Grain production by rural subsistence farmers in selected districts of Limpopo and Mpumalanga Provinces South Africa

Pamella Mngqawa[1], Lizzy M Mangena-Netshikweta[2], and David R Katerere[3]

Abstract

Subsistence farmers contribute significantly to food production, food security, and employment in South Africa. However, their production output in rural South Africa is poorly understood since no production data are available. We set out to assess maize production in two districts, namely Vhembe District Municipality (VDM) in Limpopo and Gert Sibande District Municipality (GSDM) in Mpumalanga over 2011 to 2012 seasons. A total of 39 subsistence farmers were randomly selected and interviewed using a semi-structured questionnaire. It was found that on average, VDM farmers were ten years older (±61.5 years) than those in GSDM (±51.1 years), but in both groups, education level was low. Maize was the staple food in both provinces, with a significant production difference of p = 0.0184 between the two districts over both seasons. In both provinces over two years, groundnuts and beans were consumed as secondary crops. Land used in VDM ranging from 0.5 - 4 (produced an average of 0.4 and 0.7 tonnes) and 1 to 4 hectares (3.0 and 1.8 tonnes) in GSDM was of a subsistence nature. Maize production levels varied from household to household. From the study, we can conclude that there is a need to improve productivity and crop diversity of crops. In general, VDM farmers' experience lower harvests of agricultural produce than those from GSDM.

Keywords: subsistence agriculture, grain productivity, post-harvest storage practices

[1] Mycotoxicology and Chemoprevention Research Group, Institute of Biomedical and Microbial Biotechnology, Cape Peninsula University of Technology. Cape Town, South Africa. E-mail: pamzikhosh@gmail.com.

[2] Department of Advanced Nursing Science, University of Venda, South Africa

[3] Department of Pharmaceutical Sciences, Faculty of Science, Tshwane University of Technology, Arcadia Campus, Pretoria, South Africa.

Introduction

Agriculture in South Africa is characterized by large-scale, well-developed commercial farming on the one hand and the majority 'subsistence farmers' (often communal) located in the former 'homeland' (Scotcher, 2010). The latter have limited access to suitable arable land and have historically held only 0.5 - 1.5 hectares (ha) of land per household (Lahiff & Cousins, 2005). As a result of this as well as resource constraints, climate change, historical and current challenges, production among subsistence farmers is much less than the land's potential (Walker & Schulze, 2006). They only produce food for their household food needs, with little or no surplus to sell. In general, the subsistence farming sector has been identified as being underutilized, poorly capitalized and economically unsustainable (DAFF, 2009).

Recognizing the importance of agriculture to rural economic development and the role that subsistence farmers can play in poverty alleviation and sustainable development. The South African government has put in place support interventions under the Comprehensive Agricultural Support Programme (CASP), New Partnership for Africa's Development (NEPAD)'s Comprehensive Africa Agriculture Development Programme (CAADP) framework and the *Ilima / Letsema* Programme. The new grant, Ilima/Letsema was introduced in 2009 to reduce poverty through production initiatives, such as irrigation infrastructure and support services. The program aims to transform subsistence farmers currently subsisting in the former homelands into viable commercial small-scale farmers.

Primary agriculture contributed about 4.5% to South Africa's GDP and about 10% of the country's export earnings in 2000 (NDA, 2001). This had declined at an average annual rate of 4.11% from 2001 to 2010 (Afribiz, 2009; Statistics SA, 2011a). The sector employs an estimation of over 9,000 people in commercial agriculture and a quarter of a million subsistence farmers (DAFF, 2014). Commercial agriculture supplies about 98% of maize in South Africa, while the remaining 2% is produced by the emerging farmer sector (DAFF, 2014). Agriculture is one of the pillars of economic growth and poverty alleviation ensuring food security, employment opportunities and downstream multiplier effects on rural economies (DFID, 2005). In some countries, every 1% increase in per capita agricultural output has been shown to lead to a 1.61% increase in the incomes of the poor (Irz et al. 2001; Thirtle et al., 2001).

