within its means to foster the conditions that enable citizens to gain equitable access to land (South Africa 1996). However, the Constitution does not prescribe which citizens should be prioritised or spell out specifically how this should be accomplished, leaving the details for policymakers (Sihlobo and Kirsten 2018). Unfortunately, this has resulted in a chaotic situation, as highlighted by LRAAP (2019, 56):

A key gap in the legislative framework for land reform, and especially in relation to land redistribution, is the absence of an overarching framework law that guides and directs the programme as a whole, as well as its various sub-programmes. No such law exists at present. A key object of a framework law would be to clarify who the key beneficiaries of land reform should be, so that the goal of ensuring equitable access is achieved.⁷

Whilst the issue of beneficiary selection has been raised in several high-level policy documents, the same cannot be said for ground-level implementation plans. After studying the implementation of land redistribution, Hall (2015) concluded that the South African land reform policy is without direction, given that it has no clear focus on what must be achieved and who should benefit. Both the prospective and the potential beneficiaries have also acknowledged the importance of beneficiary selection and agree that at the moment, the selection process is not competent (Bunce 2020a).

⁷ In response to this call by the LRAAP, a new draft Beneficiary Selection Policy has been published to solicit comments from the public (DRDLR 2020). The Institute for Poverty Land and Agrarian Studies [PLAAS] (2020) has commented and criticised the lack of clarity on who exactly the other beneficiaries are. They argue, for example, that the beneficiary categories are vague.

4.3.2 Past and Present South African Beneficiary Selection

The SLAG (1997–2000) and the LRAD (2000–2010) programs were based on demand-driven self-selection process, whereby beneficiaries had to identify a farm – either on their own, through the state land agency or mobilised by commercial farmers looking to sell land – and then apply for grants from the Department of Land Affairs (Aliber et al. 2018).

With the SLLDP program (2013–present), potential beneficiaries apply for a farm via the DRDLR by submitting a viable business plan. This approach, centred on commercial farming, typically benefits the rural elites, who own large herds and farm on a large scale, and excludes other types of beneficiaries, who lack the resources and information about commercial farming (Mtero et al. 2019). Aliber and Cousins (2013) criticised placing too strong an emphasis on the commercial farming model at the expense of other models and stated that making business plans part of the selection process results in the continuation of land uses that existed before the farms were transferred through the land reform. Hebinck et al. (2011) echoed similar views, criticising the use of the commercial farming model and arguing that said model resembles the previous small-scale farming development, which used a colonial and top-down approach. They recommended relying and building on beneficiaries' farming knowledge instead of following the commercial model, which is not known by the beneficiaries, and claimed that beneficiaries would, consequently, perform better and learn in the process. Studies have also shown that deserving candidates do not necessarily have the skills to compile a business plan (McCusker and Schmitz 2008); if they hire a consultant, a situation may arise where the candidate does not understand or own the business plan (Van der Brink et al. 2009).

Under the PLAS program (2006–present), the state is tasked with proactively purchasing land when suitable beneficiaries are identified⁸ (Aliber et al. 2018). Scholars have also shown that, besides the lack of unified selection criteria, there are contradictions among the existing policy documents. Though a national study showed that there were substantial differences in the implementation of the PLAS programme among provinces (see DRDLR 2015), a survey of 850 land redistribution beneficiaries in the Eastern Cape, KwaZulu Natal and Mpumalanga concluded that the process was broadly similar in these provinces. Typically, commercial farmers offered land for the DRDLR to purchase, but land could also be purchased if requested by beneficiaries. The persons on the waiting list for land distribution usually self-report their information, with the beneficiaries being selected based on having a suitable motivation,

⁸ Aliber et al. (2018, 10) stated that “in some if not many cases, however, the intended beneficiaries were already known.”

providing a viable business plan and undergoing a satisfactory interview with the local District Land Reform Committee (DLRC) (Dawood, 2018). After a person or a household is selected by the DLRC, the choice is presented several times for approval until it is eventually signed off by the relevant Deputy Director General (DDG) (Dawood, 2018).

The current composition of the DLRCs has been criticised by Aliber et al. (2018). They argued that the persons appointed to be the DLRCs do not have the capacity to perform their duties as outlined in Chapter Six of the NDP and thus only fulfil their roles on paper. Consequently, they recommended that DLRC membership should consist of local stakeholders, such as farmers and local community organisations. Cousins et al. (2020) have also proposed similar recommendations, emphasising the creation of alliances and partnerships between small-scale producers, commercial farmers, commodity organisations, NGOs, researchers and tertiary institutions. LRAAP (2019, 79) has proposed that DLRCs should “be replaced by trained area-based structures, with clear operation guidelines and aligned to the objectives and approach.” Though current DLRC members have been criticised for not having the necessary capacities to fulfil their tasks, they are given very little guidance on how to assess beneficiary applications. Rather than being based on the submission of a reasonable business plan, researchers (e.g. Van Rooyen and Njobe-Mbuli 1996; Groenewald 2004) have argued that beneficiary selection for land redistribution should be based on specific beneficiary attributes that would help the beneficiaries to succeed at farming

4.4 Data: a survey of potential emerging farmers

While there are several definitions of small-scale farmers, Cousins and Chikazunga (2013) defined smallholder farmers as individuals who produce for home consumption and who sell surplus for varying amounts of cash income. Small-scale farmers rely mostly on family labour and differing levels of mechanisation, capital intensity and credit. Our study focused on the following subset of smallholder farmers: commercially oriented smallholders who sell at least 20% of their produce. Whilst the exact number of commercially oriented smallholders in South Africa is unknown, Aliber et al. (2018, 1) estimated the number to be 150 000 in 2010.

We used the data from a cross-sectional survey – conducted in the Eastern Cape, Kwa-Zulu Natal and Limpopo provinces of South Africa in 2016 and 2017 – of commercially oriented

smallholders as potential emerging farmers.⁹ These provinces were purposively selected because of their high density of smallholders, given that they represent the majority (61%) of smallholders in South Africa (Statistics South Africa [StatsSA] 2016). Seventeen villages within these provinces were selected based on key informant interviews with extension officers, smallholder farmers' organisations (such as the African Farmers' Association of South Africa), NGOs working with small-scale farmers (such as Lima Rural Development) and commodity organisations (such as the BKB). Individuals from the villages were selected randomly, but only those who sold more than 20% of their produce were interviewed. A semi-structured questionnaire was used as a survey instrument, which was compiled in English but translated and administered in the home language of the individuals surveyed. A total of 833 farmers were interviewed, the breakdown of which is presented in Table 4.1.

Table 4. 1: Study areas and sample size distribution

Eastern Cape	<i>n</i>	KwaZulu-Natal	<i>n</i>	Limpopo	<i>n</i>
<i>Amathole</i>	175	Umkhanyakude	125	Vhembe	89
<i>Chris Hani</i>	120	King Cetshwayo	80		
<i>OR Tambo</i>	84	Harry Gwala	56		
		Zulu Land	104		
Total	379	Total	365	Total	89

The survey was designed to capture demographic information, production information and willingness to participate in land redistribution, among other variables. Regarding land redistribution, the farmers were asked whether they felt constrained by farming in the former homelands. This was followed by a question on their willingness to move to a commercial farm if they were selected as beneficiaries of the land reform. This was followed by a question on how much land they would need and what farming activities they would pursue on their redistribution farms.

4.5 Lessons from the survey of potential emerging farmers

Van Rooyen and Njobe-Mbuli (1996) and Vink and Kirsten (2019) have highlighted several farmer attributes for consideration in beneficiary selection, including the farmer's health, age, education level, financial position and farming skills. Dlamini et al. (2013) also underscored

⁹ As commercially oriented smallholders are regarded as a category of the land redistribution beneficiaries, for example by the DRDLR (2013), we use this term to refer to our respondents. Sometimes, we also use this term interchangeably with emerging farmers.

the importance of farming skills. To this list, Groenewald (2004) added previous farming experience, entrepreneurial skills and managerial aptitude. Sihlobo and Kirsten (2018) also suggested the aforementioned attributes for beneficiary selection. As they have been deemed important by scholars, in this section we will assess these attributes in relation to our survey respondents and discuss them extensively. Later in the section, we will also use our own relevant work and studies to discuss additional factors that directly or indirectly affect beneficiary-selection attributes.

4.5.1 Age and experience

Several researchers (e.g. Groenewald 2004; Nakana and Mkhabela 2011) have stressed the importance of human capital in farming. Amongst the numerous qualities encompassed by human capital, experience and education are two of the most important. Previous farming experience – that is, the “know-how” – is an important prerequisite for beneficiary success (Groenewald 2004; Denison et al. 2009). While the literature emphasises the importance of experience, few studies have specified the kind of experience and skills needed.

Age is often used as a proxy for experience. In general, scholars more experience is viewed as better (see, e.g., Van Niekerk, Groenewald and Zwane 2014), but this is not necessarily the case. In their five-year analysis of land reform projects in the North West province, Kirsten et al. (2016) could not prove that the beneficiaries who had previous farming experience performed better than those who did not. In fact, they found that the opposite was true, as experienced beneficiaries performed relatively worse. Nakana and Mkhabela (2011) found similar results in the wine industry, where younger commercial wine farmers was found to be more profitable than their older peers. Thus, the relationship between experience and performance is not binary because there can be countervailing influences. Nonetheless, in the case of land reform beneficiary selection, Van Rooyen and Njobe-Mbuli (1996) argued that individuals between the ages of 30 and 45 have the best chances of success. This age range is also supported by international literature – for example, Gale (2000) showed that in the US, the rate of full-time farm entry increases from the age of 35 years.

The average and median ages of the individuals in our sample were 55 and 57 years, respectively, with a standard deviation of 11.4 years. Within the sample, the oldest respondent was 86 years old and the youngest was 21 years old. Only 15.2% of the sample was in the 35 and 45 years bracket similar to what Van Rooyen and Njobe-Mbuli (1996). The beneficiary-selection policy (DRDLR 2020) states that beneficiaries must come from previously

disadvantaged communities and must be older than 18, claiming that the youth – the individuals between the ages of 18 and 35 – are a key target group as redistribution beneficiaries. Persons in this target group will have to be sought within small-scale farmers, as only 7.6% of the commercially oriented smallholders we surveyed belonged to this age group. The beneficiary-selection policy also identifies women as a key beneficiary group; here, relying on commercially oriented smallholders is also problematic, as women represented only 38.4% of our sample.

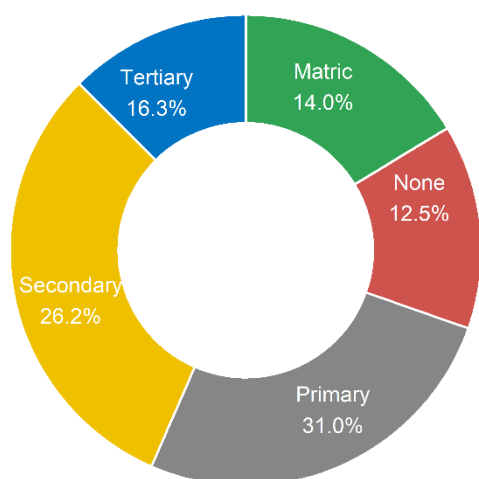
Risk preference is an important ancillary aspect of age. Several studies have shown that an individual's willingness to take risk decreases with age (see, e.g., De Mey et al. 2014). This was also the case for the commercially oriented smallholders surveyed in our study, with willingness to take risk decreasing by 0.2% per additional life year and willingness to move to a land reform farm decreasing by 0.5% per additional life year (Zantsi, Greyling and Mazwane 2020). Given the relationship between age and risk preference, together with the findings that show that the land reform beneficiaries who are willing to take risk outperform their peers (Kirsten et al. 2016), it is important to target younger beneficiaries.

4.5.2 Education

Several studies have demonstrated a positive correlation between education and farming success. For example, Mearns (2011) claimed that education can be a good predictor of success among land reform beneficiaries. He distinguished between formal and informal education and argued for the importance of both in farming. The importance of formal education for farming success is also supported by international literature. For example, a survey of farm entries and exits in the UK found that entry-level farmers viewed education and farming background as important factors that made their entry into farming smoother (ADAS 2004). However, this is not true for all education but only for agriculture-specific education. In a study of more than 50 000 Austrian farmers, Weiss (1999) found that the level of agriculture-specific schooling increased the probability of farm survival by 1.57% and increased farm growth by 1.69%, whilst the level of general schooling did not significantly influence farm survival. The importance of beneficiary education is also stressed in the literature on the South African land reform (see, e.g., Van Rooyen and Njobe-Mbuli 1996; Shinns and Lyne 2005), with some scholars advocating for beneficiaries having at least secondary education (Van Rooyen and Njobe-Mbuli 1996).

The survey showed that the average commercially oriented smallholder had nine years of schooling. A total of 12.5% of the respondents indicated that they had received no schooling, 31% indicated that primary schooling was their highest level of education, 26.6% had attended high school without graduating, 12.5% had graduated from high school and 16.3% had undergone tertiary education (see Figure 4.1). We also found that 40% of the commercially oriented smallholders had received some form of agricultural training, such as training in shearing and sorting wool, planting and fertiliser application and stock improvement and raising broiler chickens.

a) Formal education



b) Training

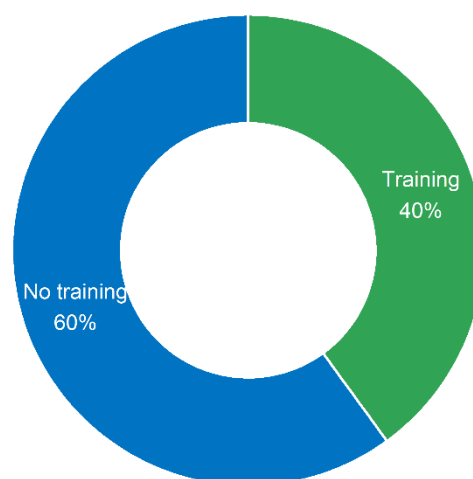


Figure 4. 1: Education level of potential land redistribution beneficiaries

4.5.3 Net worth – income and assets

Some authors have criticised land redistribution efforts for not being pro-poor, arguing that better-off households benefit more from such programmes than the poor (e.g. Zimmerman 2000; Hall and Kepe 2017; LRAAP 2019). Scholars have argued that this criticism was the reason why the LRAD was abandoned in favour of the PLAS and SLLDP programmes (Lahiff and Li 2012). Van Rooyen and Njobe-Mbuli (1996) suggested the use of a means test based on household income and assets to ensure that land redistribution targets the intended beneficiaries. However, the means test tends to result in the self-selection of the better-off beneficiaries, partly because the latter tend to be more aware of opportunities than potential beneficiaries who are poor. For example, evidence suggests that better-off households tend to be more willing to

relocate to the redistributed farms,¹⁰ which entails additional costs that emerge very late and are not covered by state support (Keswell and Carter 2014).

The survey revealed interesting insights regarding the application of a means test for the selection of beneficiaries. The average commercially oriented farmer in our sample earned R7 089 a month, whilst the median income was R5 000 per month. As with the rest of the South African economy, a large income disparity existed among commercially oriented smallholder farmers, with the lowest 10% of the sample reporting an average monthly income of R1 109 and the wealthiest reporting R25 653. If a land reform project must ensure an equivalent or greater income for potential beneficiaries, this implies a wide array of project sizes in order to meet the requirement. It is also safe to assume that the project design should not cater to the individuals within the bottom 10% in terms of income because it is below the poverty line of R1 200 per person per month (StatsSA 2018).

4.5.4 Management and entrepreneurship

Managerial skills are essential in farming, particularly in commercial farming; therefore, such skills should be an important factor in beneficiary selection (Groenewald 2004). Burger (1971) demonstrated empirically that farmers with a high net worth are also good managers. This was also echoed by Van Zyl, Binswanger and Thirtle (1995), who showed that larger farms are not inherently more efficient than smaller farms; rather, larger farms are more efficient because they are managed by good managers. Groenewald (1971) identified some of the managerial traits of good farmers: identifying problems and/or opportunities, collecting facts regarding the problems and/or opportunities, evaluating the facts and reaching a decision, carrying out the decision and allocating responsibilities. The importance of these skills was stressed by Karaan (2006), who underscored the changing nature of farming businesses around the globe, which includes, by implication, the South African farmers as well and must compete in the same space. Karaan (2006) further stated that “[a]gricultural firms are moving beyond a producer orientation towards firms that focus on creating value from size, non-farm business, service orientation, more open management style, greater human capital, accelerated self-renewal, innovation, marginalizing commodities, retaining and unlocking further value from traditional business” (Karaan 2006, 245). The importance of management skills for land reform beneficiaries has been stressed by numerous authors – for example, Zimmerman (2000, 1448) argued that “land

¹⁰ Zantsi (2019), which is based on the data used here, has confirmed a positive correlation between total household income and the willingness to relocate.

redistribution program[s] must therefore invest heavily in the farm management skills of the intended beneficiaries.”

In this regard, managerial aptitude is associated with the scale and size of a farming business, and scholars argue that small farms have a relatively smaller management load compared to larger, multi-enterprise farms (Van den Brink et al. 2007). Managerial ability is an important consideration in beneficiary selection and programme design. A DRDLR (2015) study of 113 PLAS beneficiaries revealed that more than half of the beneficiaries indicated that they could not manage their farms without the help of their mentors. Kirsten et al. (2016) cited the lack of financial management skills as a key factor for the low productivity of redistributed farms.

Van Rooyen and Njobe-Mbuli (1996) and Groenewald (2004) argued that yield can serve as a proxy for farming skills and experience. The importance of using yield as a proxy for farming experience was underscored by Vink (1993), which is human capital required to manage the production factors. However, using yields as a proxy for farming experience might be highly possible at the local level, where the influence of land quality can be controlled, with the input used being another factor of concern. Panel a) in Figure 4.2 shows the distribution of the survey farmers' maize yields, and panel b) compares smallholder to commercial maize yields between 2000 and 2017. The average and median survey farmers' yields were 1.1 and 0.9 ton/ha, respectively, with the top 10% of the commercially oriented smallholders averaging 3.2 ton/ha. The average yields discovered by the survey were substantially lower than the national smallholders' and commercial farmers' average yields of 2 ton/ha and 6 ton/ha, respectively (Greyling and Pardey 2019).

The disparity between our survey's average and the national smallholder average may be attributed to measuring errors, as smallholder farmers are known to have poor recordkeeping skills (Habiyaemye et al. 2017) and have trouble estimating the size of their area involved in production (Andrew, Shackleton and Ainslie 2003; Andrew and Fox 2004; McAllister 2000). Smallholders have also been known to underestimate their yields, reporting only the estimates of what they sell, without including what they consume (McAllister 2000). Greyling and Pardey (2019) showed that there was evidence that national smallholder yields are estimates and not actual figures. The relatively high yield of the top 10% of the commercially oriented smallholders makes them a good target group as potential land reform beneficiaries. These individuals are likely to be part of the 75 000 large-scale smallholder farmers, as outlined in the National Development Plan (NPC 2011).

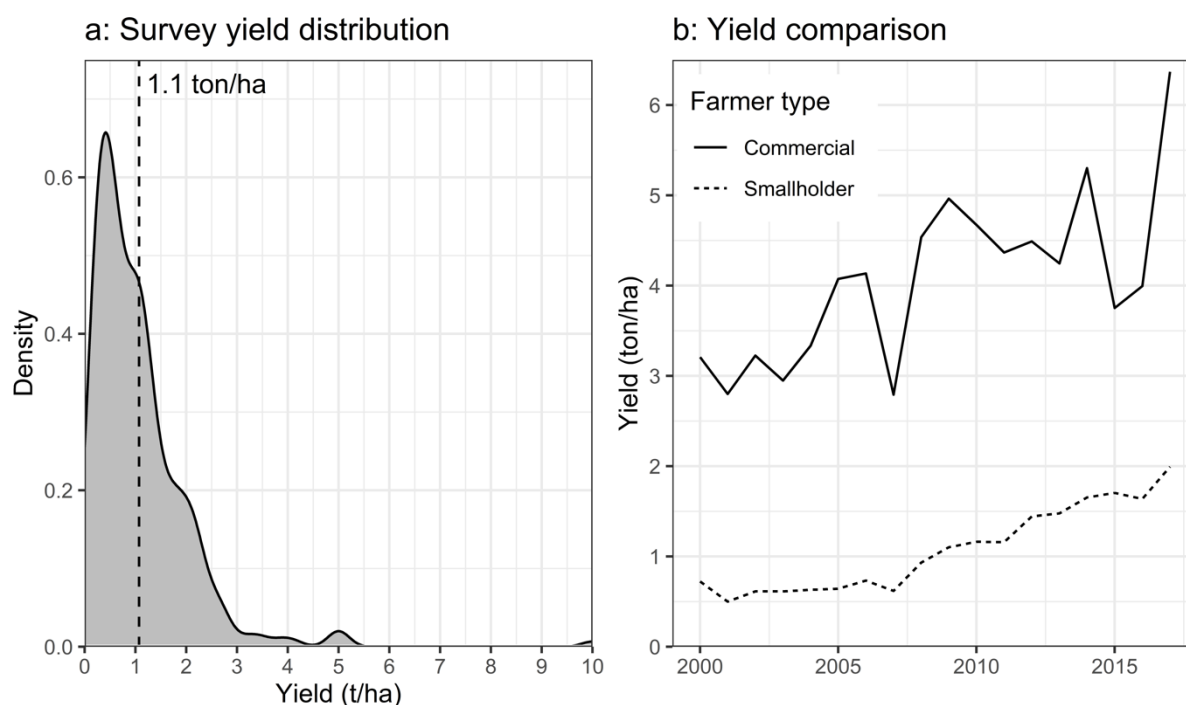


Figure 4. 2: Survey yield distribution and commercial vs smallholder yield comparison

Source: Panel a) Survey data, Panel b) Greyling and Pardey, 2019

4.5.5 Beneficiary aspirations

In the context of the land reform, beneficiary aspirations have been raised as an important factor in ensuring that the land reform matches the realities of its beneficiaries (see Cousins et al. 2020). For example, Brown (2000) and Groenewald (2004) argued that land reform beneficiary aspirations have profound implications for the success of a land reform programme. Hebinck, Fay and Kondlo (2011) criticised the top-down expert-knowledge approach to land redistribution, which does not consider the beneficiaries' reality and aspirations. Most recently, the LRAAP (2019) has also emphasised the demand-driven land reform, which speaks to the land needs of the beneficiaries.

The willingness to take the risks related to investment and production expansion is an essential element for success in commercial farming (Schirmer 2005). In our survey, the respondents who claimed to need additional land and were willing to relocate to commercial farms if selected for land redistribution were asked what farm size they would require and what farming activities they would pursue after relocation. On average, the respondents aspired to a farm of 143.7 ha, but the response distribution was skewed to the left, given that the median farm size

aspired to was 56 ha (see Figure 4.3). The top 10% of the respondents aspired to a farm of 633 ha, whilst the bottom 10% aspired to a mere 6.4 ha.

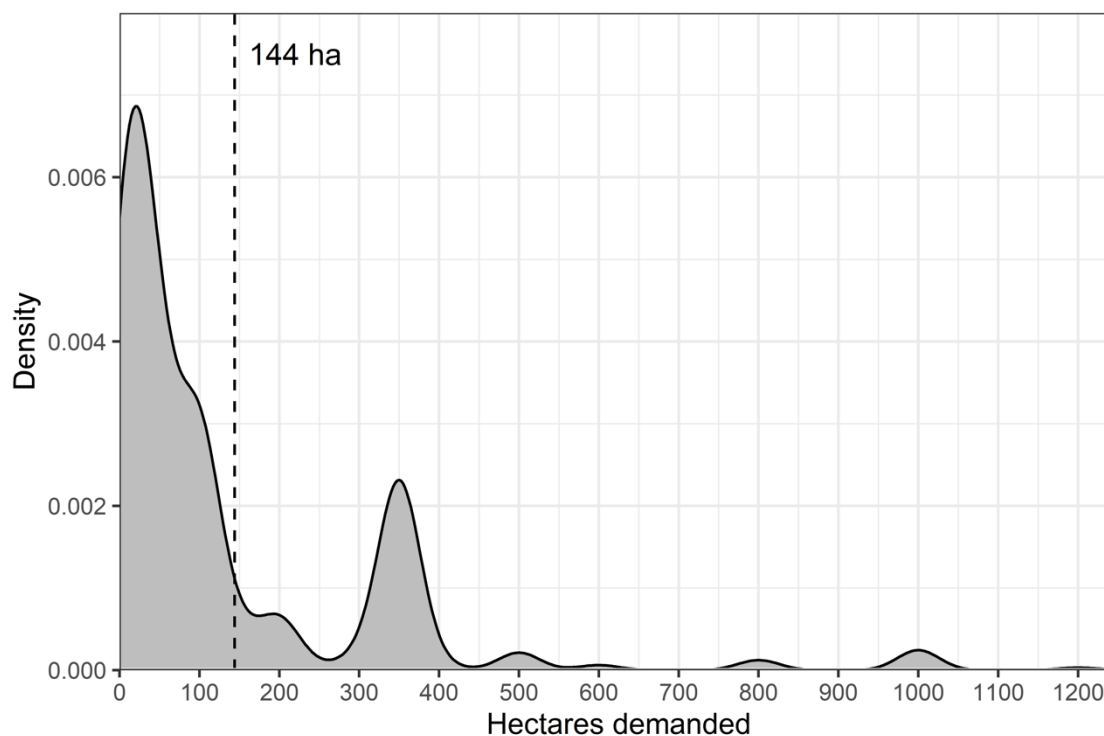


Figure 4. 3: Density plot of hectares demanded by survey respondents

Source: Survey data.

Note: A single outlier of 5 000 hectares is not plotted but included in the calculations.

Two things are important to note here. First, the gap between the average farm size demanded by the commercially oriented smallholders and their current commercial farm sizes was indeed quite wide. Using agricultural census data, Liebenberg (2013) estimated the average commercial farm size at 2 000 ha. Let us consider commercial maize and commercial cattle farming.

According to the Abstract of Agricultural Statistics, there are around 9 000 commercial maize farmers in South Africa (DAFF 2017). Given the total planted area of 1.9 million ha in 2016 (Greyling and Pardey 2019), this translates to an average planted area of 216 hectares per maize farmer. Given that commercial farmers typically plant maize along with other crops, the average planted area per farmer is probably closer to 300 ha.¹¹ According to Scholtz et al. (2008), the average commercial beef cattle herd in South Africa is 413 cattle. If such a herd were to be

¹¹ A very common rotation is the one between maize and soybeans, where a third of the planted area is dedicated to the latter each year and serves as the basis for the average planted area of 300 ha.

located in KwaZulu Natal, the Eastern Cape or Limpopo, for example, with stocking rates of 6 ha/large stock unit (LSU), 5 ha/LSU and 10 ha/LSU, respectively, the average cattle farmer would require a total of 2 478 ha, 2 065 ha and 4 139 ha in the respective provinces.¹² These farm sizes are larger than what was demanded by the commercially oriented smallholders surveyed. Similar findings were reported by Marcus, Eales and Wildschut (1996), Aliber, Reitzes and Roefs (2006) and Bunce (2020a). The discrepancy between the size of the average commercial farm and the farm size demanded by commercially oriented smallholders points to the subject of subdivision. If the one-farm-one-beneficiary approach is followed, it is probable that a sizeable portion of the farms would not be suitable for their needs and realities.

Regarding farm subdivision, numerous authors have argued that farm subdivisions for the purpose of land redistribution should meet the land needs of the different land reform beneficiaries (see, e.g., Hebinck et al. 2011; Binswanger-Mkhize 2014; Aliber 2019). This position has also been echoed by the LRAAP, despite the existing Land Subdivision Act of 1970. However, for farm subdivision to be effective, a viable farm size would need to be set, at least in the case of land intended for agricultural purposes. Zantsi, Mack and Vink (2020) have determined a viable farm income¹³ in an attempt to suggest a viable farm size by computing three emerging farmers' viable annual income typologies: low aspirant (R25 000–R200 000), moderate aspirant (R201 000–R500 000) and the highest aspirant (above R5 million). They found that the viability of the redistributed farms is determined by the type of farming enterprise practiced on the farms, with extensive livestock farms being the largest compared to orchard farms. The disparity is due to gross margins per ha in these farms.

Regarding the land-size demand, Zantsi (2020) has shown that the potential emerging farmers who possessed arable land of a relatively large size demanded larger farms for land redistribution. Furthermore, the analysis also showed that in the districts where potential emerging farmers lived, larger livestock herds and higher education levels resulted in higher demand for land demanded for land redistribution. The other avenue for considering beneficiaries' aspirations is related to the type of farm that the beneficiaries want to take over, which is important for the success of the land reform projects (see Cousins et al. 2020). Numerous studies (e.g. Van Rooyen and Njobe-Mbuli 1994; Kirsten et al. 2016) have stressed the importance of farming experience as a prerequisite for success among the beneficiaries of

¹² The stocking rates were taken from the Cape Farm Mapper, which used 2018 grazing capacity values provided by the Department of Agriculture, Forestry and Fisheries (<https://gis.elsenburg.com/apps/cfm/>).

