Estimating the value and economic contribution of agricultural production in the former homelands of South Africa

by

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DECLARATION

I, Nomonde Nomfundo Gwebu, hereby declare that the dissertation submitted in partial fulfilment of the degree MSc Agric (Agricultural Economic) at the University of Pretoria is my own work and has not been submitted by me for a degree at this or any other tertiary institution.

SIGNATURE: ……

DATE: ……

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ABSTRACT

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The value and economic contribution of agricultural production in the former homelands of South Africa has become increasingly important to measure. It is critical to our understanding of the role agriculture plays in household food security in these regions and the contribution by this section of the agricultural sector to the economy. Yet, two decades into the Democratic South Africa we still fail to consistently provide accurate estimates of this sectors value.

The fundamental premise of this dissertation is to estimate the value and economic contribution of agricultural production in the former homelands of South Africa so that the subsistence agricultural sector can be well understood in terms of its characteristics and its value. The main focus of this study is therefore placed on black subsistence farmers in the former homelands of South Africa, mostly because these areas are under great pressure to maintain food self-sufficiency.

The main hypothesis of this study is that, the value and economic contribution of agricultural production in the former homelands is significant when compared with the contribution by the commercial agricultural sector in South African. In order to test this hypothesis, three different data sets were analysed because none of these data sets individually provide exhaustive information for the purposes of this study. These data sets include primary data, such as the Agricultural Research Council (ARC) sample survey data from the OR Tambo District municipality conducted in 2015. The secondary data used in this study include the ARC sample

survey 2013, the Income and Expenditure Survey (IES) 2010/2011 conducted by Statistics South Africa (Stats SA), and the National Income Dynamics Study (NIDS) waves 1 to 3 conducted by the Southern African Labour Development Research Unit (SALDRU).

The Gross Margin (GM) analysis approach was used in this study to estimate the economic contribution of agricultural production. In interrogating the NIDS waves and IES 2010/2011 data sets, two types of variables which can be used to estimate the economic contribution of agricultural production are provided. The first type of variables are the self-reported values of agricultural goods consumed from home production, which are found in both the NIDS and IES datasets. The second type of variables are quantities of agricultural goods harvested and the value of sales from home production, found in the NIDS datasets.

The variables to estimate the economic contribution of agricultural production would appear to be the self-reported values of agricultural goods consumed from home production. Using the NIDS data the estimated value of consumption from home production in current prices was R207 million based on wave 1 data, R80,5 million based on wave 2 data, and R529 million based on wave 3 data. Using the IES data the estimated value of production for home consumption in current prices was R359 million in 2010/2011. In investigating the 2010/2011 figures estimated in this study several issues arise with regard to the number of agriculturally active households and the value of agricultural goods consumed from home production. The most important issue, is that self-reported values of agricultural goods consumed by households introduce an added source of inequality to the measurement of output. According to the UNSD (2005), households can inaccurately assign values to self-produced goods because of a lack of information about local market prices. In order to avoid this source of inequality in the measurement of the agricultural sectors contribution, estimates of the economic contribution of agricultural production were pursued, based on local market prices.

It was determined that only the NIDS and the ARC data sets have variables to directly estimate the economic contribution of agricultural production based on the GM approach. The variables include: quantities of crop and livestock goods harvested and the value of sales from own production. Using the ARCs data it was estimated that the annual GM per household per year in 2012 prices was R1 985.32 based on the 2013 data and R8 892.85 based on the 2015 data. Using the NIDS waves 1 and 3 data, it was estimated that the annual GM per household was R1 017.85 based on wave 1 data and R3 535.42 based on wave 3 data in 2012 prices. The NIDS wave 2 data set does not provide farm input cost and livestock production variables. As a result,

it was only possible to estimate the annual Gross Farm Income (GFI) per household which was R1 973 in 2010/2011 in 2012 prices. The latter results are somewhat consistent with the ARC 2013 and 2015 figures, although not directly comparable. The Agricultural Research Council-Department of Rural Development and Land Reform (ARC-DRDLR) project introduced in the OR Tambo District municipality has played a key role in terms of changing the mind-set of farmers. Therefore, programmes such as the ARC-DRDLR project should be introduced with more vigour. Such programmes should, however, not undermine subsistence households consumption type activates.

The NIDS data set was used to determine the subsistence sectors value based on GFI estimates. In determining the significance of the black agricultural sector in the former homelands, the GFI of the black subsistence sector in the former homelands was compared with the GFI of the commercial agricultural sector. The economic contribution of black subsistence farmers' agricultural production in 2012 prices was R1 062 million based on wave 1 data, R911 million based on wave 2 data, and R2 190 million based on wave 3 data. This study found that the subsistence agricultural sector was 1%, 0.6% and 1.5% of the commercial agricultural sectors GFI in 2008, 2010/2011 and 2012, respectively. These figures may depict a desolate agricultural sector in the former homelands. However, these measures of economic wellbeing detract from much of what contributes to other factors – such as social and cultural bonds – that contribute to human wellbeing but have nothing to do with income generation. The economic values of agricultural production from the former homelands may therefore be viewed as substantial.

In summary, the NIDS has offered useful data for analysing the black subsistence sector in the former homelands of South Africa. Furthermore, the economic contribution of agricultural production in terms of the GM approach, as presented in this study, has offered some solution to the fundamental question of this sector's value. This result reinforces the need for consistent variable capturing in national level surveys, so that the economic level of this vital sector can be understood in terms of its value and characteristics.

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ARC	Agricultural Research Council
DAFF	Department of Agriculture, Forestry and Fisheries
DBSA	Development Bank of Southern Africa
EC	Eastern Cape
FS	Free State
FSP	Farmer Support Programme
GDP	Gross Domestic Product
GFI	Gross Farm Income
GM	Gross Margin
IES	Income and Expenditure Survey
KZN	KwaZulu-Natal
LP	Limpopo
MP	Mpumalanga
NIDS	National Income Dynamics Study
NW	North West
SNA	System of National Accounts
Stats SA	Statistics South Africa
UNSD	United Nations Statistical Division

Chapter 1

Introduction

1.1 Background and Problem statement

The agricultural sector in South Africa is characterised by dualism, where large-scale commercial farms and smallholder farms co-exist (Van Zyl & Kirsten, 1998). The former have historically been relatively technologically advanced (Sadrey & Vink, 2008) and mostly white owned. The latter are mainly owned by black farmers in the former homelands[1] who mainly practise subsistence[2] farming. These smallholder subsistence farms were shaped by colonialism and apartheid policies (Vink, n.d.) and were less endowed in terms of technology because they operated largely outside a comprehensive institutional support structure, with limited access and opportunities for black farmers to compete in agricultural markets (Van Rooyen, 1990).

In the course of South Africa's transition to democracy, the role of agricultural production in the former homelands has, despite all expectation, survived, generally through a variety of policies which were promulgated to shape the strategic direction of the agricultural sector towards a more inclusive and growing sector. These policies have, however, not been completely effective. Makhura (2001) asserts that subsistence farming in the former homelands is characterised by low productivity and marginal farm incomes. Thus contributing to the high poverty levels in these areas (Mudhara, 2010).

Although the subsistence sector is characterised by low productivity, the issue of finding a basis for measuring this sectors true contribution is critical to our understanding of the role agriculture plays in household food security in these regions and the contribution by this section of the agricultural sector to the economy. Yet, two decades into the Democratic South Africa we still fail to consistently provide accurate estimates of this sectors value. The estimates for the economic contribution of homeland farmers' production have been included in the national accounts since they were first created. In the past, the estimates of homeland production were based on information on production by farmers in the homeland regions obtained through a) agricultural census reports, later b) through homeland administrations augmented by data

[1] The former homelands were territories set aside for black people in South Africa and Namibia, as part of the apartheid policy.

2 The term subsistence farmer is used in this study to denote a farmer who mainly produces crops and rears livestock on a small piece of land for home consumption and may sell surplus output.

obtained from Control Board, and more recently c) guess estimates on the share of national production originating from these regions. The latter is based on derivatives of past census information, which are now probably outdated. There is, therefore, a need for the development of better improved sources of data to measure this vital sectors economic contribution.

It is anticipated that the total value of agricultural production in the country is inaccurate. Consequently, many who analyse these rural areas tend to downplay the role and relevance of agricultural production in growth and poverty reduction (Vink, n.d.) particularly by smallholder subsistence farmers. It is, therefore, in the author's interest to investigate the economic contribution of agricultural production in the former homelands of South Africa for a number of reasons.

Firstly, the monetary values placed on self-produced goods for own consumption in surveys, such as the Income and Expenditure Survey (IES) and National Income Dynamics Study (NIDS), are often values that respondents themselves suggest. According to the United Nations Statistical Division (United Nations Statistical Division [UNSD], 2005) there are ground for questioning the accuracy of these self-reported values. The handbook asserts that households that produce food items do not buy these same items, so they may not be well informed about market prices. As a result these self-reported values may be inaccurate.

Secondly, there is no proposed method to directly estimate the economic contribution of subsistence sectors agricultural output using national level data. Some studies have, however, (Aliber & Mdoda, 2015; Dovie, Witkowski & Shackleton, 2003; 2006) proposed a method to estimate the economic contribution of the small-scale agricultural sector in South Africa. These studies, however, do not allow the direct estimation of this value, some estimate agricultural production for home consumption and others are generally fragmented, covering parts of South Africa as opposed to utilising national level data.

Thirdly, researchers (Wiggins, Kirsten & Llambí, 2010) have discovered that small farm development is feasible and desirable for poverty reduction. Lastly, the government of South Africa has set itself national outcomes in the National Development Plan (NDP) 2030, which include the creation of 1 million jobs by 2030 within the agricultural sector (National Planning Commission [NPC], 2011).

Given all the above facts, and while robust policies and programmes are in the pipeline, the economic contribution of the subsistence sector, particularly in the former homelands of South Africa, to the economy remains unknown. Clearly, a disjuncture seems to exist in the tabulation

and measurement of the role that smallholder subsistence farmers play in the economy. In order to properly account for the economic contribution of agricultural production, this study proposes the targeting of previously disadvantaged black farmers in the former homelands as the key focus, mostly because these areas are under great pressure to maintain food self-sufficiency. It is anticipated that investigating this sector thoroughly, together with its contribution to the economy, will place policy makers in a better position to target interventions to raise the economic level of this vital sector.

This study, therefore, seeks to describe the black subsistence sectors agricultural activities and identify the different settings in which they can be found. Equally important, it will also propose a method to estimate the economic contribution made to the economy by the agricultural sector in the former homelands.

1.2 Research objectives

The overall purpose of the study is to estimate the value and economic contribution of agricultural production deriving from the black subsistence sector in the former homelands of South Africa.

The specific objectives are as follows:

- To propose a method or approach for measuring the economic contribution of agricultural production.
- To identify a suitable data set and determine the economic contribution of agricultural production in the former homelands.
- To investigate the significance of the economic contribution of agricultural production in former homelands, as compared with the commercial agricultural sector.

1.3 Hypotheses

According to the System of National Accounts (SNA) the production of a good for own final use should be measured when the amount produced is believed to be quantitatively important in relation to the total supply of the good in the country (System of National Account [SNA], 1993). In the case of South Africa, many households in the rural areas are linked either directly or indirectly to agricultural activities (Pauw, 2007). It is projected that this sector is making significant economic contributions to the economy. Furthermore, it seems likely that households are making significant savings from the production and sale of agricultural produce.

Against this backdrop, the value and economic contribution of the black agricultural subsistence sector in the former homelands will be investigated.

In this context there are three hypotheses:

- The Gross Margin (GM) approach can be used to provide a reliable estimate of the economic contribution of agricultural production to the economy.
- The NIDS data may offer new data for policy design and can be used to accurately estimate the economic contribution of agricultural production in former homelands to the economy.
- The value and economic contribution of agricultural production in the former homelands is significant when compared with the economic contribution made by the commercial agricultural sector.

1.4 Research data sources

In order to propose a data set that can be used to arrive at a better estimate of the economic contribution of agricultural production in former homelands, three different questionnaires and data sets will be analysed.