Improving the productivity of subsistence farmers and facilitating market access are important factors in developing rural agriculture in South Africa. Currently, most of these farmers are mainly engaged in maize monocropping for household consumption with no commercial outlook (Ncube et al., 2011). This is largely because of limited hectares and resources, poor infrastructure, inadequate storage facilities and lack of access to formal markets (Altman et al., 2009). Thus of the 12 million tonnes of commercial maize produced annually in South Africa, the contribution of subsistence farmers is miniscule and insignificant (DAFF, 2009).

Sub-Saharan Africa continues to struggle with the inability of people to gain access to food due to poverty, which is the cause of food insecurity in developing countries (Interacademy Council, 2004). Poor productivity not only impacts on the economic status of subsistence farmers but it also exacerbates food insecurity and compromises food safety. While South Africa is regarded to be a food-secure country, it ranks very high for income inequality (in terms of the GINI index) among other middle-income countries. Up to 30% of the population experiences food insecurity, especially in the rural areas and informal urban settlements (Altman et al., 2009). Children are the most severely affected by food insecurity which impacts on their learning ability and development. When food is in short supply, some of the available food may not be safe enough for consumption due to spoilage, which is a cause of concern in subsistence households. The most common causes of spoilage are insect and rodent damage as well as fungal growth. However, many people living in resource-poor countries have little choice but to consume spoiled food which may be harmful to their health (Shephard, 2005; Katerere et al., 2008).

In the present study, we set out to assess and compare the grain and secondary crop production output of selected subsistence farmers' in the rural areas of two provinces in South Africa as a measure of household food security status. Maize production is critical to food security and food safety in the country because maize is the staple food for the majority of the South African population (Mudhara, 2010). In addition, we sought to understand the production constraints that subsistence farmers may be experiencing and hence to identify strategic interventions required from policy-makers, government, and other stakeholders. We focused on collecting data on maize production in the 2011 and 2012 seasons from a total of 39 households in Limpopo and Mpumalanga provinces. These areas are situated on marginal lands with limited hectarage and have sub-tropical climates.

The specific objectives of this study were to (1) assess baseline maize production among subsistence farmers in selected villages in Albert Luthuli local municipality (Mpumalanga) and Thulamela local municipality (Limpopo), and (2) understand factors affecting maize production and storage practices among rural farmers in the two areas and to assess farmers support programmes and services provided by provincial agricultural departments in two provinces.

Methodology

Study areas

This study focused on two rural district areas, namely, Vhembe District Municipality (VDM) in Limpopo Province and Gert Sibande District Municipality (GSDM) in Mpumalanga Province. Both areas have a high concentration of subsistence farmers. Two villages were selected in VDM, Tshidimbini which falls under Thulamela local municipality and Matshavhawe under Makhado local Municipality of the Limpopo Province. Nine villages in GSDM, (i.e. Waverley, Fernie, Oshoek, Ntababomvu, Hereford, Bellvedia, Swaluwsnest, Ndonga, and Mayflower) in Albert Luthuli local municipality in Mpumalanga Province were additionally selected for the study areas.

VDM is located in the Northern corner of South Africa, bordering Zimbabwe, Botswana, and Mozambique. This municipality is situated in the Lowveld and has a subtropical climate with mild, moist winters and wet, warm summers (Tshikova, 2006; Durand, 2006; Poto & Mashela, 2008). Total population percentage in this province was at 11% (Statistics SA, 2011b).

