



# Understanding the Drivers of Production in South African Farming Systems: A Case Study of the Vhembe District, Limpopo South Africa

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### Specialty section:

This article was submitted to  
Land, Livelihoods and Food Security,  
a section of the journal  
Frontiers in Sustainable Food Systems

**Received:** 08 June 2021

**Accepted:** 28 February 2022

**Published:** 25 March 2022

### Citation:

Materechera F and Scholes MC  
(2022) Understanding the Drivers of  
Production in South African Farming  
Systems: A Case Study of the  
Vhembe District, Limpopo South  
Africa.  
*Front. Sustain. Food Syst.* 6:722344.  
doi: 10.3389/fsufs.2022.722344

Farming systems in South Africa operate against the backdrop of constantly changing environmental, political, and socio-economic conditions. Farming systems are commonly defined by the Food and Agriculture Organization (FAO) as a population of individual farm systems that have broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions would be appropriate. Historically farming systems in South Africa have been characterised by dualism in which large-scale commercial farmers co-exist with small-scale farmers. Although the two farming systems are impacted by the same drivers of production (land, labour, capital, and enterprise), however, they respond to these drivers differently and the nature of the responses reveal their connectivity and possible approaches to sustaining them. A systems thinking approach is best suited to draw possible scenarios of how farming systems in the Vhembe district located in the Limpopo Province of South Africa will respond to changes with respect to the four drivers. In this area, large-scale commercial farming forms a significant component of the production of a number of subtropical crops that contribute to the country's agricultural economy particularly through exports. Simultaneously 90% of rural communities in the district depend mainly on small-scale agriculture to sustain their livelihoods and generate income. The paper provides an overview of the drivers of production for the two farming systems in the Vhembe district and explores how the government can successfully promote development through agriculture by building capacity for the joint success of the two farming systems.

**Keywords:** farming systems, agriculture, agricultural production, food security, systems thinking

## INTRODUCTION

Large-scale commercial farming alongside smallholder farming is a dichotomy that characterises South African farming systems and is a legacy of the Apartheid system. The two farming systems can be compared using a framework for production of which there are four drivers namely land, labour, capital, and enterprise (Dariusz, 2015). There has been some valuable research conducted on farming systems in the Vhembe district over the past 20 years as agriculture contributes

significantly to the economy of the Limpopo Province and the country as well as to the provincial food security. Studies have shown that there is a production gap between commercial and small-scale producers in South Africa (Altman et al., 2010; Labadarios et al., 2011; Hendriks, 2014). Commercial agricultural production has been the primary driver of national food security predating democracy in 1994 (Hendriks, 2014). Baiphethi and Jacobs (2009) argue that even though small-scale production is important for household food security, the productivity of the sub-sector in South Africa is quite low. The South African government therefore places particular importance on small-scale agriculture in its efforts to fight food insecurity and poverty. According to Hendriks (2014), while the focus of agricultural production and marketing programmes in South Africa has shifted to small-scale production, legislative, and policy measures for creating an enabling environment for smallholders to establish sustainable and competitive production and marketing systems have not been provided. Hendriks (2014) further suggests that many of the elements that helped establish commercial farmers and ensure national food security such as input subsidies, infrastructure, security of tenure, market protection, credit etc. are either no longer available or non-functioning to both commercial and small-scale sectors. More recently Nwafor and van der Westhuizen (2020) proposed that smallholder farmers could improve their competitiveness through participating profitably and sustainably in agricultural supply chains. This has become the focus of a growing body of research (Giller et al., 2021; Marinus et al., 2022).

Statistics South Africa (StatsSA) (2017) revealed that the Limpopo Province has the highest number of households involved in agriculture in the country with 41% involved in agricultural production of some kind (De Cock et al., 2013). Despite this statistic the same source highlights that 91.5% of these households practise farming at a subsistence level as an additional food source and only 4.4% is engaged in agriculture as an additional source of income. Olofsson (2018) draws our attention to the fact that up to 41% of small-scale tree crop farmers in the Vhembe district depend primarily on welfare in the form of state pensions, available from the age of 60 years onwards, as their main livelihood source. These were used to purchase food from markets to supplement food obtained from home gardens.

Although the government desires to improve the quality of life of its citizens through farming and building capacity to farm high value crops (HVCs) that can contribute to food accessibility through profits made from sales and participating in export markets, the context of the dualism of the farming systems and their response to the drivers of production presents itself as a complex problem. Numerous debates have emerged within different spheres of government and amongst scholarly researchers surrounding the question of how the co-existence of South Africa's two main farming systems can be sustained. An understanding of the dynamics of how the factors of production affect South African farming systems and as a result contribute toward the transformation of agriculture in the country is paramount. There is need for an adequate evaluation of the farming systems in order to explore how they can continue to co-exist. The objective of the study is to understand the factors

of production under the two farming systems in South Africa in order to explore the plausibility of various approaches that can be applied to support the development of these farming systems for purposes of long-term sustainability of agriculture in the country. Though the four drivers of production affect both farming systems significantly and intersect at various levels, for the purpose of this paper's discussion all four drivers are addressed generally however greater emphasis will be on land due to its contentious reputation and its significance in a politically-sensitive part of the country as the one chosen for the study.

## CONTEXTUALISING THE DRIVERS OF PRODUCTION IN SOUTH AFRICAN FARMING SYSTEMS

The context of the dichotomous nature of South African farming systems is unique to South Africa and differs vastly from farming systems in other African countries given the historical background of apartheid and its aftermath (Garrity et al., 2012). The dual nature of the farming systems significantly affects productivity across all four drivers of production as can be seen in the following sections.