¹³ This was calculated as function of farm and non-farm incomes plus an aspirational income. The aspirational income is the difference between the income a farmer thinks he or she can earn in the future and what he or she currently earns divided by the aspirational income.

land redistribution. Arguably, this aforementioned point is based on the conventional wisdom that land reform beneficiaries perform better in the farming activities with which they are familiar and in which they have experience. In terms of the aspired farming activities, the majority (56%) of the respondents indicated that they wanted to plant maize, 26% indicated that they wanted to engage in livestock agriculture (with small stock being the most popular choice at 13%) and 15% indicated that they would like to cultivate vegetables (Figure 4.4). The results were similar to those of Mearns (2011), who studied the Settlement Land Acquisition Grant proposals submitted in Mpumalanga in 2002. He found that 15% of the applicants were interested in pursuing small stock farming, while 8% wanted to venture into dairy farming.

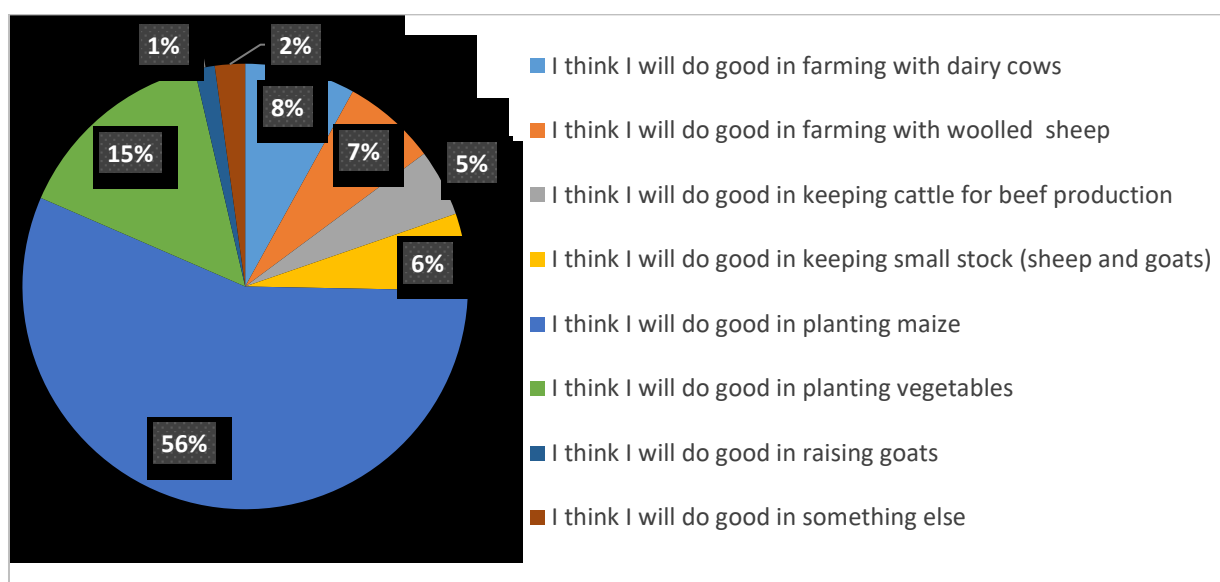


Figure 4. 4: Distribution of activities aspired to by potential beneficiaries

Source: Survey data

It is interesting to note that most of the potential beneficiaries were keen to take up completely new farming activities. Our results showed that of the 497 emerging farmers who responded and were willing to relocate to commercial farms, 60% indicated that they would want to pursue farming activities different from their current activities. This underscores the willingness to take risks, as they would have to learn new farming methods suitable to the new farming activities (as argued by Zimmerman 2000).

In addition, it would be worthwhile to investigate the factors that determine emerging farmers' willingness to relocate to commercial farms in the case of being selected. This aspect has been ignored both by scholars and the state (see Lahiff 2005). Using binary logistic regression, Zantsi et al. (2020) found that factors such as garden size, livestock sales, taking the risk to plant a

new crop and a high level of education were significant predictors of the likelihood to relocate among potential emerging farmers in the Eastern Cape.

4.6 Proposed approach and discussion

Discussing the proposal outlined in the National Development Plan that each commercial farming district should allocate 20% of the land for redistribution, Vink and Kirsten (2019, 5) suggested that such land opportunities should be advertised so that prospective beneficiaries could apply. However, Vink and Kirsten (2019) did not go into details about how such land parcels (farms) should be advertised. Mtero et al. (2019) also mentioned that in North West and the Free State, farms are advertised, but few details are known of how this occurs. Similar approach is currently used in redistributing 894 state farms (DALRRD 2020). To expand on this suggestion and current approaches, we argue that commercial farms should be advertised for land redistribution by using a fictional job market form (to be shown and discussed later). Furthermore, we argue that to address the shortcomings of the currently vague and unstandardised selection criteria, it may be possible to use transparent candidate-quality descriptions and to advertise the land redistribution farms, as is the case in the Employment Equity Act (EEA) by the Department of Labour for employment opportunities. While, for obvious reasons, the process should not be based entirely on the EEA (Department of Labour 1998, 10), the advertising of land redistribution for farms could be partially based on the EEA. For example let us consider the following passages from EEA:

7.3.5 Job advertisements should place emphasis on suitability for the job, and should accurately reflect the inherent or essential requirements (i.e. the core functions) of the job and competency specifications ...

7.3.9. A job application form is a mechanism that is used by an employer as part of selecting a suitable applicant for a position ...

7.3.10. The purpose of a job application form is to: 7.3.10.1. standardise the information employers receive from job applicants. This should reduce the probability for unfair discrimination ...

In relation to the material from the EEA quoted above, the farms (bought by the DRDLR) available for land redistribution could, for example, be advertised using the relevant public media platforms, such as the Government Gazette, local farmer organisations and newspapers or local radio stations. Details of the farm and its features could be included, but an option for

viewing and obtaining sensitive information could be arranged to allow the beneficiaries to make a sound decision. Most importantly, the required competence attributes of the candidates should be clearly presented to improve the screening process; this should be done by the DLRCs, as suggested in the National Development Plan (NPC 2011) and by Vink and Kirsten (2019). Therefore, to improve the current beneficiary selection criteria, we propose the following fictional vacancy farm description for a land reform beneficiary:

Vacancy for a commercial farm: Land redistribution beneficiary/commercial maize farmer in Mpumalanga

Duties:

- Operating a commercial farming operation located in Delmas, Mpumalanga.
- Ensuring continued production on the farm and the employment of local community members.
- Deciding on what and how to produce and where to sell the farm's outputs.
- Managing the resources, labour, finances and equipment of the farming business in an efficient manner.
- Producing food or agricultural products for selling and for generating revenue using the available farm resources.

Vacant farm requirements:

The candidate:

- Must be from a non-white or a previously disadvantaged group.
- Must be an aspiring commercially oriented smallholder.
- Must have proven farm management or household farming operation experience, which entails decisions on what and how to produce and managing labourers and financial records, even if on an informal basis. Candidates may have to take a written proficiency test.
- Must be younger than 55.
- Must have completed secondary education.
- Must be willing to relocate to the project farm if selected.
- Must participate in (a) short course and/or mentorship programme(s).
- Must be willing to undergo assessment and be interviewed by the land reform district committees.

Recommendations:

- Preference will be given to candidates located closer to the project farm.
- Young candidates (between the ages of 21 and 40) are preferred.
- Preferable candidates would have completed matriculation and finished training programmes/courses/initiatives related to farming.
- Recognition within the field of farming is preferable – for example, by peers in the village or farmer organisations.

- Candidates should have sound interpersonal skills, be able to work with people and be willing to learn.
- Relevant experience in farming operations related to the specific farm being advertised is preferable – for example, livestock farming, crop farming or mixed farming.

According to the NDP, the DLRCs should consist of government officials, local farmers, farmer organisations, commercial farmers and the private sector (NPC 2011). The selection of beneficiaries should be based on the outlined beneficiary qualities, such as farming experience, managerial aptitude and entrepreneurship, as well as other factors deemed important by the DLRCs. Beneficiary selection should also be based on the farming competence requirements and should be carried out by the DLRCs. Given that the DLRCs' role has been criticised (e.g. Aliber et al. 2018), stricter checks by an independent board could be useful.

This approach has numerous strengths and few limitations. First, it will attract relevant beneficiaries – for example, livestock smallholder farmers would apply for livestock farms. The requirements and competences will be stipulated clearly, as in clause 7.3.5 of EEA, so that potential beneficiaries can evaluate their chances of success. Furthermore, potential land reform beneficiaries will have the option to apply for a farm that best suits their interests and aspirations, which addresses the criticised top-down approach and the neglect of beneficiary aspirations (Brown 2000; Hebinck et al. 2011). Moreover, by encouraging transparency, this approach will reduce corruption and elite capture and promote accountability. Transparency is one of the criticised areas in land reform beneficiary selection (e.g. Hall and Kepe 2017; Mtero et al. 2019).

Beneficiary screening is another crucial component of beneficiary selection. Binswanger-Mkhize, Bourguignon and Van den Brink (2009) argued that, irrespective of the beneficiaries' eligibility, land redistribution beneficiary selection should be subject to screening and verification. They contended that “[i]f these mechanisms are not transparent, such programs implemented in a context of poor governance and corruption may miss the targeted individuals and/or benefit influential people instead” (Binswanger-Mkhize, Bourguignon and Van den Brink 2009, 17). However, in the current approach, beneficiary selection suffers from the lack of the above-mentioned factors. The recent draft policy on beneficiary selection has also acknowledged the lack of transparency in the current process of beneficiary selection and proposed application through an online application process. However, given the literacy levels of the beneficiaries, this would need to be introduced manually, especially if the children of the potential land reform beneficiaries have lower levels of education.

Potential limitations of this approach include, for example, the state's limited capacity to perform these functions. In fact, there is ample evidence showing the state's incapability in this regard (see, e.g., Lahiff and Li 2012; Aliber 2019). This might also threaten sellers' (i.e. commercial farmers') security, especially given the increasing number of farm attacks. Another potential problem in advertising land redistribution farms is the location of the farm. Some provinces, such as the Eastern Cape, KwaZulu Natal and Limpopo, have higher numbers of smallholders and arguably more potential emerging farmers than other provinces with more farms available for redistribution. This could be especially true if beneficiaries are unwilling to relocate and if preference is given to the locals by, for example, the DLRCs (see the proposed fictional job description). These factors should be carefully considered before implementing the proposed fictional job description, which needs to be improved via further experiments. The experience from previous the government's regimes has shown that some farmers fail while others succeed because of differences in behaviour (see Schirmer 2005).

4.7 Conclusion

The purpose of this study was to improve understanding of how land redistribution beneficiary selection can be improved to reduce selection bias, increase transparency and accommodate beneficiaries' aspirations. This study also attempted to address some of the challenges raised by the LRAAP (2019). To address these issues, various relevant policies and legislative documents were reviewed and contrasted with the results from a survey of 833 commercially oriented smallholders.

It was found that the legislation and the relevant land redistribution policies do provide some guidance for the identification and selection of different categories of land reform beneficiaries at a national level. However, beneficiary selection is not clear at the individual level. First, the criteria for selecting the beneficiaries – that is, the beneficiary attributes to be considered when selecting candidates – are not clear and are not available to the public. Even the draft Beneficiary Selection Policy provides insufficient details on how the selection process should be achieved. Second, beneficiary selection is not transparent, even though several authors have identified transparency as a key characteristic of the market-led redistribution programme, which is partly the case in South Africa.

In light of these shortcomings and the inadequacy of the important beneficiary attributes for guiding selection process, the present study propose improving the existing beneficiary selection method to make it clearer and more transparent as well as more inclusive and for it to

address beneficiary aspirations while promoting greater accountability. The proposed improvement is based on both the competence requirements of the land redistribution beneficiaries and based on the principles that inform the Employment Equity Act. Although the study have discussed the proposed fictional commercial farm vacancy description as a potentially worthwhile approach, it also advise caution in its implementation. This proposal should first be implemented at a district level and subsequently improved before being up-scaled to the provincial and national levels. Once the functionality of our proposal is verified, future studies can explore how our proposed solution can be digitalised

The standard format suggested above should be improved and adapted to each type of farm among the available land redistribution farms. Furthermore, the improvements should be decided on by the DLRCs. Further research is needed on the managerial competences for being a successful land redistribution beneficiary, with the intensity of the managerial skills being determined by farm attributes.

Chapter 5:

Cultural innovation, aspirations, and success among smallholders in former homelands of the Eastern Cape Province of South Africa: Theory and evidence

Abstract

Purpose

After unsuccessful attempts of South African governments to carry out a land reform that distributes farmland more justly, a stronger segmentation of potential beneficiaries is undertaken for a better targeting of future reforms.

Approach

A theoretical model has been developed along the axes of cultural innovation and aspirations that identifies the segment of current smallholders who would most likely relocate to become commercial farmers in the future. A survey among smallholders in the Eastern Cape province of South Africa confirms the approach.

Findings

A number of indicators can be identified, particularly for cultural innovation that predict willingness to relocate to a region where commercial farms can be managed.

Originality

The importance of cultural innovation has been neglected both in theoretical frameworks and in practical concepts of land reform.

Key words: cultural innovation, aspiration, smallholder farmers, Eastern Cape, South Africa.

5.1 Introduction

Colonial policies were among the worst policies South Africa has ever had. This is particularly true of the Land Act of 1913, according to which the white minority received 87% of the land

and confined the black majority to the remaining 13%.¹⁴ In this regard, the importance of addressing racial inequality in agricultural land ownership in post-apartheid South Africa cannot be overstated. Such racial inequality has been, for example, the cause of many divisive ideologies in the country. They have also served as the basis of desperate measures, such as land expropriation without compensation, that were adopted by the ruling party (Conradie, 2019).

To address the injustices of the past and redistribute agricultural land, a three-pronged Land Reform Policy was adopted when the first democratic government in South Africa came into power in 1994. The three prongs comprised land restitution – restoring land to those who were forcefully removed from theirs; land tenure rights – strengthening the property rights of farm workers and people living in the former homelands; and land redistribution – correcting racially skewed land ownership (Department of Land Affairs [DLA], 1997). This paper focuses on the land redistribution prong.

Much has been written about the slow progress of the South African land reform process, particularly land redistribution. Over a decade ago, Lahiff (2007) reported that land transfers remained far behind official targets and that, where land had been transferred, it made little impact on the livelihoods of the rural poor. Almost ten years later, Cousins (2016) came to an equally negative verdict about the past effect of government initiatives.

Scholars disagree about the causes of the limited success of the government's efforts. Lahiff (2007) considered a lack of participation on the part of the affected population to be the main problem. Anseeuw and Mathebula (2008) saw the lack of post-settlement support as the weakest factor in the policy. Hall and Kepe (2017) criticised the lack of transfer of land, which is only leased to new tenants. The land redistribution policy is targeted at various groups of beneficiaries among smallholders (Department of Rural Development and Land Reform [DRDLR], 2013).

In South Africa, as in Asia (Pingali and Rosegrant, 1995), smallholders can experience a trajectory across a continuum of subsistence to commercial orientation. Between these extremes lies a group of so-called “emerging smallholders”, who are somewhat commerce-oriented in

¹⁴ This 13% of land area was formally referred to as ‘homelands’. These were self-governing states only recognised in South Africa, where only black Africans were allowed to have residential plots and fields for crop cultivation and shared grazing land.

the sense that they at least sell part of their produce and aspire to fully commercialise their production (Nieuwoudt, 2000; Van Averbeke and Mohamed, 2006). This group comprises approximately 140,000¹⁵ black farming households who are considered to be more commercially inclined because they market their produce (Aliber and Hall, 2010; Tihanyi and Robinson, 2011).

Within the three groups of smallholders described above, this paper focuses on emerging smallholder farms. A number of land reform policies, including the 1997 White Paper on Land Reform, Land Reform for Agricultural Development, 2000–2010 (LRAD), Pro-Active Land Acquisition Strategy, 2006–present (PLAS) and State Land Lease and Disposal Policy, 2013 (SLLDP) have consistently identified commercial and semi-commercial smallholders on both communal and private land as major potential beneficiaries of the land redistribution policy.

However, smallholders in the category of emerging farmers are not homogeneous. Since their degrees of commercial orientation, household characteristics and income levels differ (Anseeuw *et al.*, 2001, 16) they do not all have the same potential to become future commercial farmers outside the homelands.

Past South African land reform instruments have taken an economic approach to land redistribution and beneficiary selection. Sub-programmes such as the PLAS have focused on entrepreneurs who were able to purchase the land (Van Dijk and Moeng, 2011). This paper argues that the synergies among economic aspects such as good farming practices, aspirations and cultural innovation should be examined to identify potential entrepreneurs.

Section 5.2 outlines the theoretical concepts and the method for verification is presented in Section 5.3. Section 5.4 presents results and its discussion and Section 5.5 concludes the paper.

5.2 A socioeconomic model of cultural innovation and aspiration

There are six million smallholders in South Africa (Greyling *et al.*, 2015), mostly blacks. While this is the group that would take over some of the land that is currently farmed by commercial

¹⁵ The number of emerging smallholders in the South African context is contested due to a lack of consensus on the criteria for defining them and the limited data sets on smallholders in general.

farm managers (who are mostly white), it is essential to distinguish potentially successful recipients of such land from segments in society that are not likely to convert successfully from a smallholder to the manager of a major holding. Such segmentations, when carried out in the past, have usually focused on rather straightforward sociodemographic characteristics (Kgosiemany and Oladole, 2012). This study argues that both aspirations and cultural innovation are useful dimensions to consider when looking for the most promising segment in today's smallholder societies.

'Aspiration' is defined by MacBrayne (as cited by Leavy and Smith, 2010) as "an individual's desire to obtain a status object or goal such as a particular occupation or level of education". Aspiration is a social concept that has recently gained popularity in the social sciences. Psychologists have been able to explain factors responsible for occupational aspirations for decades (Gottfredson, 1981; Farmer, 1985; Schoon and Parsons, 2002); however, the understanding of aspirations for socioeconomists is a relatively young phenomenon (Stutzer, 2004; Dalton *et al.*, 2016; Mojo *et al.*, 2016). Its relevance, however, can hardly be overestimated. Hessels *et al.*, (2008), for example, found that countries with a higher incidence of entrepreneurs motivated by increased wealth tend to have a higher prevalence of high job growth and export-oriented entrepreneurship. And Sohn and Lee (2013) use aspirations in a Bayesian network to predict early-stage entrepreneurial activity. In the realm of smallholder farming, Khue *et al.* (2016) focused on explaining the aspirations of potential young farmers.

However, there is limited literature in South Africa on smallholder aspirations towards land redistribution. Available studies have focused on other aspects of smallholder aspirations. For example, Chipfupa and Wale (2018) studied factors influencing willingness of smallholders to expand their land under irrigation. The same study went further to find factors influencing attainment of this aspiration (willingness to expand irrigable land). However, understanding the emerging smallholder farmer is a fundamental first step to effective policy design. As Brown (2000:1) states, "we believe that policies designed to help first generation of black commercial farmers are likely to succeed only with a better understanding of their values, attitudes and aspirations".

The concept of cultural innovation has greater bearing on the case of South Africa. It was developed by Shennan (2001:384), who refers to the paradigm by Cavalli-Sforza and Feldman, (1981:348) and states, "an innovation is a specific cultural event that must be perceived as such

and adopted by some form of choice". In the realities of South African smallholders, production methods, occupational choices and relocation are cases in point.

As the vast majority of South African smallholders are located in regions where commercial farms hardly exist (Lahiff, 2005), we focus on relocation in studying cultural innovation. A high degree of mobility is required from those ready to manage a major agricultural enterprise (Bunce, 2020a:31). Mobility, however, is difficult to encourage in regions in which little mobility was either possible or necessary in the past.

Historic research that has focused more on cultural innovation than socioeconomics has shown that cultural innovation and mobility were strongly interrelated in many historic situations (Shennan, 2001; Perreault and Brantingham, 2011). In fact, mobility in the past was often restricted to the elite (Marchetti, 1993). However, it is useful to think of today's homelands as regions where high aspirations can either be realised through mobility or through local success.

The various options along the lines of cultural innovations and aspirations are illustrated in Figure 5.1. Only the segment with both high aspirations and high cultural innovation includes a likely target group for taking over commercial holdings in other parts of the country. Part of a successful land reform will rely on potential beneficiaries being willing to relocate (an aspect of cultural innovation) and to take over responsibility. There are other mobile groups that, due to their lower level of aspiration, are likely to remain in the employed group of off-farm employment or are on other farms. Even though their aspirations (or aspirations of their children) may grow over time as they develop closer contacts with commercial farming practices, they cannot yet be counted as a promising target group for land reform.

There are other groups with high aspirations that are likely to form the future elites, as they maintain their dwelling places and cultural habits (Zantsi *et al.*, 2020b). Emerging smallholders in this group are characterised by high off-farm income and high white-collar professions or other high income-generating activities, with farming making a smaller contribution; some of these people provide mechanisation services such as ploughing crop fields using tractors. Although farmers in this group have high aspirations, the characteristics of good farming are limited compared to others. This is one of the most important characteristics on which to base our assumption for consideration of becoming a commercial farmer.

Finally, there is a large group that is neither culturally innovative nor ambitious. The members of this group are likely to remain local smallholders, both now and in subsequent generations. Emerging smallholders in this group are mostly pensioners; because of their age, they exhibit low willingness to relocate/move to commercial farms (Zantsi *et al.*, 2021).

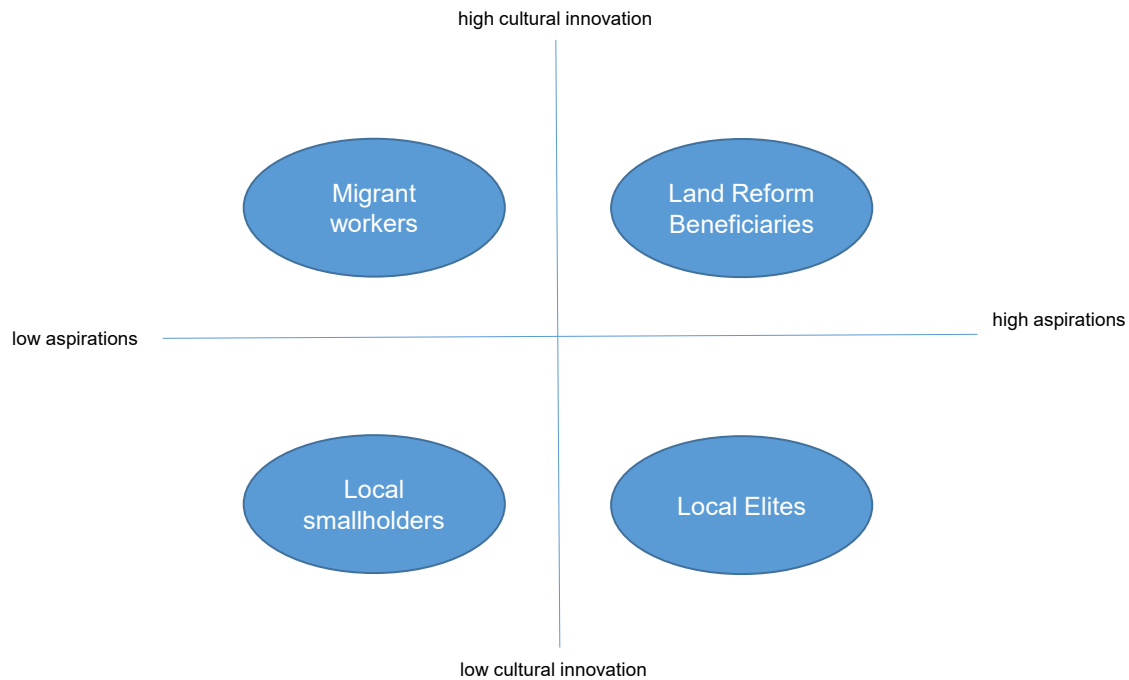


Figure 5. 1: Structuring current smallholders along two dimensions

Source: Own compilation based on literature review

Based on this framework, it should be possible to show that both variables that are proxies for aspirations (such as education) and variables that are proxies for cultural innovation (such as applying traditional production methods) are suitable predictors for the willingness to take over parts of a commercial farm.

5.3 Database and methods

5.3.1 Description of the study area

The Eastern Cape province (Figure 5.2) covers an area of close to 169,580 square kilometres (13.9% of South Africa's land area), making it the second-largest province in South Africa after the Northern Cape (StatsSA, 2011). It has a population of 6, 562, 053 and is the third most populous province (StatsSA, 2011). This province includes two former homelands: Transkei, which was the largest homeland, and Ciskei. More than 50% of the Eastern Cape province is

considered rural. It is divided into six district municipalities and two metropolitan municipalities, as shown in Figure 5.2 below.

While the Eastern Cape province is the second largest in South Africa, it is also the second poorest. It has one of the highest unemployment rates in the country, particularly in the former homelands, where unemployment is estimated at more than 60% (Aliber, 2017). In the rural parts of the province (former homelands) most households live below the poverty line and income is largely dependent on state transfers in the form of social grants (Westaway, 2012).

According to StatsSA (2016), there were 1, 773, 395 households in the Eastern Cape province in 2016. Of these, 27.9% practised some form of farming, mostly for producing their main source of food. Furthermore, StatsSA also stated that only 4.2% of the 27.9% produced for income (StatsSA, 2016). Moreover, in the Amathole District Municipality (ADM), there were 479, 960 households involved in agricultural activities, while in the Chris Hani District (CHD) Municipality, there were 384, 808 households and in the Oliver Tambo District Municipality (ORTDM), there were 851, 490 agricultural households (StatsSA, 2016).

Aliber and Hart (2009) argued that the Eastern Cape Province has the highest share of African (black) households engaged in farming. Most households practice mixed farming systems, i.e., keeping livestock and growing crops; however, this is mostly determined by rainfall availability (Andrew *et al.*, 2003). In terms of crop farming, maize is by far the most important crop, planted together with dry beans and pumpkin (McAllister, 2001; Kotey *et al.*, 2016).

The Eastern Cape has diverse agroecological zones. Seven of the nine biomes found in South Africa are located in the Eastern Cape. Grassland and the combination of Grassland, Nama Karoo and the Savannah biomes are the largest biomes in the province (Mucina and Rutherford, 2006; Lent *et al.*, 2000). Moreover, climate varies according to proximity to the oceans, i.e., the further the region from an ocean, the drier it is, and vice versa.



Figure 5. 2: Map showing Eastern Cape Province and its district municipalities

Source: Own compilation

5.3.2 Sampling procedure and size

According to the Agricultural Household Survey (AHS 2016), which is one of the few national data sets for smallholder farmers, smallholders in the country are largely found in three provinces: the Eastern Cape, KwaZulu-Natal and Limpopo (StatsSA, 2016). Within the Eastern Cape, they are mostly found in three district municipalities, the Amathole, the OR Tambo and the Chris Hani District municipalities respectively (Aliber and Hart, 2009).

A selection of the study areas for emerging smallholders was based on available literature, official statistics on Statistics South Africa's Community Survey: Agricultural Households (StatsSA, 2016) and key informant interviews. Regarding the latter, since wool is one of the few cash commodities produced by emerging smallholders, interviews with sales personnel of the wool brokers (BKB™) were commissioned to get a clear view of where most of the wool clip of communal farmers come from within the province. Furthermore, interviews with East London extension officers¹⁶ and the African Farmers Association (AFASA) were held to obtain a general view of the location of commerce-oriented smallholders within the Eastern Cape

¹⁶ At the time of publication of this chapter, the East London branch is the main branch of the Department of Rural Development and Land Reform in the Eastern Cape. The aforementioned department has been merged with the Department of Agriculture Forestry and Fisheries, and it is now called the Department of Agriculture, Land Reform and Rural Development.

Province. However, this does not necessarily mean that only emerging smallholders with wool production were considered. The key informants listed above pointed to the CHDM, specifically the Enoch Mgijima Local municipality, followed by the ADM, specifically the Mbashe, Mquma, Ngqushwa and Raymond Mhlaba local municipalities and the OR Tambo District Municipality (OTDM). Hence the three district municipalities were selected for this study. The AHS (2016) and the Aliber and Hart (2009) study pointed to the above districts; therefore, these districts and local municipalities were selected.