Firstly, the Agricultural Research Council's (ARC) sample survey from an ongoing Fruit and Vegetable Enterprises Rural Development Project in OR Tambo District, Eastern Cape (EC) will be used to estimate the economic contribution of agricultural produce. Using the ARC data this study will investigate the value of the subsistence sector where households with small farms are widespread in the former homeland area of OR Tambo District, EC.

Secondly, the study will investigate the economic contribution of crop and livestock production based on the variables provided in the IES 2010/2011 (Stats SA, 2012a). These monetary values reported in the IES household questionnaire are self-reported values.

Lastly, the NIDS wave 1 (Southern Africa Labour and Development Research Unit [SALDRU], 2008), wave 2 (SALDRU, 2010) and wave 3 (SALDRU, 2012) will be used to estimate the economic contribution of agricultural produce to the economy.

1.4.1 Comparison of agricultural variables in the IES, NIDS and ARC data sets

The data sets used in this study are not comprehensive farm censuses. However, if used in conjunction they can be used to get a better understanding of the characteristics of smallholder subsistence farms and arrive at a better value of the contribution of black farming households

agricultural output. Table 1.1 makes a comparison of the questions asked and variables released in nationally representative surveys and sample surveys.

As indicated in column two of Table 1.1, the IES surveys in 2005 and 2010/2011 only provide two types of variables which include: the values of input cost associated with home production and the values self-produced goods for home consumption.

The NIDS waves 1, 2 and 3 provide the following variables: input cost, value of crop and livestock sales, quantity of crop harvested, and the quantity of livestock sold and produced for home consumption (see Table 1.1). On the contrary, the NIDS wave 2 did not ask households about input cost and livestock production, only animal by-product variables are provided.

The ARC's questionnaires conducted in 2013 and 2015 provides the following variables: quantities of crop production harvested and consumed, value of sales for crop production, value of livestock sold and quantities of livestock consumed, and value of farm input cost incurred (see Table 1.1).

Table 1.1: Variables and questions in IES, NIDS and ARC surveys

Distinguishing features/variables		IES 2005 & IES 2010/2011	NIDS household questionnaire (all waves)	ARC survey
		Buy or acquire		
Input cost (incurred in the last 12 months).		Value of input cost associated with non-market production: • seed • fertiliser • feed for livestock • large livestock such as cattle • small livestock such as goats • services (ploughing)	All questions asked in the last 12 months • hired labour • seed/planting material • fertiliser, pesticides or herbicides • animal dung or manure • farming services for example tractors, ploughs, planters or animals. • veterinary services or products • animal feed • investments in your agricultural activities • repair and maintain machinery • water for irrigation purposes	All questions asked in the last 12 months • seed/planting material • fertiliser, pesticides or herbicides • other farming materials • wages for workers who helped with farming • petrol, diesel and oil for machines • services (tractors) • farm land that was rented • feed for animals
		Crop and livestock production		
Household production and consumption of goods (In last 12 months).	**Crop production:**	Agricultural section of diary questionnaire indicates value of: Crop consumption from home production i.e. non-market crop produce.	Agricultural section • Did anyone grow […]? • How many kg of this crop have been harvested? • Have you sold? • How many kg of […] were sold over the last 12 months? • How much money did you receive in total for selling […]? Food purchases section • What was the value in rands of […] eaten from own production in the last 30 days?	• What is the annual output of the crop? • What is the amount of crop losses for the crop? • How many kg of the crop were used for home consumption? • What is the value of sales for the crop?
	Livestock production:	Agricultural section of diary questionnaire indicates value of: Livestock consumption from home production i.e. non-market livestock produce.	Agricultural section • Has household member owned […]? • How many […] are in the household's possession at the moment? • If you were to buy all of these [...] today how much would you pay in total? • How many [...] were sold in the last 12 months? • What is the total amount you got from selling […]? • How many were slaughtered and consumed by the household? Food purchases section • What was the value in rands of […] eaten from own production in the last 30 days?	• How many […] are in the household's possession at the moment? • How many […] did the household sell? • How many […] did the household slaughter or use for own consumption? • How many did the household lose due to theft or illness or other loss? • How many […] did the household give away as gifts?

Source: Author's summary of the NIDS wave 1, 2 and 3, ARC questionnaires, and IES 2010/2011 questionnaire.

1.5 Outline of the study

The primary objective of this chapter was to provide a background and introduce the studies identified research problem, objectives, hypotheses and information about the sources of data. In the introduction the research problem is presented, followed by the objectives, the hypothesis and the overview of methodology. Chapter 2 discusses the history of land dispossession in South Africa, the extent of agricultural production in the Reserve areas of South Africa, and also discusses the agricultural support policies prior to 1994. This is followed by a discussion of the contribution of homeland agricultural production towards GDP in South Africa. Chapter 3 reviews the methods used to estimate the economic contribution of the smallholder agricultural sector by other studies. Chapter 4 discusses the data sources and the research method used. Chapter 5 shows how the data was merged and how inconsistencies in the different data sets were managed. Chapter 6 discusses the findings of the value and economic contribution of agricultural sector to the economy based on the ARC 2013 and 2015, the IES 2010/2011 and NIDS data sets. Chapter 7 concludes this study with a summary, conclusions, limitations and the recommendations for future research.

Chapter 2

The History of Agriculture in the Former Homelands of South Africa

2.1 Introduction

The history of colonial conquest and land dispossession in South Africa is well documented in literature, and according to Kahn (2007), this process was a striking one. The impact of this process succeeded in destroying a formerly vibrant black agricultural sector in the Reserves, and produced a class of black workers dependent on providing wage labour in the urban areas and on white farms.

Wilson and Wolpe (cited in Simkins, 1981) argue that the decline in agricultural production per capita in the African Reserves of South Africa occurred in the period after 1948. Following on from 1994, when South Africa acquired political independence, Mbongwa, Van den Brink & Van Zyl, 1996 state that the current dual structure of the South African agricultural sector and the seemingly low output from small-scale black farmers in the former homelands and rural areas was a consequence of decades of Union government policy and the apartheid regime. As a result, the policy framework of the South African Democratic government was centred on the issue of land. At the same time, the agricultural sector merited programmes and support directed to previously disadvantaged black farmers, who lacked the skills and resources to productively farm their land.

The overall purpose of this chapter is to discuss the history of colonialism and apartheid, and the impact that this process had on agricultural production in the African Reserves of South Africa. In section 2.2 the pre-colonial and British colonial history of South Africa is discussed. This is followed by section 2.3, which discusses the process of industrialisation in South Africa. Section 2.4 provides an account of the evolution of agricultural production in the African Reserves of South Africa from 1981 to 1969 by Simkins (1981). Section 2.5 then discusses agricultural support programmes in the South African homelands. Section 2.6 briefly discusses how the former homelands were created and presents crucial information regarding the contribution of homeland agricultural production towards GDP between 1970 and 1986 based on the DBSA statistical publications. Lastly, the conclusion is discussed in section 2.7.

2.2 Historical overview of South Africa's pre-colonial and colonial landscape

South Africa's current position as having one of the world's most unequally distributed land holdings resulted from conquests between the Europeans and native African tribes, as settlers and colonial states stretched their authority into the interior (Beinart & Delius, 2014). The next section discusses the pre-colonial history of South Africa as well as the process of the British colonisation.

2.2.1 Pre-colonial history

History tells us that the Dutch were the first Europeans to create permanent shelter at the Cape of Good Hope in April 1652 to establish a fuelling station for ships belonging to the Dutch East India Company, sailing between Europe and the East Indies (Daniels, 1989). The Dutch commander, Jan Van Riebeeck, visualised that farms around the Cape would provide meat and fresh produce to passing ships, while cattle and other commodities were to be bartered from indigenous Khoikhoi pastoralist (Boshoff & Fourie, 2010). These efforts, however, were unsuccessful, as the Khoikhoi people became unwilling to sell more of their commodities (Fourie & Van Zanden, 2012). Jan Van Riebeeck concluded that slaves would, therefore, be necessary, and in 1658 the first slaves[3] were brought into the Cape to work as pastoralists (Graaff, 2008). During 1658, the first Dutch East India Company men were released from their service to become farmers[4] (Hamann & Tuinder, 2012). Shortly after this, the first formal act of forced relocation in 1658 occurred when Jan Van Riebeeck informed Khoi[5] communities that they could no longer could occupy the areas between Salt and Liesbeek rivers (Levin, 1996).

In 1700, Dutch cattle farmers began their migration into the interior of South Africa (Daniels, 1989) and they encountered the Xhosa tribes at the Great Fish River (South African History Online [SAHO], 2012). Hamann and Tuinder (2012) remark that years before the Dutch settled, the Xhosa people concentrated on hunting, agriculture and stock farming. Cattle provided milk, and acted as the primary form of wealth. These authors also state that cattle had immense spiritual value to the Xhosas and also provided the basis of the Chiefs' political power, because they allowed them to attract and maintain followers.

3 Slaves originated from Ceylon, India, Java, the Philippines, Japan, Siam, Angola, Mozambique, East Africa and West Africa.
4 The farmers were mainly of Dutch, German and French descent.
5 Khoikhoi or Khoi were a group of people native to south-western Africa.

The expansion of the Cape colony by the Dutch was not a smooth process. For perspective, the Xhosa Wars, also known as the Cape Frontier Wars, continued for several decades, from 1779 to 1879, in what is now the EC in South Africa (SAHO, 2012).

2.2.2 British Colonisation

The British arrived at the Cape in 1795, in pursuit of a trade route to India; subsequently, the British seized the Cape from the Dutch, but returned control in 1803 (Graaff, 2008). Then in 1806, the British seized control of the Cape Colony once again (Hamann & Tuinder, 2012). British land acquisitions spread more intensely throughout the eastern frontier of the Cape. Then between 1835 and 1840, a group of Dutch settlers left the Cape colony, and headed east, in a movement that later became known as the Great Trek, in search for independence from the British (Daniels, 1989). The formation of Reserves was born during the Great Trek and it was conceived by Sir Harry Smith, the then governor of the Cape Colony (Daniels, 1989). The first government reserve created was the Mfengu community in 1836 within the Cape Colony on land formerly occupied by white farmers (Daniels, 1989). The Mfengu were a clan who fled from Zululand during the time of King Shaka between 1818 and 1828, and settled in the Eastern Cape (SAHO, 2015). According to Daniels (1989) the Cape example spread across the country, and by 1852, two million hectares of land was reserved for natives in Natal. Despite these demarcations created by Europeans, native Africans continued to purchase land in white areas and squatted on private land, and in some instances, paid rent to absentee landowners. Since the Dutch and British shared a common view that the creation of the Reserves was a solution to the problem of land invasion, they continued to allocate more land to native Africans.

Peires (1987) provides a detailed account of the continued clashes with native Africans. This author states that the British clashes with the African natives continued until the mid-1850s as they expanded their authority into the interior with advantages in weapons and disease. For example, lung sickness (bovine pleuropneumonia) arrived in the Cape aboard a ship carrying Friesian bulls to Mossel Bay in 1853 (Peires, 1987). The cattle-killings that occurred between April 1856 and May 1857 marked a significant victory for colonial authorities (SAHO, 2012). Following the visions of the prophetess Nongqawuse, the amaXhosa killed approximately 400 000 cattle (Brownlee & Maclean cited in Peires, 1987). According to Peires (1987) ‘lung sickness was the main cause of the Xhosa cattle-killing: without it, the movement could never have occurred’.

The adoption of separate development as the main focus of policy was in some measure due to increased demand for labour from urban areas and white-owned farms. The next section highlights some challenges towards industrialisation in the 19th century.