The areas are agro-ecological zoning (AEZ) as they are considered arid to semi-arid with frequent droughts in some local municipalities (VDM, 2011). The arable land in the district constitutes just over 10% (approximately 249 760 ha) of the available total hectarage. Of this land, black subsistence farmers are confined to a mere 75 000 ha (VDM, 2010/2011) where they own limited hectares per household. It contributes over 4 % of South Africa's total agricultural output, most of which is attributed to fruit and vegetable production and cattle's farming is done on a small scale. GSDM is located in the Lowveld, east of Mpumalanga bordering Mozambique and Swaziland (DAFF, 2009). It has a subtropical climate and the highest rainfall concentrated in the eastern part falls mainly between October and March (NDMC, 2002). It has occasional maximum temperatures above 25°C and mostly below zero minimum temperatures (GSDM, 2011/12). The population is estimated percentage at 7.23% Statistics SA 2011. GDM is the biggest district in the Mpumalanga province and the most rural (DAFF, 2009).

Sampling and data collection

The study protocol (ID no. EC11-002)_was approved by the MRC Ethics Committee of the South African Medical Research Council. Community meetings were held to explain the purpose of the study prior to its initiation, and all participants signed prior informed consent forms. Twenty households from GSDM and 19 VDM households were recruited and interviewed with six weeks of harvesting in July 2011 to 2012.

Households were randomly selected for participation in the study and farmers wereinterviewed face-to-face using a semi-structured questionnaire by the principal investigator and co-workers. The questionnaire was designed in English and translated into Tshivenda language spoken by VDM farmers and siSwati language understood by GSDM farmers. It captured information on household size, farm size, types of crops grown, storage practices and several food security indicators, including agronomic data and harvest output.

Statistical data analyses

Data obtained for household variables in this study was subjected to the mixed procedure in SAS statistical package v. 9.3, which were used for regression modelling. The kg (tonne) variables had a skewed distribution, so subsequently for this log transformed variable kg (i.e. kg (tonne) log) a mixed-effects regression model was used with year and province as fixed effects. A year by province interaction term was also included to investigate whether weights differed across the two years (2011-2012) and two provinces (Limpopo and Mpumalanga). Least Squares Means (LS Means) were used to estimate the fixed effects, and their comparisons, as well as 95% confidence intervals for household size and differences, were obtained.

Results

Socio-demographic

In Thulamela local municipality (Limpopo province), samples were collected from 19 households in two villages and Albert Luthuli local municipality (Mpumalanga Province). Samples were collected from 20 households in nine villages. Table 1 shows the demographic data of the respondents as well as their harvest for the 2011 to 2012 cropping seasons. There were more female farmers (74%) in Limpopo than in Mpumalanga (20%). The farmersin Limpopo province were on average ten years older (average 61.5 years; 49 - 81 years) than those in Mpumalanga province (average 51.1 years; 37 - 75 years). The formal educational background of Limpopo farmersvaried from none to secondary, while all farmers in Mpumalanga reported having had only primary education. The size of the households in Mpumalanga was on average bigger (mean 9.2; 3 -14 occupants) than those in Limpopo province (6.5; 2 – 23 occupants).

Table 1: Demographic and productivity indicators for subsistence farmers in Vhembe (VDM) and Gert Sibande District Municipalities (GSDM)

Average components of Indicators	**Limpopo Province (VDM)**	**Mpumalanga Province (GSDM)**
Ages of household head (years)[1]	61.5 (49-81)	51.1 (37-75)
Amount of land used (ha)[1]	1 (0.5-4)	1 (1-4)
Number of adults & children/households[2]	6.5 (2-23)	9.2 (3-14)
Literacy level*[3]	2.0 (1-3)	2.0 (2)

*****Highest standard passed by the household head. 1-no education, 2-primary education, 3-secondary education.

[1]Primary data. An average age of household heads (male and female), cultivated hectare (ha) and number of participants (family size) in each household.

[2]Total average number of occupants in each household

[3]Literacy level refers to the average education level of the household head. 1-no education, 2-primary education, 3-secondary education.