A total of 379 emerging smallholder farmers were randomly selected. Of these, 175 were in the ADM – 55 in Mbashe, 50 in Mquma, 30 Ngqushwa and 40 in the Raymond Mhlaba Local Municipalities respectively. Another 84 were in the OTDM, specifically in the King Sabata Dalindyebo Local Municipality and 120 in the CHDM – 80 in the Enoch Mgijima Local Municipality and 40 in the Sakhisizwe Local Municipality. Emerging smallholder farmers were formally defined as those who were located in the former homeland areas, who at least had some degree of commercial orientation and aspired to be full commercial farmers (Nieuwoudt, 2000). Based on the above definition, we used a semi-structured questionnaire to interview only households selling at least 20% of their produce. With respect to the Land Redistribution Policies (such as PLAS and SLLDP), this is the large group of potential land reform beneficiaries; while they are not entirely homogeneous (Anseeuw *et al.*, 2001; Zantsi *et al.*, 2021), all smallholders described in the theoretical model in Figure 1 fall in this group.

The sample sizing was unequal across the districts because of the respective populations of the three districts and availability of resources, time and money. In each local municipality, a list of villages within the selected local municipalities was obtained from Statistics South Africa's website; villages were also selected randomly through a lottery. Across the selected villages, we skipped four homesteads, when moving along the main roads and asked for permission to interview the available household head if they had produced agricultural products in the previous season and had sold at least 20% of them. Furthermore, the selected villages were not equal in size (in terms of population of households), nor were the number of farming households; hence, the unequal samples in the three districts. Due to the fact that the number of emerging farmers in South Africa is highly contested because of disagreement in their definition, it is difficult to deem the study's sample size as representative; however, it is large enough to portray a detailed picture of emerging farmers, especially since it covers a reasonable number of districts.

5.3.3 Data analysis

The survey data gathered in this study was analysed using a stepwise Binary Logistic Regression model. A Binary Logistic Regression was chosen since the dependent variable has only two outcomes, i.e., willing or not willing to move to a commercial farm. This model has been used in similar studies with a binary outcome in the field of agricultural economics (see: Randela *et al.*, 2008; Antwi and Chagwiza, 2019). Furthermore, this is a step-by-step regression, where insignificant variables are removed, and allowing only important variables to predict the dependent variable (Gregoire, 2014). The stepwise Logistic Binary Regression is a combination of forward and backward selections, which reduces the shortfalls of both types of selections. All the variables included in the model were influenced by the state of the current literature on this subject. This type of regression helps to eliminate the chance of irrelevant regressors decreasing the precision of the estimated correlation between relevant independent variables and the dependent variable, as it was used in similar studies, such as Randela *et al.*, (2008). The model specification is outlined in Equation 1 below, as used in Randela *et al.*, (2008):

$$\text{Log} \left(\frac{P(y = 1)}{1 - P(y=1)} \right) = \beta_0 + \sum_{i=0}^n \beta_i X_i \text{ or as } \left(\frac{P(y = 1)}{1 - P(y=1)} \right) e^{(\beta_0 + \sum_{i=0}^n \beta_i X_i)} \quad (1)$$

Where, Y is the dependent variable, i.e., willingness to move/relocate to commercial farms (“Yes” is coded as 1 and “No” as 0), β_0 is the constant term, $\beta_1 \dots \beta_k$ are the coefficients of independent variables and e is the error term.

Furthermore, P is the probability that $y=1$ and X_i represent the list of independent variables or predictors described in Table 1. The independent variables used in this study contain both continuous and categorical variables. In the second expression of Equation 1, the left side represents the odds ratio, while the right side denotes the marginal effects of X_i on the odds. The delta method is chosen over margins at the mean to report marginal effects.

5.4 Results and Discussion

5.4.1 Household characteristics of the emerging smallholders

The socioeconomic characteristics of the emerging smallholder farmers are important, as they influence decisions taken on farming activities. Here we present the results of the survey sample (Modiselle *et al.*, 2005). Table 5.1 shows frequencies and summary statistics of the dependent and independent variables.

Table 5. 1: Descriptive results of the dependent and independent variables

Variable name	Description	Coding	Frequency	Mean	S.D.	Min.	Max.	No. of observations
			[%]					
			Dependent variable					
MOVE	Willingness to move to the private property right (PPR) area ¹⁷	0 = no	28	0.72	0.45	0	1	332
		1= yes	72					
			<i>Explanatory variables</i>					
FARM INCOME	Net farm income	ZAR		45209	60325	-67282	776013	379
OFF-FARM INCOME	Income from off-farm labour	ZAR		6910	9613	320	80000	379
INCOME SOURCE	Main income source	1: Salaries/Wages (Reference)	21					378
		2: Selling agricultural products	19					
		3: Remittances	10					
		4: Pensions	37					
		5: Other sources	9					
		6: Child grants	3					
		7: Public work programme	1					
		8: Disability grants	1					
AGE	Age of the household head	Years		59	9	24	65	379
FIELD	The estimated size of the fields that are currently cultivated	Ha		0.40	2.27	0.00	30.10	379

¹⁷ These are private property right areas where owners have titles, unlike the homelands where the land is owned under communal tenure

Variable name	Description	Coding	Frequency	Mean	S.D.	Min.	Max.	No. of observations
			[%]					
GARDEN	The estimated size of the garden that is currently cultivated	Ha		1.35	2.94	0.00	22.60	379
FAMILY LABOUR	No. of family members employed to work on agricultural activities	No		2.05	1.24	0.00	7.00	379
EXT LABOUR	Number of external labourers employed to work on agricultural activities	No		0.84	1.81	0.00	10.00	379
CAR	No. of cars owned by the household	No		0.65	1.15	0.00	9.00	379
TRACTORS	No. of tractors owned by the household	No.		0.13	0.42	0.00	3.00	379
CATTLE SALE	No. of cattle sold by household	No.		1.61	2.89	0.00	20.00	379
GOAT SALE	No. of goats sold by household	No.		0.64	2.95	0.00	29.00	379
SHEEP SALE	No. of sheep sold by household	No.		4.78	6.77	0.00	45.00	379
MAIZE YIELD	Harvested maize yield	Bags		6.68	16.35	0.00	150.00	379
POTATO YIELD	Harvested potato yield	Bags		10.21	31.09	0.00	230.77	379
CABBAGE YIELD	Harvested cabbage yield	Heads		10.81	47.91	0.00	500.00	379

Variable name	Description	Coding	Frequency	Mean	S.D.	Min.	Max.	No. of observations
			[%]					
RISK	Risk preferences of household head extracted by playing a game	0: no risk (Reference) 1: very low 2: low 3: middle 4: high 5: very high	8 7 16 13 13 43	3.43	1.67	0	5	379
REASON LIVESTOCK	Household head reason of raising livestock	1: Main income source from farming (Reference)	33					378
		2: No livestock	11					
		3: Main food source	2					
		4: Extra income source	51					
		5: Extra food source	1					
		6: Cultural	1					
		7: Wealth store	1					
CONSTRAINED	The HH head was asked if she or he feels that her/his farming activities are constrained in her/his homeland area	No: 0 (Reference) Yes: 1	26 74	0.74	0.43	0	1	378

Variable name	Description	Coding	Frequency	Mean	S.D.	Min.	Max.	No. of observations
			[%]					
EDUCATION ¹⁸	Highest level of formal education of household head	1: None (Reference) 2: Passed matric 3: Primary school 4: Secondary school 5: Technical college 6: University	8 11 36 31 6 8	3.43	1.26	1	6	379
CHILD OCC.	Level of occupation the household head would like her or his children to achieve	1: Not sure (Reference) 2: Farmer 3: Doctor 4: Extension officer 5: Lawyer 6: Municipality officer 7: Nurse 8: Teacher 9: Social worker 10: Other	23 29 14 6 6 4 6 5 3 2					379

Source: Survey data

¹⁸For the purpose of this study, the household head's level of education was categorised as 'None' for no formal education, 'Primary' for accomplishing grades 1–5 and 'Secondary' for accomplishing grades 6–11. Those who 'Passed matric' were categorised separately and the tertiary or post-matric education was categorised into 'Technical college' for a 3-year diploma or higher certificates, while 'University' was used for those having university degrees.

Whilst the aspirations of smallholders have been taken into account by some studies (see e.g. Chipfupa and Wale, 2018), few (e.g., Ntsebeza, 2002) have considered whether emerging smallholders would be willing to move from their communal farm. In this study, we have explored this hypothesis and used it to identify potential land reform beneficiaries, and we have used the ‘willingness to move/relocate’ parameter as the dependent variable. The majority of the respondents (72%) would be willing to move from the homeland area to the private property rights area if they were selected as a land reform beneficiary who is given the option of renting land for a period of 10 years on the condition of paying 5% of their turnover per annum as farm rent. After 10 years, the respondent would be allowed to buy the rented land for R1, 000 per ha.¹⁹ Only a minority of 28% of the respondents were not willing to relocate.

The respondents achieve an average farm income of 45, 209 ZAR per year. However, it was observed that a great variation in farm income, from 7, 777 ZAR to almost 700, 000 ZAR per year. In addition, the respondents achieve an average off-farm income of 6, 910 ZAR per year. It is clear there is high income inequality among emerging farmers, confirming the hypothesis they are not homogeneous. However, it is not unique to the study areas, but cuts across the whole country. As such, South Africa is among the countries with the highest inequality in the world (Keeton, 2014). While the average income from farming is more than 9 times as high as the off-farm income, more than 20% of the respondents pointed out that salaries or wages are their main income source, while 10% indicated that remittances are their main income source and 37% reported that pensions are their main income source. Only a minority of 19% of the participants reported that the revenues from selling agricultural products represent their main income. This might be strange, but the literature (e.g., D’Haese and Van Huylenbroeck, 2005) shows that rural farming households obtain their income from a diverse portfolio of activities, while for some, agriculture only contributes to a small proportion (Daniels *et al.*, 2013).

The respondents were, on average, 59 years old. The youngest participant was 24 years old and the oldest was 65. These results are not far from the Agricultural Household Survey (2016), which reported an average age range of 45–54. Sinyolo *et al.* (2016) found similar results (mean smallholder age was 56 years) in KwaZulu-Natal. Youth are underrepresented in farming, which is a concern in view of sustainability (Leavy and Smith, 2010). These results also show

¹⁹ This scenario is adapted from the SLLDP; however, the period was reduced from 50 to 10 years and the price of land was hypothetically used (see: DRDLR, 2013). An update of the SLLDP has reduced the number of rented years to 5 (DRDLR, 2019).

that the potential emerging farmer is on average four years younger than his commercial counterpart (Department of Agriculture, Forestry and Fisheries [DAFF], 2017).

All participants to the survey were asked to estimate the size of their fields and gardens in hectares within a given range. The respondents cultivate on average 0.4 ha crops on fields and 1.35 ha in their gardens. However, some participants indicated that they cultivate up to 30 hectares of fields and up to 22 ha of gardens. The larger mean garden size was unexpected, since fields are usually larger than gardens. However, this is based on the fact that farmers were asked for the land that was under cultivation. In this respect, the literature (de la Hey and Beinart, 2016; Blair *et al.*, 2018) shows that field cultivation has been abandoned in many parts of the Eastern Cape's former homelands, with some studies finding intensification in garden cultivation (e.g., Andrew and Fox, 2004). This might also imply cultivating other households' gardens, which are not used by their owners, as some respondents claimed.

The participants indicated that, on average, two family members work on agricultural activities throughout the year. In addition, most of the participants employ external labour for agricultural activities. This shines a positive light on the hypothesis of the National Development Plan [NDP], that emerging smallholders have the potential to create 165,000 primary jobs and 82,500 jobs in secondary employment (National Planning Commission, 2011). While most of the emerging farmers own a car, only a minority own a tractor; most of them make use of hired tractor services, for 350 ZAR per garden on average. This is another form of secondary employment, as envisaged in the NDP.

Most of the participants have small ruminants or cattle that graze on common grounds. On average, the animal offtake per farm is 1.6 oxen, 0.6 goats and approximately 5 sheep per year. The most common crops are maize, potatoes and cabbage. However, potatoes and cabbage are more frequently cultivated on smaller land portions while maize is cultivated on larger portions of the farms. A minority (8%) of the respondents reported that their household head has no formal education, while 47% indicated that the household head passed matric or primary school. At least 31% passed secondary school and a minority of 14% college or university.

The risk attitudes of the smallholders are important to understand, as farming operates under much uncertainty and risk (Brown, 2000; Komarek *et al.*, 2020). There are various ways of capturing risk attitudes of farmers. In this study, we adopted a method from Di Falco (2014)

that was also used to capture risk attitudes of smallholders in Ethiopia. The study extracted the risk preferences of the household heads by playing a game (see Appendix 1 for the game).

To probe commercial orientation, as adapted from AHS (2016) and Aliber and Hart (2009), participants were asked their reasons for raising livestock. For 33% of the respondents, the livestock represents their main income source, while 51% of the participants raise livestock to generate additional income. Only a minority of 3% keep livestock for self-supply and 1% for cultural reasons or capital investment. These results indeed show there is at least some commercial orientation among emerging smallholders, as argued by Montshwe (2006), although they can hardly make ends meet solely on farming as shown by the Tomlinson Commission Report of 1955 (Houghton, 1956). The majority of the household heads are characterised by a high or very high risk preference

Emerging smallholders in the former homelands face a number of challenges, such as limited access to credit due to insecure property rights (Cousins, 2015), high transaction costs (Khapayi and Celliers, 2016), smallholding size (Fourie *et al.*, 2018) and the overutilisation of shared rangeland (Vetter, 2003). We asked respondents whether they felt constrained farming in the former homelands considering these challenges; 74% of the household heads reported that their farming activities are constrained in their homeland area.

Household heads were also asked which type of occupation they would wish for their children. Approximately one third of the respondents indicated they would appreciate it if their children become farmers. The others would like to see their children in “white-collar professions” such as medicine, law, education, civil service, etc. Such aspirations from parents suggest that we are likely to see fewer young farmers.

5.4.2 Determinants for the willingness of emergent smallholders to move

Table 5.2 provides significant determinants for the willingness to move from the homeland area to the private property right (PPR) area. The stepwise binary model correctly classified and predicted 73% of the determinants and the model fit is fair, as shown by the area under the receiver operator curve (ROC) of 0.6533. In addition to economic or good farming practice proxy determinants such as net farm income in the case of the present study, it was found that both proxy for cultural innovation and one that can be used for aspirations.

Table 5. 2: Logistic Regression results

Determinants	Coef.	Odds Ratio	Std. Err.	P> z
Primary school education	.56	1.75	.28	0.049**
Garden size	-.07	.92	.03	0.057*
Risk for planting new crop	.06	1.07	.03	0.067*
Farm income	.00	1.00	3.73	0.006***
Keeping livestock as an extra income source	-1.83	.159	.950	0.053*
Number of goat sales	-.06	.941	.036	0.099*
Income from child grants	-.66	.516	.39	0.097*
Constant	.119	1.126	.35	0.737
N	319			
R square	0.06			
Area under ROC	0.65			
% of correct prediction	73%			

Notes: * = $P < 0.10$, ** = $P < 0.05$ and *** = $P < 0.01$

Source: Authors' calculations from the survey data

The significant cultural innovation determinants are garden size, goat sales and taking the risk of planting a new crop. Regarding garden size, the results can be interpreted to show that the bigger the garden size of the emergent smallholders, the lower the likelihood of their willingness to move. The odds ratio substantiates this and shows that each hectare increase of smallholder garden size decreases the probability of being willing to relocate by 0.75 times. Furthermore, within the theoretical framework developed in Section 6.2, it is possible to use the size of the garden as a proxy for the prevalence of a traditional farming system, characterising a low degree of cultural innovation for various reasons. This type of crop production system on small plots adjacent to human settlements is considered “the oldest and most enduring form of cultivation” (Ninez, 1987). For centuries, home gardens have been an integral component of family farming and subsistence farming systems. In South Africa, crop production in gardens relies mainly on family labour due to the limited access to capital and traditional farming methods such as using traditional seeds instead of hybrids and weeding instead of herbicides (see McAllister, 2001; de La Hey and Beinart, 2017). While it was assumed that these methods are the best practice in the smallholder environment and their cost effectiveness is not known, it is argue that these methods suggest a low degree of cultural innovation. An alternative would be to consider the size of the garden as a proxy for the opportunity costs of moving/relocation. If a large garden feeds you perfectly well, why would you consider moving away?

The Binary Logistic Regression results also show that an increase in the number of sold goats, lowers the likelihood of smallholder willingness to move. Goat production has an even more

straightforward meaning compared to gardens in terms of cultural innovation. Furthermore, goats are regarded as the most traditional animals of smallholders in homeland areas, as they are mainly used for performing rituals and other traditional ceremonies. Even the households that sell goats sell them mainly within their communities when they are in need of cash to address urgent household needs. Moreover, the other determinant that directly links to goat sales, which also can be used as a proxy for cultural innovation, is the keeping/farming of livestock for an extra income source. While this was expected to have a positive influence, it is linked with the previous determinant discussed above. The vast majority of the farmers market their livestock (goat, sheep and cattle) informally within their communities and surrounding communities, not in the formal markets. The lens of smallholder commercialisation from Pingali and Rosegrant (1995) indicates the smallholders being studied show at least some degree of commercialisation in terms of market participation. However, their market participation is rather limited in the formal markets, which is required for a successful farm business in the context of South African commercial farming. Furthermore, the low formal market participation arises from the primary reasons of engaging to agricultural production, as Pingali and Rosegrant (1995) have argued. Commercialisation can be observed first in the inputs farmers' use, where the farmers using traditional inputs such as manure and indigenous livestock breeds (as is the case in the study areas) have no strong commercial objectives than those who use market inputs such as fertilisers and highly productive livestock breeds.

In contrast, the higher the farm income of the participants, the more likely they would be willing to move, holding other factors constant. This suggests that emerging smallholders generating higher income from farming have higher aspirations of moving to the PPR than those with lower farm incomes. Although many factors are at play here, a higher income is the result of good farming practices and efficiency, which entails adopting new technologies such as hybrid seed varieties that can be linked to a high degree of innovation. In any case, wealthier farmers can start an investment in a new region, so that the significance of farm income is plausible. Moreover, this is a strongest predictor of smallholder willingness to relocate, as shown by the significance level (P-value= 0.006) of the higher odds ratio (see Table 5.2).

The other important determinant or predictor of smallholder willingness to relocate refers to the attitude towards risk (Table 5.2), specifically the risk of planting a new crop that the smallholder has not planted before. This has practical relevance, as smallholders relocating to commercial farms will encounter farms that have already planted crops with which they have no experience, such as wine grapes and sunflowers. The more risk-friendly respondents are, the more likely

they will move and start a commercial farm. With each unit increase on a risk scale of one to ten (as shown in Table 6.1), the likelihood of a smallholder farmer being willing to relocate increases by a factor of 1 (see odds ratio in Table 5.2). In particular, this refers to the “innovation” portion of the concept, which requires a certain willingness to take risks.

It was found that one proxy variable for aspirations, which has a significant positive influence on the willingness to move. Emerging smallholders with a primary school education show a significantly higher willingness to move than their peers without any formal education. This likelihood is further supported by the higher odds ratio, showing that the probability of the willingness to relocate increases by 1.75 times when the smallholder has at least a primary education. This was also suggested as one of the important beneficiary characteristics by van Rooyen and Njobe-Mbuli (1996) and recently emphasised by Sihlobo and Kirsten (2018) in their argument on the importance of selecting land reform beneficiaries.

5.4.3 Marginal effects of the willingness to move

One of the useful tools of the Binary Logistic Regression is the post-estimation of the results, which include marginal effects. As similar studies (e.g., Randela *et al.*, 2008) have done, for the present study too, it was possible to report both partial and marginal effects. The results are presented in Table 5.3 below.

Table 5. 3: Marginal effects of the determinants of the willingness to move

Determinants	Marginal effects
Primary school education	13%
Keeping livestock as an extra income source	-37%
Income from child grants	-10%
Garden size	-1.1%
Risk of planting other crop	1.6%
Farm income	200%
Goat sales	1.1%

Source: authors' calculations from survey data

On the positive side, having at least a primary school education increases the likelihood of being willing to move by 13% holding other determinants constant. This finding corroborates the suggestion by van Rooyen and Njobe-Mbuli (1996) that land redistribution beneficiaries should at least have basic literacy. This is because the nature of commercial farming business involves contracts and signing agreements, necessitating at least a basic education. Furthermore, planting

a new crop with which a smallholder farmer has no experience does not have much effect; it increases the likelihood of being willing to move by only 1.6% holding other determinants constant. The low effect can be explained by the fact that farmers can still learn and have the option sometimes to choose what to produce. Moreover, having a higher net farm income increases the probability of being willing to move by 200% holding other determinants constant. While this is based on good farming practices, it can also be translated to confidence in being innovative.

On the negative side, keeping or farming livestock as an extra income source decreases the likelihood of being willing to relocate by 37% holding other determinants constant. While this finding was rather unexpected, it shows a strong influence of the primary reasons for farming on the willingness to relocate. Although it was not a significant predictor, keeping livestock as a main income source was rather the more expected result in this regard. Furthermore, obtaining income from social grants decreases the chances of being willing to relocate by 10% holding other determinants constant. The social grant recipients are mostly poor and low-income households. In this regard, the cost of relocation would be too much for low-income households for several reasons; first, the government provides support for inputs, but not the cost of relocating; second, support from the government does not usually come immediately; third, farming does not generate returns in a short period of time. This view was also echoed by van Rooyen and Njobe-Mbuli (1996) and Sihlobo and Kirsten (2018). With regard to partial effects, larger gardens and higher goat sales do not have much effect on lowering the likelihood to move, as they decrease the probability of moving by only 1.1% holding other determinants constant. Thus, although these two determinants have a negative influence on the willingness to move, it is relatively minor regarding the positive impact shown by other determinants.

5.5 Conclusions and recommendations

The attempts to distribute land more evenly in South Africa have largely failed. In addition to the existing literature focusing on economics, this paper introduces a socioeconomic concept that could help to target potential investors more successfully. Two main dimensions were used. One of these has already received some attention in social science discourses, namely, aspirations; the other, cultural innovation, is rather specific to the South African problem set.

While the empirical study also found an aspirations-related variable of significance, namely, education, it could confirm the relevance of cultural innovation. Five variables related to cultural innovation or the lack thereof were significant predictors of the willingness of

smallholders to move to a different place to start a commercial farm. Although socioeconomic dimension is important for the selection of the land reform beneficiaries, the economic aspects of the farm business still play an important, significant role; accordingly, results showed that farm income was highly significant with at least reasonable odds ratio of one.

This indicates the practical relevance of the theoretical approach, in addition to the economic factors on which land redistribution policies are largely focused. Given the relevance of the theoretical approach and the results of the empirical model, it can thus, be concluded that high aspirants and cultural innovators with some degree of good farming practices are likely to succeed as new land recipients. When programmes to relocate emerging smallholders to regions of commercial farms are designed, both economic factors, such as good farming practice, and aspirations and their degree of cultural innovation should be taken into account for any targeting measures. This has practical relevance in the selection of beneficiaries, which has been cited for the failure of land reform farms (e.g., Hall, 2015) and criticised for lack of clarity in the criteria (e.g., Sihlobo and Kirsten, 2018).

Nevertheless, a caution is suggested with respect to the measure of determination. As much as 73% of the variance in willingness to relocate and become a commercial farmer can be explained by the set of variables, indicating there remain influential factors that have not yet been identified. There is still ample room for research in this direction.

Chapter 6:

Towards a viable farm size – determining a viable household income for emerging farmers in South Africa’s Land Redistribution Programme: an income aspiration approach

Abstract

The poorly implemented land redistribution programme in South Africa is among the priorities on the country’s agenda. Despite disagreements on proposed solutions, researchers seem to agree on the causes, and one of their agreements suggests that farm sizes are too large for the emerging new and inexperienced farmers (Hebinck et al. 2011; Aliber and Cousins 2013; Aliber 2019). As such, some researchers advocate for subdivision of the land redistribution farms in order to enhance the potential of emerging farmers and achieve successful land redistribution. Expediting subdivision of agricultural land has also been recommended in the recent report of the presidential Advisory Panel on Land Reform and Agriculture. However, one of the challenges has been finding a ‘viable farm size’. This article uses cross-sectional survey data from 833 potential emerging farmers in three rural provinces to determine a viable income for the emerging farm households and ultimately suggests a viable farm size. Adapting from the income aspiration literature, Farm Household Economics Theory and farm turnover appropriateness as a major determinant of farm size, a viable farm household income for an emerging farm household is determined. The viable farm household income determined in this study is a function of off-farm income, farm income and aspirational income. The viable farm household income is then used as the basis for suggesting what could be a range of possible ‘viable farm sizes’ for different types of potential emerging farmers. Although this approach has its own limitations, it provides initial steps towards determining a viable farm size and paves the way for future studies. The article ends with some illustrations and recommendations on how our findings can be used practically if subdivision is approved.

Key words: land reform, survey, income aspiration, Eastern Cape, KwaZulu Natal, Limpopo

6.1 Introduction

Although addressing the land reform question in South Africa is among the top priorities, progress in the redistribution of commercial farmland has been very slow, to a point where the government has considered measures of land expropriation without compensation (see e.g. Conradie; Akinola, 2020). This contrasts with the market-led redistribution policy adopted with the onset of democracy as stated in the White Paper on Land Reform (Department of Land Affairs [DLA] 1997). The urgency and importance of addressing the land reform question have been stressed by various studies (see for example Conradie 2019; Mukarati, Mongale and Makombe 2020). Furthermore, there are various analyses of the slow progress and poor productivity of the redistributed farms.

Among these analyses, one strand of literature²⁰ (Lyne and Darroch 1997:561; Kirsten and van Zyl 1999:339; Hebinck, Fay and Kondlo 2011:236; Aliber and Cousins 2013:162; Binswanger-Mkhize 2014:263; Cousins 2015:20) seems to argue that one of the reasons for the poor progress in land redistribution might be the large farm sizes because the existing commercial farms are too large for the inexperienced land reform beneficiaries. Some authors suggest a subdivision of commercial farms intended for redistribution despite the existing restrictions laid down in the Subdivision of Agricultural Land Act of 1970²¹ (Aliber and Cousins 2013:162; Binswanger-Mkhize, 2014:267; Cousins 2015).

In addition, a panel appointed by the South African president to advise on the way forward with land reform called for the subdivision of agricultural land as follows (Advisory Panel on Land Reform and Agriculture [LRAAP] 2019:95):

The panel calls on the President to assent to the Subdivision of Agricultural Land Act 64 of 1998 and sign it into law forthwith. Further, the President should explicitly call on all organs of state to work together to expedite subdivisions of agricultural and non-agricultural land to make available smallholdings for poor people, for residential, business and productive processes. Subdivision of large holdings, for the purposes of land reform, is essential if it is to benefit the poor and contribute to a less concentrate and unequal pattern of landholding.

²⁰ There are various analyses of why land reform has been so slow and redistributed farms unproductive. Reasons include lack of or poor post-settlement support, lack of farming skills and poor beneficiary selection, among others (Binswanger-Mkhize 2014).

²¹ This Act prohibits subdivision of agricultural land into smaller units which are not viable. Before subdivision, owners of the land should consult the DLA to approve the subdivision if deemed viable. However, subdivision has rarely happened; instead, farm sizes have continued to increase.

Although there is some level of consensus on land subdivision, there are also concerns regarding the competitiveness of small farms facing global competition (Hazell 2005; Karaan 2006). Regarding the latter point, the prospects of small farms were discussed in depth by Wiggins, Kirsten and Llambi (2010), who concluded that small farms are desirable for poverty alleviation and are still feasible despite the changing circumstances if appropriate support and policies are put in place.

In the past three decades, sizes of commercial farms in South Africa have been increasing (Liebenberg 2013), and based on the argument made by Bernstein (2013:23), this trend can be expected to continue. The argument for land subdivision is based on the views that smaller farms are more efficient, employ more labour and require less managerial skills than larger farms (van Zyl 1996; van den Brink, Thomas and Binswanger 2007). Furthermore, these factors match the objectives of the Land Reform Policy, one of which is to create employment, equity and vibrant rural communities (DLA, 1997). In addition, evidence from other African countries such as Kenya and Zimbabwe has shown that with a small family farm size, land redistribution beneficiaries can lift themselves out of poverty, even with little or no support from the government (van den Brink et al. 2007). Moreover, findings from KwaZulu-Natal suggest that land parcels would be more affordable if the commercial farms were to be subdivided and thus would contribute to the pace and equity of land redistribution (Lyne and Ferrer 2006:272).