### Land

Land is arguably the most critical driver of production in both large-scale commercial and small-scale farming systems in South Africa. There is a plethora of issues that pertain to land as a driver of production of which land access, availability, tenure, quality, and management of the land can be identified as major issues. Land management differs between the farming systems and becomes a key concern because it will determine the sustainability of the land. Land management is influenced by availability of land and tenure security amongst other factors. With regard to availability of land to the two farming systems, historically small-scale farmers, demographically classified as black, who made up the majority of the population were allocated limited proportions of land in the former homelands areas known as Bantustans (Van den Berg, 2013). This land was mostly of poor quality in comparison to the arable land allocated to their white South African counterparts who formed the minority (McCusker, 2004). This disparity in land availability is seen in the Limpopo province. There was reportedly a total of 5,000 commercial farming units in the Limpopo Province in 2002 (Whitbread et al., 2011). This number steadily decreased to 3054 in 2017 (8% of the national total) (Statistics South Africa (StatsSA), 2017) which corroborates the assertion made by Walker and Dubb (2013) that commercial farming units in South Africa have been rapidly decreasing since the 1990s. Although the exact number of commercial farming units in the Vhembe district is not specified, according to Oni et al. (2012) 174830 ha of arable land (70% of the total for the district) is owned by white commercial farmers while small-scale farmers own 74927 ha (30% of the district total). Olofsson (2018) describes the present state of small-scale farmers in the Vhembe district where farmers continue to be confined to overpopulated areas where land access is severely limited and land is governed by traditional authorities

under a communal land tenure system. This communal land tenure system limits the production capacity of small-scale farmers as the combination of a lack of tenure rights and overlapping land uses restricts their ability to sustain production in the long term (Burger, 2021). Large-scale commercial farmers in the Vhembe district typically own the land they farm on (Olofsson, 2021) and this places them at an advantage as they are able to make more long-term production decisions. In terms of land quality as it pertains to fertility, irrigation plays a crucial role for the two farming systems. Irrigation promotes crop production throughout the year and crop diversification because of the availability of water. Irrigation is commonly practised by large-scale commercial farmers in the Vhembe district (Tapela, 2008). Most small-scale farmers in the district on the other hand depend on rainfed agriculture. According to Mpandeli (2014) rainfed crop yields amongst small-scale farmers are generally poor due to low and erratic rainfall coupled with already poor soil fertility.

## Labour

Labour is also a key driver of production in South African farming systems. Some of the main issues of concern surrounding labour include the type of labour, i.e., permanent or seasonal, labour availability, quality, and management of labour with respect to decision making. There is heavy reliance family labour amongst small-scale farmers in South Africa and the Vhembe district in the Limpopo province is no exception. Labour is hired seasonally and to a limited extent mostly during the harvest season. Olofsson (2018) mentions the unique situation of smallholder tree crop farmers in the Vhembe district who rely primarily on their own labour, with some additional help coming from seasonal labour and family members and operate at a relatively small scale of production. This is in sharp contrast to their large-scale commercial farmer counterparts who according to Hall et al. (2013) have historically depended on hired seasonal and permanent labour to support large-scale production. The availability of seasonal labour is essential to the management of high value horticultural crops such as those typically found in the Vhembe district. The limited extent of hired family labour can be attributed to the size and demography of rural families which are impacted by urban migration patterns. According to Nhemachena and Hassan (2007) in most rural smallholder communities in Limpopo males are more often based in town as they seek for employment there, leaving much of the agricultural work to women. Mugovhani and Tshishonge (2012) highlight that the frequent absence from home of adult males involved in migrant labour in the Vhembe district resultantly increased social responsibility for women and boys. Hall et al. (2013) indicate that migration ushers in new patterns of displacement that bring migrants and refugees from the neighbouring country of Zimbabwe to Limpopo's farms and this has implications on the source of labour for small-scale farmers. Labour for large-scale commercial farmers on the other hand is generally hinged on costs.

In attempts to maximise profit, large-scale commercial farmers opt for mechanisation as an alternative to hired labour which can potentially reduce labour costs. Hall et al. (2013)

suggest that this shift to a less labour-intensive production and increased mechanisation is a major driver of change in commercial agriculture in South Africa that is shaping the lives of workers on farms in the Limpopo Province. An unintended consequence of this shift in reliance on hired labour amongst large-scale farmers is a negative impact on labour relations between farmers and laborer's where members of the local communities feel excluded from participation in farming activities for production. The issue of what will promote the sustainability of production in terms of labour for South African farming systems remains unresolved.

There is ongoing research into what approach will result in success whether mechanisation is the best solution for both farming systems or a combination of mechanisation and hired labour. Due to the numerous constraints encountered by small-scale farmers across the country it is challenging to determine whether they have the capacity to replace the existing family labour structure with the adoption of new technologies and mechanisation.

## Capital

Capital to support farming systems is yet another important driver of agricultural production. If neither of the two farming systems have access to sufficient capital, then the farming systems cannot be sustained. Most large-scale commercial farmers have access to capital from large commercial institutions. Greenberg (2013) points out that production finance in South Africa was historically provided for by state and statutory institutions such as the Land Bank and the Agricultural Credit Board. The Land Bank is said to have continued to play a valuable role in agricultural financing of commercial farmers in the province mostly excluding black producers (Cousins, 2016). Small-scale farmers on the other hand have limited access to capital which directly impacts the scale at which they can operate. Limited access to capital presents itself as a constraint to the farming of HVCs amongst small-scale farmers as the input costs for these crops are high. The lack of tenure rights for small-scale farmers alluded to earlier means farmers are unable to pledge land or income from harvests as surety for loans to improve their land (Burger, 2021). As a result of limited access small-scale farmers have to explore multiple avenues of generating capital such as diversifying farming systems to include livestock (Whitbread et al., 2011). Sale of some of the livestock serves as an alternative capital source. Other sources of capital amongst small-scale farmers include savings, money borrowed from family members and even money inherited from deceased family members. In order for small-scale farmers to transition into farming at a commercial level they need reliable sources of capital.