Maize production

GSDM farmers reported an average annual maize yield of 3.0 and 1.8 tonnes which was significantly higher than that reported by VDM (0.4 and 0.7 tonnes) farmers in the first and second season, respectively (Table 2). The least (0.08 tonnes) in 2011 and (0.1 tonnes) in 2012 productive farmers were both found in VDM. VDM has villages with limited arable land with farmers holding anything between 0.5 - 4 ha each. While farmers in Gert Sibande District Municipality (GSDM) also have access to limited arable land they do appear to be more productive with an average yield of 3 tonnes (0.3 – 10). In VDM, subsistence farming was mostly dominated by women (74%). In contrast, 80% of subsistence farmers in GSDM were men. Apart from maize, minority of farmers I both provinces grew peanuts and beans.

Table 2: Varieties of crops and productivity output for subsistence farmers in Vhembe (Limpopo) and Gert Sibande (Mpumalanga) District Municipalities.

	Years	Average maize harvested (tonnes)[1]	WM[2]	YM[3]	Peanuts[4]	Beans[4]
VDM	2011	0.4 (0.08-2.4)	1/19	18/19	2/19	3/19
	2012	0.7 (0.1-2.5)	n/a	17/17	3/17	2/17
GSDM	2011	3.0 (0.3-10)	17/20	12/20	1/20	7/20
	2012	1.8 (0.4-5.0)	19/19	9/19	n/a	3/19

[1]Average of maize harvested – average maize produced per hectare presented as tonnes and the range of the harvested maize (range of harvested maize).
[2]WM-White maize, number of households found with WM
[3]YM- yellow maize, number of households found with YM
[4]Number of beans and peanuts cultivated as secondary crops.
n/a - not applicable, no WM samples found.

Informal trading of surplus

Farmers from VDM (62%) and GSDM (28%) indicated that they buy maize either from other subsistence farmers or commercial maize to last them until the next harvest. Selling of maize to hawkers or other subsistence farmers had considerably decreased in 2012 as there was not enough food harvested in the second year. Only 1/17(VDM) and 3/19 (GSDM) household maize was sold in 2012 compared to the year 2011, where approximately 50% maize was sold in both districts. Comparing the two seasons (2011 and 2012) on maize harvest duration, VDM (10/19 and 9/17), showed no difference in maize which lasted less than six months. A decrease in the number of households with maize that lasted for 12 months from 9/19 to 5/17 in the first and second season respectively was observed. VDM farmers appear to be prone to food insecurity might not be food sufficient as they only produce one type of maize at low production compared to GSDM where they plant white and yellow, and the production is much higher. There are various other reasons such as storage practices, climatic conditions that influence productivity and are discussed in detail below.

Factors affecting production

As noted earlier, farmers are in areas with low rainfall and therefore drought-prone overcrowding in scarce arable land. Only 7% of South Africa's farmland is irrigated (CEEPA, 2006; Scotcher, 2010). Climate change is one of the many challenges that the subsistence farmers encounter and will worsen in the future reducing agricultural productivity in many parts of Southern Africa. Some subsistence farmers in GSDM stated that they were not able to produce much because of the floods that affected their crops. Impacts of climate change will undermine food security, especially in Africa. Soil degradation caused by overcrowding, limited access to agricultural technical assistance and lack of knowledge have been previously cited as impacting on crop production (Mwaniki, 2006). Lack of crop rotation, conservation agriculture, and soil conservation measures have a negative impact on a long-term agricultural productivity (FAO, 2011).

These factors/conditions were observed in both areas, particularly in VDM. In GSDM, the farmers had on average larger plots while in VDM all farmers reported farming on no more than 1 ha of land. Apart from these considerations, there appears to be a general lack of tillage facilities, poor storage infrastructure, lack of access to credit and inadequate extension support services from government. The farmers in GSDM were in a slightly better position as they received some government assistance under the *Asibuyele emasimini* (back to farming, Zulu) program which provides tillage for 1 hectare and starter seed packs and fertilizers for that hectare. In VDM respondents indicated that due to limited financial resources, very little or no fertilizer was applied to their crops during storage. Farmers in GSDM and VDM reported using the previous year's harvest as seed (55 and 37% respectively), the rest purchase commercial seed. In VDM about 16% used mixed portions of the previous season's harvest and new seed. Ncube et al. (2011) have previously reported on this practice elsewhere in rural South Africa. This however increases the risk of systemic mycological infection and impacts on crop health and consequently productivity (Wilke et al., 2007)