However, one question has not been addressed in research in the context of land redistribution so far: What is a viable farm size? The problem with the viable farm size approach is its ambiguity; (Cousins and Scoones 2010) because ‘viability’ is a relative term, it differs from farmer to farmer as well as between and within farms. For example, Hazell (2005:94 - 95), in his attempt to answer the question of what a viable farm size is, argued that ‘size depends on the ability to create viable household livelihoods, and this varies enormously with the type of farming that is possible at any location, and the possibilities of combining farm with nonfarm sources of income’. The other problem with finding and determining a viable farm size is the need for an adequate methodology, which should be based on realistic data of the target beneficiaries in question. For example, the few existing studies in South Africa have tended to focus only on physical farm size (e.g. Mbatha 2017). Other studies have only reported viable farm enterprises without a systematic procedure. For example, Bunce (2020a) reported views of both commercial and emerging farmers that a 30-hectare farm is a viable economic unit for avocado production. In the wine industry, Townsend, Vink and Kirsten (1998) suggested a 7-hectare farm as a feasible starting point size for new and inexperienced entrants.

To date, no consensus has been reached on a viable farm size, and this issue has not fully been explored. For example, Lyne (2014:12) pointed out that ‘experience has shown that agreement on farm size is difficult to achieve’. Binswanger-Mkhize, Bourguignon and van den Brink (2009) have also expressed concerns about the difficulty of subdividing farms.

A report from the Department of Rural Development and Land Reform [DRDLR] (2013) determined lower and upper bounds of landholdings for every commodity per district; however, there is no evidence of the outcome of these determinations. Most recently, the final report of the presidential Advisory Panel on Land Reform and Agriculture recommended action to be taken in signing the subdivision bill (LRAAP 2019).

In light of this background, the first objective of this article is to use the concept of emerging farmers and their total household income to determine an appropriate viable total household income for them. Emerging farmers in South Africa are broadly defined as land reform beneficiaries (Gwiriri, Bennett, Mapiye and Burbi 2019). These emerging farmers are often drawn from smallholders that have a potential of becoming commercial farmers, so in this study we examine commercially-oriented smallholders, who are often regarded as prime candidates for agricultural land redistribution (DRDLR 2013). Thus, emerging farmers or potential emerging farmers in this study are defined as commercially oriented smallholders. The second objective is to use the viable total emerging household income to suggest a viable farm size that can sustain an emerging farm household. A viable farm size is defined as a farm size that can sustain a livelihood and allows the possibilities of combining farm with nonfarm sources of income (Hazell 2005:95). In adapting this definition to this study, first a computation a viable emerging farm household income, which is a function of farm income, off-farm income and a threshold by which an emerging farm household head believes s/he could increase her/his total household income in future (this is based on Ray’s 2006 income aspiration approach). Income range types of a viable emerging farm household income are then computed and substituted into gross margin per hectare incomes from existing commercial farms (drawn from BFAP annual reports) in order to estimate a possible farm size that can sustain an emerging farm household.

The article is structured as follows: the following section, delineate the main issues around subdivision of agricultural land in the South African context. Section 6.3 provides a conceptual and theoretical framework for determining a viable emerging farm size. In Section 6.4, the study methodology is described, followed by the presentation of the results in Section 6.5. Section 6.6 provides implications and discusses the results along with methodological shortcomings

and limitations. Finally, Section, 6.7, conclude and end with recommendations and hint at a scope for future studies.

6.2 Current state of knowledge regarding subdivision of agricultural land in South Africa

There are mainly two schools of thought about subdivision of agricultural land in South Africa. Opponents of land subdivision are concerned about the competitiveness of small farms (e.g. Karaan, 2006) and loss of efficiency gains (Mbowa and Nieuwoudt 1998:399), whereas proponents point out the inverse relationship of farm size to productivity (Schultz 1964). Past work in South Africa Since Schultz's study has confirmed this relationship (see van Zyl 1996). Whether this still holds true is yet to be confirmed. Along the same lines, Sender and Johnston (2004) voiced concerns about the adaptability of behaviour in South African smallholders, which they suggests that it will not hold true to the farm size inverse relationship. International evidence has shown that this relationship depends on numerous factors such as the intensity of land use, land fertility²² and managerial factors (Fan and Chan-Kang 2005; Muyanga and Jayne 2019). Other important factors include differential responses to uncertainty, labour market imperfections, and differences in technical and/or allocative efficiency and property rights (Dourandish et al. 2020; Henderson 2015). Henderson's (2015) study in Latin America has confirmed the effect that labour market imperfections have on the inverse farm-size–productivity relationship and has also shown that this relationship holds true up to a certain point (farm size or income). Regarding the latter point, in Sub-Saharan Africa-Kenya, recent work based on a range of farm size datasets has shown that the inverse farm-size–productivity relationship holds true for farm sizes up to three hectares (Muyanga and Jayne 2019). Another study based in China confirmed the latter point that the farm-size–productivity inverse relationship only holds true for the smallest farms, even when analysing the specific production enterprise, such as maize. The aforementioned study found that the high intensity of labour as a substitute for capital is the driver of the inverse relationship (Sheng et al. 2019).

Nevertheless, for proponents of subdivision, the main argument regarding subdivision of commercial farms revolves around an adequate farm size that suits the abilities of emerging

²² Barrett, Bellemare and Hou (2010) showed empirically that very little influence can be attributed to soil quality and market imperfection to explain the productivity to farm size inverse relationship.

farmers but also fulfils their aspirations (e.g. Hebinck, Fay and Kondlo 2011:236; Binswanger-Mkhize 2014). Others point out the relatively easy management associated with small farms, which is compatible with the experience of emerging farmers from their former homeland homestead farms (see Lyne 2014:12; Zantsi 2019). For example, numerous studies have shown that potential land reform beneficiaries want far smaller land sizes than the current average commercial farm size (Marcus, Eales and Wilchut 1996; Zantsi 2019; Bunce 2020a).

However, the still existing Subdivision of Agricultural Land Act of 1970 prohibits subdivision of agricultural land into unviable economic units. The other reason for this prohibition was to exclude Africans from acquiring agricultural land. As Binswanger-Mkhize et al. (2009:13) phrased it:

It may be too expensive or even impossible to break up large farms into family farms. This is because in many countries, including all settler economies of eastern and southern Africa, subdivision restrictions were imposed by the colonial powers to prevent the sale of small parcels of land to “native” people. In many countries those restrictions remain in place and make it difficult to break large farms into small farms.

While not much detail is given on the ‘viable farm size’, this expression simply refers to a farm size that allows the owner to make a living largely by farming, i.e., income obtained from farming or the income equivalent to that of an average civil servant. Evidence from Australian farms in the 1960s shows that viability of farms was partially determined based on welfare, i.e., farm income above the poverty line, although other parts of it was determined arbitrarily (Higgins 2001). Hazell (2005) adds that an economic viable farm should be a farm that can sustain livelihood. In this respect, physical farm size²³ alone will not be a good determinant of a viable farm size as argued by Kirsten and van Zyl (1998). Moreover, South Africa’s history of colonization and suppression of black people has led to huge gaps in income, living standards and living cost between an average black person and an average white person (see, e.g., Leibbrandt, Finn and Woolard 2012; Keeton 2014). As van den Brink, Thomas and Binswanger (2007) revealed, the Subdivision of Agricultural Land Act was primarily intended to facilitate white commercial farmers’ earning an acceptable income typical for a white person.

²³ This measure is inappropriate because farm size will vary due to differences in soil fertility, rainfall distribution and intensity of production, in turn affecting turnover. For example, in terms of turnover, a 500-hectare farm of semiarid shrub can be ‘small’ when compared with half a hectare of irrigated roses (Binswanger-Mkhize et al. 2009).

Therefore, the commercially oriented smallholders²⁴, who by nature are mostly black people, need to be considered in determining a viable farm size, since they are the prime beneficiaries of agricultural land redistribution (see DRDLR 2013). Because the farms should be ‘viable’ to the beneficiaries, one approach to finding a viable farm size is to relate it to the potential beneficiary’s total household income.

This approach raises the following two important questions: (1) What is the total monthly income of a potential land redistribution beneficiary? This assessment should consider farm and off-farm incomes because existing evidence has shown that past and potential future land reform beneficiaries depend on a variety of income sources and not just on farm income (Anseeuw and Laurent 2007; DRDLR 2015). (2) What could be the appropriate lower and upper bounds of the emerging farm income that would allow for increments over time? This question arises because neither general household incomes (Woolard and Klasen 2005) nor farm household incomes (Phimister, Roberts and Gilbert 2004) are static. Households are always looking for ways to increase their income. Moreover, there can hardly be one income threshold for all the emerging farmers due to their diversity (see for example, Olofsson 2020).

6.2.1 Income

While there are numerous methods of determining a viable farm size, income as a determining factor (or indicator) in establishing a viable farm has been used in previous studies concerned with the determination of an economic farm unit or viable farm (Union of South Africa 1955; Archer, Hoffman and Danckwerts 1989). The income should include both net farm income and off-farm income because potential emerging farmers usually own very small parcels of land and thus hardly live on farm income alone (see Union of South Africa, 1955; Yobe, Mudhara and Mafongoya 2019). This situation has prevailed even in post-apartheid South Africa, where numerous studies have shown a declining contribution of agriculture to rural household income (e.g. Cousins and Scoones 2010; Aliber and Mdoda 2015).

This seems to be a trend not unique to smallholder farming, but rather seen across the South African farming sector. According to Cousins (2015), most current commercial farmers in South Africa also supplement their farm income with off-farm employment. Moreover, Lyne (2014) viewed combining off-farm and farm income as a normal practice for all farmers.

For a majority of the smallholder farmers, the main reason for engaging in farming is to earn either main or an extra source of income (Aliber, Baiphethi, de Satge, Denison, Hart, Jacobs,

²⁴ There are various categories of land redistribution beneficiaries, but for agricultural and commercial farming, commercially-oriented smallholders are the prime beneficiaries.

van Averbeké and Antwi 2009). However, would earning the same amount they would otherwise earn on their former homeland homestead farms give them a strong incentive to move or relocate to commercial farms? The short hypothetical answer is that they are unlikely to relocate, and Farm Household Economics Theory (FHET; see Low 1986) can aid in understanding the most likely answer to this question. According to FHET, farm households' objective is to maximize utility, where utility is synonymous with the total household income and not just the net farm income (Low 1986; Ellis 1993). Utility is equated to income because it is believed that income enables livelihood directly or indirectly. For example, farm household members engage in agriculture to meet their daily food needs, and the surplus can be sold or traded for other non-food household goods. Similarly, food and other household goods can be purchased with income that household members with high opportunity cost earn in wage labour. Farm inputs such as inorganic fertilizer can also be purchased using off-farm income. Therefore, combining the net farm income and off-farm income would arguably maximize an emerging farmer's utility. The other indicator that can help to understand the wider range of emerging farmers' income goals is income aspiration (Ray 2006), which in this case acts as an incentive.

6.2.2 Incentive

Incentives play an important role in farming because they constitute much of the driving force regarding agricultural production (Karaan 2006). Knowing that most of the potential emerging farmers engage in farming for attaining income gives us a good starting point to think about their incentives to engage in agriculture (Zantsi, Greyling and Vink 2019). Earning what potential emerging farmers are currently achieving on their former homeland homestead farms is arguably not enough for those emerging farmers who are willing to move or relocate to commercial farms as part of the land redistribution program. Assuming they want to maximize income based on FHET (Low 1986), there can be a threshold above which they intend to increase their income. Ray (2006) term such income as an aspired income (to be discussed in detail below).

6.3 Conceptual and theoretical framework for a viable emerging farm size

Figure 6.1 below provides a conceptual and theoretical framework for determining a viable emerging farm size.

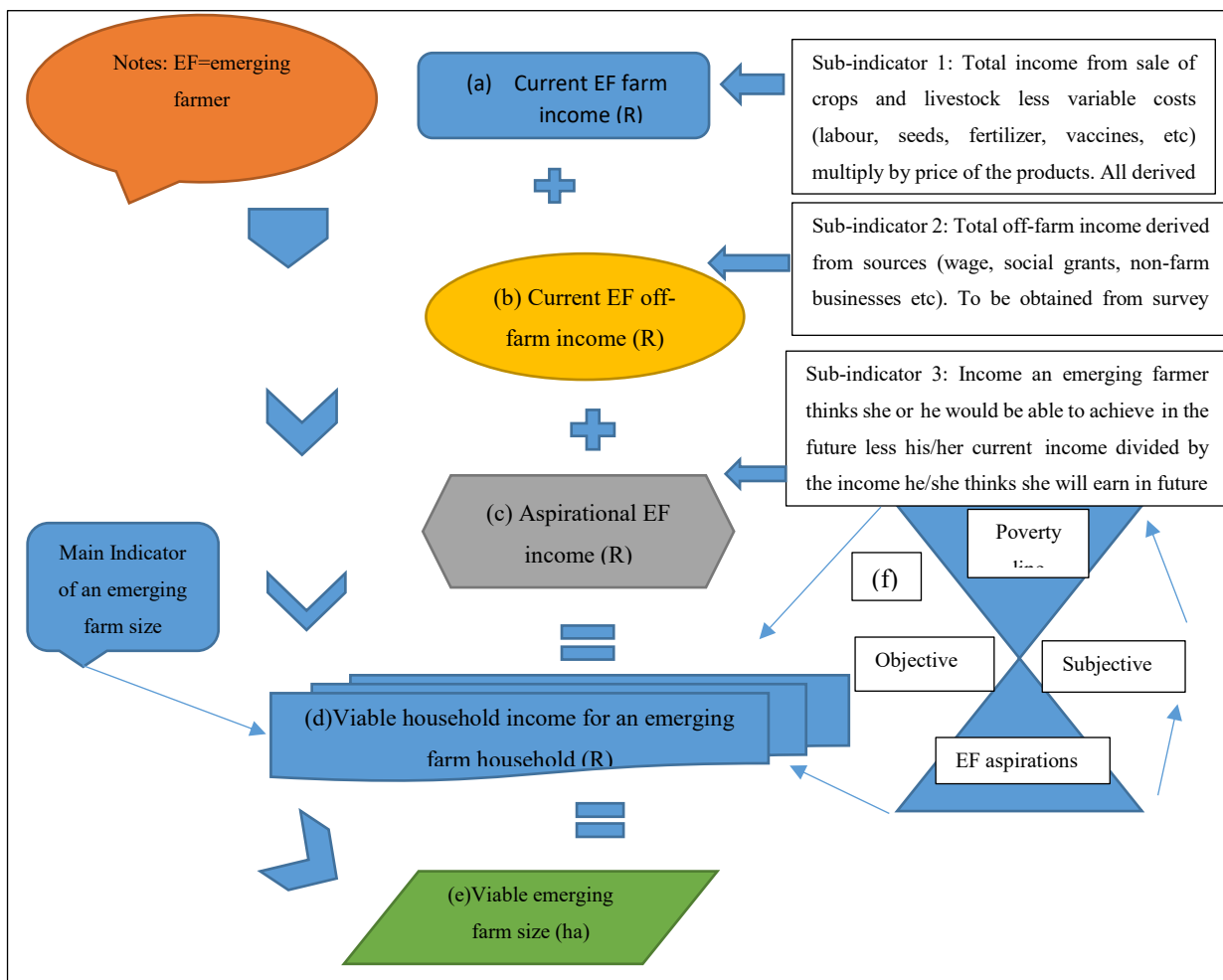


Figure 6. 1: Conceptual and theoretical framework for a viable emerging farm

Source: Own computation

As it has been already defined in the introductory section, in this study, we base our definition of an emerging farm size on Hazell's (2005:95) definition of a viable farm size, which is one that can sustain a livelihood and a possibility of combining farm with non-farm sources of income. Therefore, to the context of this study, a viable farm size (measured in hectares) for an emerging farm household is a farm that can generate income that fits into the range of viable farm incomes when substituted into gross margin per hectare of commercial farms (gross margins will be explained in the next section). Thus, the indicator of a viable emerging farm size (measured in hectares) is viable income that can be generated by a given farm (measured

in rands). Viable emerging farm household income is computed as a product of farm income plus off-farm income (refer to “a” and “b” in Figure 6.1).

As it has already known that potential emerging farmers similar to those studied here are driven to agriculture mostly by income (Zantsi et al. 2019). Experiences of viability have been based on welfare and some of them on arbitrarily computed income thresholds (e.g. Archer et al. 1989; Higgins, 2001). The latter point has been criticised on numerous grounds for taking a top-down approach (see Cousins and Scoones 2010). Therefore, it would be important to combine both welfare and a less subjective approach such as beneficiary aspirations (refer to “f” in Figure 6.1).

However, because household incomes are constantly changing (see e.g. Phimister et al. 2004; Woolard and Klasen 2005), an income range derived from potential emerging farmers’ current income plus aspired future income was computed (refer to “c” in Figure 6.1). Nevertheless, emerging farm households are diverse and can never be addressed by a one-size-fits-all approach. Therefore, emerging farm households are grouped into three income range (typologies), low aspirant (R25, 000–R200, 000), moderate (R201, 000–R500, 000) aspirant and high aspirant farmers (more than half a million rands).

To reflect how the viable emerging farm income could be translated to a viable farm size, the three emerging farm income bands are substituted into gross margin per hectare of the existing commercial farm enterprise groupings to get an idea of what could be a viable farm size for an emerging farm household. However, off-farm income is not considered when estimating viable farm size, although it is considered in computing viable emerging farm income. Knowing that emerging farmers rarely rely on only one income source (as reported in: Anseeuw and Laurent 2007; DRDLR 2015), accounting for emerging farm households’ additional income from other sources is an advantage, as it does not limit emerging farm households strictly to the income they can earn on the farm. This makes room for stochasticity and flexibility, similar to the view of Hazell (2005:95), that a viable farm size is that which can sustain a livelihood and the possibility of combining farm with nonfarm sources of income. In the end, a given emerging farm size will be determined by the composition of farm enterprise (Horticulture, livestock, field crops), the intensity of production (e.g., irrigated vs. dry land) in the given farm and aspirations of the farmer (low, moderate and high). Therefore, for the purpose of this study, the above-mentioned factors will be considered sub-indicators determining an emerging farm size. Data and details of the approach to this conceptualisation will be described below.

6.4 Data and methodological approach

6.4.1 Study area, sampling technique and sample size

This study was conducted in rural areas of three provinces in South Africa, namely the Eastern Cape, KwaZulu-Natal and Limpopo. These provinces were chosen because jointly they house the majority (61%) of smallholders in the country according to Statistics South Africa's Agricultural Household Survey of 2016 (StatsSA 2016). Within these three provinces, district municipalities and local municipalities which have a high density of smallholders were chosen purposely through key informant interviews with extension officers, smallholder farmers organizations such as African Farmers Association of South Africa, non-governmental organizations serving small-scale farmers such as Lima Rural Development and commodity organizations such as BKBTM and through a review of the relevant literature. At the village level, a list of villages with agricultural households was obtained from Statistics South Africa, and villages and households were selected randomly.

According to Aliber et al. (2009) who conducted an analysis of the Income and Expenditure Survey and the Labour Force Survey (StatsSA 2016), the following districts have a high density of smallholders: Amathole, Chris Hani and Oliver Tambo district municipalities in the Eastern Cape; Umkhanyakude, King Cetshwayo, Harry Gwala and Zululand districts in KwaZulu-Natal; and Vhembe in Limpopo.

The number of smallholders and specifically the number of commercially oriented smallholder farmers are highly contested in South Africa (see Kirsten and van Zyl 1998; Rother, Hall and London 2008; Gouse, Sengupta, Zambrano and Zepeda 2016). Therefore, we have limited grounds to declare that this is a representative sample although we argue that it is big enough to give a detailed picture. We surveyed a sample of 833 farmers randomly from the eight districts mentioned above in the three provinces. Table 6.1 presents a summary of the study areas and sample size in each selected district and province.

Table 6. 1: Study areas and sample size distribution

Eastern Cape	(n)	KwaZulu-Natal	(n)	Limpopo	(n)
Amathole	175	Umkhanyakude	125	Vhembe	89
Chris Hani	120	King Cetshwayo	80		
Oliver Tambo	84	Harry Gwala	56		
		Zululand	104		

Total	379	Total	365	Total	89
Overall sample size = 379 (Eastern Cape) + 365 (KwaZulu-Natal) + 89 (Limpopo) = 833					

Regardless of the extent of commercial orientation, commercially oriented smallholder farmers were randomly selected and interviewed in each district. A semi-structured questionnaire compiled in English and translated to local languages spoken in the study areas was used for the interviews with farmers.

6.4.2 Approach to analytical methods

The methodological approach employed in this study is based on the principles of Household Economics Theory and analysis of potential emerging farm households' data to compute viable emerging farm household income and ultimately a viable emerging farm size. The Farm Household Economics Model (FHEM), on which the Household Economics Theory is based, is not much different from the General Household Economics Model first proposed by Becker (1965); in fact, it is an extension with a focus on farm households. Prominent scholars who have extended Becker's theory to farm households in southern Africa include Ellis (1993) and Low (1986). These authors have shown that the standard household utility model slightly changes for farm households because resource endowment and resource allocation differs between farm households and non-farm households. The latter can be best analysed by the standard utility model, while the former needs one to take into account farm income and agricultural labour time, which can be traded for off-farm wage labour. For instance, household members have different opportunity costs in wage labour. In a farm household, such opportunity cost greatly affects agricultural production, which tends to rely on family labour more than a non-farm household (Low 1986). Therefore, FHEM is much concerned about how farm households make decisions in terms of time allocation within and between household members. It provides a framework for analysing interactions between household production for subsistence and for the market, wage labour and consumption of market goods. Barnum and Squire (1979) postulated the farm household production function to be given by equation 6.1:

$$Y = f(A, L, V) \dots \dots \dots (6.1)$$

where Y denotes the production function, A is the area of land under production, L is the total labour, both family and hired labour, and V is other variable inputs to production. This input is subject to income and time constraints, where the time constraint is the combination of farm work, wage work and leisure time.

This definition makes FHET relevant to the South African smallholder farming sector, which consists mostly of subsistence, emerging and a few commercially oriented smallholder farmers (Olofsson 2020). These smallholders farm households who cultivate small areas of land and keep livestock to derive an additional source of food. A few smallholders have modest land size and farm to obtain an extra or main income source. Furthermore, a majority of these households combine farming activities with off-farm income-generating activities to maximize utility (see for example Yobe et al. 2019). Therefore, understanding the motives behind such behaviour, which according to FHET is to maximize utility, where utility is synonymous to income, allows us to think of their farming goals. Viable emerging farm household income therefore, should encompass farm income, off-farm income and aspirational income in order to maximise utility of emerging farm households. The first two incomes can be easily captured from the dataset.

The aspirational income which acts as an elastic band through which emerging farm household income can be expanded requires us to consider current emerging farm household income and income which such households think they can attain in future. According to Ray (2006), the total income aspiration gap g can be calculated as shown in equation 6.2.

$$g = \left(\frac{a-s}{a} \right) \dots\dots\dots(6.2)$$

Where a is the income which a household head thinks s/he would be able to achieve in the future and s is the current income of the farmer. This means farmers with an aspired income that is greater than their current income will have a positive aspiration gap (with g approaching 1, when the gap increases), whereas farmers with income aspirations that are below their current income will have a 0 or negative aspiration gap (Janzen, Nicholas, Sharma and Thompson 2017). Therefore, this gap gives an indication of the threshold income that can be used as an incentive for potential emerging farmers willing to relocate to commercial farms, should they be selected to participate in land redistribution program (Zantsi, Mack and Mann 2020). Taking into account off-farm income, farm income and aspirational income, we can therefore calculate a viable emerging farm household income. All income is quoted in 2017 values of South African rands. How, then, would this “viable emerging farm household income” help in determining a “viable emerging farm size”?

In the last step, we calculated a viable emerging farm size by dividing the viable farm income through an average gross margin per hectare. We used average gross margins per hectare from the Bureau for Food and Agricultural Policy (2018; see Figure 6.2). As average gross margins depend mainly on the type of farm activity, we considered different farm activities: Extensive

livestock, grains and oilseeds dryland, grains and oilseeds irrigated, vegetables and orchards. This method ensures that a viable farm size for different farm activities is calculated.

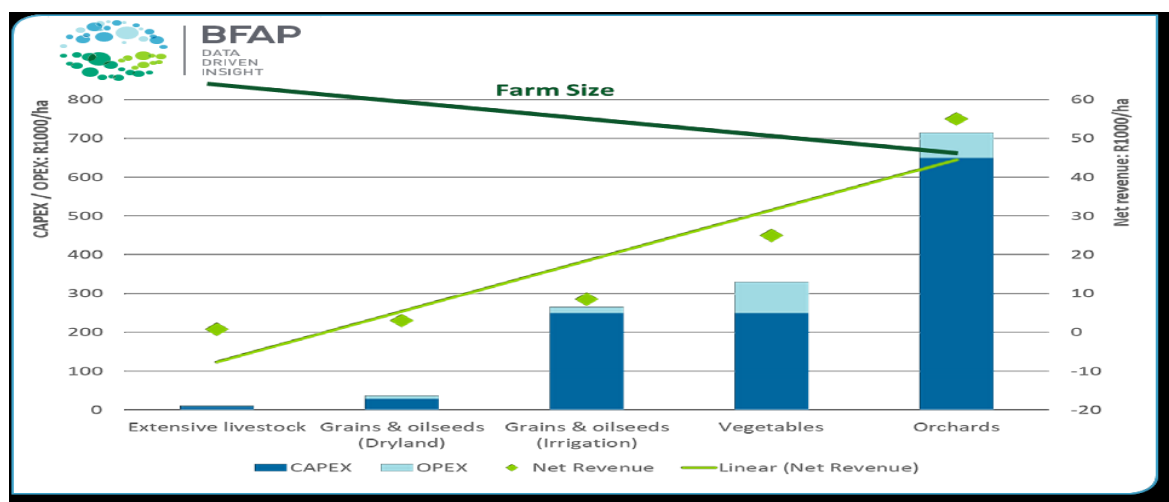


Figure 6. 2 Gross margin per hectare (Rands per year) for selected agricultural activities in South African commercial agriculture

Source: Bureau for Food and Agricultural Policy, 2018:12

The gross margins for different agricultural activities and different production techniques shown in Figure 6.2. Based on the gross margin per hectare values in Figure 6.2, a viable farm size could be estimated based on the viable household income.

6.5 Results and discussion

This section presents the results of the data analysis described in the above section and specifically discusses what these results mean and how they can be translated to viable farm size. The section starts with off-farm income followed by farm income and income aspiration to arrive at the typical average income and typical average income aspiration gap for an emerging farmer. Lastly, income bands are constructed based on viable household income and are applied to gross margins of selected commercial farm enterprises.

6.5.1 Off-farm income for an emerging farm household

Emerging farmers in South Africa have multiple income sources, which can be categorized into farm and off-farm incomes (Zantsi et al. 2019). The distribution of off-farm income among emerging farmers is presented in Figure 6.3. This distribution shows great variation between

households, which is a common trend in South African society (Keeton 2014). A vast majority (84 percent) of these farm households earn between R1, 320 and R10, 319 per month on a widest range; however, within this group, a fraction of 136 farmers (35 percent) earn between R1, 320 and R2, 319 per month. Regarding the latter group's lower bound, they earn just above the poverty line (R1, 183). The average off-farm household income for an emerging farmer is R6, 388 per month (R76, 656 per year).

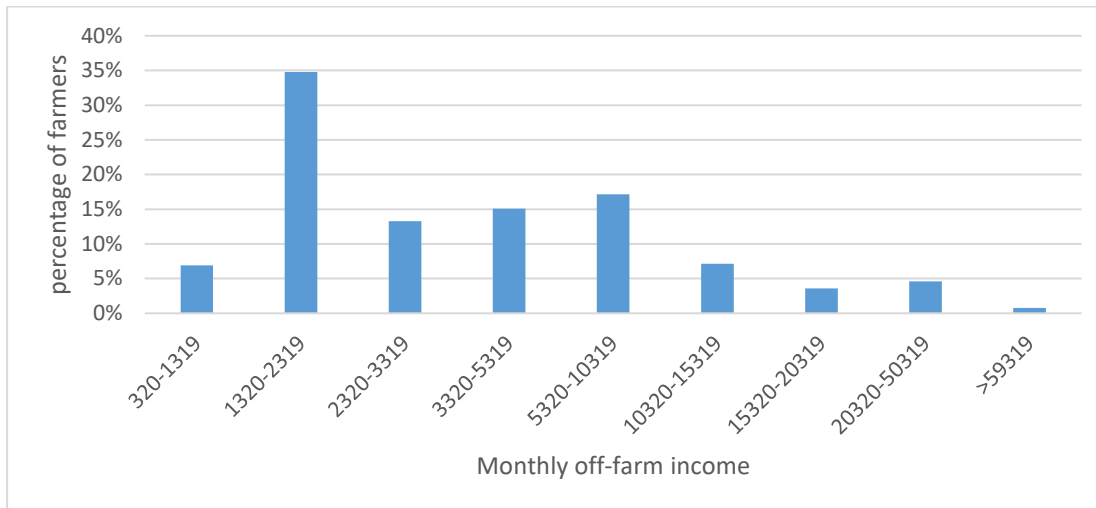


Figure 6. 3: Distribution of monthly total off-farm income

Source: Own calculations from survey data

6.5.2 Farm income for an emerging farm household

Like off-farm income, farm income shows a great variation, from farmers making less than R5, 000 to farmers making over R80, 000 per year, as shown in Figure 6.4. This range indicates diversity within the group of potential emerging farmers, and this diversity is formalized in Olofsson's (2020) study. The average farm income achieved by an emerging farmer is R80, 703 per year (R6, 725 per month), which is similar to the average monthly off-farm income. However, the higher farm incomes are probably from irrigating farmers and the lower incomes from non-irrigating farmers, although we did not capture this in the data. For example, from observations during the field survey in the Eastern Cape, where there were very few irrigating farmers, the average annual farm income is R45, 209, which is almost half of the average of the total sample.