## Enterprise

The issues of enterprise selection and combination are crucial to production in South African farming systems. Selection of the enterprise for small-scale farming systems is not based solely on profit. There are other considerations that must be factored into decision making such as the lack of land tenure security, the quality of the land and access to capital referred to in preceding sections. When small-scale farmers are unable to access capital

from large financial institutions, they still need cashflow in order to cover running costs of farm operation and production for profit. It is common to find mixed enterprises amongst small-scale land holdings in South Africa. Small-scale farmers tend to mix the farming enterprise for example incorporating livestock alongside HVC farming. Beside the fact that livestock have social and cultural significance and are often used for cultural ceremonies, livestock can also be sold for additional income to reinvest in agriculture. Home gardens which include vegetables and nuts alongside the farming of HVCs are another example of mixed enterprises. Maize is the predominant cereal grain grown in the district among small-scale farmers (Odhiambo and Mag, 2008). Leguminous crops like groundnuts, bambara nuts and cowpeas are also grown by small-scale farmers as well as vegetable crops which include spinach, cabbage, tomatoes and onions (Obadire, 2010). These are grown for the farmers' own consumption with any surplus sold to neighbours or relatives. Sales from home garden produce are used to support the farming operations and resultantly sustain small-scale farming systems.

## Theoretical Framework

South African farming systems operate against the backdrop of constantly changing environmental, political, and socio-economic conditions. It is within this context that agricultural production needs to be understood as it forms an important component of the water, energy, and food security nexus in a changing climate. A systemic approach to addressing agricultural development is necessitated by the reality of heterogeneous approaches to production by way of the response to the drivers of production by the two dominant farming systems. Systems analysis is a valuable tool for the evaluation of complex problems such as that presented by the duality of farming systems in South Africa. Arnold and Wade (2015:7) define systems analysis as “a set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviours and devising modifications to them in order to produce desired effects.” The application of systems analysis is rooted in the theoretical understanding of systems thinking which the same authors define simplistically as “a system of thinking about systems.” (Arnold and Wade, 2015: 670). Systems thinking is based on the understanding that with globalisation comes increased interconnectedness and interdependence on systems that govern human existence (Meadows, 2008). The overlap in the various components of these global systems presents a complexity that necessitates a diversity of interventions and a systems dynamics (SD) approach to addressing complex problems. Simonovic (2012) describes systems dynamics as the understanding of the relationship between integrated systems elements and how they impact each other's behaviour.

## METHODOLOGY

### Study Site

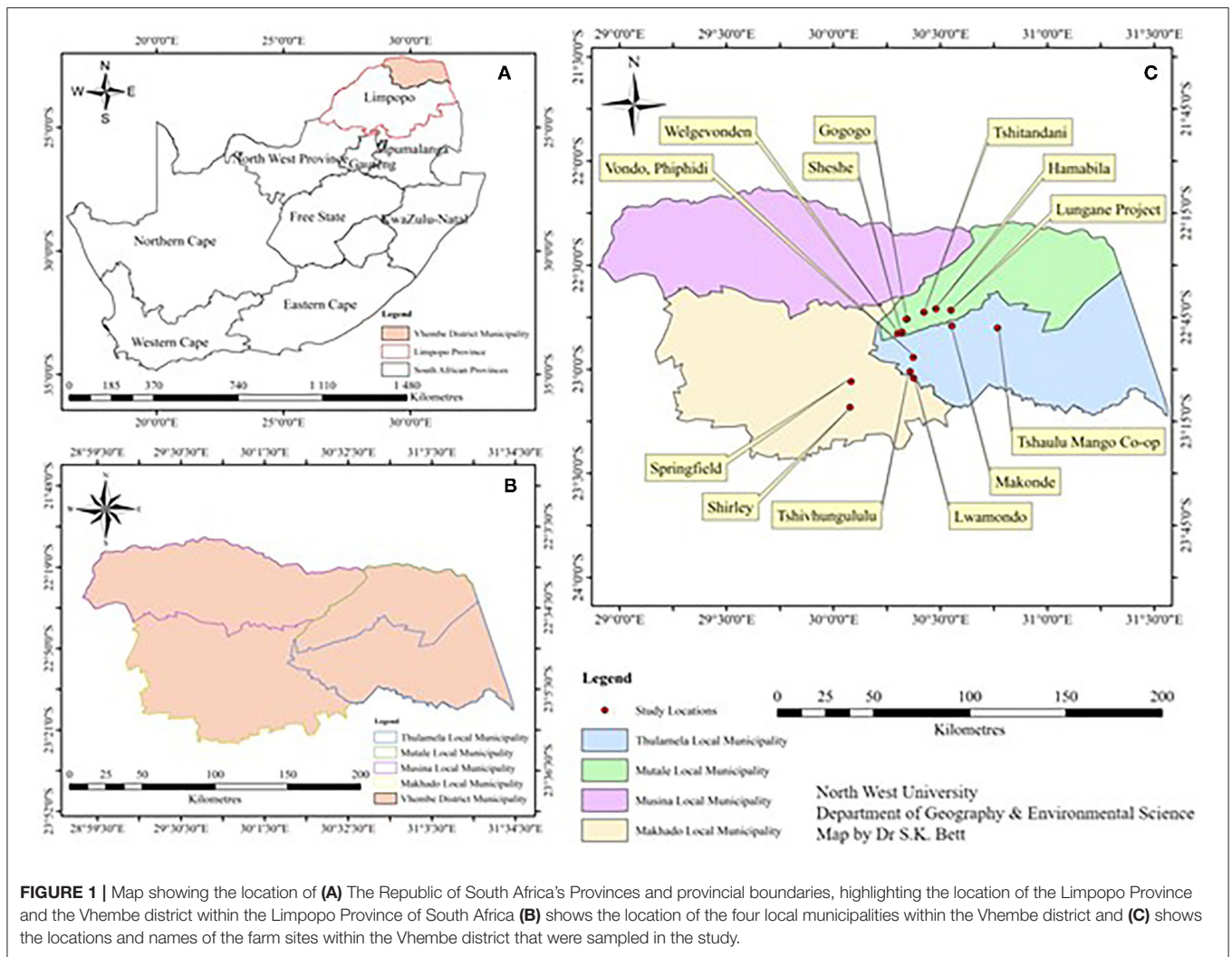
The Vhembe district is a district municipality in the Limpopo Province of South Africa that is farthest north (**Figure 1**); sharing a border with Botswana and Zimbabwe in the north-east and Mozambique in the south-east through parts of the Kruger