Post-harvest storage methods

In both areas, the practice is to leave maize in the field for about a month to dry prior to harvesting. This happens from April to May and harvesting begins in June. In GSDM three-quarters of the farmers placed their harvest in traditional open wooden cribs for further drying and on-cob storage. It was observed that storage structures used for maize by the farmers differed from district to district. Open wooden cribs were used by the majority of farmers from GSDM for further drying and 75 & 84% farmers made use of the cribs both for continuous drying and as an on-cob crop storage, while 65 & 26% used the community silo for storage in 2011 and 2012, respectively. A minority of farmers, respectively 15 & 32% used the wooden cribs solely as storage, and 25&26% maize samples were stored in steel tanks inside the house during season one and two.

In GSDM only a few wooden cribs were covered with corrugated iron roofing, allowing access to environmental conditions. Some residents stored and pre-stored in houses, steel tanks, open wooden cribs, roof, covered wooden cribs as shown in Figure 2 and instead of adequately ventilated silos. GSDM farmers have access to a community silo which not only stores the maize for them but also mills it at a small charge (Figure 3). The community silo is a temperature and humidity controlled storage system with ventilation. Ventilation system with cooling and drying in the silo are important to avoid unnecessary deterioration of agricultural commodities caused by fungal growth and activity during storage (Jouany, 2007). While in 2011, 65% of farmers utilized the silo, this had plummeted to 26% due to the cost of electricity of the silos which users were expected to pay.

Mudhouse (called duru) were used by about a fifth of farmers. For season one and two respectively, 21and 24% farmers in Limpopo used enclosed cement or mud storehouses for storage. The majority of respondents (79 and 76%) were frequently observed storing loose grain in polypropylene or polyethylene sacks (Figure 4).

These sacks were usually stored in the kitchen or living area directly on the floor against the wall due to the small size of the yield.

Storing maize in sacks or plastic drums (which was common in VDM) presents obvious problems not only with weevils, termites, rats and stalk borers but also pre-disposes the crop to heat, humidity, and moisture. Signs of insect, rodent, and fungal spoilage were obvious on visual inspection in most of the bags inspected.

Climatic data of Mpumalanga and Limpopo Provinces

The resilience of agriculture commodities depends on the climatic parameters of the area and the storage practices of each household. A seven-year climatic data was obtained to check if there were any climatic changes from year to year (Table 3).

Climate data from October to March growing season in South Africa, were as follows; VDM in 2011 and 2012, respectively ranged from18 - 30 °C and 17 - 30°C with relative humidity (33 - 93% & 32 - 87%) and maximum rainfall of 434.3 mm and 202.18 mm. Mpumalanga had a temperature (from 15 - 33°C & 14 -32 °C), relative humidity (31 -92% & 29 – 89%) and a maximum rainfall of 221 and 206 mm during 2011 and 2012 respectively.

Table 3: Annual averages of climatic data conditions (temperature (°C), relative humidity (%), and rainfall (mm) patterns) for Mpumalanga (Mpu) and Limpopo (Lim) Provinces