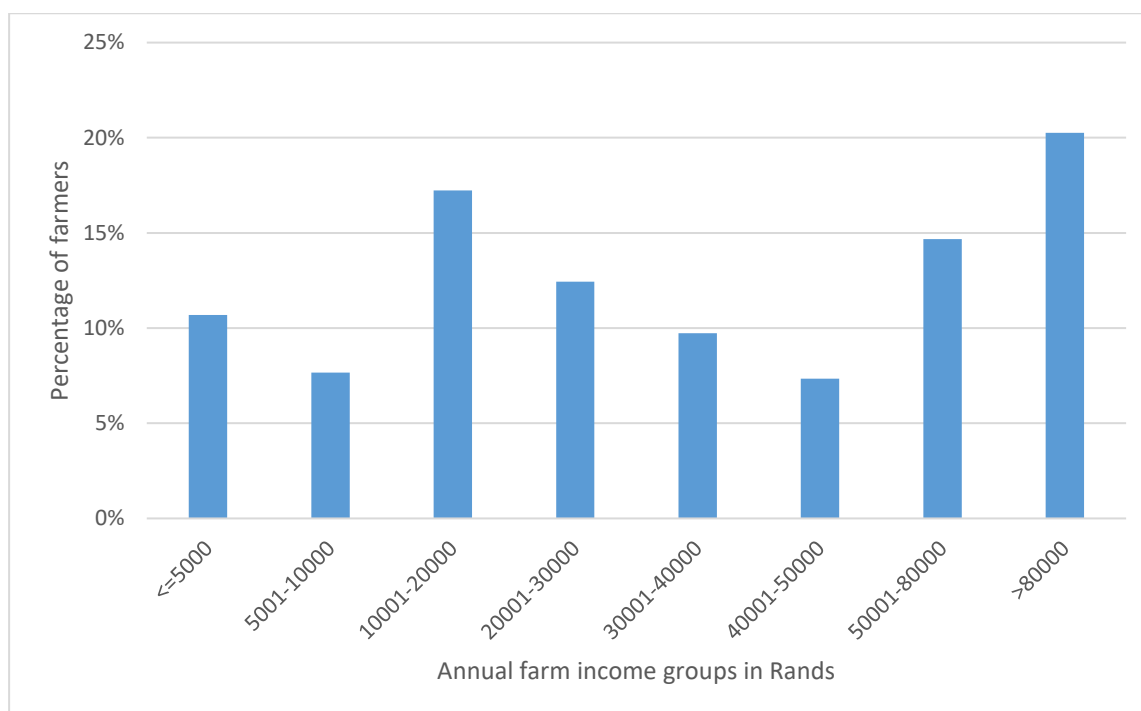


Figure 6. 4: Distribution of annual farm income of emerging farmers

Source: Own calculations from survey data

6.5.3 Total income aspiration gap for an emerging farm household

The average total income aspiration gap from the study sample is 0.7, and the distribution of this gap is summarized in Figure 6.5. This average value means that emerging farmers think they can increase their income in the future by 70 percent of the current total income, indicating a wide gap between current and aspired emerging farm incomes. In simple terms, this value shows high ambition among the emerging farmers. Moreover, results from Figure 6.4 illustrate that more than 80 percent of the sample of emerging farmers have an income aspiration gap of more than 0.4 (indicative of low ambition), more than 60 percent have a gap of more than 0.6 (indicative of moderate ambition), and a few (16 percent) have an aspiration gap below 0.4.

The variation in these results highlight the diversity within the sampled group of smallholders, which can be divided in sub-groups with differing levels of income aspiration. Cousins (2015) also identified sub-groups within the broader groups of land reform beneficiaries. Chipfupa and Wale (2018) showed that aspirations of smallholders in KwaZulu-Natal are influenced by positive psychological capital, among other factors. Differences in positive psychological capital (which includes personality traits such as optimism, confidence and resilience) might be linked to the different aspiration gaps of the smallholders in our sample.

The income aspiration gap improves understanding of how emerging farmers aspire their income to grow over time. Therefore, the average income aspiration gap was added to the total average income. Adding up the average farm income of R80, 703 per year and the average off-farm income of R76, 656 per year results in a combined total average household income of R157, 359 per year for an emerging farmer. On average, emerging farmers intend to increase their total annual household income by R110, 151 (i.e., by 70 percent) to R267, 510. This means a ‘viable farm household income’ for an emerging farm household would be between R157, 359 and R267, 510 per year (between R13, 113 and R22, 292 per month).

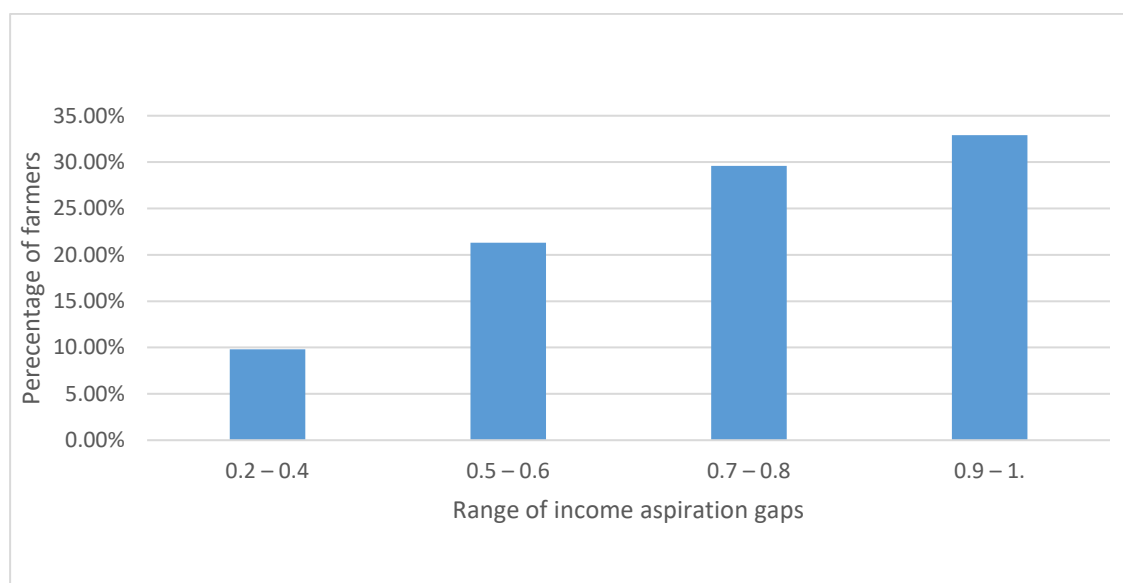


Figure 6. 5: Distribution of total income aspiration gaps of the potential emerging farmers

Source: Own calculations from survey data

Although the generally accepted standard of living should be above the poverty line, some of the emerging farmers may be living below the poverty line, as is the case with this study’s sample (see Figure 6.3). The national upper-bound poverty line in South Africa according to Statistics South Africa (2018) was R1, 183 per person per month in 2018. To relate our results to this value, the average household size would be required and was available for the data from the Eastern Cape, where the average household size is five persons per household. Thus, in the Eastern Cape, a total average household income of R13, 113 per month equals R2, 622 per month per family member and is above the upper-bound poverty line. However, the wide gap between actual income, either off-farm or farm income, and aspired income by some of the emerging farmers (33 percent of the sample; see Figure 6.5) is one factor to be scrutinized here. Based on the literature on aspirations, this wide gap may result from aspiration failure (see Ray, 2006). Nevertheless, Shakra (2018) found no evidence of income aspiration failure among

potential emerging farmers in the Eastern Cape. Furthermore, sketching viable household income based on average income for a range of potential emerging farmers adds little value. To add value to these results, we created cluster groups of emerging farmers based on viable household income (see next section).

6.5.4 Viable household income for an emerging farm household

Figure 6.6 provides a typology of the viable household income for emerging farmers. As seen by the positive values of the income aspiration gaps in Figure 6.5, the viable household income, representing the potential income to be earned in the future, is higher than the actual income.

From the viable household income presented in Figure 6.6. Three types of emerging farm households were identified. This grouping is based on Zantsi, Greyling and Vink (2019), who categorized potential emerging farmers based on their turnover. The first broad group consists of emerging farm households who have a viable income between R25, 000 and R200, 000 per year, and represents the low aspirant emerging farm households. It is the second largest group, representing more than a third (36 percent) of the emerging farms in our sample. This group can be broken down into two sub-groups: very low aspirant households (17 percent) with a viable income between R25, 000 and R100, 000 per year and low aspirant households (19 percent) with a viable income between R101, 000 and R200, 000 per year.

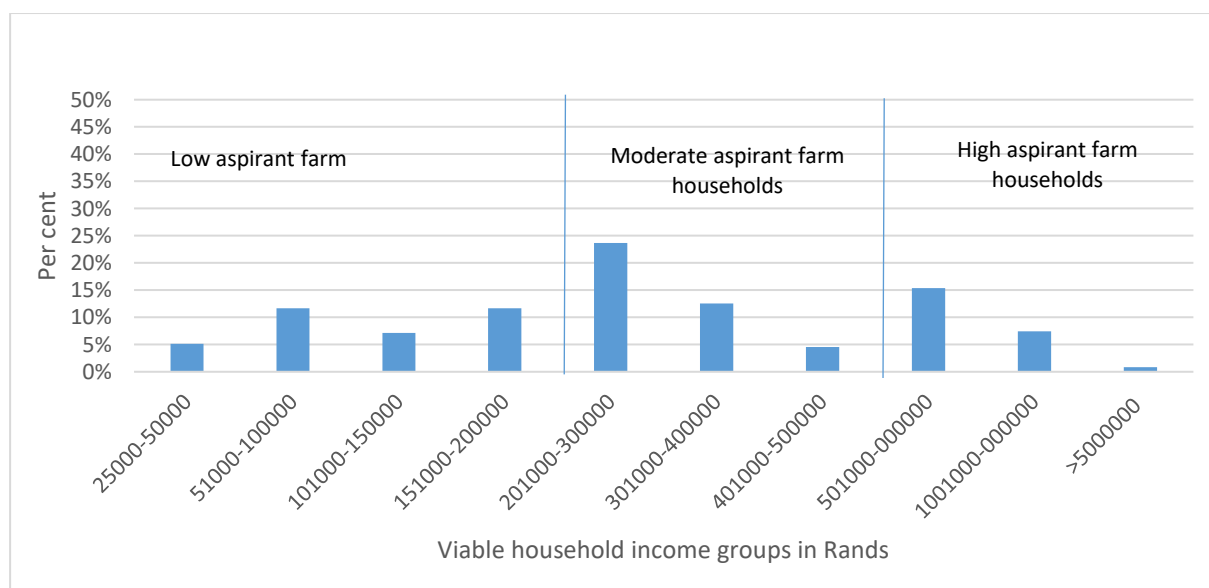


Figure 6. 6: Distribution of the annual viable household income of emerging farmers

Source: Own calculations from survey data

The second and the largest (41 percent) broad group consists of moderate aspirant emerging farm households with an annual viable income between R201, 000 and R500, 000. Lastly, the smallest broad group (23 percent) consists of high-aspirant emerging farm households with a viable income just above half a million rands up to 108 million rands per year. These emerging farm household income bands are above the poverty line of R1, 183 per person for an average household of five persons. Except for the lower bound of the low aspirant emerging farmers. For the latter it would therefore be necessary to have another source of income. These results lead to our final question, which we address in the next section: How can this viable household income typology of emerging farmers be translated to viable farm sizes?

6.5.5 Viable farm size for emerging farm households

Based on the gross margin values per hectare presented in Figure 6.2 (Section 4.2), farm sizes vary across farm enterprises for each emerging viable farm income band computed in the preceding section. High value activities will result in smaller farm sizes. For example, if one only consider the upper limit in the viable income groupings in Figure 6.6, a viable orchard farm for low, moderate and high aspirant emerging farmers would have a size of 1.2, 3 and 36 hectares, respectively²⁵ (Table 2). In contrast, for low gross margin enterprises such as extensive livestock production, a viable farm size for low, moderate and high aspirant emerging farmers would be 200, 500 and 6, 000 hectares, respectively (Table 2). In terms of grains and oilseeds, which a majority of potential emerging farmers would want to grow for example, maize (see Zantsi 2019), the farm size for low, moderate and high aspirant farmers could be 57, 142 and 1,714 hectares, respectively. However, some of these activities may not hold true outside the estimated enterprise budgets, for example 100 cows or ewes, due to economies of scale and size.

²⁵ For the high aspirant emerging farm households, 6 million rand was used, because there are only a few farmers above this point.

Table 6. 2: Viable farm sizes for emerging farm households

Farm Type	Emerging farm typology	Viable farm size (ha)
Horticulture	Low aspirant	1.2
	Moderate aspirant	3
	High-aspirant	36
Livestock	Low aspirant	200
	Moderate aspirant	500
	High-aspirant	6000
Field crops/Grain & oilseeds	Low aspirant	57
	Moderate aspirant	142
	High-aspirant	1714

Source: Own calculations

6.6 Discussion and implications for land redistribution

The implication of this finding for the Land Redistribution Programme is as follows: if farms are subdivided for land reform beneficiaries, farm sizes should differ according to agricultural activities (farm enterprise), intensity of production and potential emerging farmer aspirations (Kirsten and van Zyl 1998; Zantsi et al. 2020). Accordingly, Lyne (2014) suggested offering a range of farm sizes for categories of land reform beneficiaries. These results could be used as the basis for estimating the numbers as well as different categories of potential land reform beneficiaries, similarly to the approach suggested by Conradie (2019) of grouping land redistribution beneficiaries according to their land needs and livelihood strategies.

Moreover, some of the physical farm size ranges we identified are within the aspirational farm sizes reported by Zantsi (2019). The author reported that potential emerging farmers aspire an average farm size of 152 hectares. Zantsi et al. (2020) theoretically identified determinants of potential emerging farmers' willingness to relocate from their former homestead farms. Such determinants included potential emerging farmer aspirations and cultural innovation proxy variables, which can be used to predict likelihood of relocation and farmer orientation.

Finding a viable farm size by using viable household income is certainly not a straightforward task; Lyne (2014) and Binswanger-Mkhize (2014) have previously pointed out the difficulty of subdividing farms. Analysis in this study attempts to illustrate both how this task could be approached and what challenges it poses. A few lessons could be learnt from this analysis. One is that the determinants of subdivision would be based on the types of farming enterprises, as we observed huge discrepancies between gross margins across different agricultural activities, for example between extensive livestock rearing and orchard production.

The other lesson is that subdividing farms might not be as simple in reality as we assume in our illustrations in the preceding paragraphs (based on Figure 6.5 and Figure 6.6), because gross margins do not always linearly increase with size due to, for example, economies of scale related to input costs, as Mbowa and Nieuwoudt (1998) showed in the case of sugarcane farms. This non-linear relationship confirms the concerns of researchers against farm subdivision. Moreover, farmer aspirations, which were incorporated in this study in terms of income, would not be enough in the end to capture an emerging farmer's ideal farm size for several reasons. One is that incomes are not static, and inflation could change the determined viable income in the near future. If subdivision of farms is signed into policy, these factors should be considered. Furthermore, the literature on aspirations suggests that aspirations are shaped by observation of reference groups (e.g., Genicot and Ray 2017). For example, in the context of this study, farmers in their former homeland might have low aspirations because their peers are not considered rich in the wider South African community, but are relatively rich or better off in the former homeland areas, where a majority of people have low incomes and depend on social grants (see Pienaar and von Fintel 2014).

6.6.1 Challenges and methodological limitations

This sub-section, discusses methodological shortcomings and the difficulty of translating viable household income to viable farm size. It begins with the limitations of the income approach in determining viable farm size.

Although the income approach has been recommended widely for subdividing farms into viable economic units, it is not without limitations. Cousins and Scoones (2010) discussed the numerous framings of viability in agrarian questions in southern Africa. They showed that farm households' livelihoods are complex, and no single measure can provide a holistic approach to account for all relevant aspects. Even in the present study, only one dimension is presented with slight improvements compared with previous studies.

Denison, Field, Wotshela, van Averbeke, Mutamba, Masika and Mayson (2009:28) also voiced concerns about the income approach towards finding a viable farm size. They outlined criticism of this approach from numerous angles. One is the assumption of the income requirement of farm households. They deemed this assumption problematic because the household income requirement is considered static although in reality incomes grow and are dynamic (Phimister et al. 2004; Woolard and Klasen 2005). Secondly, the production system that is employed on

the farm may cause difficulties in accommodating technological innovations and system adaptations. Thirdly, the income approach assumes that current household circumstances will remain the same, whereas in reality, conditions are always changing.

6.7 Conclusions and recommendations

The objective of this study was to contribute to the existing literature on determining a viable farm size for emerging farmers based on a viable household income and to show the challenges and limitations of this method. To do so, an income aspiration approach was employed and empirical data from a survey of the relevant target land redistribution beneficiaries was used. In this study, a viable household income is computed as a function of farm income, off-farm income and income aspiration gap in order to allow flexibility and reflect ambitions and potential of the emerging farmers. It was found that no single figure of viable emerging farm income can represent all emerging farmers and consequently a viable emerging farm size. As such, a range of viable farm incomes can be used to identify categories of viable income for emerging farm households. From these viable emerging farm incomes, it was possible to illustrate practical application of the results to existing enterprise gross margins per hectare taken from existing commercial farms. It was found that a range of viable farm size for low aspirant, moderate aspirant and high aspirant emerging farmers could be derived from the emerging farm households' viable incomes. The major determinants of the emerging farm size are, farm enterprise, intensity of production of the farm and emerging farmers' aspiration. A viable orchard farm size for low, moderate and high aspirant emerging farmer would have a size of 1.2, 3 and 36 hectares, respectively, while for low gross margin enterprises such as extensive livestock production, a viable farm size for low, moderate and high aspirant emerging farmers would be 200, 500 and 6, 000 hectares, respectively. In terms of grains and oilseeds, the farm size for low, moderate and high aspirant emerging farmers would be 57, 142 and 1,714 hectares, respectively. Our results confirm the hypotheses and assertions from related studies, namely, that a range of emerging farm sizes will be determined by farmer aspirations (Zantsi et al. 2020), farm enterprise and intensity of production of the farm in question (Hazell 2005; Cousins and Scoones 2010).

These findings should be interpreted with caution, because the gross margin per hectare that calculations from this study were based on, assume a certain production scale, for example, 100 ewes in the case of extensive sheep production. Further, some commercial farms practice

mixed-enterprise farming, therefore a different scale might be necessary to take into account off-farm income.

The study also provides substantial evidence for the previously suggested creation of a range of farm sizes to accommodate different categories of beneficiaries (see Lyne 2014; Conradie 2019). Based on the findings of this study, it is recommended to consider farm enterprise, farmer aspirations and intensity of production of the farms before making any attempts of subdividing farms. It would make sense to allocate low-aspirant emerging farmers either to low gross margin per hectare activities or to smaller land parcels of high value crops (such as fruits) and allocate high aspirant emerging farmers to parcels of high value crops, because these farmers would need bigger farm size in low-value enterprises such as extensive livestock.

However, more research is needed to balance farmer income aspiration and farmer enterprise aspiration. For example, Zantsi (2019) showed that a majority of potential emerging farmers would want to plant maize and keep small ruminants if they were selected as land reform beneficiaries. Finally, previous studies pointed out the complexity of potential land reform beneficiaries' livelihoods, and this aspect cannot be fully understood by aspirational income alone. Therefore further research is recommended to explore the multifaceted dimensions of potential land reform beneficiaries' complex livelihoods.

Chapter 7:

'Land divided': Subdivision of commercial farms in South Africa, an agent-based approach

Abstract

Should commercial farms bought by the state for redistribution to emerging farmers be subdivided? How should the farms be subdivided? How big should such subdivided land parcels be? This study is concerned with addressing these crucial questions confronting South African land redistribution. A novel agent-based model for analysing the effects of land reform policies in South Africa developed by a research collaboration between Stellenbosch University and Agroscope, is used for analysis. The model is built from a survey database of 605 commercial farmers across the country and 833 potential emerging farmers in three smallholder densely populated provinces. Results show that it is theoretically possible to subdivide the 10.6 million hectares (14 per cent) of commercial farmland that becomes available for land redistribution to create emerging farms. Most of the redistribution land (99 per cent) is grazing land and the remainder is field crop and horticultural land. The emerging farms (farms created on redistribution land) subdivided by viable emerging farm sizes as subdivision factors, show remarkable differences in numbers, farm size (both in hectares and farm income). In terms of farm activities or farm type, the emerging farms are almost in line with potential emerging farmers' aspirations of field crop and livestock farming. These results have policy implication for land redistribution. Firstly, when a systematic procedure is used to redistribute land, more realistic targets could be achieved, which can improve planning. Secondly, by using viable farm size aspired by emerging farmers, appropriate farm size and farm numbers could be achieved, which could improve the impact of land redistribution and address the criticised top-down approach followed in land redistribution.

Keywords: land redistribution; South Africa; agent-based model; farm subdivision; viable farm income

7.1 Introduction

A number of policy documents and legislation (e.g. the constitution, 1997 White Paper on land reform and the National Development Plan) have laid a firm foundation and provides sufficient guidelines on how the land question should be addressed (South Africa 1996; National Planning Commission 2011; Department of Land Affairs 1997). The main challenge in the South African land question lies in its poor implementation. Despite implemented in more than two and half decades of political freedom, it seems that the state has learned very little lessons to improve implementation. To date limited progress has been made with the land redistribution programme and a large number of redistributed farms has failed (see for example: Vink and Kirsten 2003; Mbatha and Antrobus 2012; Lahiff 2016, Mbatha 2017; BFAP 2018; Akinola, 2020).

Among the many reasons ascribed to the high failure rate of redistributed commercial farms in South African land reform is the mismatch between the size of the redistributed commercial farms and aspirations of emerging farmers. As a result, several authors have argued for the subdivision of commercial farms before being transferred to emerging farmers (see for example Hall, 2007; Hebinck et al. 2011; Binswanger-Mkhize, 2014; Cousins 2015; Lahiff 2016; Mbatha, 2017; Aliber, 2019; Vink and Kirsten 2019). Land reform farm subdivision has also been raised by the recent report of the Land and Agriculture Advisory Panel [LRAAP] delivered to the presidency (LRAAP 2019).

There are at least three main reasons for the subdivision of farms. Firstly, it is argued that small family farms are more efficient, secondly, small farms generate more employment and thirdly, small farms require less managerial skills than large farms do²⁶ (see van Zyl 1996; van den Brink et al. 2007; Binswanger-Mkhize 2014). However, some authors also argue against the subdivision of commercial farms. Sender and Johnston (2004) argues that the inverse farm size relationship might not apply to the South African context due to the nature and farming competency of small-scale farmers. Basing their argument on the example of sugarcane farms in KwaZulu Natal, Mbowa and Nieuwoudt (1998) warned that subdivision of farms may reduce economies of scale. Olubode-Awosola et al. (2008) voiced concerns on the ability of small farms in meeting the country's food security. While other researchers have reported that the farm income from redistributed farms are too low to support livelihoods of the beneficiaries (see Brown 2000; Anseeuw and Mathebula 2008; Jordaan and Grobler 2011). This implies that

²⁶ However, this depends on the intensity of production, for example, pecan nut production or production of berries requires more skills than raising beef steers under extensive grazing.

income derived from the redistributed farms quoted in the aforementioned studies is not viable for the beneficiaries²⁷.

To date the subdivision hypothesis is yet to be tested partly because such an experiment could put the livelihoods of individuals or food security at risk. In addition to the ethical considerations, such an experiment would also be prohibitively expensive (Binswanger-Mkhize et al. 2009:13). Whilst the hypothesis has not been tested empirically, some theoretical work has been done on the topic. Mbatha (2017:10) argue that subdivision factors will depend on numerous factors such as the type of crop cultivation considered, climate conditions, water availability, technology use and others. Numerous studies have echoed this (see for example, Hazell 2005; Binswanger-Mkhize et al. 2009; Cousins and Scoones, 2010). Zantsi, Mack and Vink (2020 – Chapter 6) have gone a step-further. Firstly, they have determined a viable household income for an emerging farm household and secondly, they have illustrated, using farm enterprise gross margins from commercial farms, how the subdivision factors will differ, between different viable farm incomes of different groups of potential emerging farmers.

In the natural sciences such as physics, chemistry, agronomy it is possible to design an experiment to test a hypothesis, for example the yield response of a crop to different fertiliser application rates (Gilbert 2008). However, such experiments are often difficult if not impossible to do on farm households. Instead, modelling household behaviour could serve as a substitute for a natural science experiment. Kremmydas (2012) argues that the agent-based modelling (ABM) enables researchers to conduct “virtual laboratory experiments” on various policy scenarios. Such models have been used successfully by several studies (see for example Berger et al. 2006; Berger et al. 2017; Appel and Balmann 2019; Möhring and Mann 2020) to test agricultural policy scenarios. Not only does the use of ABMs overcome the ethical and practical constraints of policy experiments but it also enables the estimation of the forecasted outcomes of policy scenarios (Troost and Berger 2014).

This paper seeks to address two critical questions within the subdivision debate. One, what should the subdivision parameters of commercial farms be? This is important because in South Africa there are different agro-ecological zones with different soils and land potential (Acocks 1953), implying different farm incomes on what is produced on such farmland. Further, there are different farming enterprises with different gross margins per hectare. Therefore, a single subdivision parameter would not be suitable.

²⁷ In some instances, this is because too many beneficiaries are allocated in one farm, for example, under the SLAG land redistribution policy (see Kirsten et al. 2016 for a detailed discussion).

And two, what would the structure subdivided farms be, given different subdivision parameters? Will these farms be compatible with aspirations of potential beneficiaries? Addressing these questions will provide policy makers with valuable information to make sound decision whether subdivision of redistribution farms would be worth both in terms of achieving land reform objectives and maintaining a stable commercial farming sector.

This paper proceeds as follows. Section 7.2 provides a review of the agent-based modelling literature. This will be followed by description of the ILUPSA agent-based model and methodology. Section 7.4 discuss the model results and Section 7.6 concludes the paper.

7.2 Agent-based models, an overview

Real-world problems are complex since they arise from the behaviour and interaction of multiple entities be it humans, markets, the natural environment et cetera (Macal and North 2010). This is also the case with agricultural problems where the complexity thereof arises from the heterogeneity of farms, interdependency between actors, dynamic adjustment processes to institutional, social, economic, and ecological events, and path dependency. Conventional modelling tools such as econometric models provide inadequate insight when faced with such complexities since they approach such problems in a linear fashion, which is far from the reality (Happe et al. 2004). Such models also fail to capture the interaction between agents themselves but also the interaction between agents and their environment (Berger 2001; Berger and Schreinemachers 2011). Another shortfall of conventional models is their failure to take the heterogeneity among agents into account when reporting model results, which reflect that of the aggregate and not the individual, thereby generating limited understanding (Nolan et al. 2009). In addition, conventional models fail to trace individual decision making by agents within the model (Berger and Schreinemachers 2011). For example, econometric models only assumes a linear relationship between two variables and more, and shows how each changes when a unit increase in one changes the other variable, but it is not possible to know the individual observation, because variables are aggregated. In response to the challenges with conventional models, ABM have emerged as an attractive option to model real world problems.