National Park (Maponya, 2021). The district is one of the five district municipalities that constitute the Limpopo Province. Out of an area of 2,140,708 ha, 247,757 ha of the land in the Vhembe district is arable (Setshego et al., 2020). Four local municipalities are found within the Vhembe district: Mutale (renamed Collins Chabane), Thulamela, Makhado and Musina. The South African governance structure regards the composition of local municipalities as towns and their surrounding rural areas (Independent Electoral Commission (IEC) of South Africa, 2016). The main towns within the district are, Malamulele, Thohoyandou, Makhado, and Musina, respectively, for the four local municipalities.

The Soutpansberg mountain range divides the Vhembe district into two agro-ecological systems. The northern side is largely semi-arid, with livestock farming and game ranching being the main activities and some limited horticulture where water is available; this is comprised of the local municipalities of Musina and Mutale. The southern side, comprised of the local municipalities of Thulamela and Makhado, is a subtropical regional hub with high rainfall, in excess of 700 mm per annum, making it suitable for the cultivation of subtropical fruits, cereals, vegetables, and nuts (Oni et al., 2011). The Vhembe district forms a significant component of the production of a number of subtropical crops that contribute to the country's agricultural economy particularly through exports. According to Kom et al. (2020) the well-established white commercial horticulture farming is generally found on the southern side of the district (local municipalities of Makhado and Thulamela). It is mainly made up of stakeholders in the subtropical industry which includes commodities such as litchis, bananas, mangos, avocados, citrus, and pecan nuts. Another subtropical crop found dominantly in the southern side of the Vhembe district is macadamia nuts.

Geographically, the Vhembe district covers a location that is predominantly rural (Rusere et al., 2019), which is characteristic of the Limpopo province. According to DAFF (2013) 89% of the population is classified as rural, therefore agriculture plays a prominent role in the economic development of rural areas in the province. The Vhembe District Municipality (VDM) (2014) reports that 90% of rural communities found in the Vhembe district depend mainly on agriculture to sustain their livelihoods and generate income. Maponya (2021) indicates that agriculture in the Vhembe district is one of the economic drivers that contribute to the Limpopo Province and nation at large. The Vhembe district produces 4.4% of South Africa's total agricultural output, 8.4% of the country's sub-tropical fruits and 6.3% of its citrus according to the Vhembe District Municipality's Local Economic Development Strategy (2020). A large proportion (70%) of the farming activities in the Vhembe district can be accounted for by small-scale agriculture and the remaining 30% is commercial agriculture (Odhiambo and Mag, 2008; Oni et al., 2012; Olofsson, 2018).

In terms of viability for agriculture, the district is located in a semi-arid area, is frequently affected by dry spells that often develop into severe drought and experiences severe water shortages from May to August (Rusere et al., 2019). The same authors document that most commercial farmers in the district



depend on irrigation systems for farming whereas the small-scale farmers mostly rely on seasonal rainfall which typically falls from November to March. According to Moeletsi et al. (2013) seasonal rainfall (October-April) in the southern side of the district, identified earlier as including Makhado and Thulamela local municipalities and a horticulture hub, ranges from 400 to 600 mm. The average rainfall for the southern side ranges from 246 to 681 mm per annum (Rusere et al., 2019). Soils in the Vhembe district are variable and tend to have a higher loam and clay content toward the east but are sandy in the west (Odhiambo and Mag, 2008; Rusere et al., 2019). Moeletsi et al. (2013) state that soils in the southern region of the Vhembe district vary significantly from one place to another with most parts having Glenrosa and Hutton soils according to the South African soil classification (SA Soil Classification, 1991).

According to the census of commercial agriculture in 2017, the biggest crop output in the Vhembe district was fruit, mainly subtropical and citrus (Statistics South Africa (StatsSA), 2017). The district ranked third as the largest driver of agricultural production amongst the five districts in the province generating

R5.4bn. The census also ranked the Vhembe district as the third biggest agricultural employer in the province employing 17,714 employees in large-scale commercial operations (Statistics South Africa (StatsSA), 2017).