2.3 The efforts towards industrialisation

In the late 19th century, the discovery of minerals in the interior of the country created a market for agricultural products and resulted in the rise of capitalism because of the large capital requirements of the mines. In spite of this discovery, Tomlinson and Hyslop (1984) argue that free labour was a potentially limiting factor to the development of capitalist production. These authors discovered that several factors hampered development. Firstly, there was a high demand for migrant workers (Legassick cited in Tomlinson and Hyslop, 1984). Secondly, access to financial capital and labour limited Afrikaner white farmers' ability to engage in fully commercialised agriculture (Greenberg cited in Tomlinson and Hyslop, 1984). Thirdly, during the 1800s black people were becoming successful in producing agricultural goods, and farming provided an alternative to labour migrancy for large sectors of the black population in the Reserves (Bundy cited in Tomlinson and Hyslop, 1984). Lastly, weak administrative structures were unable to implement policies to force black labour out of the Reserves (Greenberg cited in Tomlinson and Hyslop, 1984).

Solutions to the abovementioned limitations were established by a combination of economic, political and ecological changes. In the first place, African peasantry deteriorated as a result of drought and the rinderpest outbreak between 1896 and 1897 (Mwatwara, 2014) which destroyed livestock of the indigenous African farmers. These losses were catastrophic to black farmers, mainly because many tribes held their wealth in their stock of cattle. Secondly, a series of wars between the Dutch and the British Empire over land forced the government to provide agricultural assistance to farmers through the formation of cooperatives. This financial assistance mainly favoured white-owned farms (Makhura, 2013). Lastly, an increase in hut and ox tax were introduced in the reserves (Cochet, Answeeuw and Freguin-Gresh, 2015) which contributed to the rise of cheap labour supply.

In 1910, the Union of South Africa was established through the merger of the four British colonies: Transvaal Colony, Cape Colony, Natal Colony and Orange River. The Union of South Africa later converted to a Republic in 1961 (Liebenberg, 2013). The Union introduced legislation to ensure effective labour control and ensured that white farmers had access to South Africa's prime agricultural land, coupled with the financial and practical support they would

need to develop that land agriculturally (Makhura, 2013). While the black population grew rapidly in the Reserves, black people were condemned to subsistence farming and becoming migrant labourers (Arrighi, Aschoff, & Scully, 2010). Hall (2010) highlights that the resulting land shortages, overcrowding, and the demise of agriculture guaranteed a reliable flow of cheap labour to the mines and urban areas, while families of migrant workers relied on agriculture to maintain their lives in the Reserves.

Agricultural production suffered a serious set-back because migrant labourers, mostly men, were forced to leave their families in the Reserves. In addition, the low wages, which were paid to black people could only maintain the lifestyle of a single migrant, allowing very little capital available for reinvestment to improve agricultural production in the reserve areas (Arrighi *et al*., 2010). The policies and legislation that subsequently followed contributed to black people in the Reserves depending on the cash economy.

In early 20th century, the agricultural sector was on track to recover from the South African war and droughts that followed. In Parliament, during the second reading of the Land Bank Bill in May 1912, white farmers in the former Boer colonies raised their need for a financial institution for the agricultural sector. In response, the Union government passed the Land and Agricultural Bank Act in 1912 to form the Land Bank (Makhura, 2013). The Land Bank only operated in the Union provinces. Consequently, only white farmers benefited from high levels of support, both in terms of skills development and financial aid during droughts and recessions. An indirect consequence of this policy was an increase in the black population in the urban areas who were seeking employment.

In order to further minimise contact with black people, in 1913 the South African government approved the Native land Act, 27 of 1913 (Feinberg, 1993). In terms of this Act, certain areas which were most inhabited by black people were reserved for the exclusive occupation of black people (Tomilson & Hyslop, 1984). This Act made it illegal to sell land outside the Reserves to black people and also attempted to end squatting and sharecropping by black people on white-owned farms (Olivier, 1984). Consequently, black people were only permitted to live on white-owned farms as labours. In 1936, the Native Trust and Land Act, 18 of 1936, was promulgated to allow the provision of more land to the previously reserved 1913 scheduled territories (Olivier, 1984).

A series of World Wars between 1914 and 1936 hampered the agricultural export market and stimulated the local manufacturing industry. During this period, the black population in the

towns increased and for the only time in South African history, this group's wages in the manufacturing sector increased between 1936 and 1948, faster than those of the white population (Legassick, 1975). As a result, white workers felt threatened by the greater competition from black people over jobs. At the same time, farms in the rural areas faced greater competition from urban employers for the supply of cheap labour. For the second time, government provided a solution to the rapid movement of labour to the urban areas. As a measure of influx control, the Natives (urban areas) Consolidation Act was promulgated in 1945, and in terms of this Act, black people were allowed to occupy only specific areas in urban territories (Olivier, 1984). This Act was then followed on by the apartheid regime, which was introduced by the Nationalist Party government and set the foundation for separate development.

2.4 Agricultural production trends in the African Reserves of South Africa, 1918-1969

According to Simkins (1981) the African Reserves include: crown state Reserves or locations, mission Reserves or stations, tribally owned farms, African-owned farms, crown or state land occupied by Africans, and trust lands purchased after 1936. According to Simkins (1981) agricultural censuses in the African Reserves of South Africa were carried out since 1918 mainly by the police. From 1925 to 1965 the agricultural censuses in the African Reserves of South Africa was undertaken by several government departments. For perspective, in 1946 enumeration in the Reserves was carried out by the Department of Native Affairs with the cooperation of the Veterinary Division of the Department of Agriculture. From 1964 to 1969 – with the exception of 1965 – the agricultural censuses from the Reserves were carried out by the Department of Bantu Administration and Development and the Department of Agriculture and Forestry of the Transkeian Government. In 1965 the censuses were carried out by the Bureau of Census and Statistics.

According to Simkins (1981) these agricultural censuses are imperfect sources to analyse the production of agriculture from the African Reserves of South Africa and have to be viewed with an open mind. This is because these censuses have not been explicit about enumeration or estimation methods. Moreover, Simkins (1981) discovered that in 1929 the production of maize, kaffircorn, wool and mohair in the Reserves was arrived at by means of 'carefully prepared' estimates. Similarly, from 1934 to 1939, estimation methods were used for livestock production, with the exception of 1937 where an actual enumeration was conducted.

Table 2.1 below shows the value of agricultural production from 1918 to 1969. An analysis of agricultural production in the African Reserves of South Africa by Simkins (1981) reveals that from 1918 to 1969 pastoral production contributed the greatest part of total production in economic terms. The agricultural censuses used to arrive at these estimates provided no output observations for items such as other winter cereals, sisal, phormium tenax (New Zealand hemp), cotton, sunflowers, other vegetables, fruits and forestry products. As a result, agricultural censuses are likely to have underestimated production from the Reserves; which would make the estimates in Table 2.1 too low.

Table 2.1: Total value of agricultural production in the Reserves of South Africa, 1918-1969 (in Pounds million - current prices)

Date	A-Cereals	B-Pulse etc.	C-Cash crops	D-Vegetables	E-Cattle	F-Small stock	G-Pigs & Poultry	Total
1918	2,702	0,132	0,088	0,193	1,345	1,673	0,25	6,383
1921	4,667	0,132	0,135	0,154	2,422	1,059	0,219	8,788
1923	3,291	0,132	0,08	0,125	1,929	1,298	0,236	7,091
1924	2,065	0,132	0,074	0,11	2,257	1,544	0,24	6,422
1925	2,939	0,132	0,073	0,094	2,181	1,659	0,261	7,339
1926	1,607	0,132	0,071	0,077	2,647	1,409	0,255	6,198
1927	2,497	0,132	0,099	0,067	2,41	1,422	0,261	6,888
1928	2,045	0,132	0,08	0,049	2,739	1,693	0,266	7,004
1929	2,607	0,132	0,073	0,046	2,927	1,431	0,27	7,486
1930	2,601	0,132	0,067	0,044	2,412	1,115	0,273	6,644
1934	2,763	0,132	0,055	0,04	2,174	0,935	0,242	6,341
1935	1,12	0,132	0,054	0,04	2,164	0,748	0,252	4,51
1936	0,817	0,132	0,054	0,041	2,188	0,868	0,268	4,368
1937	2,216	0,132	0,056	0,042	2,357	1,127	0,291	6,221
1938	1,465	0,132	0,059	0,044	3,837	0,899	0,321	6,757
1939	1,856	0,132	0,062	0,045	3,026	0,851	0,358	6,33
1946	2,988	0,494	0,117	0,072	5,866	1,393	0,806	11,736
1947	5,841	0,492	0,164	0,068	5,676	1,638	0,879	14,758
1948	6,303	0,501	0,207	0,067	5,722	2,248	0,947	15,995
1949	3,505	0,52	0,245	0,068	6,191	2,698	1,01	14,237
1950	4,307	0,549	0,279	0,071	6,302	3,043	1,067	15,618
1951	3,523	0,588	0,308	0,077	6,425	3,499	1,119	15,539
1952	3,658	0,638	0,332	0,084	7,117	3,867	1,167	16,863
1953	6,638	0,698	0,352	0,095	8,245	4,27	1,209	21,507
1954	6,292	0,768	0,367	0,107	7,9	4,158	1,245	20,837
1955	5,866	0,848	0,378	0,122	7,279	3,687	1,277	19,457
1956	3,908	0,781	0,425	0,223	8,362	3,816	1,631	19,146
1957	6,603	0,737	0,47	0,321	8,939	3,865	1,913	22,848
1958	4,127	0,716	0,516	0,415	9,553	3,701	2,124	21,152
1959	5,208	0,717	0,561	0,507	9,327	3,312	2,263	21,895
1960	5,021	0,74	0,605	0,595	7,73	3,046	2,331	20,068
1961	6,236	0,786	0,649	0,68	9,082	3,165	2,327	22,925
1962	4,286	0,854	0,692	0,762	8,476	3,048	2,251	20,369
1963	4,785	0,945	0,734	0,841	8,798	2,74	2,104	20,947
1964	4,577	1,059	0,777	0,917	9,249	3,225	2,145	21,949
1965	3,624	1,195	0,818	0,99	9,585	3,548	1,973	21,733
1966	4,33	1,28	0,582	1,426	10,15	3,57	2,161	23,499
1967	4,481	1,062	1,262	1,834	11,066	3,921	2,3	25,926
1968	2,971	0,786	1,618	1,128	11,547	4,366	2,39	24,806
1969	4,278	1,062	1,418	1,498	11,044	4,454	2,431	26,185

Source: Simkins (1981).

Note: 1. No Agricultural Censuses were undertaken in the Reserves in 1919-20 and 1922 or at all in 1931-3 or 1939-45.

2. Some figures were interpolated (see Appendix 1 in Simkins, 1981).

Figure 2.1 below shows the value of agricultural output and the output per head between 1918 and 1965 in 1946 prices. According to Simkins (1981) total agricultural production (valued at

constant prices) did not fall over the period 1918 – 1965. Moreover, the author asserts that the value of agricultural output per head drastically declined after 1948, rather than before that date. This result is no coincidence because once the Nationalist Party gained power in 1948 its relocation plans were taken up more earnestly - putting more pressure on land in the Reserves or homelands. For example, a study by Simkins (1983) found that 4.3 million people lived in the homelands in 1950, a figure that rose sharply to 11.1 million in 1980.