7.2.1 Agent based models

Gilbert (2008:2) defines agent-based modelling as ‘a computational method that enables a researcher to create, analyse, and experiment with models composed of agents that interact within an environment’. ABM is a combination of game theory, complex systems, emergence,

computational sociology, multi-agent systems and evolutionary programming. ABMs can be written using a variety of programming languages (Java; C++ etc.) and a number of computer software most notably General Algebraic Modelling System (GAMS) (as used by Möhring et al., 2016) or MP-MAS (as used by Berger et al. 2017). The choice of programming language and software depends on numerous factors such as personal preferences, availability of supporting resources, size of the user community and accessibility (Crooks and Castle 2012).

Because of the ability of ABMs to model real world problems they have been applied across several disciplines, examples include criminology (e.g. Gerritsen 2015), tourism (e.g. Nicholls et al. 2017), transport (e.g. in Bandyopadhyay and Singh 2016), construction and building (e.g. in Lee and Malkawi 2013), geography (Huber et al. 2018), and agricultural economics (e.g. Möhring et al. 2016). Mathews et al. (2007) provide a good overview of the applications of ABMs to problems in agricultural economics. They aggregate the ABM applications into five themes as policy analysis, participatory modelling, and testing hypothesis of land use patterns, testing social science concepts and explaining land use functions as shown in Table 7.1

ABMs have also been used to model policy scenarios in numerous disciplines in South Africa such as the transport industry (e.g. Van der Merwe 2011), in the fishery industry (e.g. Cooper and Jarre 2017), agricultural economics specifically on climate change and food security (Bharwani et al. 2005). Some studies have also applied ABMs to land reform, for example, Woyessa et al. (2008) developed a conceptual model of land use decision on water resource in the Modder river basin in the Free State province while Olubode-Awosola et al. (2008) developed a regional mathematical model for land redistribution for Free State. To date an ABM for the whole of South Africa to test the impact of various land reform policies on land use patterns is yet to be tested.

Table 7. 1: Some of the themes and research question that can be addressed using ABM

Key theme	Research question/objective	References
Agricultural policy analysis	What would be the impact of Mecasur policy on farm households? To test the impact of switching the agricultural policy regime on farm structure	Berger 2001 Happe et al. 2008
Explaining land use functions	To assess land use and ecosystem changes in traditional agriculture To model land use change arising from rural land exchange	Acosta et al. 2014 Bakker et al. 2015
Testing hypothesis	What would be the impact of climate change on household food security? What would be the impact of water pricing on the efficiency of irrigation water use and land use dynamics? Can smallholder farmers adapt to climate change variability and how effective are policy intervention?	Bharwani et al. 2005 Berger 2001; Berger et al. 2010 Berger et al. 2017
Participatory modelling	To build a shared representation of the interaction between rice farming, water availability and labour migration through a participatory ABM	Naivinit et al. 2010
Explaining spatial patterns of land use	To describe a conceptual framework for ABM to analyse and simulate regional land-use change.	Valbuena et al. 2010

Source: Adapted from Mathews et al. (2007)

7.2.2 Appropriateness of ABM for the current study questions

The use of ABMs has clear merits but is it appropriate for the research questions posed in this study? This is the case because of two main reasons:

Firstly, the commercial farms and the potential land reform beneficiaries who are the object of this study are independent entities that interact with each other in an environment, be it

economic, social, and/or physical. Since it can be assumed that they strive to maximize their utility and are heterogeneous as shown in (Zantsi et al. 2021 -Chapter 3), they can be viewed as agents in accordance to Macal and North's (2010) definition.

Secondly, farming and the decision-making associated with commercial and emerging farmers is a complex system since it arises from the behaviour of individuals who interact in the context of their natural environment, institutions, norms, cultural attributes, and policies (Happe et al. 2004). Furthermore, the interactions of emerging farmers are shaped by their aspirations, farming objectives and challenges.

Given that farming in general, and emerging farming specifically, consist of a large number of agents who interact with each other in a complex environment, an ABM as a bottom-up approach is the appropriate analytical model for this study since it addresses the criticisms levelled against the top-down approaches often taken when developing smallholder policies as Binswanger-Mkhize (2014) noted.

7.2.3 Conceptualisation of agent-based decision making

One of the key characteristics of an agent is that they are independent entities who can make their own decisions (Macal and North 2010). To abstract the reality of how the agents may react to certain stimuli i.e. what decisions they would make within a specific situation, a modeller is confronted with a choice on how they will incorporate that in the conceptual model (Crooks and Castle 2012). Troost (2014) argues that agents' decision making can be conceptualised as either rule-based heuristic decision making or goal optimisation orientated rules.

Rule-based decision making is analysed using a decision trees which are constructed from theory or empirical observations of agent behaviour. While the goal-based optimisation consist of mathematical programming that maximise or minimise an objective which is subject to a set of constraints defined as equations. These are also informed by theory and/or empirical observations (Day 2008). These decision-making models can be combined within a single model to form hybrid rule and optimisation decision making systems (see for example Berger 2001).

It is worth noting that by virtue agricultural economists tend to assume utility maximizing behaviour. While this assumption is based on reasonable grounds, in some instances such as in the case of agricultural households, the reality is more complex (Troost 2014). Therefore, one needs a clear understanding of what utility means for the agents studied. For potential emerging farmers studied in the current study, their utility is discussed in Chapter six.

7.3 An agent-based agricultural model for South Africa

This section provides an overview of the agent-based model for South African agriculture (ILUPSA), its' database and details on the decision rules of the agents in the model. The ILUPSA model has two major agent groups as commercial farmers and the emerging farmers who interact with each other, see Figure 7.1. The exiting commercial farmers are the main source of land supply. Commercially oriented homeland smallholder farmers who are willing to move serve as a pool from which beneficiaries for the transferred land can be pulled. Thus, land is transferred from commercial farmers to commercially orientated homeland smallholders who become emerging farmers after beneficiation.

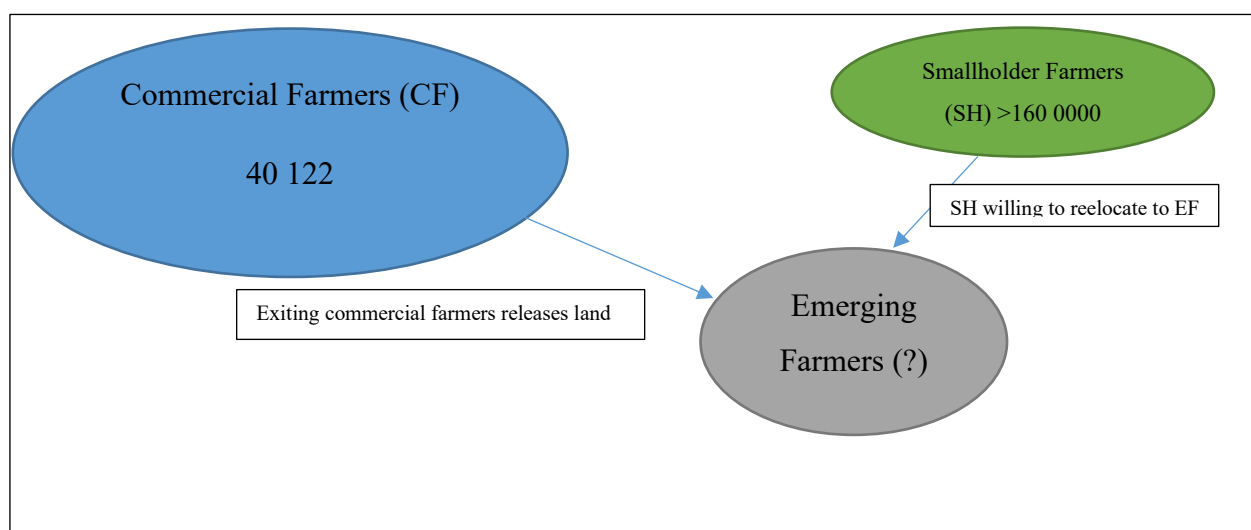


Figure 7.1: Illustration of agent interaction within the ILUPSA model

Source: Own compilation

Note: smallholders were not up-scaled to sectoral level, it was assumed that all the 8% of commercial oriented smallholders reported in StatsSA (2018) would be willing to relocate to commercial farms previously owned by white commercial farmers.

7.3.1 Data and sampling

Multi-agent models such as this one can be provided with data from five main sources, namely sample surveys, participant observation, field and laboratory experiments, companion modelling, or Geographical Information System and remote sensed spatial data (Robinson et al. 2007). The ILUPSA model was constructed using survey data of both commercially orientated smallholders and large-scale commercial farmers.

A total of 833 commercially orientated smallholder farmers were surveyed in three provinces, see Table 7.2. These were chosen because they had the highest share of smallholders in the country (StatsSA 2016; Aliber et al. 2009). Individuals were targeted through extension officers, farmer organisations (e.g. African Farmers Association of South Africa) and commodity organisations (e.g. BKB). To qualify as a commercially orientated smallholder and thus be interviewed for this study, individuals had to sell at least 20 per cent of their produce.

Table 7. 2: Smallholder farm distribution across different districts and provinces

Eastern Cape	<i>n</i>	KwaZulu-Natal	<i>n</i>	Limpopo	<i>n</i>
Amathole	175	Umkhanyakude	125	Vhembe	89
Chris Hani	120	King Cetshwayo	80		
OR Tambo	84	Harry Gwala	56		
		Zulu Land	104		
Total	379	Total	365	Total	89

A total of 939 large-scale commercial farmers were surveyed nationally using an online survey. The survey requests were sent via direct emails or through local/national industry organisations. As shown in Table 7.3 this voluntary participation did not yield a balanced sample since 49% of surveys was collected in the Western Cape whilst the province only constitutes 17% of producers nationally based AgriSA membership data (AgriSA 2018). To overcome this uneven distribution, an upscaling was done to align the surveyed share with the ideal share. This was achieved by duplicating agents at random in provinces other than the Western Cape until the ideal share was achieved, thereby bringing the total number of commercial agents in the model to 2629. The model was also up-scaled with respect to the number of farming units, total employment, aggregate income and area to reflect the national averages as reported in the most recent agricultural census (StatsSA 2020). Thus, each of the 2629 agents were multiplied by a weight so that they reflect the national total of the aforementioned aggregates.

Table 7. 3: Distribution of commercial farm sample

Province	Count	Actual share	Ideal share	Agents added to get to ideal share	New total
Limpopo	68	7	7	120	188
KwaZulu Natal	139	15	9	90	229
Mpumalanga	61	6	9	170	231
Western Cape	464	49	17	0	464
Eastern Cape	104	11	10	150	254
Gauteng	10	1	4	100	110
North West	24	3	12	290	314
Northern Cape	38	4	13	300	338
Free State	31	3	19	470	501
South Africa	939	100	100	1690	2629

In addition to capturing variables on farm structure and production attributes, both the smallholder and commercial questionnaires also captured qualitative indicators on the farmers themselves. This included indicators such as demographic information, risk attitude, perceived opportunities and threats, aspirations, succession planning and others. For example, smallholders were asked, if they were willing to relocate to commercial farms and if so, how much land they will need and what would they farm, when relocated to these commercial farms. Whilst, for commercial farmers the question was whether they are planning to sell their farms, or a portion thereof, in the near future and if so, what portion would they be willing to sell?

7.3.2 Modelling production decision of farm agents

The structure of commercial farm agents, which are the principal supplying agents for land to emerging farms, consisted of multiple enterprises produced in each farm. Emerging farmers were assumed to take over the existing production activities as is currently done in the SLLDP and PLAS (DRDLR 2013).

A goal optimisation orientated rule was used to model agents' production decisions based on the ILUPSA objective. The objective of the ILUPSA model was to maximise income as shown in Equation 7.1, given the set of constraints outlined in Equation 7.2 and Equation 7.3. The resource-constraint balanced equation, controlling the model to optimise production at the capacity of available resources for resources and constraints is shown in Equation 7.4. This

objective of the model of income maximisation was mimicking the objectives of the surveyed farmers (agents), both commercial and commercial oriented smallholders. In the survey questionnaires both these types of farmers were asked what their main farming objective and a majority wants to generate income, hence the income maximisation objective of the ILUPSA model.

$$\begin{aligned} \text{Max } INCOME_{a,t} = & \sum_g p_{a,g} * LAND_{a,t,g} + \sum_l p_{a,l} * ANIMAL_{a,t,l} + \sum p_a * Funding_{a,t} \\ & - COSTFUNCTION_{a,t} \end{aligned} \quad (7.1)$$

subject to

$$\sum_g \omega_{a,g,w}^{LAND} * LAND_{a,t,g} \leq Area_{a,t} \quad (7.2)$$

$$\sum_l \omega_{a,l,w}^{ANIMAL} * ANIMAL_{a,t,l} \leq Grazing Area_{a,t} \quad (7.3)$$

$$\sum_f \omega_{a,f,w}^{LABOUR} * LABOUR_{a,t,f} * LAND_{a,t,g} + LABOUR_{a,t,f} * ANIMAL_{a,t,l} \leq LABOURCAP_{a,t} \quad (7.4)$$

7.3.3 Modelling exit decision of commercial farm agents and bidding process

The agent commercial farmers' exit decisions and the agent emerging farmers' entry decisions were modelled using a rule-based heuristic decision-making process. This process can be summarised as follows. When a piece of land becomes available under the redistribution program, two agents compete for the land. The first agent is a commercially oriented smallholder selected randomly from the pool 462²⁸ who are willing to relocate to a land redistribution farm and the second agent is selected randomly from the non-exiting commercial farmers. Thus, if a commercially oriented smallholder wins the bid an emerging farm is created and if a commercial farmer wins the bid the parcel is incorporated into his/her existing land holding. The winner of the bid is the bidder who can achieve the highest potential farm income on the vacant land parcel (emerging farm). The highest income change of the bidders is determined by optimising the existing production function of both the bidding farmers or agents (commercially oriented smallholder and a commercial farmer). In doing so production function of the bidding farmers, one-at-time are substituted in the production function of the vacant farm (emerging farm). After optimising the production, the outcomes are

²⁸ Smallholders were not up-scaled to the sectoral level. Based on the data of smallholders willing to exit, it was assumed that there will be another 57% smallholders willing to relocate from the 8% of 2.2 million commercial oriented smallholders (StatsSA 2018).

compared and the bidder with highest income change wins. For commercially oriented smallholders the shadow yields are used to substitute to the production function of the vacant farm (emerging farm) as shown in Equations 7.5 and 7.6 below. These commercial oriented smallholder shadow yields are computed as average yields per hectare for maize²⁹ (γ) and off-takes per herd in livestock (δ).

$$Yield\ Crop_{Emerging\ Farm} = Yield\ Crop\ Commercial\ Farm_{exit} \times \gamma \quad (7.5)$$

$$Yield\ Livestock_{Emerging\ Farm} = Yield\ Livestock\ Commercial\ Farm_{exit} \times \delta \quad (7.6)$$

Baseline (or current) farm income of the bidding commercial farmer, as done for smallholders, is compared with his or her farm income after optimisation within the production function of the available emerging farm. This is done by substituting such average crop yield and livestock off-take as beta and alpha values in equation 7.7 and equation 7.8 below.

$$Yield\ Crop_{Bidding\ commercial\ farmer} = Yield\ Crop\ Commercial\ Farm_{exit} \times \beta \quad (7.7)$$

$$Yield\ Livestock_{Bidding\ commercial\ farmer} = Yield\ Livestock\ Commercial\ Farm_{exit} \times \alpha \quad (7.8)$$

$$Yield\ Livestock_{Bidding\ commercial\ farmer} = Yield\ Livestock\ Commercial\ Farm_{exit} \times \alpha \quad (7.8)$$

This process is repeated each year of the eight years simulated in the model, until the maximum of 2 per cent (about 800 farmers a year) exiting rate of commercial farms is achieved for each year.

7.3.4 Technical implementation

Various specialized software and programming languages can be used to execute ABM models (see: Nolan et al. 2009; Macal and North 2010). This study used the General Algebraic Modelling System (GAMS) for the implementation of the single farm optimization models of commercial and smallholder farmers, this was lined to a JAVA module that executed the bidding process and enabled the implementation of the policy scenarios. Given that the complexity of the model and the need for transparency and reproducibility, an ODD (Overview, Design concepts, Details) protocol was constructed in accordance to the framework proposed by Grimm et al. (2006), it is presented in Appendix 2.

A user interface for the model was also constructed in JAVA, a screenshot of which is shown in Figure 7.2. As shown the interface shows a list of parameters that can be changed, the values

²⁹ Only maize yields were used as proxy for all crops (cabbage, spinach and potatoes), because a vast majority of smallholders produced maize.

of the parameters and right-hand side shows data type of the parameter. A set of parameters can also be saved as a scenario using the box on the top right corner.

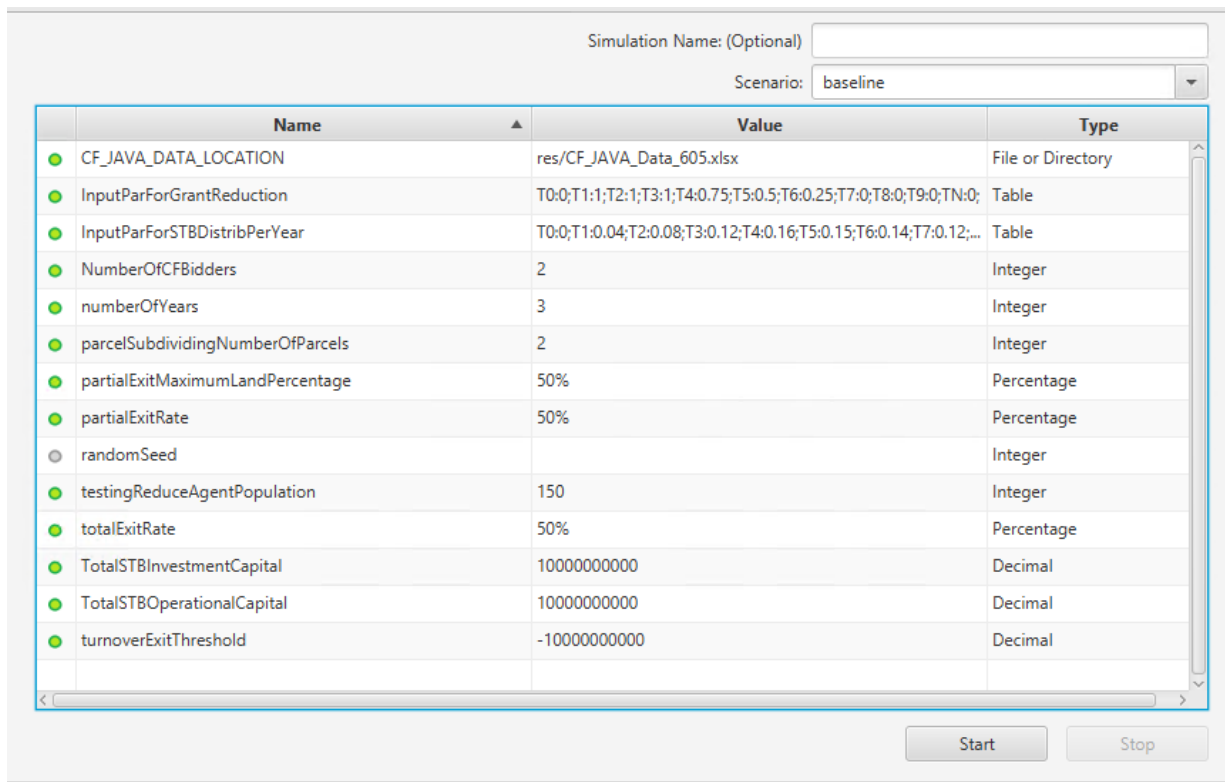


Figure 7.2: Snapshot of how simulations were executed in JAVA

7.3.4 Subdivision scenarios

The existing literature on subdivision (e.g. Kirsten and van Zyl 1998; Aihoon et al. 2007) warns against using physical farm size to determine a viable farm size for smallholder farmers. Instead, they propose the use of farm income to determine a viable farm size for emerging farmers. Zantsi, Mack and Vink (2020) addresses this issue by applying an income aspiration approach to determine a viable farm size for emerging farmers using smallholder dataset used for modelling emerging farmers used in the present study. Since income aspirations could not be used as an explicit subdivision parameter in the model, it was decided to use viable farm size typologies determined by Zantsi, Mack and Vink. (2020), refer to Chapter 6 for details.

The subdivision process within the ABM model is summarised in Figure 7.3. In the first step, commercial farms that become available are acquired by the State. Hence, a “willing seller-willing buyer” approach is assumed – as is currently the case with Proactive Land Acquisition Strategy and the State Land Lease and Disposal Policy (DRDLR 2013). The results of the commercial survey showed that only two per cent of commercial farmers were planning to sell

their farms, hence the model has a two percent exit rate. However, some of the farmers were planning/willing to sell no more than half of their farms, hence the effective exit rate is less than two percent. Farms purchased by the state can then be allocated to deserving commercially orientated homeland smallholders to create emerging farmers. This reflects the current land reform process (see Lahiff 2016), but this is where the similarities between the current reality and the model stops.

The second step takes place after the acquisition of the land by the state but before the selection of beneficiaries. This step involves the subdivision of land parcels into viable farm sizes as determined in Chapter 6.

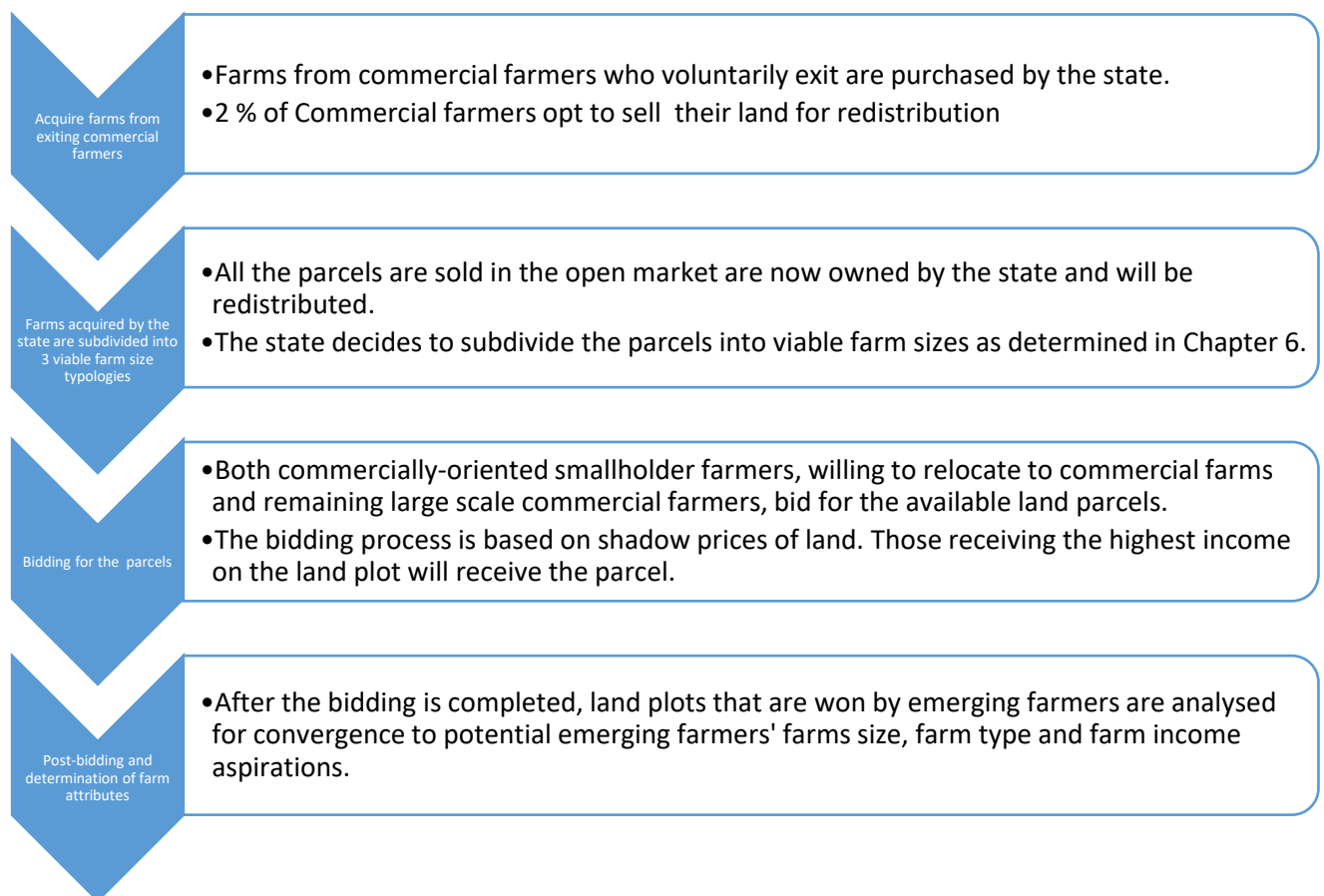


Figure 7.3: Model conceptualisation

Source: Own compilation

The third step involves the bidding process wherein a smallholder and a commercial farmer competes for the newly subdivided land parcels based on the land shadow prices achieved on their existing entities as discussed in Section 7.3. In the fourth and last step farms that are won by commercially-oriented smallholders are selected by default and analysed (see next section).

The analysis mainly focus on farm characteristics such as farm size, farm income and farm enterprises.

7.4 Results

This section presents the results of the eight year run of the ILUPSA simulation model assuming a farmer exit rate of two percent and all farms that become available are subdivided into viable parcels as determined in Chapter 6 before the bidding starts.

7.4.1 Land redistribution

Given the assumptions assumed in the ILUPSA model, the model results indicates a distribution of 10.6 million hectares or 14 percent from commercial to emerging farmers, the cumulative breakdown of which is shown in Figure 7.4. This result is the same irrespective of the subdivision factor used. To put the distributed land in context, a total of 8.6 million hectares have been redistributed as part of the land reform programme and an additional 2.3 million hectare has been acquired by the State for distribution since the inception of the land reform programme in 1994. Given that there is 77.6 million hectares of commercial farmland under free hold, the transferred and acquired land translates to 11.1 and 3 per cent respectively (Vink and Kirsten 2019).

This fourteen percent of redistributable land over a seven year period suggest that there will be a gradual land redistribution opposed to the radical land redistribution proposed by political parties such as the Economic Freedom Fighters. Several researchers supports this form of land redistribution as it allows the sector to recover as few emerging farmers enter. It also has little destruction to the production and therefore it may not jeopardise food security (Cousins 2015; Mkhabela et al. 2018; Mukarati et al. 2020).

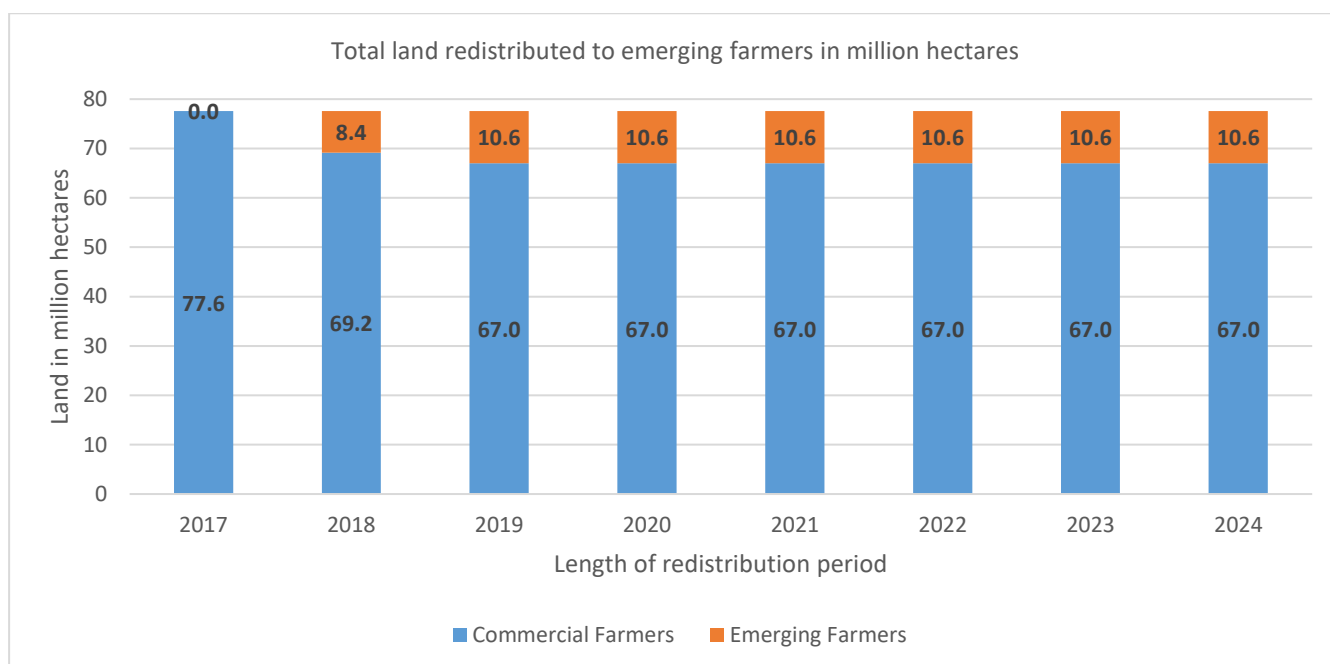


Figure 7.4: Land redistributed to emerging farmers under voluntary exit

Source: Own calculations

It is also worthwhile to reflect this redistributed amount of land on current government land redistribution targets. In the National Development Plan [NDP] it is proposed that the state should redistribute 20 per cent of agricultural land in each district of the 44 district municipalities that exist in the country by 2030 (NPC 2011). Given the available land on the ILUPSA model simulation, this would mean that to achieve the NDP target, each district would have to redistribute about 240 909 ha in this period. However, this 14 per cent of agricultural land is not uniformly distributed across provinces. Since potential emerging farmers as beneficiaries of this land are not equally distributed across the country (see e.g. StatsSA 2016, 2018), it is important to look closer at the distribution of this land across provinces.