	Minimum temperatures (°C)		Maximum temperatures (°C)		Minimum Relative Humidity (%)		Maximum Relative Humidity (%)		Rainfall (mm)	
Year	**Mpu**	**Lim**	**Mpu**	**Lim**	**Mpu**	**Lim**	**Mpu**	**Lim**	**Mpu**	**Lim**
2006	12.7	17.3	26.5	28.7	28.2	33.1	76.8	79.9	63.5	55.2
2007	12.7	17.0	27.3	27.2	32.2	37.4	84.9	79.3	42.9	85.0
2008	13.0	17.0	26.9	27.2	35.4	39.0	86.8	80.2	101.1	68.1
2009	13.1	17.0	26.7	26.8	36.7	40.5	87.7	80.5	63.8	79.1
2010	13.4	17.2	26.9	26.8	38.0	43.7	88.3	83.4	64.8	75.4
2011	10.1	16.5	25.3	26.4	31.1	41.0	86.0	80.6	59.7	105.5
2012	13.0	16.6	27.8	27.0	30.5	35.2	83.3	77.8	50.0	47.7

*Weather data provided in this study was supplied by the Institute for Soil Climate and Water of the Agricultural Research Council in Pretoria, South Africa. The reported weather data are from the closest weather stations to the study areas.

Discussion

This study found that farmers in Limpopo province were on average ten years older than those in Mpumalanga province and that the level of formal educational was low in both groups. Low levels of education and old age concur with findings by Oni et al. (2003), who reported that most subsistence farmers in Mpumalanga province are aging men and women (Oni et al., 2003). In the African continent, it has been found that women at a subsistence level produce more than 70% food (Doss, 2011). Lahiff & Cousins (2005) have reported that men produce much greater yields than women. The majority of men (farmers) in GSDM may point to the bias towards pastoral activity in the Nguni ethnic groups which dominates in the area and which is culturally regarded as an activity reserved for men which is why more men are farmers (EGSA, 2013). Women play an important role in crop production and food security but they face gender-based inequalities, they have_less access to agricultural productive resources such as land, infrastructure and economic opportunities than men (World Bank, 2009).

However, maize production in VDM has shown an average increase of 0.3 tonnes from 2011 to 2012. GSDM maize production decreased in 2012 by 1.2 tonnes as a result of late crop planting. The world consumes 116 million tons of maize, with 30% consumed in Africa and 21% in sub-Saharan Africa (SSA) (Maize Crop, 2013). Although farmers in GSDM also have limited hectarage they appear to be more productive in both seasons. The main reason appears to be the support they get from the provincial government which provides access to basic production equipment and agricultural extension services. Such support was lacking in VDM and Baloyi (2010) had previously pointed out that access to resources such as land, water, infrastructure, capital and good resource management is necessary for subsistence farmers to increase their productivity (Baloyi, 2010). Such support could improve productivity substantially (CAADP, 2009; World Bank, 2007).

This study shows that maize is the major crop while groundnuts and beans were produced by a minority of farmers as secondary crops in both areas. Consequently, this difference in productivity between the two provinces presented an analysis variable with a statistically significant difference ($p < 0.05$; 0.0184) for both seasons. Good nutrition is important for plant health and delayed planting has been known to influence production and exposes the crop to higher temperatures, inducing fungal infection and consequently mycotoxin contamination (Kendra, 2009). Two participants from VDM were not available for collection and were thought to have migrated to the urban areas for employment.

There were distinct differences in the maize varieties grown and the subsistence productivity in two different AEZ. GSDM farmers cultivated two maize varieties (both yellow and white maize) while farmers in VDM only grew yellow maize. In the former, white maize was grown for human consumption, whereas yellow maize was used for animal feed. This showed that animal husbandry is an important part of the livelihoods and culture of GSDM farmers who are of Nguni ethnicity. Nguni people (Swati and Zulu) are pastoralists and cattle in particular play a significant part in providing food, draught power, bridewealth and savings Lahiff E, and B Cousins 2005). In contrast, in the VDM, yellow maize is the culturally accepted variety for human consumption. The farmers reported no ownership of large stock because of lack of pasture land and water. Nationally, Lahiff & Cousins (2005) have previously reported that 25 - 50% of rural households own cattle in South Africa. They found that while this number was considered low, its overall contribution to the economy (largely in non-monetary terms) was significant (Lahiff E, and B Cousins 2005). Rampant stock theft, frequent droughts, lack of water supply and grazing pastures are reported to limit the growth of the rural herd in South Africa (Poto St & Pw Mashela, 2008).