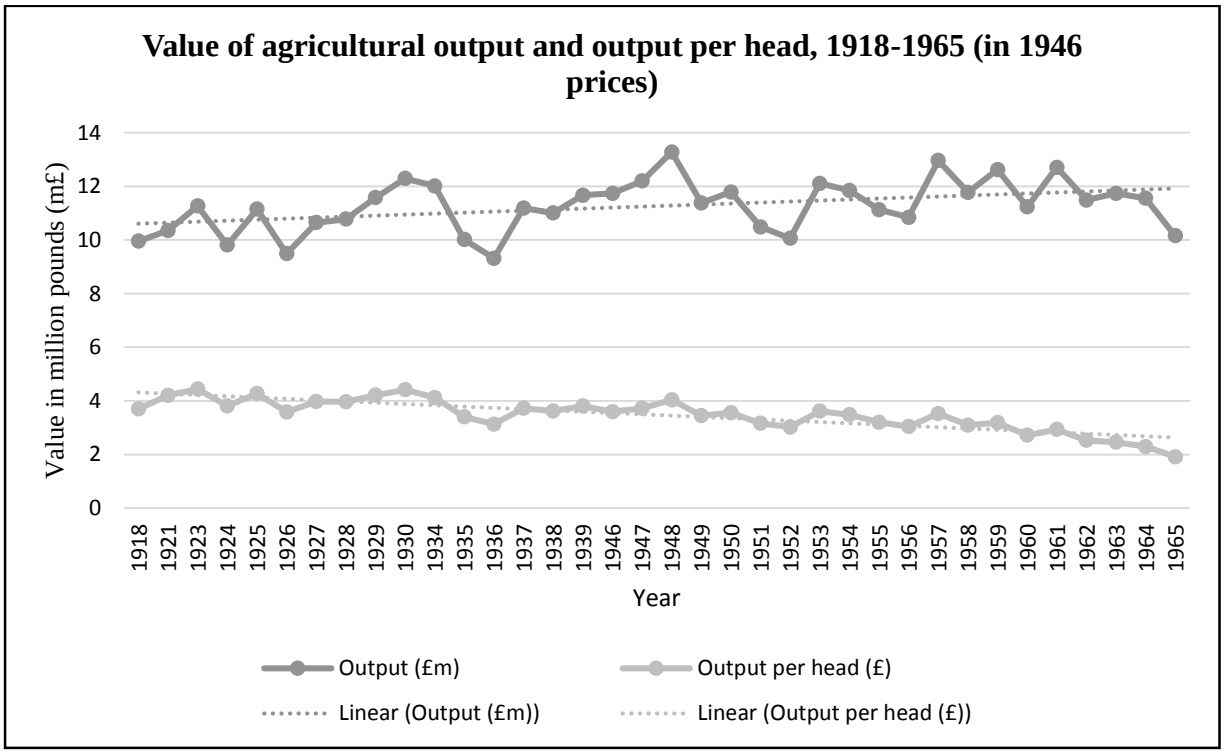

Figure 2.1: Total value of agricultural output and output per head, 1918-1965 (Pounds million - 1946 prices)

Source: Simkins (1981).

Among researchers who have studied the course of agricultural production in the Reserves conflicting findings are presented about when the decline in agricultural productivity occurred. Other studies suggest that this decline in agricultural production occurred in the late 1920s. On the other hand, Simkins (1981) argues that agricultural productivity significantly declined after 1948. It is evident that agricultural output per head was on a downward trend in the early 1920s. There is, however, no doubt that Simkins (1918) results make a compelling point about the negative impact of increased population growth in the Reserves in the period after 1948.

2.5 Agricultural support in the homelands of South Africa

Under the apartheid regime, the Reserves were turned into homelands, which constituted approximately 13 % of the land under the Republic (Beinart & Delius, 2014). According to Butler, Rotberg, and John (1977), each homeland had been granted some measure of self-governance and promises of independence were in the pipeline. These homelands, however, would never become independent, but the Bantu Authorities Act introduced in 1951 provided for the establishment of tribal, regional and territorial authorities, assigned with advisory functions only (Geldenhuys, 1981). A total of 10 homelands were established, namely Transkei, Ciskei, KwaZulu, Lebowa, Venda, Gazankulu, Bophuthatswana, QwaQwa, KaNgwane and KwaNdebele (Butler, *et al*., 1977). The Transkei, Bophuthatswana, Venda and Ciskei (TBVC) gained independence in 1976, 1979, 1981 and 1977, respectively (DBSA, 1987). The remaining six homelands were self-governing territories of South Africa, namely KaNgwane, KwaZulu, QwaQwa, KwaNdebele and Gazankulu, which became self-governing in 1973, 1984, 1961, 1977, 1972 and 1974, respectively (DBSA, 1987).

The role of the homelands – as separate states used for housing families of migrant workers and a source of cheap migrant labour – was being threatened by rapid population growth, sanctions against South Africa and increasing domestic unrest called for an end to the apartheid regime (Arrighi, *et al*., 2010).

Concerns about the deteriorating state of the homelands arose from the Native Economic Commission Report of 1930-1932, academics and state officials (Beinart & Bundy, 1980). In response to these concerns the Nationalist Party government intervened by introducing agricultural services and rural development programmes in the former homelands. Strategies for stimulating economic growth through farming included: betterment planning to the late 1970s, centrally managed project farming, and the farmer settlement programme projects during the 1970s and 1980s, supported by the Development Bank of Southern Africa (DBSA) (Vink, Kirsten & Van Zyl, 2000).

The next subsections discuss the Betterment Planning scheme with a view to show what the wider government policy considerations underlying Betterment Planning might have been. This is followed by a brief discussion of the centrally managed project farms. Lastly, the Farmer Support Programme (FSP) is discussed in order to see what can be learnt from the DBSA's broad-based strategy in the 1980s.

2.5.1 Betterment Planning

Betterment Planning in South Africa refers to attempts, started in the 1930s, by the government to reverse the deterioration of natural resources and to contribute to agricultural development in black-occupied rural areas, and in some measure, control migrant labour and urbanisation, thereby keeping black people in the homeland areas (De Wet, 1989).

The Natives Trust and Land Act (No. 19 of 1936) provided the legal basis for the establishment of the South African Natives Trust to administer the Reserves for black occupation and simultaneously deal with concerns surrounding Betterment Planning (De Wet, 1995). This Act and related documents concluded that the deteriorating state of the Reserves was mainly due to poor farming practices on the part of the farmers. Consequently, the government put its conservation plan into legal action through Proclamation No. 31 of 1939, which was designed to combat overstocking (Proclamation No. 31 of 1939 cited in De Wet, 1995). In terms of the Proclamation, if the number of cattle units in a Betterment Area exceeded its carrying capacity, officials of the Department of Native Affairs were empowered to conduct a cull.

Betterment Planning also included the construction of farms, erection of contour banks, dams, roads and dipping tanks. These investments, however, were not forthcoming, because of a lack of funding and interruptions caused by the Second World War (Beinart & Bundy, 1980).

Betterment was not a smooth process and in places where Betterment work did continue, some areas resisted this policy, while in areas that were set aside for Betterment after 1936, that is, Trust areas, inhabitant consent was hardly granted (McAllister, 1991). In addition, Betterment was also opposed by white farmers who objected to the loss of arable land and labour (Ngcaba, 2002).

In 1950, the Tomlinson Commission was appointed to conduct an inquiry to report on the rehabilitation of the Reserves. The report, released in 1954, announced a change of emphasis with regard to Betterment and adopted the necessity for separate development. One of the main proposals by the commission was to establish viable agriculture by removing surplus populations from homelands to rural villages. However, this would require that the government invests in agriculture, forestry, mining, industry, religion, health, welfare, education and administration, as well as to the consolidation of the Reserves into well-organised blocks of land. These recommendations were only partly implemented by the South African government. According to Hendricks (1989) the rejection of the commission's proposals clearly demonstrates how desperate the state was to control the rural labour force.

It is evident that the government's priority to establish viable agriculture in the rural areas never materialised. Instead McAllister (1991) argues that betterment schemes threatened the survival of the rural economy, discouraged investment in agriculture, and contributed to environmental degradation. This era was followed by a rural development approach that focused on capital-intensive projects.

2.5.2 Centrally managed project farms and farmer settlement projects

During the homeland era in the 1970s and 1980s, the government focused on centrally managed project farming and farmer settlement projects, mainly for industrial crops where large farm units were preferred (Vink et al., 2000).

Farm workers or wage employees were settled on these schemes which provided management, inputs, tillage and marketing services. These modern farming enterprise projects achieved a higher level of resource use and wage employment. However, according to Vink *et al*. (2000), very little was achieved to promote a class of independent farmers or to improve farming conditions for smallholders outside these schemes, because parastatal companies and consultants managed them.

Consequently, an alternative approach to agricultural development, called the FSP, was introduced, targeting subsistence agricultural producers by providing comprehensive agricultural support services and incentives to farmers (Van Rooyen, 1995).

2.5.3 Farmer Support Programme (FSP)

The FSP was introduced in 1986 (Van Rooyen, 1995) with the goal of shifting away from investment in projects to a programme that could provide access to support services for a large number of smallholders and rural households in a broad-based manner (Vink *et al*., 2000). The main goal of the FSP was, thus, to assist smallholder farmers to achieve improved farming efficiency through increased access to resources and support services. From its broad-based approach, the FSP was directed by demand from smallholders for services, allowing for increased economic growth in the rural areas.

In the late 1980s, the DBSA financed its first agricultural rural development programme through the FSP. The first FSP was implemented in KaNgwane and KwaZulu in 1987, followed by Venda and Lebowa in 1988 and 1988–1990, respectively. Case studies (Singini & Van Rooyen, 1995) conducted by the DBSA in the above-mentioned homelands revealed major challenges. These included high transaction costs to borrowers of credit, poor record-keeping

on the extent of FSP, lack of coordination by extension farmers, low levels of experience and skill, political divisions in communities, and a shortage of training personnel. Indications were that achievement of success in the FSP was most likely when farmers had access to: monthly wage remittances and welfare payments; additional land; liquid assets (cattle); and extension and training.

The extent to which the FSP aimed to improve the welfare of people in the homelands through agricultural financing was subject to land and credit limits. Based on the DBSA's scientific review of the FSP in 1995 (Singini & Van Rooyen, 1995) the programme had very good chances of succeeding in areas where people had access to reliable credit and land. Table 2.2 below provides a summary of the institutional aspects and selected characteristics of the DBSA's FSP. In the KwaZulu homeland, the FSP clients earned more income than non-FSP clients. In KaNgwane and Lebowa FSP farmers attained higher agricultural outputs and achieved increased farm efficiency through better use of inputs. In Venda, the FSP succeeded in alleviating the constraints FSP clients faced. According to Naledzani (1992) FSP clients became more actively involved in their farming operations, were more productive, earned higher incomes, had higher economic activities, and utilised more extension services and farmer institutions than non-clients. In general, indications are that the FSP clients positively benefited from the programme.

The objective of the FSP to commercialise farmers in the homelands did, however, restrict the application of the FSP. As a consequence of this problem, from 1989 onwards the FSP extended support to household productive activities and included the funding of consumption-type activities. Van Rooyen (1995) asserts that this helped to secure private sector institutions as co-financiers of development programmes.

On the other hand, attempts by the state to create capital-intensive agricultural projects aimed at increasing production levels and employment in the former homeland areas, inevitably raised operational costs of the activities in question. This was indeed the experience of the FSP whose effectiveness in improving the lives of the rural poor failed to solve the problem of rural poverty and underutilised resources in some cases. It can further be argued that the success of the DBSA's FSP development initiative was limited and applied to a few farmers in the homelands where the programme was initiated. The main reason for this was that the programme ignored the effects of internal and external influences, including natural, historical and political influences (Ortmann & Lyne, 1995). For instance, farmers and contractors received externally

derived and expensive inputs which they could not afford to pay off. Consequently, the programme was unable to bring about structural change away from subsistence production. Overall, the main lesson picked up from this initiative was that no amount of capital invested in the homelands could rescue the rural farmers, as long as the most fundamental impediments to economic growth inherited from the apartheid regime remained in place.

Given that the historical and political influences of the apartheid regime have been removed, and the unequal distribution of land is currently being redressed. Perhaps it is now time to review the FSP and implement a similar programme in South Africa.