### Study Design

The study was conducted by analysing primary and secondary data to identify and characterise small and larger-scale farming systems of three tree crops in the Vhembe district namely macadamia nuts, avocados, and mangos. The aim of the analysis was to highlight the connectivity of interactions within and between the two farming systems in relation to the four drivers of production, i.e., land, labour, capital, and enterprise. Secondary data were collected from numerous sources: peer reviewed research articles, books, the official database of subtropical crops from the local Department of Agriculture, climate data from the Institute of Soil, Climate and Water (ISCW), and data of soils and land type from the Agricultural Research Council (ARC). The target population consisted of a combination of small-scale and large-scale commercial farmers of the three commodities within

the district. Farming systems were first broadly categorised based on information extracted from the subtropical crop database which contained data on farm location (detailing the village or town and local municipality), gender of the farmer, farm size (ha) and the farmers personal contact details. A purposive sampling method (Ames et al., 2019) was used to select criteria for site selection. The four chosen criteria were farm size, commodity, farm location, and gender of the farmer. The database contained this information for six subtropical crops namely, litchis (92), avocados (204), bananas (23), macadamia nuts (184), citrus (90), and mangos (528). In total the database documents a total of 1,121 subtropical crop farmers in the Vhembe district. Based on the database information the three commodities selected for the study are the most commonly farmed commodities in the Vhembe district. This influenced the choice of commodities. Furthermore, macadamia nuts were selected based on their known export value as high HVCs and their significance to the country's agricultural economy while avocados were selected based on farmers' expressed willingness to participate in the study derived from preliminary interaction with farmers at a local study group information sharing meeting. Mangos were selected on the basis of having the largest number of documented farms on the database suggesting their popularity as a farming crop. With regard to farm size, farms were chosen using a systemic random sampling procedure to ensure equal representation within the various categories of size that are found in the database, namely small-scale (1–10 ha) and large-scale (11 ha and above) as the study required farmers with both smallholding and larger holdings. For the criterion of location farms were selected that reflected equal representation of all four local municipalities that characterise the Vhembe district namely Thulamela, Musina, Makhado, and Mutale. The last criterion for farm selection was farmers' gender. A random number generation method was employed to ensure there was equal representation of both genders across the farms. The process of random number sampling was carried out by allocating a number to the selected farmers using the previously stated criteria, writing down the numbers and placing them in a container. The researcher then randomly picked out numbers from the container to make up a total of 12 farms. The 12 farms were comprised of four samples for each of the three commodities spread across the four municipalities with two small-scale and 2 large-scale farms and an even combination of male and females. A detailed characterisation of the three farming systems based on the four drivers of production followed after the initial site selection. In-depth, on-site interviews with farmers provided primary data. Snowball sampling (Etikan et al., 2016) was used to conduct the interviews with farmers in selected farm locations with the objective of maintaining the same initially selected sample size. The outcome of the snowball sampling technique produced the following number of samples: mangos (4), macadamia nuts (7), and avocados (8). In total 19 farmers were selected to participate in in-depth interviews based on their availability and willingness to participate. Due to the extremely rural location of farm sites and challenges in accessing farms and farmers, data were collected at only one point in time. This explains the exceptionally small sample size which is acknowledged.

## Data Collection

Face-to face interviews with farmers on-site at the farm locations were conducted over two visits to the Vhembe district in October and November 2020. Ethical clearance (number H19/09/26) was obtained from the University of the Witwatersrand ethics committee, as well as from the Local Department of Agriculture by way of an official letter of approval. Due to language barriers the researcher conducted the interviews alongside a local field assistant who served as an interpreter. Interviews were conducted in the local Vhenda language.

## In-depth Interviews

The main instrument of data collection was a questionnaire made up of a combination of open and close-ended questions aimed at collecting both quantitative and qualitative data. Close-ended questions were used to obtain statistical information regarding the four drivers of production while open-ended questions were used to enable participants to provide more detailed answers. The questionnaire was divided into four sections: land, labour, capital, and enterprise.

## Data Analysis

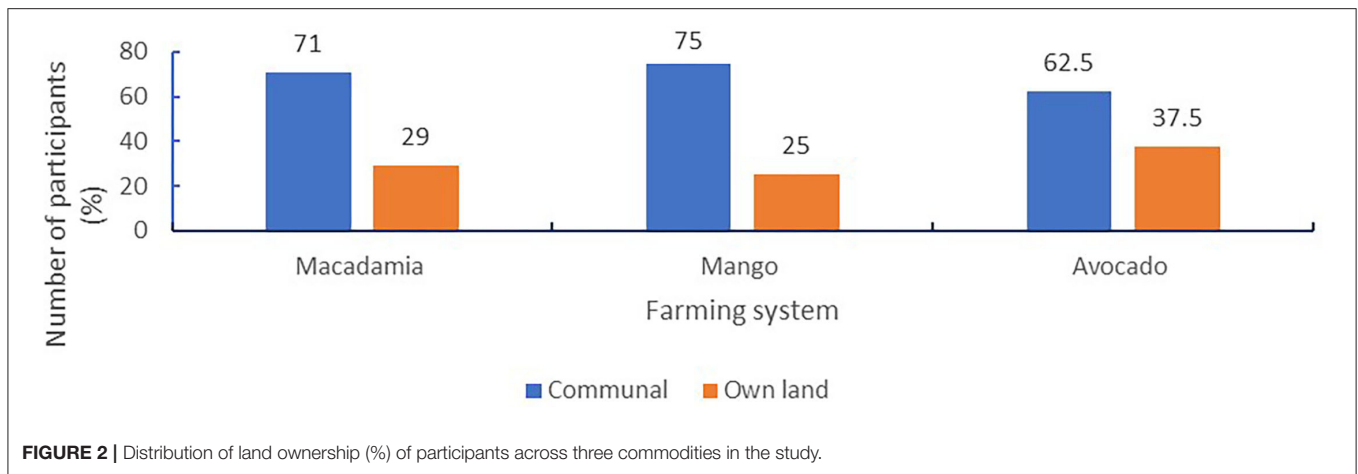
Qualitative data were analysed using descriptive statistics (Sarka, 2021) by calculating averages, percentages, and standard errors. Student *t*-tests and Chi squared tests (Shen et al., 2021) were used to compare the means across the two categories of farm size and between the different commodities. Qualitative data were analysed through the use of thematic analysis (Grodal et al., 2021) of participant responses to open-ended questions related to the drivers of production across the different commodities and between the two farm sizes. Responses from these questions were categorised into dominant themes and sub-themes. Emerging themes were triangulated with quantitative data in order to explain phenomenon.