Wooden cribs are commonly used in Africa as traditional storage methods positioned on raised platforms to prevent moisture, insect and rodent damage to crops (Hell et al., 2000). They may be covered with thatch or corrugated iron sheet or not covered. GSDM wooden cribs were exposed to extreme environmental conditions such as the sun, rain and rodent invasion which damage maize. On that score, the cement and mud houses used in Limpopo seemed to be superior, but humidity and growth of mould were possible due to poor aeration. Further, weevil and stalk borer which damage maize in storage can only be prevented by appropriate use of pesticides to preserving crops.

Even though further drying of crops on the wooden cribs is encouraged, wooden cribs are also exposed to extreme environmental conditions such as the sun, rain and rodent invasion which damage the crops. Cement and mud houses seemed to be superior, but humidity and growth of mould were possible due to poor aeration. Proper ventilation is one of the important factors throughout drying and storage in order to eliminate possible fungal growth (Wagacha & Muthomi, 2008). These storage structures were similar to granaries used in Zimbabwe except that those in Zimbabwe are usually mud huts and raised on boulders from the ground (Marchand, 2007). This is meant to reduce dampness, and they are wellaerated. In southern Togo traditional cylinder-shaped storages called *bliva* made from woven vegetable materials are used to dry maize cobs and in Ibadan, Nigeria, storage structures are made from grilles of wood and bamboo (FAO, 1994). Steel drums tend to create a cool well-ventilated atmosphere which reduces spoilage. A study by Hell et al. (2000) in Benin, West Africa found that maize kept in different storage structures vary in fungal and mycotoxin contamination. Kankolongo et al. (2009) observed the same process in Zambia, where households store maize harvest in sacks inside their houses.

Variations and distribution in temperature and rainfall have a negative effect on agricultural production in the field in South Africa (Durand, 2006; Dube et al., 2013). These sampled areas are vulnerable to poor, and unreliable rainfall, participants from both districts, had stated that they had experienced insufficient late rain with high temperatures over the years. South African maize prefers temperatures of 12 - 24°C minimum and a maximum of 26 - 29°C for better growth highly sensitive to humid parameters (Durand, 2006). Mpumalanga normally receives rain during summer while in Limpopo Province receives enough rainfall but has high temperatures (Durand, 2006). Some parts of Africa have the most important climatic factors which highly favour the growth of toxins which damage agricultural crops (high moisture content of 17 to 25% high relative humidity (≤ 70%) and 2 to 55^{o}C temperatures) (Bankole & Adebanjo,2003; Negedu, et al., 2011; EMAN 2013.).

In both provinces, agriculture is considered to be a secondary activity. This is partly reflected by the average age of the farmers, most of whom are elderly and past their most economically productive phase of life. It further appears that very few farmers produce surplus quantities of the maize to allow for trade. In general maize production in both areas is characterised by low yields. In some households, the average yield was inadequate to meet their food needs. Households had to purchasing additional maize which shows low the insufficiency of production as well as storage methods used. A similar situation was previously reported in the Northern KwaZulu-Natal by Thamaga-Chitja et al. (2004).

Maize in VDM was mostly planted in backyards in which the yields were low and in the degraded land, this was evident in one of the villages. Odhiambo (2011) reported that most of the land in Limpopo has degraded and the current unproductive soil has resulted from factors which include overcrowding and poor land management (Odhiambo, 2011). In the second season, all GSDM farmers indicated that their fields were planted late due to problems within the agricultural sector compared to the previous year. As a result of late planting, it was too late for one farmer to cultivate. The two provinces are affected by the negative climate conditions which exist, i.e. relative humidity above 70% and temperatures between 2 to
40 ^{o}C. This was evident especially in VDM despite households being smaller (6.5 occupants) compared to GSDM (9.2 occupants).