Table 2.2: Characteristics of the DBSA's Farmer Support Programme (FSP)

Homelands (Date of implementation)	KwaZulu (1987)	KaNgwane (1987)	Venda (1988)	Lebowa (1988-90)
Implementing Agent	KwaZulu Finance and Investment Corporation (KFC) and the Department of Agriculture and Forestry (KDA)	Agricultural Development Corporation of KaNgwane (Agriwane)	Department of Agriculture and the Agricultural Development Corporation of Venda (Agriven)	Lebowa Agricultural Corporation (LAC)
Most important FSP elements	Credit	Credit	Extension	Extension/Training
	Extension	Extension		
Description	KFC initiated its own FSP in KwaZulu, and in addition, KDA and private organisations assumed much of the planning and coordination of the programme.	Agriwane implemented FSP on existing farming structures, many of which were already commercially orientated.	Agriven's approach to FSP was to promote commercial farming, but credit was combined with a wider range of support services.	LAC identified food security as the primary need; therefore, the FSP'S main aim was increased maize production rather than a change away from agriculture.
Success Factors	FSP clients earned more crop incomes than non-clients.	FSP farmers obtained higher maize yields/ha, sold more maize, used more inputs, and cultivated larger areas than non-FSP farmers.	FSP largely alleviated the constraints experienced by Venda farmers in the target areas. Farmers had better access to inputs, extension advice and were generally able to produce and sell more maize.	Maize yields were significantly increased and hostility towards FSP turned into growing demand for the programme.
Limiting factors	Limited access to credit (especially to non-clients) and shortage of land were viewed as a major problem by farmers.	Lack of coordination between agricultural cooperatives and the department of agriculture resulted in poor extension service in the area.	Low effectiveness of services, due to a lack of formal education and an absence of job-specific non-formal training; was a major concerns.	Political division in communities.

Source: Author's summary based on information from Singini and Van Rooyen (1995).

2.6 Homeland agricultural contribution towards GDP

The agricultural sector in the developing homeland areas[6] of South Africa was often viewed as inefficient and unproductive when compared to modern farming in the white areas of the South

[6] The developing homeland areas of South Africa includes the self-governing (i.e. KaNgwane, KwaZulu, KwaNdebele, Lebowa, QwaQwa and Gazankulu) and TBVC states (i.e. Transkei, Bophuthatswana, Venda and Ciskei).

Africa. However, among researchers who have analysed agricultural production in the developing homeland areas of South Africa, there appears to be consensus on the rational behaviour of farmers in the homelands (Van Rooyen, Vink & Christodoulou, 1987). From this viewpoint it was argued that agriculture has an important role to play in creating jobs and improving household incomes. The information presented in Table 2.3 and Table 2.4 below was compiled by the DBSA. In response to a need for a joint publication containing statistics on agricultural production in the homelands. The author was able to obtain publications released in 1989 and 1990 from the resource centres at the DBSA and DAFF.

2.6.1 Agricultural contribution towards GDP by the self-governing states

Table 2.3 below summarises the percentage and value contribution of agricultural GDP from the self-governing homelands of South Africa at current prices from 1970 to 1990.

The agricultural sector in Gazankulu contributed 20% towards total GDP in 1980; its highest figure based on the period under review. In addition, the Gazankulu homeland realised its highest average annual agricultural growth rate[7] (21%) in 1980.

In 1975 the agricultural sector in KaNgwane contributed 32% towards total GDP; its highest figure based on the period under review. In terms of agricultural growth, KaNgwane realised its highest average annual agricultural growth rate (42%) in the mid-1970s.

The agricultural sector's economic contribution in KwaNdebele improved steadily between 1980 and 1990. The agricultural sector in KwaNdebele contributed a modest 9% towards total GDP in 1985; its highest figure based on the period under review. In terms of agricultural growth, KwaNdebele realised its highest average annual agricultural growth rate (40%) in 1990.

The agricultural sector in KwaZulu contributed 29% towards total GDP in 1975; its highest figure based on the period under review. In terms of agricultural growth, KwaZulu realised its highest average annual agricultural growth rate (23%) in the mid-1980s.

The agricultural sector in Lebowa contributed 21% towards total GDP in 1970; its highest figure based on the period under review. In terms of agricultural growth, Lebowa realised its highest average annual agricultural growth rate (16%) in the mid-1970s.

[7] The formula for calculating the annual growth rate is $\left((f/s)\hat{}\ \frac{1}{y} - 1\right) * 100$ where f is the final value, s is the starting value, and y is the number of years.

The agricultural sector in QwaQwa contributed 13% towards total GDP in 1970; its highest figure based on the period under review. In terms of agricultural growth, QwaQwa realised its highest average annual agricultural growth rate (30%) in the mid-1970s.

Table 2.3: Self-governing states agricultural GDP at current prices, 1970-1990 (in R'000)

	Gazankulu[8]	KaNgwane	KwaNdebele	KwaZulu	Lebowa	QwaQwa
Sector	**Agriculture, hunting, forestry and fishing**					
1. Product and distribution						
1970	8 404	851	n/a	22 527	8 316	175
%	15	27		28	21	13
1975	11 334	4 928		51 881	17 071	639
%	15	32		29	16	11
1980	29 891	6 591	1 400	83 192	17 821	1 442
%	20	13	8	19	9	5
1985	46 674	16 071	7 484	237 613	34 426	4 218
%	17	13	9	18	6	3
1986	56 034	18 500	9 120	285 300	41 500	5 300
%	18	11	7	17	6	3
1987	53 637	23 500	10 860	333 700	49 300	6 240
%	16	11	6	15	5	3
1988	56 160	25 600	12 110	413 000	55 040	6 890
%	15	10	5	15	5	2
1989	64 336	29 898	12 266	483 668	59 933	8 530
%	15	9	4	14	4	2
1990	68 689	34 917	13 492	566 428	65 261	10 561
%	15	9	3	14	4	2
2. % Average annual growth rate increase/[decrease]						
1975	6	42	n/a	18	16	30
1980	21	6	n/a	10	1	18
1985	9	20	13	23	14	24
1990	8	17	40	19	14	20

Source: Statistical Abstracts (DBSA, 1992).

The agricultural sector in QwaQwa and KwaNdebele contributed modestly towards total GDP. On the other hand, KwaZulu, Gazankulu, Lebowa and KaNgwane homelands contributed significantly to total GDP. This is possibly because the total population numbers[9] in KwaZulu (4 978 900), Lebowa (2 658 900), Gazankulu (717 000) and KaNgwane (600 000) are higher than in QwaQwa (293 000) and KwaNdebele (425 000). It is likely that there were more

[8] Gazankulu's GDP at factor cost and constant (1985) prices for the agricultural sector; 1970-1990 (R'000).
[9] The de facto population as in 1990: included all persons physically present in the country at the reference date. In terms of this definition, migrants who were working elsewhere and who were, therefore, not enumerated in their country of origin were not regarded as part of the country's de facto population.

agriculturally active households in KwaZulu, Lebowa, Gazankulu and KaNgwane than in QwaQwa and KwaNdebele.

2.6.2 Agricultural contribution towards GDP by the SATBVC states

Table 2.4 below summarises the percentage and value contribution of agricultural GDP from South Africa, Transkei, Bophuthatswana, Venda and Ciskei (SATBVC) states at current prices between 1970 and 1989. The agricultural sector in South Africa contributed 8% towards total GDP in 1970 and 1975; its highest figures based on the period under review. The average annual agricultural growth rate remained constant at 16% between 1975 and 1989, with the exception of 1985 – which had a lower average annual agricultural growth rate of 10%.

The agricultural sector in the Transkei contributed 43% towards total GDP in 1975; its highest figure based on the period under review. In terms of agricultural growth, the Transkei realised its highest average annual agricultural growth rate (27%) in the mid-1970s.

The agricultural sector in Bophuthatswana contributed 11% towards total GDP in 1975; its highest figure based on the period under review. In terms of agricultural growth, Bophuthatswana realised its highest average annual agricultural growth rate (37%) in the mid-1970s.

The agricultural sector in Venda contributed 32% towards total GDP in 1975; its highest figure based on the period under review. In terms of agricultural growth, Venda realised its highest average annual agricultural growth rate (32%) in the mid-1970s.

The agricultural sector in the Ciskei contributed 16% towards total GDP in 1970; its highest figure based on the period under review. In terms of agricultural growth, the Ciskei realised its highest average annual agricultural growth rate (51%) in the mid-1980s.

Table 2.4: SATBVC states agricultural GDP at current prices, 1970-1989 (in R'000)

	South Africa	Transkei	Bophuthatswana	Venda	Ciskei
Sector	**Agriculture, hunting, forestry and fishing**				
1. Product and distribution					
1970	887	27 631	4 524	1 842	3 440
%	8	32	8	27	16
1975	1 888	91 163	21 647	7 450	8 358
%	8	43	11	32	13
1980	3 880	124 320	29 000	7 100	8 934
%	7	22	5	13	7
1985	6 163	200 002	62 870	26 852	69 412
%	6	14	5	10	12
1986	6 894	220 006	79 512	28 927	64 423
%	6	13	4	8	9
1987	8 745	261 806	100 559	41 410	67 179
%	6	13	4	9	8
1988	9 432	286 000	141 974	52 535	73 561
%	6	13	4	10	7
1989	10 980	319 453	180 000	62 044	87 224
%	6	12	4	9	7
2. % Average annual growth rate increase/[decrease]					
1975	16	27	37	32	19
1980	16	6	6	[1]	1
1985	10	10	17	31	51
1989	16	12	30	23	6

Source: Statistical Abstracts (DBSA, 1989).

It is evident that for majority of the homelands agricultural production decreased in the early 1980s. This was due to severe weather conditions that affected production between 1980 and 1990 in South Africa. Notably, in 1981 floods caused significant losses in crops and livestock, the destruction of road and rail links cutting farmers off from markets, and destruction of irrigation channels and other equipment (Kirsten, Van Zyl & Van Rooyen, 1994). In addition, the summer rainfall areas suffered a severe drought in 1983 (Kirsten, *et al*. 1994).

2.7 Conclusion

The "two agricultures" phenomenon in South Africa was as a result of pre-colonial and colonial historical events and policies that restricted fair access to resources and markets, and specifically legislation biased against black smallholder subsistence farmers. Thus, the notion that the deteriorating state of the homelands was due to poor farming practices by black farmers is without concrete evidence.

Over the period 1918 to 1965 total agricultural production (valued at constant prices) did not fall in the reserves. The decline in agricultural production per head occurred in the period after 1948. This was no coincidence considering that apartheid was promulgated in 1948. Upon realisation of the deteriorating state of the reserves mainly due to overpopulation, the government of the RSA intervened by introducing rural development and agricultural policies in an effort to improve the economic landscape of these areas. Most notable, the FSP piloted by the DBSA played a key role in agricultural development in the homelands. There is evidence that farmers grew a wide variety of crops and improved crop yields in some of the areas where the FSP was implemented was achieved.

The average annual agricultural growth rate in the homelands increased between 1970 and 1980 as reported by the DBSA. The contribution of agricultural production towards GDP did however decrease in the early 1980s. This was as a result of the floods in 1981 and the droughts in 1983. In summary, it can be argued that smallholder subsistence farmers in the homelands responded positively to agricultural development policies and programmes despite the constraints of limited resources and weak land and labour markets.

Looking into the future, similar programmes such as the FSP can be a vital tool to create the much needed jobs in the economy and drive out poverty in the rural areas of South Africa because it has been shown that farmers do respond in an economic, rational and efficient manner to access opportunities provided through agricultural funding services. The impact of such agricultural funding services can have a positive impact on welfare and can substantially contribute to household income given all the resources that farmers' have in the rural areas. Focus should, however, be placed on supporting subsistence type activities because policies in favour of commercialisation may undermine the safety net provided by subsistence production particularly for resource poor farmers.

Chapter 3

Review of Methods for Estimating the Economic Contribution of Agricultural Production

3.1 Introduction

The decisions households make to allocate output of staple foods between home consumption and sales is an issue that is receiving increasing attention the world over (Aliber & Mdoda, 2015; Davidova, Frederickson, & Bailey, 2009; Dovie *et al*., 2003, 2006; Gilimani, 2005) because of its important implications for food security and the contribution by this section of the agricultural sector to the economy. It is, therefore, very important to estimate the significance of the economic contribution of agricultural production that agriculturally active households produce.

This chapter is divided into three main parts. Section 3.2 presents a review of the economic methods used to estimate the economic contribution of agricultural production by the smallholder subsistence agricultural sector. This is followed by section 3.3, which discusses the gross margin analysis framework. In section 3.4 the conclusion is discussed.