## RESULTS AND DISCUSSION

Results have been selected that speak to key issues raised under the sub-theme: Contextualising the drivers of production in South African farming systems. In line with the authors' decision to focus specifically on land as a driver of production, results reflect issues highlighted to this end.

### Land Ownership

The predominant land ownership amongst participants in the study was communal (74%) compared to 26% who owned the land that they farmed on. Only a few macadamia (16%) and mango (5%) farmers owned the land compared to avocado farmers (26%). Results of the Chi-Square test revealed that the differences in land ownership between the three commodities are insignificant,  $\chi^2(2, N = 19) = 3, 8, p > 0.05$ . Results revealed higher proportions of small-scale farmers who farmed on communal land across all three commodities compared to those who owned the land (Figure 2). There was an insignificant difference between farm size and land ownership [ $\chi^2(2, N = 19) = 0, p > 0.05$ ] amongst participants. This disparity in ownership reflects the common reality of tenure rights amongst farmers



located in the former homelands of South Africa as indicated by Hall (2004).

### Water Sources and Irrigation

The main source of water on farms was rivers (40%), dams (21%), boreholes (21%), and tanks (13%). The use of pipes was the most common form of irrigation identified amongst all participants in the study followed by rain-fed and jet irrigation (**Figure 3A**). All mango farmers reported relying on rain-fed agriculture as orchards were mature. Pipes for water reticulation were commonly used by small-scale macadamia and avocado farmers compared to jet irrigation, e.g., micro-jet and jet spray irrigation systems were commonly used by a few large-scale macadamia and avocado farmers (**Figure 3B**).

Farmers in the Vhembe district who irrigate get higher incomes from on-farm activities as opposed to dry-land farmers due to higher yields (Olofsson, 2021). Access to water for irrigation is considered a macro constraint for smallholder farmers in the Vhembe district according to Mpandeli and Maponya (2014). These farmers are often victims of water shortages and irrigation politics.

## GENERAL DISCUSSION

### The Significance of Small-Scale Farmers

The land issue is one of ongoing contention due to the country's historic context of land distribution inequalities. Statistics show that small-holder farmers form a large percentage of farmers in South Africa at large. Aliber and Hall (2012) indicate that in 2012 there are ~2.5 million smallholder farming households in South Africa and 35,000 commercial farming units. Though there are no accurate recent statistics on the current number of smallholder farming households as this appears to be a difficult demographic to document, results of the census on commercial agriculture report in 2017 showed that commercial farming units had increased to 40,122 (Statistics South Africa (StatsSA), 2017). Due to this higher percentage of small-scale farmers any intentions of government to improve on agricultural

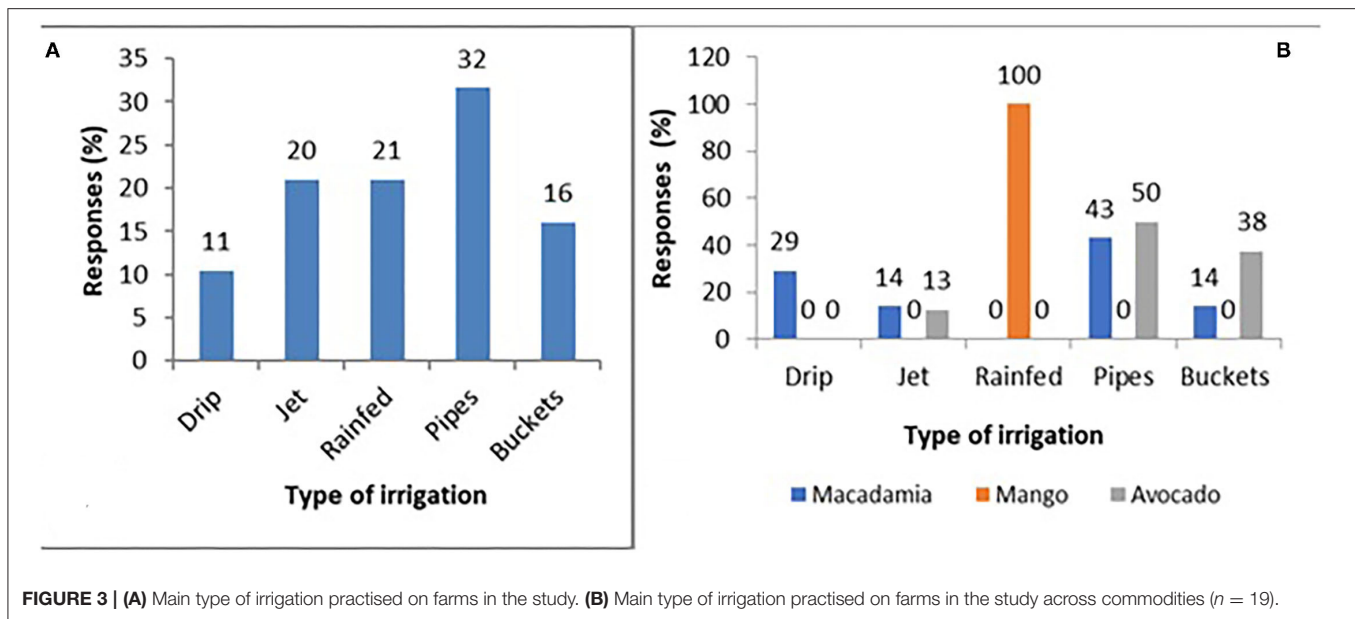
development interventions must prioritise the need to build capacity amongst small-scale farmers.