The following challenges were encountered more especially in Matshavhawe village (VDM), no-uniform plots in a wide range of sizes and actual postharvest losses. In this area maize is grown under irrigation, harvested and sold as green mealies no sales and harvest records were kept by the respondents unlike in GSDM where each farmer is planted one hectare by the provincial department of agriculture. The findings of this study is similar to those of the study by Chimonyo, et al., (2012) at the Eastern Cape Province, South Africa that farming in this area was dominated by elderly farmers who relied heavily on old age pension, using low-yielding landrace varieties, no fertilizer application and pests were major productivity constraints with average yield less than one ton per hectare. The production constraints all three provinces were the same except the fact that farmers in Limpopo and Mpumalanga used medicinal plants (Lippia javanica) to control pests such as maize weevils and also used kraal manure to improve soil fertility since they cannot afford conventional fertilizers

Conclusions

This study has identified the fact that food safety and security in rural South Africa remains a challenge which needs to be addressed urgently. It has revealed an average of 75 % and 47% of farmers in GSDM and VDM, respectively reported producing maize crops that would last to the next season's harvest. The farmers stated that they purchased maize either from other subsistence farmers or retail outlets in order to last them until the next harvest. When household size was taken into consideration, most families were prone to food insecurity if they were to rely solely on crop farming. For the subsistence farmers in rural South Africa to improve food supply for themselves and the country, they need to increase and diversify crop production. Both are lacking knowledge farming practices such as crop rotation, crop diversification and adoption of newly improved crop varieties that can help to improve the yield.

However, storage practices and land ownership remains the major challenges that negatively impact on production levels. Access to more arable land than VDM and agricultural extension services were the major reason why the farmers in GSDM were significantly more productive. At the macro-economic level, policymakers should focus on these two elements (land reform and suitable extension support services) while at the farm level, there appears to be a great need to create awareness about Good Agricultural Practices (GAP) which protect the land, reduce production losses and ensure improved food quality. More farmers in this area have a potential to grow to another level and increase their yields provided training, and information is provided in the following areas: improved maize varieties, cropping systems, crop rotation, diseases and pest control, harvesting, storage, record keeping of all inputs, marketing, and general business management.

The findings show the inconsistency in farmer support program roll-out among provinces, which exacerbates inequalities in farming communities. The findings show the inconsistency in farmer support programs roll-out among provinces, which exacerbates inequalities in farming communities. It has clearly shown the existing vast fragmentation of government farmer support between the two provinces not just within the same province in South Africa. If programs such as Comprehensive Agricultural Support Programme (CASP) which its aim is to enhance the provision of support services to promote and facilitate agricultural development can be fully rolled out fully by all provinces much can be achieved in this sector. Looking at its focus of training, capacity building, on/ off-farm infrastructure development and information management all its beneficiaries such as the hungry, subsistence farmers and household food producers, both beneficiaries from the two study areas (provinces) could have benefited a lot from such a program.

Increasing productivity of the subsistence agriculture sector by encouraging farmers to improve their management skills of their harvest from the field to storage would increase food security. This would consequently reduce the high dependence of having to buy food from the shops and improve the food quality. It is evident from this study that if the support from provincial agricultural departments can be increased and properly monitored, more f are likely to graduate to semi-commercial level. The worrying factor about most participants/respondents is their age and level of literacy. There is a need for sound programs that will bring or attract more young people into the agricultural sector not as labourers but as managers, researchers, and entrepreneurs. Agricultural sector and all stakeholders have a major task of creating awareness on how important food production to sustain our livelihood more especially young people in schools and all corners of life. Though this was a small exploratory study the information gathered should be valuable to policy makers and development workers.

Acknowledgements
We would like to thank the "South Africa and Netherlands Programme on Alternatives in Development" (SANPAD) for funding the project, the field workers, and the farmers for allowing us access to their homes. The authors would like to declare that they have no conflicts of interest.

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