3.2 Analysis of methods used for estimating the economic contribution of agricultural production

Various studies (Aliber & Mdoda, 2015; Davidova *et al*., 2009; Dovie *et al*., 2003, 2006; Gilimani, 2005) have endeavoured to assign monetary values to the subsistence sectors agricultural production. This has led to the use of different methods, such as the non-parametric "gap" approach and other monetary valuation methods, which estimated the gross value of production and the net income of production. The type of data used by these studies include household-level surveys, national level surveys and regional and local market prices.

The following section discusses these studies methods, with a view to showing the results and to propose a suitable method for estimating the economic contribution of agricultural production in the former homelands of South Africa.

3.2.1 Indirect method: Non-parametric "gap" approach

Aliber and Mdoda (2015) used the IES 2010/2011 national level data to estimate the economic contribution of small-scale agricultural production in South Africa. The value of the direct economic contribution of small-scale agriculture was calculated as the per capita food expenditure savings of agriculturally active households, relative to agriculturally inactive households controlling for settlement type. The non-parametric approach allows for estimation of the economic contribution of agricultural production by firstly, disaggregating by consumption deciles; secondly, by using the comparison of per capita household food expenditure as a basis for estimating the overall value of household consumption from own production; thirdly, by taking into account the cost of agricultural inputs; and lastly by repeating the analysis for each of the four settlement types in South Africa. By doing this, these authors argue that they are able to control for different production environments, food tastes, and market systems. Nevertheless, there are still significant differences in food tastes that exist among households in the same settlement area which is not accounted for.

Table 3.1 below summarises the findings by Aliber and Mdoda (2015). These authors found that agriculturally active households in both the former homelands and urban formal areas spend less on food per capita than non-farming households in both areas. Furthermore, the study also revealed that agriculturally inactive households in the former homelands spend less on food than agriculturally inactive households in the urban formal areas do. These authors state that this is attributable to the secondary benefits of residing in an area where many households are agriculturally active.

These authors found that the direct economic contribution of small-scale black agriculture for the four main settlement types across all ten deciles in South Africa was R13 billion and over R7 billion in the former homelands. Which according to these authors contradicts the perception that small-scale black agriculture is insignificant especially when compared to the gross value-added by the commercial agricultural sector, which was R 49 billion in 2010/2011 (Aliber & Mdoda, 2015).

3.2.2 Direct methods: Monetary valuation approaches

Gilimani (2005) investigated the economic contribution of subsistence farmers' agricultural production for rural and urban black households in the EC and KwaZulu Natal (KZN) provinces. This author used the IES 2000 national level data set. Unlike the IES 2005 and

2010/11, the data on agricultural production in the IES 2000 provided variables for the quantity consumed, quantity sold, input cost, and value of sales of crops and livestock produce.

Gilimani (2005) directly estimated the economic contribution of agricultural production as the gross value of crop and livestock production. The gross value was estimated by calculating the sum of the value of agricultural goods consumed from home production and the value of sales of both livestock and crop produce. The objective of his study required the valuation of crop and livestock output produced for home consumption. The values of goods consumed from home production were valued using implicit price, based on the assumption that the value the household had received is the best indicator of the quality of output. Implicit price was calculated by dividing the value of crop or livestock sales by the quantity sold. Once the implicit price was calculated, the median price was used because mean prices skewed the price data. According to Gilimani (2005), it was necessary to calculate implicit prices before dropping the commercial producers so that reasonable prices could be calculated for all the output. In order to calculate the value of self-produced goods, median price was multiplied by the quantity retained by the household to get the value of agricultural goods consumed from home production.

Gilimani (2005) found that of those households engaged in subsistence farming, there were some that did not spend any money on inputs, equating to 48.4%. In summary, Gilimani (2005) found that the average annual income of EC and KZN households that were engaged in subsistence farming was R16 142.62 and R18 443.12, respectively (see Table 3.1). The contribution of subsistence agricultural production to income was 12 % and 6.7 % of the total income of EC and KZN households, respectively. It is evident that subsistence farming is important among low income earning households. Furthermore, he found that the average annual cost of farm inputs was R106.19 in the EC, and R85.18 in KZN. He also found that the majority of people involved in subsistence farming are, indeed, from rural areas. Based on these figures, he concluded that subsistence farming makes a small contribution to the livelihoods of households in both the Provinces. The author also concluded that households engaged in subsistence farming are poorer than the non-farming households. For example, non-farming households' income was R22 381.53 in the EC and R22 348.52 in KZN (Gilimani, 2005). He also states that although subsistence agriculture makes a small contribution to household income, households are, nevertheless, interested in subsistence farming even though it is not efficient.

A similar study estimating the economic contribution of household agricultural production was conducted in Thorndale, Limpopo by Dovie *et al*. (2003, 2006). These authors estimated the net direct-use value of smallholder crop and livestock production for farming households in the region. The sample consisted of 45 households. The economic contribution of agricultural production was directly estimated as the annual net farm income per household. Costs of production included depreciation of fixes assets, labour, manure, ploughing and other farm input costs. Benefits included values of cash income from crop and livestock sales and self-produced food items, such as home consumption of crop and livestock produce, and other benefits from livestock such as cow dung. The net direct-use values of agricultural production were calculated on a per household basis for user households only and scaled across the entire sample in relation to the frequency of use and calculated averages. The objective of these authors study required the valuation of crop and livestock output produced for home consumption. Monetary values of these items were computed from known and existing prices quoted in the village. In cases where the product was not sold in the village, prices from the closest local village and town markets were used. A questionnaire was designed which included the following information: crop products and livestock goods and services; production outputs and inputs; and unit cost associated with each product. This information was collected largely through structured and semi-structured interviews.

According to Dovie *et al*. (2003) investments in livestock production by rural people has numerous advantages. For example, livestock provide draught power, milk and meat, and small stock are important for accumulating wealth to buy cattle and respond to immediate household needs. Additionally, Dovie *et al*. (2006) found that smallholder cropping for household consumption is an important activity for households, mainly for sustaining livelihoods and providing food security. Some reasons cited for the success is that women are actively involved in farming activities. Some challenges, however, include a lack of farmer support services such as technical advice through agricultural extensions, costly equipment supplies and hiring charges, and a lack of micro-finance and subsidies to expand production. In summary, these authors found that the annual net direct-use value of crop production was $443.4 (R2 722.5) (Dovie, *et al*., 2003), and $656 (R4 027.84) per household/annum for livestock production (Dovie *et al*., 2006) (see Table 3.1). The monetary values were calculated in South African Rand and converted to US dollars at the exchange rate of $1=R6.14 prevailing at the time of field work.

The studies listed above all estimated the economic contribution of smallholder subsistence farmers' agricultural production in South Africa. A similar study by Davidova *et al. (*2009) was done in Europe for five European Union - New Member States (EU-NMS) where households with small farms are widespread in Bulgaria, Poland, Romania, Hungary and Slovenia. The main premise of these authors study was to estimate the value of unsold output for home consumption and analyse its importance for household income. It was anticipated that their results would answer the following questions: firstly, does subsistence farming contribute in an important way to household income? Secondly, is this contribution more important in the poorest EU Member States (Bulgaria and Romania)? Lastly, what is the role of subsistence farming for poor and vulnerable households?

The last row of Table 3.1 below presents the results from the study by Davidova *et al*. (2009). This study used national-level data from a comprehensive agricultural survey. These authors studied subsistence and semi-subsistence farming in selected EU-NMS. The economic contribution of agricultural production was estimated as the gross value of production using household income per capita as a variable. Benefits of production included, self-produced food output, such as home consumption of crop and livestock produce.

The study's objective required the valuation of self-produced crop and livestock items for home consumption. Similar to Gilimani (2005) these authors valued output using implicit prices, based on the assumption that the value the household had received is the best indicator of the quality of output. In cases where the household consumed all produced output, the weighted average price from the village was used. In cases where few sales were reported from a village, and there was therefore a large difference reported in prices, regional averages or country averages were used for the estimation of output price.

A questionnaire was designed which included the following information: household head and household members characteristics; household income, employment, and time allocation; agricultural land and non-land assets, production and sale; household attitudes to their farming activities; and their perceptions of the importance of drivers for, and impediments to, commercial agricultural activity.

These authors found that subsistence production valued at market prices contributes significantly to household income, particularly in Romania, Bulgaria and Poland. Furthermore, these authors found that the contribution of subsistence farming is higher for households that are below the poverty line. In other words, subsistence farming is crucial for poorer households.

These authors' findings were also used to inform policy. For example, these authors were able to recommend that policies in favour of commercialisation might undermine the safety net provided by subsistence production – especially for households below the poverty line. In terms of value it was estimated that the total value of unsold output for all small farms in Bulgaria, Hungary, Poland, Romania and Slovenia was €7915/capita.

Table 3.1 Results and methods of reviewed studies

Title of study	Data source	How is the economic contribution of subsistence production calculated?	Approach	Results
South African Studies				
The Direct and Indirect Economic Contribution of Small-scale Black Agriculture in South Africa by Aliber and Mdoda (2015).	IES 2010/11 and GHS 2013.	The direct economic contribution is calculated by subtracting the per capita household (HH) food expenditure of farming and non-farming HHs, controlling for income and settlement type.	Non-parametric gap approach.	Value of small-scale agriculture in the former homelands of South Africa is R7, 9484 billion and total value for South Africa is R13, 0319 billion.
The Economic Contribution of Home Production for Home Consumption (HPHC) in South African Agriculture by Gilimani (2005).	IES 2000	Subsistence production is calculated by adding the value of home consumption (based on implicit prices) and the value of sales of both livestock and crop produce.	Monetary valuation approach.	Average annual income is R16 142.62 (R18 443.12) and subsistence income is 12% (6.7%) of total income for EC (KZN) households. The annual average input cost was R106.19 in the EC and R85.19 in KZN
Direct-use value of smallholder crop production in semi-arid rural South African Village by Dovie *et al*. (2003).	Household surveys: structured and semi-structured interviews with household members.	Net income is calculated by subtracting total costs from total revenues.	Monetary valuation approach	Net direct use value of crops was $443.4 (R2 722.5) per household per annum with a gross estimate of $501. The cost of inputs per household $57.6.
Valuation of communal area livestock benefits, rural livelihoods and related policy issues by Dovie *et al*. (2006)	Household surveys: structured and semi-structured interviews with household members.	Net income is calculated by subtracting total costs from total revenues.	Monetary valuation approach	Net direct use value of livestock was $656 (R4 027.84) per household per annum and cost was equivalent to 24, 3% of net direct use-value.
European Study				
Subsistence and semi-subsistence Farming in Selected EU New Member States by Davidova *et al*. (2009).	EUROSTAT: EU Farm Structure Survey.	Monetary values of subsistence production was calculated by adding the total value of cash income and non-market crop and livestock output.	Monetary valuation approach	Value of unsold output/capita is PPP€ 7915.

Sources: Author's compilation based on information from Aliber and Mdoda (2015), Gilimani (2005), Dovie et al. (2003, 2006) and Davidova et al. (2009).

3.2.3 Overview of methods reviewed

With the exception of Aliber and Mdoda's (2015) study, all the studies reviewed in this chapter directly estimated the economic contribution of subsistence farmers' agricultural production.

Aliber and Mdoda (2015) estimated the economic contribution of agricultural production as the difference in per capita food expenditure between agriculture active and agriculturally inactive households. The gross value of crop and livestock production was estimated for two studies (Davidova *et al*., 2009; Gilimani, 2005) reviewed in this chapter, while Dovie *et al*. (2003, 2006) estimated the net income of household agricultural production.