Globally small-scale farmers generally tend to be constrained by similar problems. There are some reports from 2013 to 2020 that small-scale farmers in the Limpopo Province are faced with a plethora of challenges that compromise their capacity to be significant contributors to the provincial and national agricultural economy (Greenberg, 2013; Hall et al., 2013; Mpandeli and Maponya, 2014; Olofsson, 2018; Setshego et al., 2020; Maponya, 2021). Some of these challenges include: the inability to purchase agricultural inputs (Oni et al., 2010), transport limitations which consequently hinder market access (Mpandeli and Maponya, 2014), lack of tenure security (McCusker, 2004; Beinart and Delius, 2018), limited access to labour (Hall et al., 2013), fragmented (or no) sources of technical and financial advice (Ortmann and King, 2007) and limited access to water for irrigation (Maponya, 2021) amongst others. Government is greatly invested in the promotion of small-scale farmers to a level that allows them to compete with their commercial counterparts. This is expressed in the resolution on rural development, land reform and agrarian change (2007) where the government is quoted as saying: *“the development of the smallholder sector is thus premised on creating an enabling environment for farmers to progress in a linear trajectory toward becoming increasingly commercially oriented and finally operating as fully fledged commercial farmers thus building “a modern and competitive smallholder sector”* (ANC., 2007:22).

There have been numerous interventions by government to address the challenges of small-scale farmers in order to improve on national agricultural development some of these are outlined below with reference to the Vhembe district. This is in line with a systems analysis approach which suggests that due to the complex, multi-variable nature of a problem there cannot be only one way approach to addressing problems but a diversity of interventions (Meadows, 2008; Arnold and Wade, 2015).

### Land Tenure Reform

In attempts to address the inequalities presented by a historical land distribution framework that placed small-scale farmers in



a highly disadvantaged position compared to their commercial farmer counterparts, government has launched multiple policy interventions targeting land reform. Hall (2004) explains that the key focus of government's land reform has been the redistribution of land through a market-led "willing buyer, willing seller" land redistribution programme. The programme has received much criticism and current parliamentary debates around the success of this programme have been heated because it does not tie the acquisition of land to farmer support and resources to enable farmers to generate an appealing livelihood.

The lack of tenure rights for small-scale farmers in the Vhembe district much like the case of other small-scale farmers located in the former homelands is further compounded by overlapping use rights on communal land. Small-scale farmers are not able to fully participate in commercial activities because they do not own land. An example of this challenge is illustrated by Burger (2021) where a farmer may plant maize on a piece of land only to have someone else's cattle possibly graze there after the harvest and individuals from other families collecting water, food, and firewood from the same land. The same author (2021) suggests that in order to reform the current land tenure context on the communal level, the law must democratise control over communal land. This can be achieved by shifting power from the traditional leaders and placing it in the hands of community members. The challenge of land reform and the absence of tenure security is not unique to South Africa. Peters (2009) draws our attention to the fact that communal tenure is "the joint creation of colonial officials and African leaders" and therefore a complex problem that impact numerous African countries.

Using the example of Kenya, the post-colonial government's approach has been the creation of settlement schemes. According to Rutten et al. (1997) Kenyan land use policy was primarily targeted at adjudication and replacing customary land rights with individual tenure agreements. This approach was aimed

at facilitating collateral for loans and enabling long-term investments. Unfortunately, one of the many negative consequences of this attempt at land reform has been the creation of a category of landless people as land has become increasingly concentrated in the hands of a privileged few. This sheds some light on the complex challenge that land reform presents for many governments in other African countries. It also presents an opportunity for the adoption of a systems analysis approach to address these complex problems.

### The Commodity-Focused Approach

There has been a growing trend in agricultural policy toward a commodity-focused approach to agricultural development (Chawiche, 2015; Jaskiewicz, 2015; de Satgé and Phuhlisani, 2020). Olofsson (2018) draws our attention to how a commodity focus can be seen amongst small-scale farmers in the Vhembe district. Olofsson (2018) maintains that it is particularly visible amongst macadamia and avocado farmers where the focus has shifted entirely toward integrating small-scale farmers into national and international markets. This commodity-focused approach is also exemplified in agricultural extension in the district. Extension officers are aligned to a specific commodity specialisation and provide support and training to farmers who are grouped according to their production focus (Aliber et al., 2010; Genis, 2012). Olofsson (2018) dates the rapid growth in orchards for avocado, mango and macadamia nuts in the Vhembe district to the first decade after the transition to democracy in 1994.

Another result of this commodity-focused approach has been the expanding role for commodity organisations in supporting small-scale farmers (Aliber and Hall, 2012). This has been especially evident in the activity of the South African Subtropical Growers Association (Subtrop) and the South African Macadamia Growers Association (SAMAC). Both



organisations, which historically represented white commercial farmers in the region, have taken an active role in supporting small-scale farmers who produce avocados and macadamia nuts in recent years (Maponya, 2021). According to DAFF (2014) a statutory levy was implemented in 2014, of which 20% of the revenues were earmarked for small-scale “transformation” amounting to approximately R2 million in the first 4-year period. Most of this money was spent on enterprise development of small-scale macadamia farmers.