The provincial breakdown of the simulated distribution to emerging farmers is presented in Figure 7.5. The North West (NW) makes more land available for redistribute while Limpopo have the least land available for redistribution. Gauteng does not have any land for redistribution, implying that there were no willing sellers. The land availability for redistribution does not converge with the location of prime beneficiaries – commercially-oriented smallholders because, provinces that have higher numbers of small-scale farmers - the Eastern Cape, Limpopo and KwaZulu Natal (StatsSA 2016), have relatively little land available for redistribution. These results underscores the necessity of beneficiary relocation to other provinces (Lahiff 2005; Bunce 2020a). Factors that predicts the willingness to relocate include

age, education, number of hired labourers and have been extensively covered in Chapter five (Zantsi et al. 2020a).

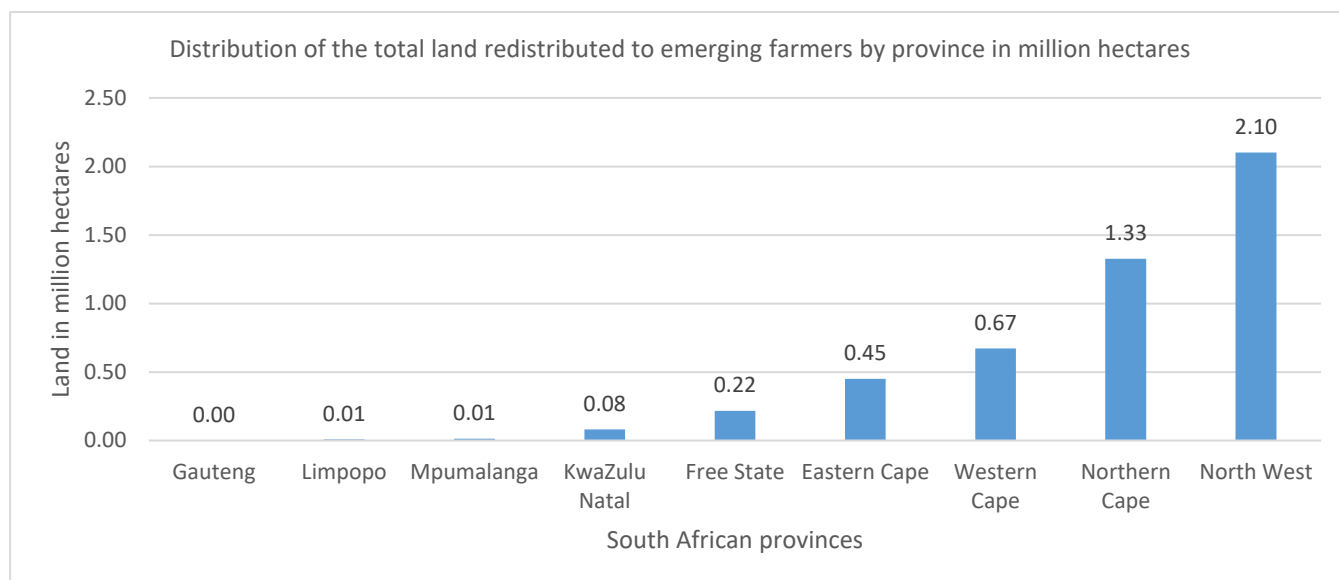
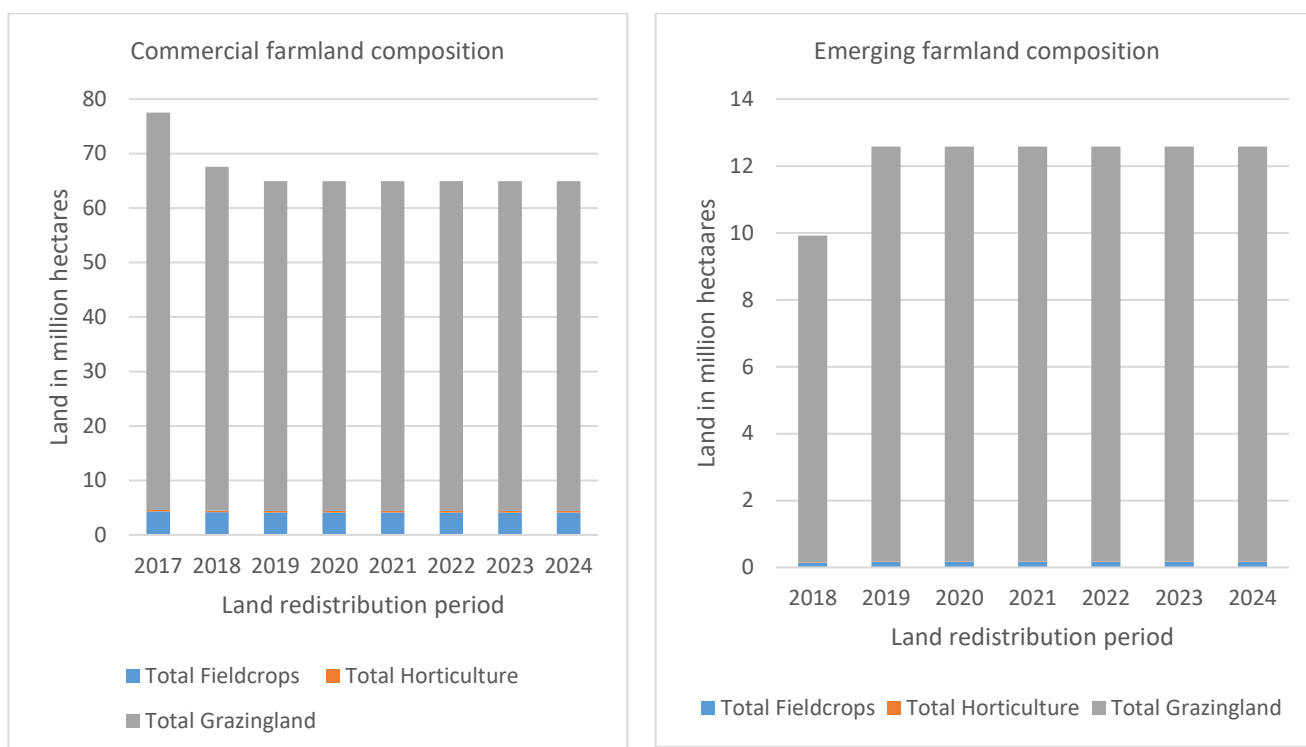


Figure 7. 5: Distribution of emerging farmland by province in 2024

Source: Own calculations

7.4.2: Composition of farmland that becomes available for redistribution

The farming activity composition of commercial farmland (Panel A) and the simulated distribution to emerging farmers (Panel B) is shown in Figure 7.6. In commercial farming the land used for grazing, field crop and horticulture constitutes 36.8, 7.44 and 0.307 million hectares respectively at the start of the model period and 30.8, 7.09 and 0.301 million hectares respectively at the end of the model period. In comparison, the simulated shares of land dedicated to grazing, field crop and horticulture by emerging farmers is 1.1, 0.127 and 0.008 million hectares respectively during the first year (2018) and 5.9, 0.338 and 0.01 per cent respectively by the last year (2024). Of the redistributed land, grazing land constitute the largest share (17 percent), followed by field crop land (5 percent) and horticultural land had the least share (2 percent). These results resonates with the reported trend by previous studies, which have reported that most redistributed farms tend to be livestock farms (see e.g. Mtero et al. 2019; Netshipale et al. 2017; DRDLR 2015). Furthermore, these results imply that commercial farmers are rational entrepreneurs, they are willing to sell land that has poor potential of making higher income and keep land that gives high returns.



Panel A: Commercial farms

Panel B: Emerging farms

Figure 7. 6: Comparing the distribution of farmland between farmer types

Source: Own calculations

It is worth mentioning that the simulated emerging farmer results are in step with the aspirations of the pool of commercially orientated homeland farmers from which they are drawn in the sense that 27 % indicated that they would prefer to pursue livestock farming as land reform beneficiaries, with 56% and 15% indicating that they would like to pursue field crop and vegetable production respectively (see Zantsi, 2019). These results also resonate with current land redistribution predictions, which suggest that land redistribution should focus on farm enterprise that have high potential of creating local employment while building from smallholder farm activities and aspirations (see Cousins et al. 2020).

7.4.3: Farm numbers created on the redistributed land

The redistributed land must be contextualised in terms of the number of emerging farms created as suggested by several authors (e.g. Aliber 2019; Conradie 2019; Cousins et al. 2020). The number of emerging farms created under the baseline scenario using respective viable farm sizes as subdivision factors are shown in Figure 7.7. At a national level, in the baseline scenario, only about 4227 farms are created, while for low and moderate aspirant emerging farms, the number almost doubles that of the baseline scenario. This implies that by subdividing farms according to beneficiary aspirations, the land redistribution can benefit double the number of commercially oriented small-scale farmers than it would be the case when farms are not

subdivided. This will also ensure that the land is used productively and efficiently as it has been reported that some emerging farmers tend to use only small portions of their farms due to lack of post-settlement support and finance from their own pockets (Kirsten et al. 2016). Contrary to this evidence, with appropriately sized farms some beneficiaries can be able to finance production from their own pockets as argued by Lyne and Ferrer (2006). To shed more light on farm numbers, it is useful to reflect the model results to the number of commercial farms.

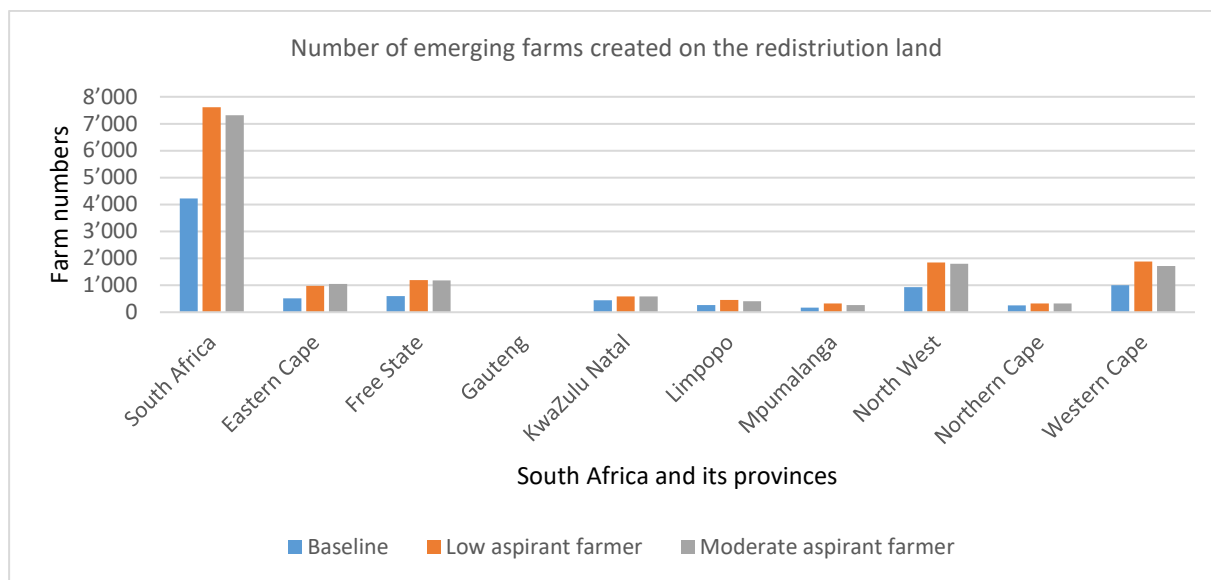


Figure 7. 7: Distribution of emerging farms from the aspirational subdivision factors

Source: Own calculations

Table 7.4 below show the number of emerging farms created on the redistributed land based on farm subdivision factor. On a national level, under baseline scenario, only 4 227 emerging farms are created, representing 11% of total commercial farms in South Africa. The number is almost doubled when a subdivision factor of low aspirant emerging farmers is used and it becomes 18% if moderate aspirant viable farm size is used as a subdivision factor. For provinces this trend does not change significantly. The important finding here is that when farms are subdivided by the viable farm income threshold or subdivision factor, a significant number of farms are created, which can benefit a more number of smallholders.

Table 7. 4: Distribution of the number farms created from the redistributed land using viable emerging farm size as a subdivision factor

South African provinces	Number commercial farms	Baseline		Moderate aspirant farmer	
South Africa	40122	4227	11%	7311	18%
Eastern Cape	4214	514	12%	1045	25%
Free State	7951	604	8%	1177	15%
Gauteng	1804	0	0%	0	0%
KwaZulu Natal	3103	447	14%	583	19%
Limpopo	3054	260	9%	406	13%
Mpumalanga	2823	175	6%	262	9%
North West	4921	926	19%	1800	37%
Northern Cape	4829	249	5%	322	7%
Western Cape	6937	1008	15%	1715	25%

Source: Own calculations

In all scenarios, the North West and the Western Cape create more number emerging farms followed by the Eastern Cape and the Free State. Gauteng, Mpumalanga and the Northern Cape create the least emerging farms (see Figure 7.7 and Table 7.4). Both the provinces that creates high number of emerging farms and least number of emerging farms do so in both absolute values and as a share of the total number of commercial farms in the country (Table 7.4). Firstly, these results underscores the issue of relocation from beneficiaries (Lahiff 2005; Zantsi Mack and Mann 2020). According to the 2016 Agricultural Household Survey, a majority (about 60%) of small scale farmers, which are the pull from which land reform beneficiaries are selected, are from the Eastern Cape, KwaZulu Natal and Limpopo (StatsSA 2016). However, based on the results presented in Figure 7.7, only the Eastern Cape among the three provinces that have high number of smallholders seem to have more number of emerging farms.

Secondly, these results also shed light on the suggestions made by several authors, of creating a variety of farm sizes to meet land demand of different types of smallholders (see for example, Low et al. 1999; Lyne 2014; Conradie 2019). Based on the land demand by different categories of smallholders, Aliber (2019) recommends making smaller farms for settlement and small-scale farming more available and allocating few larger farms to capitalist potential black commercial farmers. Indeed, the decision on which subdivision factor should be guided by land size demand and income aspiration of the beneficiaries. In this study context, capitalist farmers could be associated with high aspirant emerging farmers, while low and moderate aspirant could fall under the smallholder category in Aliber's (2019) classification (this will again be discussed in the next sub-section Figure 7.8). However, land demand among potential emerging farmers is also affected by geographical location (Zantsi 2020). A factor noted in the Land Reform and Agriculture Advisory Panel report. According to LRAAP (2019:55) land demand, or need, is differentiated and geographically distinct – people in different areas need different types of land in various sizes, for different purposes.

7.4.4 Average farm size

Several authors have suggested that redistributed farms should be subdivided into emerging farmer appropriate units (Aliber 2019; Conradie 2019; Cousins et al. 2010). The average aggregated farm size created through each of the subdivision scenarios is shown in Table 7.5.

Table 7.5: National and provincial distribution of emerging farm size in 2024

Average Farm Size (ha)			
	Baseline	Low aspirant farmer	Moderate aspirant farmer
South Africa	5770	2939	2998
Provinces			
Eastern Cape	873	441	431
Free State	357	176	166
Gauteng	0	0	0
KwaZulu Natal	182	135	129
Limpopo	35	20	22
Mpumalanga	78	36	40
North West	2271	1037	1030
Northern Cape	5327	3822	3530
Western Cape	667	304	391

Note: in Gauteng no land is redistributed to emerging farmers, hence the zero median farm size

Source: Own calculations

At a national level under the baseline scenario, the average emerging farm size is huge, more than double the average of existing commercial farms of 2000ha (Liebenberg 2013). It declines to almost half of the baseline scenario for low and moderate aspirant emerging farmers. The reason for the huge emerging farm size is twofold. Firstly, because it includes farms in the Karoo, where farm size is generally big. Secondly, there is a huge gap between the smallest and biggest farm in our data.

It is acknowledged that appropriate farm size from the subdivided redistribution land would differ according to geographical location and farm enterprise (see LRAAP 2019; Cousins et al. 2020). In an attempt to understand this difference, farm size on provincial level is reported as well. In this regard, only the Northern Cape and the North West resembles the farm size of the national level under the baseline scenario. Further in all provinces there is a small gap between the low aspirant and moderate aspirant emerging farmer. In the Northern Cape and North West provinces, livestock and game farms account for a largest share of agricultural land. For example, in the Northern Cape more than 40 per cent of agricultural commercial farmland is

devoted to livestock and game farming (StatsSA 2020). With the exception of the Eastern Cape and the Western Cape, farm size in all other provinces is less than a quarter of the average commercial farm estimated in Liebenberg (2013). Mpumalanga and Limpopo have the smallest farms. However, these results of the farm size presented in Table 7.5 are aggregated and obscure to disaggregate these results, in the following Figure 7.8 reports the number of viable farm size by industry.

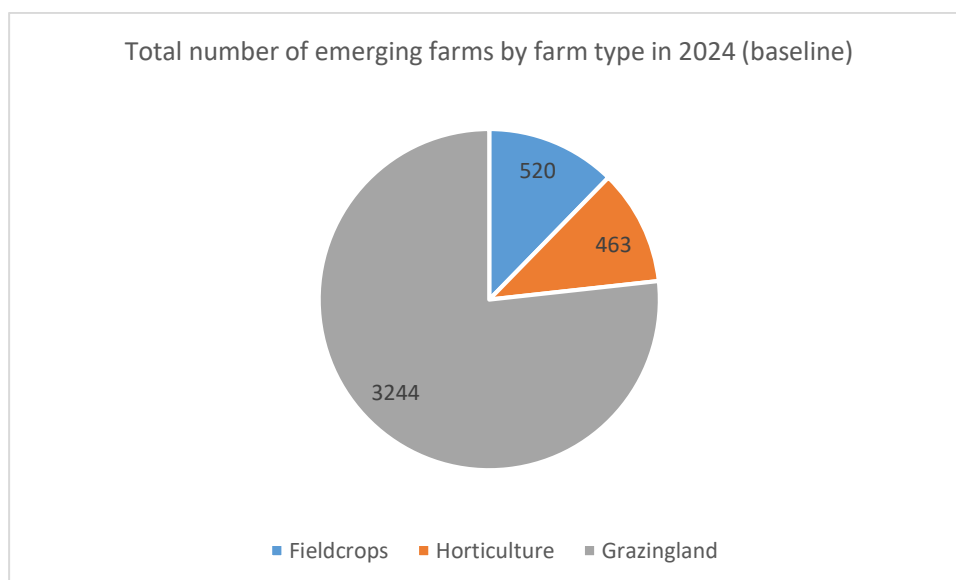


Figure 7. 8: Total number of emerging farms by farm type in 2024

Source: Own calculations

From the 10.6 million hectares of land that is redistributed to emerging farmers, when this land is subdivided into the viable emerging farm sizes determined in Chapter 6, a total of 4226 farms can be created. This number of farms is 1544 less to the total under the baseline when average farm size is used. This difference is due to the fact that when considering the average, farm type (enterprise), which determines viability is partially considered. However, similarly to the aforementioned scenario, grazing land constitute a large share (77%) while field crop and horticultural farms make up 12% and 11% respectively. Please note that a viable farm size was not calculated for mixed farms.

7.4.5: Livestock and bird enterprise on the emerging farms

As stated earlier, 99 per cent of farmland redistributed to emerging farmers is intended for grazing animals, Table 7.6 below present distribution of the livestock farm activities practiced in these farms. At most, chicken raised for meat, sheep raised for meat and cattle constitute major production in the emerging animal farms (Table 7.6).

Table 7. 6: Composition of livestock categories and birds raised on the emerging farms in 1000 livestock units

Animal and bird categories	2018	2024	Difference between 2024-2018
Cattle	24562	33989	9427
Goats	2612	2612	0
Ostriches	12454	12454	0
Pigs	0	0	0
Broilers	213002	265358	52356
Hens	1	7	6
Sheep Meat	49521	56824	7303
Sheep Wool	8773	9801	1027

Source: Own calculations

If compared to the enterprise aspirations of commercially orientated reported in Chapter 4 and shown in Table 7.6, the model results slightly differ from the aspirations. Rearing small ruminants and planting maize were cited as the major aspirations of potential emerging farmers willing to take over commercial farms (see Chapter 4). Cousins et al. (2020) see great potential in small ruminant farming for land reform beneficiaries as a compatible plan for employment creation and dealing with effects of climate change. Coming to the reality of the model results, farming with broilers could be an attractive farming activity for full-time emerging farmers, particularly those without off-farm income, since broilers provide frequent income than for example, small ruminants reared for meat and wool. Broiler income is earned weekly, when cycle rotation is practiced, since the production cycle is shorter (Louw et al. 2017). While the ILUPSA did model markets, however, it assumes that emerging farmers would take over the markets of exiting commercial farmers³⁰. A challenge however, could arise on the subdivided parcels, where efficiency gains could be lost due to scale. Louw et al. (2017) found that although small-scale broiler incurs high input costs but they received higher incomes by selling live birds. Assuming that emerging farms will take over markets of the former commercial farmers might pose problem of scale efficiency. Even grouping or giving the parcels to a number of emerging farmers (as Louw et al. 2017 suggests), will struggle to retain scale efficiency for at least two reasons. Firstly, the emerging farmers are inexperienced in commercial farming (and farming at formal and larger scale) and secondly, international competition in the broiler industry is tight even for current experienced commercial farmers. Supplying government entities could be one possible solution (Cousins et al. 2020).

³⁰ The analysis acknowledge the difficult of access to markets for emerging farmers, but this is beyond the scope of this study. Cousins et al. (2020) suggests procurement strategies such as emerging farmers supplying schools for the nutrition program and hospitals.

7.4.6: Median Emerging Farm Income

It is often stressed that the land redistributed farms generate too little incomes to support the beneficiaries (see e.g. Brown 2000; Anseeuw and Mathebula 2008; Jordaan and Grobler 2011). The present study analysed farm income on the land redistribution farms to test this claim. The simulated median gross margin³¹ by farmer group and subdivision factor is illustrated in Figure 7.9. As expected the subdivision of farms does not only have an impact on the number and size of farms created, but it also has an impact on the potential income that the subdivided parcels can generate. Results suggest that when redistribution farms are not subdivided they have higher median income than when subdivided by viable farm sizes as aspired by emerging farms albeit not differentiated by farm enterprise or farm type. The low emerging farm income can also be attributed partly to the fact that emerging farmers get land of poor quality, grazing land (see Figure 7.6). The other reason for the low farm income is the drop in productivity on the redistributed farms because emerging farmers will take time to adapt to their new context and learn new management skills. As such, the model assumes a 49 per cent drop in productivity as emerging farms settle in the new environment (Rincón Barajas 2020). Using mathematical models and other simulation tools, previous studies have predicted similar drop in productivity and reduced supply of food due to this lag (Olubode-Awosola et al. 2008; Mkhabela et al. 2018; Rincón Barajas 2020; Mukarati et al. 2020; Adamopoulos and Restuccia, 2020).

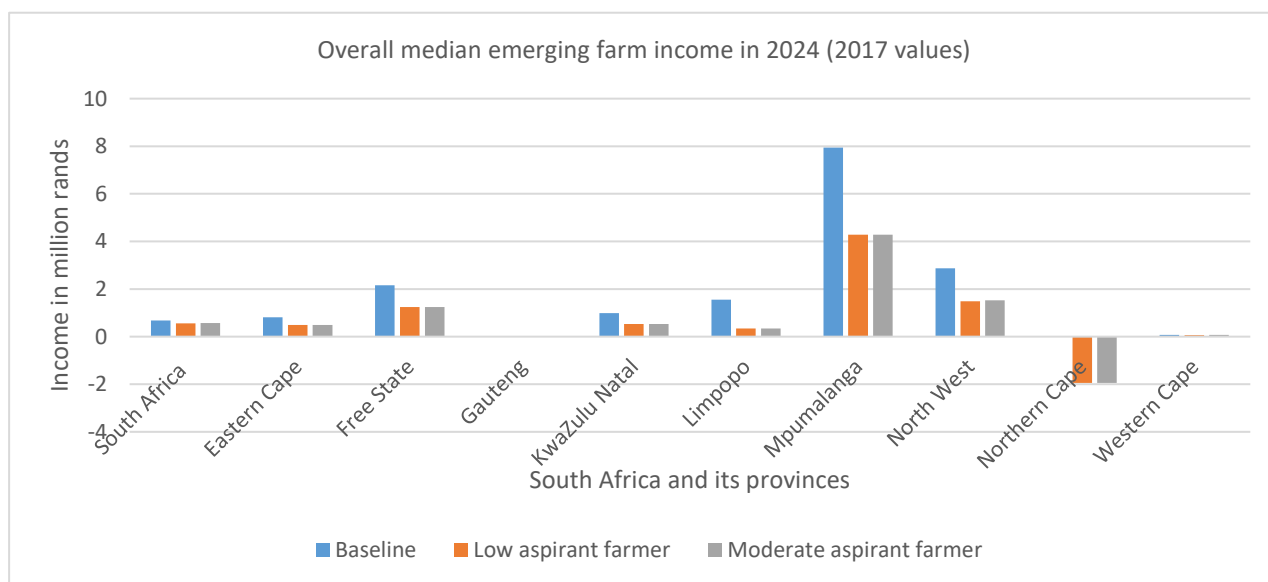


Figure 7. 9: Distribution of commercial and emerging farm incomes per farm

³¹ This is gross income minus directly allocable variable cost which include: labour, repair and maintenance, fertilizer, seed, irrigation, chemicals, marketing, fuel, purchases). All in 2017 values.

Source: Own calculations

From a provincial perspective, Mpumalanga, and the North West have the highest simulated median gross margin, while the median margins for KwaZulu Natal, Limpopo and Eastern Cape is 8,5, 9 times lower than that of Mpumalanga, respectively (see Figure 7.9). The Northern and Western Cape provinces show negative median margins. The disparities between the median incomes can be attributed to both the drop in productivity and farm enterprise produced on the farms. According to the latest commercial farm census, the Northern Cape has 45% of the South African grazing land area, where livestock and game farms are suitable. According to BFAP (2018) gross margin enterprise estimations, extensive livestock farms (cattle, sheep and goats) have lower gross margins per hectare relative to horticultural farming enterprise and field crop enterprises (BFAP 2018; StatsSA 2020). Western Cape has mainly horticultural farm enterprises and few livestock due to the climate of the province and thus it has few redistribution farms or land, hence the low income.

7.5: Discussion and Conclusion

The objective of this study was to explore the impact of three subdivision scenarios on the redistribution of commercial farmland to emerging farmers. The available land for redistribution was subdivided by three viable farm size thresholds determined in Zantsi et al. (2020 - Chapter 6). A further objective was to analyse characteristics of the subdivided farms – farm size and farm income for compatibility to potential emerging farmers' aspirations. A novel agent-based model for South Africa (ILUPSA) that is based on a 605 commercial farm survey and 833 commercial oriented smallholder survey was used to achieve these two objectives, where the simulation scenarios were run.