The approach by Davidova *et al*. (2009), Dovie *et al*. (2003, 2006) and Gilimani (2005) presented a useful method for directly estimating subsistence farmers agricultural production based on the quantities of crop and livestock produced and consumed by households. However, the use of implicit prices and market prices in the measurement of subsistence agricultural production has led to different conclusions about the significance of subsistence farmers' agricultural production. Gilimani (2005) applied median implicit prices to subsistence output and concluded that subsistence farming makes a small contribution to the livelihoods of farming households'. It is likely that households may have been too pessimistic when assigning values to their own output. On the other hand, Davidova (2009) and Dovie *et al*. (2003, 2006) applied market prices to output and concluded that subsistence agricultural production is important and contributes significantly towards income, particularly among poor households. This outcome seems more credible because implicit prices may result in large variability in the values of subsistence output produced by households in the same region. According to the UNSD (2005) the large variability or low monetary values assigned to goods produced and consumed by the household results in higher incidence of poverty in households which depend largely on subsistence production. In order to reduce this source of measured inequality in the measurement of agricultural output, the UNSD recommends the use of local market average prices or average unit values from the same 'cluster' or area to determine price of food produced and consumed by the household.

It is evident that, it is possible to directly estimate the economic contribution of agricultural production provided that the following variables are provided: variable and fixed farm cost, quantity produced, quantity of production for home consumption, quantity sold, and value of sales.

3.3 Gross margin analysis framework

The objective of this section is to present a framework to measure the economic contribution of smallholder subsistence agricultural production, based on a variety of products on the farm. In this study and in the proposed solution, we limit the analysis to GM because the NIDS and

ARC surveys have variables to estimate total variable farm cost and the gross value of crop and livestock production. These data sets do not have variables to estimate insurance costs, taxes, marketing, and depreciation costs, therefore, the calculation of net farm income is unattainable. The framework discussed in the following section defines the variables used to estimate the GM which include: gross value added and total variable cost.

3.3.1 Theoretical background in the context of the farm household

A greater use of accounting techniques has been implemented in agriculture, resulting in net margin or GM estimations for farming households. The GM is calculated by subtracting total variable costs from total gross income. The variable costs are costs that vary with the level of output of an enterprise. The Gross Farm Income (GFI) on the other hand, is the total gross value added from crop or livestock output, valued at market price. According to Savva and Frenken (2002), GFI equals agricultural produce sold plus the value of goods produced for home consumption and by-products with value, such as holdings for livestock feed.

The GM is usually expressed on a per-unit basis of the most limiting factor, for example land, labour or capital. Crop GMs are usually quoted on a per-hectare basis, while livestock GMs are usually quoted on a per-head basis (Firth, 2002). In this study the GM is calculated per household per annum for all crops and livestock produced.

Although the GM approach is useful for assessing the returns to limited resources, there are some important limitations to the use of the GM approach. Firstly, GM estimates are static because the budgets normally look at what happens over a season or uses prices for one season. Secondly, in a GM approach focus is on casual labour associated with a particular activity such as harvesting. Fortunately, subsistence farming households generally deploy casual labour. Lastly, GM does not take into account fixed costs. As a result, the GM estimates may show a good result for one particular crop; however, after all the overhead costs are included such as advertising costs, the business may still make a loss. A GM approach is a simple and acceptable tool, although it is recommended to use it with other financial management tools.

To further clarify the definitions of the dependent variables and show how the independent variables influence the dependent variables of the study. Figure 3.1 below provides an illustration of the GM, GFI and variable cost in the context of a smallholder subsistence enterprise.

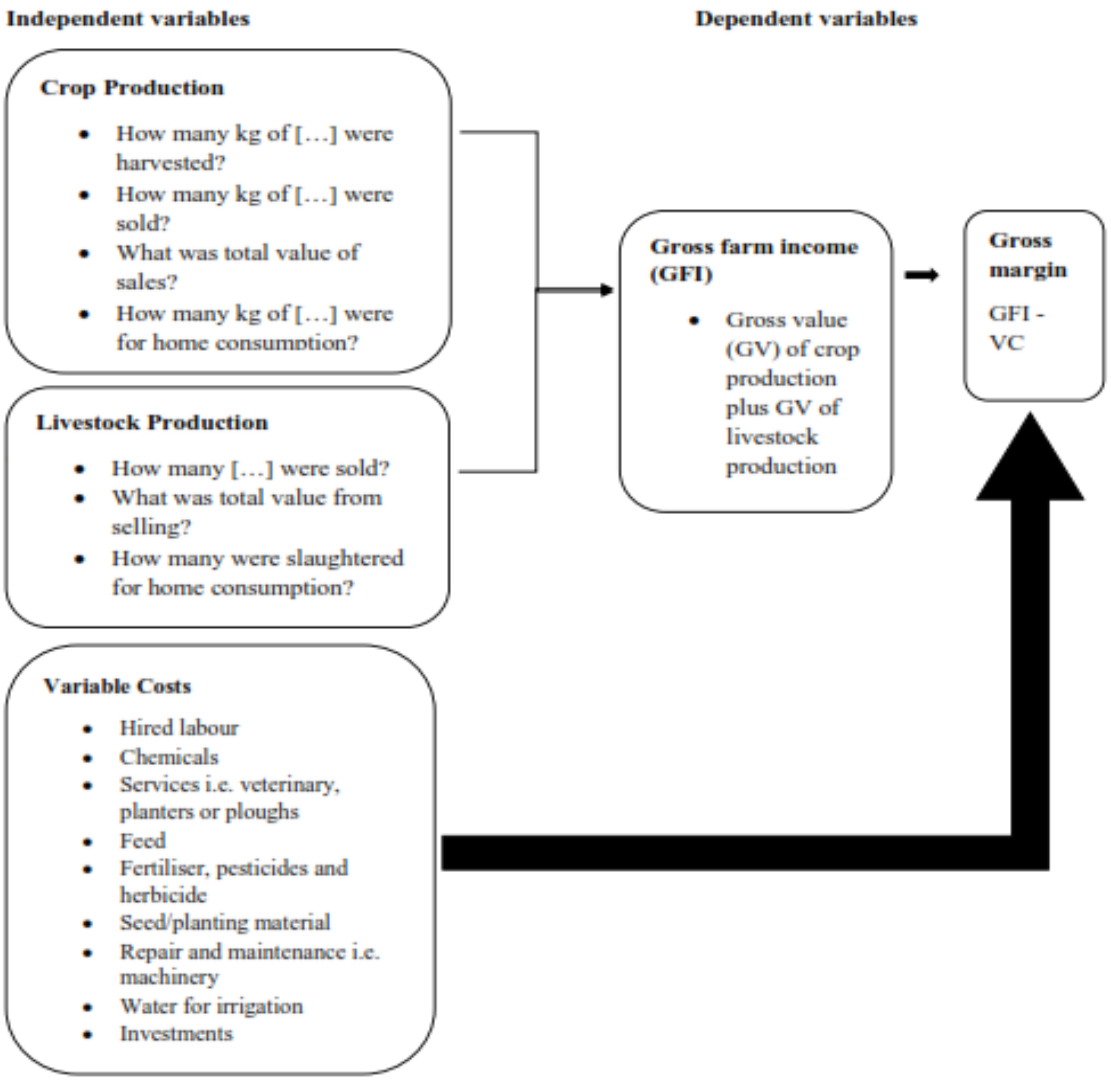

Figure 3.1: Summary of variables used to calculate the GM

Source: Author's compilation based on information from DAFF (DAFF, 2015).

According to the 2008 SNA, production is defined as an activity in which an enterprise uses inputs to produce outputs (SNA, 2009). It is further noted in this document that even though services produced for own consumption within the household fall outside the SNA, the production of a good for own final use should be measured when the amount produced is believed to be quantitatively significant in relation to the total supply of the food in the country (SNA, 2009). An illustrative list of the most common types of goods that should be included comprises:

a) The production of agricultural products and their subsequent storage; the gathering of berries or other uncultivated crops; forestry; wood-cutting and the collection of firewood; hunting and fishing;

b) The production of other primary products such as mining salt and cutting peat;

c) The processing of agricultural products; the production of grain by threshing; the production of flour by milling; the curing of skins and the production of leather; the production and preservation of meat and fish products; the preservation of fruit by drying, bottling, etc.; the production of dairy products such as butter or cheese; the production of beer, wine, or spirits; the production of baskets or mats.

This list is highlighted because it shows that leaving out information about quantities of self-produced goods consumed from own production from national accounts underestimates the contribution of agricultural production, especially in developing countries were farmers in rural areas are involved in agricultural activities. In addition, it provides a useful framework for understanding the multiple and diverse livelihood bases of rural households.

3.4 Conclusion

The studies reviewed in this chapter showed that the economic contribution of subsistence farmers' agricultural production contributes significantly to the incomes of low income earning households and households below the poverty line. This reinforces the view that farming is a tradition economic activity among low income earning households. Studies have, however, shown that in order to enable these households to move out of poverty, they require targeted support in activities that will enable them to diversify their household income.

Estimations of the subsistence sectors economic contribution is dependent on available data which ultimately informs the approach used to measure this sectors value. It has been shown that indirect and direct approaches can be used to estimate the economic contribution of subsistence farmers' agricultural production. Directly estimating the economic contribution of subsistence farmers' agricultural production can be achieved by estimating the gross value of production, gross margin and net income of agriculturally active households. These measures of economic contribution can be directly measured provided that questionnaires have variables relating to: variable and fixed farm cost, quantity produced, quantity of production for home consumption, quantity sold, and value of sales. Moreover, the application of market prices to agricultural goods is necessary to reduce the large variability in the values of goods produced and consumed by households in the same region. This method may, therefore, offer accurate estimates of the contribution of subsistence farmers' agricultural production.

An indirect method to estimate the economic contribution of subsistence farmers' agricultural production has been proposed by Aliber and Mdoda (2015). The non-parametric gap approach proposed by these authors is suited when using household food expenditure and farm cost data. These authors acknowledge that although their method is indirect, their approach was inevitable because the IES 2010/2011 did not include variables to directly estimate this sectors contribution. The non-parametric approach did, however, add value in offering insight into the value of the subsistence sectors economic contribution in South Africa.

Based on the variables provided in the NIDS and ARC data sets used in this study, it has been stated that the GM approach can be applied to directly estimate the subsistence sectors economic contribution. However, the GM approach has some disadvantages. Firstly, GM estimates are static because the budgets normally look at what happens over a season. Secondly, a GM analysis focuses on casual labour associated with a particular activity such as harvesting. Fortunately, a subsistence household deploys casual labour. Thirdly, GM does not take into account fixed costs. As a result, the GM analysis may show a good result for one particular crop; however, after all the overhead costs are included such as advertising costs, the business may still make a loss. A GM analysis is a simple and acceptable tool, although it is recommended to use it with other financial management tools.

In the next chapter, the data sources will be discussed with a view to highlight the applicability of built-in variables to the GM approach. The data used is derived from the IES 2010/2011 (Stats SA, 2012a), the NIDS wave 1 (Southern Africa Labour and Development Research Unit [SALDRU], 2008), wave 2 (SALDRU, 2010) and wave 3 (SALDRU, 2012), and the ARC's household sample surveys of 2013 and 2015.

Chapter 4
Research Methodology

4.1 Introduction

Since the national income accounts were first created in South Africa, adjustments to the estimated gross value of production arising from commercial agriculture to include guess-estimates for homeland agriculture have always been made. Presently, this adjustment is made for a limited number of staples produced by farmers in the former homelands. In addition, input use reported by DAFF does not include input used by farmers in the former homelands. Therefore, existing estimates of the contribution made by farmers in the former homelands remains an inaccurate estimate of unknown proportions.

The implication, therefore, is that the official estimate of GDP reported in any given year seriously under or over-represents the total value of all final goods produced in the economy in that year.

Section 4.2 discusses the sources of data and the sampling procedure used in this study. This is followed by section 4.3, which discusses the method used for estimating the black subsistence agricultural sectors contribution. In Section 4.4 the conclusion is discussed.

4.2 Data sources and sampling procedure

The household data used in this study are drawn from three different surveys. Firstly, the IES 2010/2011 (Stats SA, 2012a). Secondly, the NIDS wave 1 (SALDRU, 2008), wave 2 (SALDRU, 2010) and wave 3 (SALDRU, 2012). Lastly, the ARC's household sample surveys of 2013 and 2015.

The IES and NIDS are secondary data sources which are administered at a national level and are representative of South African households, while the ARC 2013 and 2015 sample data was administered by the ARC at a household level. The ARC 2013 sample survey is secondary data set, while the ARC 2015 sample survey is primary data set.