### Access to Capital for Small-Scale Farmers

There are a few approaches that the government has used to finance the buying of land for emerging black farmers that have included access to both loans and grant funding. One such approach was the Land Grant which was put into operation in 1995 in the earliest years of South Africa’s democracy. The Land Grant operated through the Settlement Land Acquisition Grant (SLAG). Through this grant the government provided a grant of R15 000 per beneficiary household to buy land that would be registered as a property, with up to 500 families registered as beneficiaries (Aliber and Hall, 2012). Hall et al. (2013) argues that while it stands to reason that concentrating resources on smaller numbers of beneficiaries and projects is a means of improving the “quality” of those particular projects, it is obviously at the expense of reaching larger numbers of farmers thus highlighting a shortfall of the scheme.

Greenberg (2013) indicates that the Land Bank’s lending activities are split between business and corporate banking, retail commercial and retail emerging market. The retail emerging market is said to be for small-scale farmers “without a good credit profile.” In 2011 the CEO of Land Bank, Phakamani Hadebe indicated that up to R1 bn would go to emerging farmers over 2 years under the Retail Emerging Market unit (Vollgraaff, 2011). More recently the Land Bank 2019 annual report indicates that the absolute value of “transformational loans” targeted at small-scale farmers has increased to R7.9 billion representing 17% of the loan book, up from 12% in 2018.

### A Shift From “Small-Scale” to “Commercial”

Literature identifies a small cluster of small-scale farmers who are characterised by their larger scale of production, high reliance on hired labour and higher level of mechanisation in comparison to other small-scale farmers (Hall et al., 2013; Olofsson, 2018). These have been coined differently by various authors as “*small-scale capitalists*” (Olofsson, 2018), “*emerging commercial farmers*” (Whitbread et al., 2011), or “*emerging farmers*” (Senyolo et al., 2009). This small cluster of farmers has higher land access compared to other small-scale farmers with a median of 40 ha, ranging from 22 to 54 ha, as compared to other small-scale farmers who averaged between 5 and 7 ha according to a study by Olofsson (2018). It is commonplace in South African policy and planning documents to use the term smallholder and “emerging” farmer synonymously (DAFF, 2012, 2013, 2014) suggesting they are not a category of farmers in their own right but in a process of becoming a category. Non-farm employment plays an essential

role in sustaining and developing the farm in the years leading up to full production for farmers who form part of this small cluster.

### Non-farm Income

Marinus et al. (2022) highlight the value of diversification of livelihoods to improve the living income of small-scale farmers in Africa. Non-farm income, livestock and vegetable farming rank high amongst examples of additional income sources that have proven successful for smallholder farmers in Sub-Saharan Africa. Olofsson (2018) identified the most common form of non-farm employment amongst small-scale farmers in the Vhembe district as teaching, at primary and secondary school levels. According to Genis (2012) dependency on non-farm employment allows farmers to reinvest profits. In as much as non-farm income may serve as beneficial for small-scale farmers as it facilitates capitalisation, it can also result in these farmers being marginalised and excluded from accessing information, training and other state or private sector opportunities premised on the expectation that one is a full-time farmer and therefore available during working hours (Aliber and Hall, 2012). This has created an opportunity for white commercial farmers to emerge as “*knowledge brokers*” (Olofsson, 2018:52) providing access to alternative resources and facilitating social relations across racial and class barriers and fostering interaction between large and small-scale farmers.

According to Aliber and Hall (2012), small-scale farmers in Limpopo have resorted to employing innovative strategies to optimise their potential to participate in the market value chain in a manner similar to large-scale commercial farmers. Some of these strategies include the use of intercropping systems. Using the example of tree-crop small-scale farmers in the Vhembe district, Olofsson (2018) illustrates how annual tree-crop income constitutes the main agricultural income. A very small share of this agricultural income is obtained from a variety of crops such as sweet potatoes, spinach, carrots, tomatoes, peppers, ground nuts and cabbage amongst others. These are mostly for home consumption and only surplus is sold to local markets generating small amounts of money. Non-tree crops are perceived to be a short-term strategy for income generation while tree crops reach maturity which can take between 2 and 4 years.

## CONCLUSION AND RECOMMENDATIONS

In order for the South African government to successfully achieve the agenda of agricultural development, taking into account the dual nature of the country’s farming systems and the varied ways in which they respond to the drivers of production there is need for multiple points of intervention. There is an urgent need to focus attention on capacitating small-scale farmers to be able to compete on similar terms as large-scale commercial farmers while sustaining a decent standard of living. Research and policy development priorities need to adopt a systems thinking approach which highlights the complexity of the interrelatedness of the factors that impact the drivers of production and the practicality of therefore applying interventions concurrently. There is potential for systems approach to be applied to a broader context beyond South Africa and in other sectors. Issues

surrounding farming systems are closely tied to the sustainable development goals (SDG) 1 (no poverty) and 2 (zero hunger) but a systems analysis approach can be applied to tackle other issues encapsulated in the remaining SDGs that intersect across different spheres.

## AUTHOR CONTRIBUTIONS

FM and MS contributed to conception and design of the study on which the manuscript is based. FM wrote the first draft of the

manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

## FUNDING

This research was funded by the National Research Foundation and the Department of Science and Technology, through the funding of MS SARChI Chair in Global Change and Systems Analysis (Grant number 101057).

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