Based on the willing seller-willing buyer (voluntarily exit) as commercial farmers indicated on the survey, it was found that only a total of 10.6 million hectares (14 per cent of the commercial farmland) was transferred to emerging farmers. Most of this land is used for grazing (99 percent) and the remainder allocated to cropland and horticultural emerging farmers. Furthermore, the transfer of grazing land is in step with the aspirations commercially orientated homeland smallholder farmers, as the target group for the creation of emerging farmers in this study, who wants to farm small ruminants and to lesser extent maize (see Chapter 4). Farms that become available are in other provinces (such as North West, Northern Cape and Western Cape) that have rather low density of smallholders and this emphasize

relocation of some of the beneficiaries who will take over the farms. While 14 percent of commercial farmland over seven-year period is not a very small figure, the radicalists debate on land reform pace (e.g. EFF) may think it is not enough, given the on-going considerations on land expropriation (see e.g. DALRRD 2020). However, in any case, the budget for land reform may need to be topped up, given the fact that even, in the current state (slow pace), post-settlement support is a challenge (Aliber 2019). These results provide a simplistic, but empirical founded illustration, which suggests that, if a systematic procedure of redistributing land can be followed, more realistic targets of redistributing commercial farmland could be possible to achieve. This systematic procedure followed in the ILUPSA model can potentially improve land redistribution planning, which is one of the greatest challenges confronting the program at the moment (see e.g. LRAAP 2019; Cousins et al. 2020). For example, in each seven-year period, a 14 per cent of commercial farmland can be redistributed to at least 4 227 and at most 7 608 emerging farmers, depending on the farm sizes desired.

Subdivision of redistribution land into viable farm sizes as aspired by potential beneficiaries indeed show remarkable differences in farm numbers, size and farm income in relation to the aspirations of prime beneficiaries of land redistribution. Low aspirant emerging farmers' exempt creating of relatively smaller and many farms in high gross margin farm enterprises, such as orchards. While moderate aspirant viable farm sizes and un-subdivided farm needs more land hectares respectively. The latter imply that only a few emerging farmers can benefit, although evidence suggests that small-scale farmers wants smaller farms (Aliber et al. 2006b; Zantsi 2019). Further, it is worth noting that the difference between the viable emerging farm size on average and per farm enterprise have an influence on the number of emerging farms created. Emerging farm number is low when viable farm size by enterprise is considered and slightly higher when it is not considered. This difference underscores the sensitivity of farm income to farm subdivision than physical farm size, which was stressed out in previous studies (e.g. Kirsten and van Zyl 1998; Mbatha 2017).

Overall, this study has made contribution to the literature as it is the first to use agent-based model to experiment subdivision of commercial farmland. This contribution is in line with the current policy questions as recommended by the LRAAP and the pressing need from scholars to subdivide commercial farms available for redistribution to emerging farmers (see Hebinck et al. 2011; Aliber and Cousins 2013; Cousins 2015; Aliber 2019; Vink and Kirsten 2019). Based on the findings of this study, it seems sensible to suggest that redistribution land should be subdivided based on beneficiary aspiration through viable farm size in order to have more impact i.e. to redistribute more number of appropriate farm sizes which can support livelihood and are relatively easy to manage. For instance, if the government wants to create smaller

farms and less medium farms, it would be imperative to use moderate and low aspirant viable farm sizes as subdivision factors. This will corroborate suggestions made for example by Lyne (2014), Aliber (2019) and LRAAP (2019).

While this study generated some insights on how commercial farms can be subdivided using viable emerging farm size as subdivision factors, more still needs to be done. To start with, a systematic support for emerging farmers would be needed as well as appropriately designed agricultural extension would be required and thus further studies can expand in this direction. There are also further limitations and cautions that need to be considered before utilising the findings of this study. Firstly, of course, subdivision of farms is not as simple as what is simulated in the ILUPSA model, for example, a broiler farm building or a dairy farm milking parlour, cannot be physically subdivided into four equal parcels. Secondly, the model only assume subdivision of land and livestock units. In such cases, a co-rental sharing or ownership arrangements should be done. Alternatively, such farms should be retained as they are (undivided) to cater for high aspirant emerging farmers (Zantsi et al. 2020-Chapter 6). As it is suggested that land redistribution will need to have a range of farm sizes to meet different needs of potential emerging farmers wanting land (Aliber 2019). Thirdly, it will not be possible to subdivide farms by integers in some instances. Typical cases include commercial farms separated by railway lines, national roads and where dam points are all in one side of the farm will pose difficulty, as Vink and Kirsten (2019) pointed out. Fourthly, re-allocation and distribution of water rights will also have to be attached to the farm subdivision. Currently there seems to be a delay of transfer of water rights, with a disconnection to land transfer (Bunce 2020a; Cousins et al. 2020). Finally, the scope of the current study did not involve land tenure, as suggested by Aliber (2019) and Cousins et al. (2020) different tenure arrangement should be given to the beneficiaries based on their aspirations. However, giving beneficiaries full land ownership could permanently avoid relocation overtime and encourage investment on the farms. Future studies are recommended to expand upon these directions.

Chapter 8:

Summary, conclusion, and recommendations

This chapter presents a summary of the results and draws overall conclusions. The chapter begins by revisiting the research questions formulated in the first chapter. It then summarises the findings and scientific contributions of each specific question, approached as a chapter and independent research paper published or submitted for publication in various scientific journals. This chapter will also provide policy recommendations based on the findings and will point out some limitations, which are recommended as areas for future studies.

8.1 Revisiting the research question

The main research problem underpinning this dissertation was centred on two themes, namely ‘potential emerging farmers’ and ‘land redistribution’ in South Africa. After an extensive overview of the often-quoted reasons for the limited success of land redistribution, five reasons were identified and two were addressed directly, whereas others were addressed partially. This was done because, on the one hand, commercially oriented smallholders in the former homelands are identified as prime land-redistribution beneficiaries, and their potential is widely cited (see, for example, National Planning Commission [NPC], 2011; Khapayi & Celliers, 2016). On the other hand, land redistribution has been criticised strongly for being slow and inefficient (Cousins, 2016). This dissertation sought to address the following question: How can the potential of emerging farmers be unlocked through linking commercially orientated homeland smallholder farmers to land redistribution in the South African agricultural sector? This complex question was broken down into smaller and manageable sub-questions:

- Who are the commercially orientated homeland smallholder farmers (“emerging farmers”), where are they located, and what are their farming activities and intentions?
- What are the different constituents of the large pool of potential emerging farmers?
- How can the land redistribution beneficiary-selection criteria be improved to be more transparent and capture beneficiary aspirations?
- What are the determinants of potential emerging farmers’ willingness to relocate?
- What could be a ‘viable’ commercial farm size for an emerging farmer?

- What should the subdivision factors be for subdividing land reform farms to converge on the farm size and income aspirations of emerging farmers?

These sub-questions were developed into research papers, with some published in scientific journals and others either submitted or revised. Each chapter's contribution is synthesised in the next section.

8.2 Summary of findings

The introductory chapter laid the foundation for both the need and imperatives for this study. It articulated why land reform needs to be achieved and, most importantly, how land redistribution can be achieved through integrating emerging farmers into commercial farming. After describing the major obstacles to land redistribution, it then expands on how these challenges can be addressed if framed in accordance with manageable research questions. The main hypothesis is that in order to achieve some level of success, implementation of land redistribution must take a holistic and systematic approaches. To link commercially-oriented smallholders to commercial agriculture through land redistribution programme. At minimum, two levels of understanding regarding commercially orientated smallholders are essential: the first rests on an understanding of their attributes and capabilities, and the second on an understanding of their aspirations.

Chapter 2 sought to establish a better understanding of the definition of an emerging farmer in the South African context. Most authors have tended to use the term “emerging farmer” without expanding on who these farmers are and why they are grouped in this category. The review of the current literature suggested the use of a multifaceted approach that combines several commonly used parameters to classify smallholders. This includes the location from which the smallholder farms – as often quoted, every communal farmer is assumed to be a subsistence farmer. The other parameter used is the race of the farmer – here, again, the assumption is that all black farmers are non-commercial. The intentions of the farmer, i.e., the main reason they engage in farming activities, play a crucial role. Distinguishing between farmers based on farm size is not a good measure of farming scale; instead, farm turnover should be used. Thus, it was found that the profile of the typical emerging farmer in the three provinces (Eastern Cape, KwaZulu-Natal, and Limpopo) is as follows: A majority (61%) are males, black Africans, located in the former homelands, with an average age of 55 years old. The typical farmer cultivates field crops as a secondary source of food and income but keeps livestock as primary and secondary sources of income. The average

emerging smallholder mostly grows maize for own consumption, given a crop commercialisation index (CCI) of 0.66, and he sells a greater portion of his cabbage and potatoes, given a CCI of 0.73 and 0.83, respectively. The average emerging farmer earns a net income of R27 000 per year, but income inequality among the farmers is evident, because the most successful farmer earned 26.7 times the average income. In conclusion, Chapter 2 found that no single measure should be used in isolation to categorise potential emerging farmers. This finding implies that, if a multifaceted approach is not followed, incoherent results and confusion are likely to be seen, both in the academic literature and in policy design. Such confusion may result in poor planning and unaligned research on this group of farmers. This finding also laid the ground for the other chapters of this dissertation.

Chapter 3 applied a robust and appropriate multivariate statistical analysis to the commercially orientated smallholder farmers surveyed. The goal was to explore the hypothesis that this sub-group of commercially oriented smallholders is not homogeneous and that, if so, it would require different policy support and support from the land redistribution policies. The chapter indeed found that commercially orientated smallholder farmers are not a homogeneous group, since there is substantial diversity among them. The study identified five sub-groups with similar characteristics. Cluster 1 consisted of male, educated, full-time livestock farmers; Cluster 2 was composed of intensive crop producers with a relatively high preference for risk and who make use of hired labour; Cluster 3 was made up of female, risk-averse small ruminant farmers with relatively higher land demand; while Cluster 4 comprised young, full-time crop farmers who are risk takers. Lastly, Cluster 5 consisted of resource-poor retired female farmers with low levels of education, and who are not willing to relocate to commercial farms. The importance of taking such differences into account in project policy formation and project planning has been stressed by several authors (e.g. Aliber et al., 2006a; Cousins, 2016). These findings substantiate and complement suggestions made in previous studies to create livelihood options for different categories of land reform beneficiaries (see Lyne, 2014; Aliber, 2019; Conradie, 2019).

Building on the previous chapters, Chapter 4 continued to the topic of beneficiary selection as one of the main reasons for the failure of the land reform programme to date (e.g. Binswanger-Mkhize, 2014; Hall & Kepe 2017; Aliber 2019). Drawing from the survey and the results of the previous chapters, it first describes the factors hindering the efficacy of beneficiary selection from both legislation and policy points of view. By analysing the aforementioned documents and extensive literature, combined with the profile of potential emerging farmers, it was found that land redistribution policies do provide some guidance for the identification and

selection of different categories of land reform beneficiaries at the national level. However, beneficiary selection is not clear at the individual level. Firstly, criteria for selecting beneficiaries as the beneficiary attributes to be considered for selecting candidates, are not clear and are not known to the public. Even the recent draft Beneficiary Selection Policy provides insufficient details on how the process should be implemented. Secondly, beneficiary selection is not transparent, even though transparency is stressed by several authors as being a key component of a market-led redistribution programme, such as is partly the case in South Africa. The chapter then continued to suggest an empirically founded set of beneficiary-selection criteria for land redistribution. This approach bears many advantages and in contrast to current proposals, employs a bottom-up approach to identify suitable beneficiaries to be targeted. This new set of beneficiary selection criteria could arguably be of importance to planners, especially from the local districts, as suggested in the National Development Plan (National Planning Commission, 2011). In most cases, beneficiaries will need to relocate to their land reform farms, which in most cases are located far from their initial homestead (e.g. Lahiff, 2005; Anseeuw & Mathebula, 2008; DRDLR, 2015).

Chapter 5 took a closer look at the relocation aspect, specifically the factors that predict whether beneficiaries would be willing to relocate to a land reform farm located far from their homestead. Through the lens of aspirations and cultural innovation, a sound theoretical approach with which different potential land reform beneficiaries could be viewed, was developed and tested empirically using a binary logistic regression using data from the Eastern Cape survey. In this framework, it is argued that it is mostly high-aspirant and cultural-innovator beneficiaries who have a better chance of success in relocating to land redistribution farms. The analysis revealed that both cultural innovation (garden size, goat sales and taking the risk of planting a new crop) and aspiration (education) serve as significant proxy variables for predicting willingness to relocate. Such factors could be used to estimate the likelihood to relocate and could help with policy planning. This shows the practical relevance of the theoretical approach, in addition to the economic factors on which land redistribution policies are largely focused. Given the relevance of the theoretical approach and the results of the empirical model, it was concluded that high aspirants and cultural innovators with prior knowledge of farming are likely to succeed as new land recipients. When programmes to relocate emerging smallholders to regions of commercial farms are designed, both economic factors, such as good farming practice, and aspirations and their degree of cultural innovation, should be considered for any targeting measures.

After knowing the factors that can predict a beneficiary's likelihood of relocating to land reform farms, it is imperative to know the appropriate farm size, which is to be matched to the skills and aspirations of potential beneficiaries. This is important, since several studies have identified the failure of taking a beneficiary-centric approach to land redistribution as one of the main causes for the programme's failure (Hebinck et al., 2011; Aliber & Cousins, 2013). Some studies (e.g. Marcus et al., 1996; Aliber et al., 2006b; Zantsi, 2019; Bunce, 2020a) have also argued that small-scale farmers want smaller farm sizes than the larger commercial farm size, which Liebenberg (2013) estimated at around 2 000 ha. Some scholars have suggested the scrapping of the current Subdivision Act of 1970, which prohibits the subdivision of farmland, and to sign the subdivision of farmland into policy (see Aliber, 2019; Vink & Kirsten, 2019). Other studies have reported that land reform beneficiaries complain that incomes on the land redistribution farms are too low. These studies further report that beneficiaries say such farm incomes cannot support their livelihood (Brown, 2000; Anseeuw & Mathebula, 2008; Jordaan & Grobler, 2011).

Chapters 6 and 7 contribute to the land subdivision debate. Chapter 6 moves away from using physical farm size as an indicator of viable farm size, instead using indicators of viable household income and beneficiary aspirations. It is argued that viable income is a function of off-farm income, farm income and aspirational income. The latter represents the amount by which land reform beneficiaries think they can increase their income over the short term (Ray, 2006). This addresses the criticism of assuming that farm household income is static (Denison et al., 2009). The results with respect to the viable farm household income of potential land reform beneficiaries was then used to construct a typology that includes three tiers, namely low-aspirant, moderate- and high-aspirant beneficiaries. For comparative purposes, these income typologies were used to calculate the physical farm size required, given the accompanying gross margin estimates of each. It goes without saying that the physical farm size required is a factor of the type of farm enterprise and geographical location thereof. It was deemed sensible to allocate high-aspirant emerging farmers to high-value commodity farms, such as fruit farms, and low-aspirant farmers to extensive livestock ranching farms.

Chapter 7 used a novel agent-based model to simulate the structural change through the subdivision of commercial farms available to be redistributed to emerging farmers. The objective was to determine how different subdivision scenarios of the transferred farms would compare to the respective income typologies of potential emerging farmers identified in Chapter 6. The results presented in Chapter 7 contribute to the debate on

whether subdivision should be signed into policy. Based on the viable farm size subdivision factors selected, the commercial farms available to be redistributed were subdivided. A novel agent based-model for South Africa, based on 605 commercial farms and 833 smallholder farms, was used to simulate the hypothesis of subdividing commercial farms. Firstly, it was found that a modest amount of land (14%) could be available for redistribution. Much of this land (99%) is grazing land and the remainder is field crop land and horticultural land, converging with emerging farmers' farm-type aspirations. The viable farm size subdivision factors show remarkable differences in farm numbers, farm size and income. The main implication of these results is, if a systematic procedure such as the ILUPSA model is followed, that more realistic targets can be achieved in land redistribution. For example it can be estimated that within a period of seven years, 4227 farms can be redistributed. Furthermore, appropriate farm sizes, which are fairly easy to manage and which cater for distinct categories of beneficiaries, could be achieved and this could improve the impact of land reform and address the criticism of the top-down approach. Caution should be taken in interpreting these results, as farm subdivision might be difficult for some farms, e.g. those that are interconnected by irrigation water dams or separated by railway lines, or broiler farms and dairy farms that sharing buildings. These studies, in Chapter 6 and Chapter 7, have laid the foundation for policymakers to make a sound decision regarding this hotly debated issue.

8.3 Discussion and conclusion

In relation to the overarching research question – how land redistribution can be achieved by integrating emerging farmers with commercial farming – this research has shown that five important factors need to be addressed to achieve this goal.

The first relates to understanding the type of target beneficiaries land redistribution to be targeted for taking over commercial farms. The 2013 State Land Lease and Disposal Policy, identifies group category of potential beneficiaries (see DRDLR, 2013). However, that categorisation is insufficient to make specific and effective policies, because one can still find subgroups within the identified groups. Further, the group is not based on a detailed data of small-scale farmers (Aliber, 2019). In a country with a relatively large number of small-scale farmers (see StatsSA, 2016, 2018; Aliber & Cousins, 2013; Zantsi et al. 2019a), a clear segmentation and categorisation of the target beneficiaries is imperative if they are to be included in the land reform programme. Understanding these beneficiaries would help in aligning policy with beneficiary needs and aspirations, which could improve the impact of the land redistribution. In Chapter 2 and 3, this dissertation provided evidence on how the lack of understanding of the contextualisation of the definition of emerging farmers can be problematic

in South Africa, and how diverse is this sub-group of commercially oriented smallholders. The policy implication in this regard is that a clear articulation of the conceptualisation and categorisation of land reform beneficiaries must be emphasised. Ambiguity must be done away with, as this hampers effective research on these specific land reform beneficiaries. A further step is to understand the constituents of these beneficiaries, as it has been shown in this dissertation that even within a segmented subgroup such as commercially orientated smallholders, one still finds clusters of heterogeneity (Chapter 3). The policy implication is that well intended policies can still miss their target beneficiary group simply because they are informed by the assumption of smallholder homogeneity. While this may not be easy to achieve, policies must be flexible enough to accommodate this reality. In addition, it is also crucial to implement a transparent and less bureaucratic process of beneficiary selection. Not all potential land reform beneficiaries are good candidates for land redistribution (Vink & Kirsten, 2019), and capable beneficiaries with the desired qualities seem to constitute a small subset of potential beneficiaries (Chapter 3). Therefore, the selection process needs to be more explicit by including more specific details of the candidate beneficiary, and this will require joint stakeholder efforts. This will enable accountability in the beneficiary selection process and the committee in charge, because the public will have a clear and detailed guideline on how the selection was done.

Furthermore, being a land redistribution beneficiary carries some risks, but it equally also carries some opportunities. Therefore, candidates are needed who are willing and determined to take the risk of relocating and acquiring new skills, such as new farming methods and planting crops that they have not planted previously, to tap into the opportunities offered by their new farm (Chapter 4). Candidates with higher chances of success must have high aspirations and cultural innovation, in addition to farming skills and entrepreneurial spirit (Chapter 5). The other important factor connected to beneficiary relocation is land ownership in allocating land to beneficiaries. Here actual ownership serves to address the reallocation over time, while active land rental markets can achieve this in the short term.

In addition to the desired characteristics for a potential land reform candidate, policymakers need to be aware of the candidate's capability. For example, for a novice farmer, managing a relatively larger, multi-enterprise farm is a big task, and the evidence suggests that potential candidates for emerging farmers want smaller farm sizes (Aliber et al. 2006b; Zantsi, 2019). Even if the issue of farm size and livelihood aspiration is tackled by viable farm income and

size, segmenting farmers is a necessary step to fully tap beneficiary potential. For example, giving a large farm to a low-aspirant farmer who only wanted a smaller farm might be a waste of resources. This means that it is necessary to consider that the concept of a 'beneficiary-centric approach' which entails finding a viable farm size for the diverse groups of emerging farmers and giving them land ownership. This can potentially improve performance on the redistributed farms and have more impact on the beneficiaries.

Agent-based models as a simulation tool have proven to be effective in informing land redistribution policy questions in South African. Through the novel ILUPSA ABM, it was possible to simulate the subdivision of commercial farms intended for redistribution, thereby enabling a comparison between the potential income to be gained from subdivided farms and current emerging farm-household incomes. Subdivision of redistribution farms by viable farm sizes have shown remarkable differences in farm numbers, farm size and income, which cater for different categories of land redistribution beneficiaries (see Chapter 7). This addresses the question of creating livelihoods through land redistribution and meeting the ideal farm size aspired to by emerging farmers (see e.g. Conradie, 2019; Aliber, 2019). The overall lesson here is that making use of such models can save policymakers and the state financial and human resources, as opposed to the trial-and-error approach that has been implemented since the start of land reform after 1994. This is particularly important, considering the substantial criticism of a lack of or poor coordination and handling of the process of land redistribution (see Lahiff & Li, 2012; Cousins, 2015; Vink & Kirsten, 2019; LRAAP, 2019).

8.4 Contributions

Focusing on a specific target group of South African smallholders, this dissertation contributes to the existing body of literature in numerous ways. The first contribution relates to policy and planning. The findings of this study augment the recommendations made in the report of the Advisory Panel on Land Reform and Agriculture (2019). Moreover, it addresses several of the often-quoted factors attributed to the failure of land redistribution, some of which are quoted in the National Development Plan, Chapter 6. The next contribution relates to smallholder data. The lack of a large, detailed commercially orientated smallholder dataset has been one drawback of smallholder research in South Africa (noted, for example, by Binswanger-Mkhize, 2014; Cousins et al., 2020). What is particularly needed is a segmented dataset from a specific target group of smallholders, such as the one created and used in this dissertation. Lastly, this dissertation also contributes to the existing literature by applying a novel agent-based modelling methodology, which has never been used extensively in the context of South African land

redistribution policy and, more particularly, for testing farmland subdivision and determining viable farm size.

8.5 Limitations and areas for future studies

Notwithstanding the contribution of this study, more still needs to be done to fully understand how the integration of emerging farmers into the commercial sector can be improved and made to be a smooth transition. Firstly, although the dataset from the surveyed potential emerging farmers that was used was large enough to capture differences between commercially orientated smallholders, it only covered a subset of districts with a high density of smallholder farmers and thus does not allow for comparisons between districts and provinces. This limitation was particularly obvious in the third chapter, where a larger dataset would have added specific insights helpful for planning at the provincial level. Hence incorporating the data from regular surveys that are representative of the district and provincial level would enable a refinement of the recommendations of this study. The emerging farmer typology in chapter 3 was limited to commercially oriented smallholders and excluded other potential land reform beneficiary categories. In addition, focusing on districts can help with exploring the suggestions made in Chapter 6 of the NDP and the recommendations of the LRAAP so that these can be codified in policies. The role of land reform committees also needs further attention to facilitate beneficiary selection.

Furthermore, the study explored the determinants of the willingness to relocate among emerging farmers. However, the linear econometric model explained almost three quarters of these factors. A more nuanced method, such as system dynamic modelling, could be used shed more light on this aspect. Moreover, the determination of viable farm size by using the income aspiration approach captured only one of the dimensions of rural households' livelihood contributions. Therefore, a multidimensional, more nuanced analysis is recommended in further studies.

Finally, addressing other, often quoted factors relating to progress in land redistribution, such as systematic, one-stop-shop for beneficiary support, could be a complementary study to the present study's contribution. One way to achieve this would be to build from Zantsi et al.'s (2020c) study based on the ILUPSA model. Other factors not tackled in the present study include the efficacy of the willing seller-willing buyer approach used to redistribute agricultural land and land expropriation. This work is yet to be achieved through the ILUPSA model. Further, the other important factor which must accompany the recommendations of this study is a strong and tailor-made agricultural extension system designed to bridge the gap of

information and technological advancement. The NDP has already put forward a call to develop a new cadre of agricultural extension officers to assist emerging farmers. Given the weak and incompetent public agricultural extension system (see Worth, 2008), there is a need to tap into innovative forms of agricultural extension to meet the demand. One alternative is the extension service provided by NGO-funded programmes, such as Lima Rural Development. Its efficacy and initial works are reported on and discussed in Lyne et al. (2018). There is even further evidence from KwaZulu-Natal and the Eastern Cape showing that land reform beneficiaries are willing to pay for private extension services (see Loki et al., 2019). The other potential method that has received little attention is Farmer Field Schools (FFS) that were first initiated by the Food Agriculture Organisation in the 1980s. In the South African smallholder context, evidence of FFS efficacy is detailed in Apleni et al. (2019). Bunce (2020:30) has also reported on the practice of study groups among emerging farmers and extension officers as a good platform for information sharing in Limpopo.

“The most basic question is not what is best, but who shall decide what is best.”

Thomas Sowell

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Appendices






Appendix 1: Risk capturing game

In this question, we will play a small game with the farmer to capture her/his risk preferences. Please show the boxes to the farmer and ask the following:

Imagine you can select one of the six plots in the picture. On plot one, you earn R1000 if the season is bad (HEAD) and also R1000 if the season is good (TAIL); on plot two, R900 if the season is bad or R1800 if the season is good; on plot three, R800 or R2400; on plot four, R600 or R3000; on plot five, R200 or R3600 and on plot six, 0 or R4000. In each plot, there is one chance in two to get the bad and good harvest; that is, a good season is as likely as a bad season. Please take a moment to compare the six different plots and then tell me which plot is the best for you.

Xhosa version:

Kulombuzo sizodlala umdlalo. Sicela ukuba ubonise umfama ezibhokisi zi6. Ezibhokisi zibonisa igadi ezi6 ngokwemeko yemozulu umzekelo xa kukho imbalela okanye unyaka umhle kukho imvula eyaneleyo isivuno esilindelekileyo kwigadi nganye (qaphela ukuba amathuba wokuba kubekho imbalela nokuba unyaka ubemhle ayalingana) wena kufuneka ukhethe ukuba yeyiphi onokuyikhetha. Kwigadi yokuqala xa kukho imbalela okanye isivuno sisibi ufumana iR1000 kananjalo naxa sisihle ufumana kwa iR1000. kwigadi yesibini xa isivuno sisibi okanye kukho imbalela ufumana isiqingatha R900 sesivuno esiqhelekileyo R1800 xa kungekho mbalela. Kwigadi yesithathu xa isivuno sisibi ufumana amawakaR2400 kodwa xa sisibi ufumana nje amakhulu asibhozo R800. Kwigadi yesine ufumana amawaka amathandathu R6000 ukuze xa sisibi isivuno ufumane nje amawaka amathathu R3000. Kweyesihlanu xa sisihle isivuno ufumana amawaka R3600 ukuze xa sisibi isivuno ufumane nje amkhulu amabini R200. kweyesithandathu igadi xa isivuno sisihle ufumana amawaka amane ukuze xa sisibi ungafumani kwanto.

<p>IGADI YOKUQALA (1)</p> <p>Bad harvest /ISIVUNO ESIBI</p> <p>ZAR1000</p>  <p>Good harvest /ISIVUNO ESIHLE</p> <p>ZAR1000</p>	<p>IGADI YESIBINI (2)</p> <p>Bad harvest/ISIVUNO ESIBI</p> <p>ZAR900</p>  <p>Good harvest/ISIVUNO ESIHLE</p> <p>ZAR1800</p>	<p>IGADI YESITHATHU (3)</p> <p>Bad harvest /ISIVUNO ESIBI</p> <p>ZAR800</p>  <p>Good harvest /ISIVUNO ESIHLE</p> <p>ZAR2400</p>
<p>iGadi yesine (4)</p> <p>Bad harvest/isivuno esibi</p> <p>ZAR600</p>  <p>Good harvest /isivuno esihle</p> <p>ZAR3000</p>	<p>igadi yesihlanu (5)</p> <p>Bad harvest /isivuno esibi</p> <p>ZAR200</p>  <p>Good harvest/isivuno esihle</p> <p>ZAR3600</p>	<p>iGadi yesithandathu (6)</p> <p>Bad harvest /isivuno esibi</p> <p>ZAR0</p>  <p>Good harvest /isivuno esihle</p> <p>ZAR4000</p>

Appendix 2: ODD protocol

	Guiding questions	Description
I.i Purpose	I.i.a What is the purpose of the study?	The purpose of the ILUPSA model to test the impact of the land redistribution policies on the structure of agricultural sector. This include production, productivity, and farm income changes.
	I.i.b For whom is the model designed?	ILUPSA is intended to give empirical founded advice to policymakers, land reform committee, investors and AgEcons.
I.ii Entities, state variables and scales	I.ii.a What kinds of entities are in the model?	<ul style="list-style-type: none"> • Commercial Farmers (agents) – farmers farming on freehold properties. • Smallholder Farmers (agents) — households farming under communal land, selling at least 20% of their produce. • Emerging Farmers — new entrants to the commercial farms that become available when a commercial farmer exit.
	I.ii.b By what attributes (i.e. state variables and parameters) are these entities characterised?	<p>Farmer: Commercial farmers want to maximize farm income under freehold in a very competitive industry and if they are inefficient, they sell farms to the market.</p> <p>Emerging farmers defined as commercial oriented smallholders who aspire to fully commercialise their production. The government purchases commercial farms and allocate to deserving smallholders. In the ILUPSA model, it is assumed that there will always be available.</p>