This study will use all three data sets because none of these data sets provides exhaustive information for the purposes of this study.

4.2.1 Price data

The national market prices used in this study were obtained from the Abstract of Agricultural Statistics (DAFF, 2013) and an email received from Mrs M. Bennett on 17 October 2016 supplied the average provincial price data for agricultural goods.

4.2.2 Income and Expenditure Survey (IES) 2010/2011

The IES is conducted by Stats SA every five years and is used to provide relevant statistical information on household income and consumption expenditure patterns that will inform the rebasing of the Consumer Price Index (CPI). The IES 2010/2011 data set is not an agricultural survey. However, it includes 9 variables relating to farm input costs from agricultural production consumed from home production and 14 variables relating to the types of food items household consume from home production. The IES of 2010/11 had a sample realisation of 27 665 households, while only 25 328 households were used.

4.2.3 National Income Dynamics Study (NIDS)

The NIDS is a panel study, which is administered by SALDRU. It is a record of personal continuing stories of approximately 28 000 South Africans. Every two years, the same 28 000 South Africans that were selected to represent the broad range of our population are re-interviewed.

The NIDS is not mainly concerned with farming, but the household questionnaire includes 2 sections related to agriculture. Section E asks households about the value of agricultural goods consumed from own production in the last 30 days. Section H of the NIDS asks households about income and expenses from agricultural production activities that took place in the last 12 months. These variables include farm input cost, quantity of goods consumed from own production and quantity of sold crop and livestock produce, value of crop and livestock sold, and quantity of crop harvested. Interrogation of the NIDS variables in section H show that they can be used to directly estimate the economic contribution of agricultural production, based on the GM approach.

Table 4.1 below shows the number of successfully re-interviewed households between waves 1, 2 and 3, as well as the questionnaires administered.

Table 4.1: Number of households and individuals interviewed in the NIDS wave 1, 2 and 3

NIDS	WAVE 1	WAVE 2	WAVE 3
Year	**2008**	**2010**	**2012**
Number of households interviewed	7305	6787	8040
Number of individuals interviewed	26 776	28 551	32 633
Questionnaires and data sets in waves (1, 2 and 3)	Household Questionnaire Proxy Questionnaire Adult (+15) Questionnaire Child (0-14) Questionnaire		

Source: Author's compilation based on data from NIDS waves 1, 2 and 3.

4.2.4 Agricultural Research Council (ARC) sample survey

The ARC and DRDLR partnered on a rural development project to establish fruit and vegetable enterprises in different Provinces in South Africa. This project seeks to train households on establishing economically viable agricultural enterprises, while capacitating farmers on processing, and fast-tracking access to markets through the formation of agricultural marketing centres or AgriParks. In order for the project to be successfully implemented it was necessary to conduct routine surveys to get an idea of what households are producing and what challenges they are facing.

In order to initiate the project a situational analysis was conducted in 2013. These results were used to inform the ARC researchers on what households were producing and what kind of training the farmers would require. The ARC and Is'baya Development Trust team subsequently trained farmers on how to adopt sustainable crop production practices and they assisted farmers to access markets for surplus output. Approximately two years after training the same villages were re-interviewed in 2015, with a view to find out if households are still producing, and what is their nature of production.

4.2.4.1 Design questionnaire

The questionnaire was designed to collect information on farming households' socio-economic characteristics, consumption and sale of agricultural produce, and their impediments to farming in the OR Tambo District municipality. Similar to the NIDS questionnaire, the ARC sample surveys also have variables to estimate the economic contribution of agricultural production, based on the GM approach. The variables include:

a) age and gender of respondents,

b) level of education,

c) major crops grown, area cultivated, annual output, crop losses, quantity of home consumption, how much money was made and where crop was sold, livestock production,

d) farming costs, and

e) challenges to farming in household and in respondent's area**.**

4.2.4.2 Study area

The EC is the second largest province in South Africa, and it covers an area of approximately 170 000km^2 of diverse landscape which is divided into six district municipalities and two metropolitan municipalities (Eastern Cape Provincial government, 2015). The data used in this study was collected from four local municipalities (King Sabata Dalindyebo, Nyandeni, Ingquza Hill and Port St John) under OR Tambo District municipality. OR Tambo District is one of six district municipalities of the Eastern Cape Province. The area covers 80% of the former Transkei homeland and consists of five local municipalities: King Sabata Dalindyebo, Nyandeni, Mhlontlo, Ingquza Hill and Port St John. The municipality covers 12 096km^2 which represents 7.2% of the total land area of the Eastern Cape Province (Stats SA, 2012b). Figure 4.1 shows the location of the OR Tambo District municipality on the map of South Africa.

Figure 4.1: Map of OR Tambo District municipality, South Africa

Source: https://en.wikipedia.org/wiki/OR_Tambo_District_Municipality

4.2.4.3 Sampling procedure

With respect to the primary data a homogenous sampling method was used taking into consideration the main criteria for the ARC and DRDLR project. Homogenous sampling is a purposive sampling method that aims to achieve a homogenous sample. As a result, the sample of households chosen for this study share the same characteristics. According to the ARC and DRDLR project the sample of households should include those that are affected by poverty, have access to land and are involved in some form of agricultural production. The advantage of homogenous sampling is that it is simple and it is created on the judgment of the researcher. However, since this non-probability sampling technique is mostly based on the judgment of the researcher, the sample can be highly prone to researcher bias.

The ARC 2015 primary data was collected between November and December, 2015. The ARC 2015 sample survey consists of 107 households and the ARC 2013 sample survey consists of 96 households.

The researcher and the Is'baya Development Trust team collected the ARC 2015 primary data. All assistants were trained before the data collection. Field assistants included employees and village monitors from the Is'baya Trust who speak English and Xhosa. This was necessary to ensure a common understanding of the whole survey in order to reduce interviewer biases as much as possible.

The interviews were conducted at a venue that was accessible to all farming households in the respective villages, for example a household or a cooperative hall. This was mainly because, it was not feasible to visit each individual household, considering the distance between households and time constraints. The main member of the household or household head was interviewed, but if he/she could not attend the meeting, then an adult household member was interviewed. Each interview lasted on average 45 to 60 minutes.

4.3 Methodology

4.3.1 Economic procedure: GM analysis

The GM of production in this study is a reasonable proxy for estimating the economic contribution of subsistence agricultural production. It is estimated by adding the gross value of crop production plus the gross value of livestock production less the cost of production. In this study no distinction is made between the quantity of crop production harvested for home consumption and for sale. The total value of crop harvested will be estimated instead. The gross

value of crop production will be calculated by computing the product of quantity harvested and price. The price assigned to crop production harvested will be local market average prices. The local market average price method is consistent with the recommendation by the UNSD. According to the UNSD the value of agricultural goods produced and consumed in the household should be valued at local market prices or average unit values from the same 'cluster' or area to determine price (UNSD, 2005). Consistent with the method applied by Dovie, *et al*. (2003, 2006) this study will estimate the value of a single product harvested by an individual household with Equation 4.1.

$$Y_i = p_i * q_i \qquad (4.1)$$

where, p_i is the unit price of the i th commodity; q_i is the quantity of the i th commodity harvested by the i th household.

Secondly, the values of multiple products harvested by an individual household will be calculated from Equation 4.2. From Equation 4.1, if n is the number of individual households, then the value of the i th commodity harvested by j = 1, 2, 3 …..n Households is given by:

$$p_i q_{j,1} + p_i q_{j,2} + p_i q_{j,3} + \cdots + p_i q_{j,n} = \sum_{j=1}^{n} p_i \, q_j \qquad (4.2)$$

Thirdly, the value of all products harvested by all households will be calculated from Equation 4.3. Where the total quantity of commodities is given by k and the value of all the commodities harvested by all households is given by:

$$\sum_{j=1}^{n} p_i \, q_j + \sum_{j=2}^{n} p_i \, q_j + \sum_{j=3}^{n} p_i \, q_j + \cdots + = \sum_{i=1}^{k} \sum_{j=1}^{n} p_i \qquad (4.3)$$

The gross value of livestock production will be estimated by adding the value of livestock sales plus the value of livestock production for home consumption. This is because there is no variable in the data sets that captures the quantity of livestock produced for home consumption and sale. The value of livestock sale is a self-reported value by members of the household. However, the methodology used in this study requires the valuation of price for livestock production for home consumption. The implicit-median price approach, used by Gilimani (2005) will be used to estimate the livestock income of production for home consumption. The application of average market prices was not feasible for livestock production because subsistence households' quantity consumption of livestock is not reported on a per kilogram basis in the data sets used.

The GM will be expressed on an annual per household basis for the ARC and the NIDS data. The cost of agricultural production for each household is estimated by aggregating the total annual value of all inputs used as reported by farming households. This method is inevitable because the IES 2010/2011, ARC and NIDS data sets used in this study provide variables of self-reported values of each input used during the production process.

4.4 Conclusion

The data sources for this study include NIDS, ARC sample survey 2013 and 2015, Stats SA's IES 2010/2011, and price data from Stats SA and DAFF. The first objective of this study is addressed in this chapter. The monetary valuation method based on the GM approach, the UNSD method for assigning prices to goods produced and consumed in the household, and the median livestock price method is proposed as a method to estimate the economic contribution of agricultural production in the former homelands.

The economic contribution of agricultural production will be estimated as the annual GM per household. This method will be applicable to all the NIDS waves and ARC data sets, because these data sets include the variables to conduct a GM analysis. These variables are: quantity of crop harvested, quantity of crop consumed and sold, value of crop sales, number of livestock owned, number of livestock consumed and sold, value of sales for livestock sold, and input costs (veterinary, labour, repair, machinery, feed and fertiliser).

The estimates of agricultural contribution based on the IES 2010/2011 data set will be aggregate values of agricultural production for home consumption and the imputed cost associated with this production.

The next chapter discusses how data sets were cleaned and how inconsistencies were managed. The first part discusses how household level data sets were created for NIDS data, followed by IES 2010/2011, and lastly ARC data set.

Chapter 5

Data Management

5.1 Introduction

Initial exploration of the NIDS, IES and ARC data sets revealed inconsistencies. The agricultural variables in the NIDS data sets are similar to the agricultural variables in the ARC's data set, with the exception of the NIDS wave 2, which has no information on farm input cost, livestock ownership and livestock production and consumption. On the other hand, the IES 2010/2011 data on agriculture only provides variables related to the self-reported values of agricultural goods consumed from home production and the imputed cost associated with this production.

Section 5.2 discusses how prices were adjusted for inflation. Followed by section 5.3, 5.4 and 5.5, which all discuss how the differences and inconsistencies encountered in all the data set were managed. Lastly, section 5.6 concludes this chapter.

5.2 Data manipulation

The national and provincial price data obtained from DAFF and Stats SA, respectively were adjusted for inflation to 2012 constant prices using the GDP deflator as used in other studies (Tshabalala, 2015 & Liebenberg, 2013). The CPI values were obtained from the South African Reserve Bank.

5.3 Developing the household level data set for the NIDS data

The next sub-sections shows how files were merged in Stata to create a household level data set that contain variables to estimate the GMs for agriculturally active households.

5.3.1 The database

Agricultural information that is of interest in this study is found in two files, namely the Household and the Household Derived files. Within the Household Questionnaire file, in all the waves, households reported a value for agricultural goods consumed from home production in section E. Close examination of this variable revealed a number of negative values which were non-response codes and which were changed to "system missing". Otherwise, Stata calculates the negative non-response codes as values. In order to find an accurate value of

agricultural consumption from home production, all food items that are unlikely to have been produced by households were excluded from the calculation.

In section H of the Household questionnaire file in wave 1, the data are divided into three sections, namely the type of agricultural activity, crop and livestock produce, and input cost sections. In section H of the Household questionnaire file in wave 2 and 3, the data are divided into four sections. Namely, land access and size, type of farming activity, crop and livestock produce section, and input cost sections. The input cost section in wave 2, however, only asks households if they had incurred farm costs. Interrogation of wave 2 also revealed that only livestock-by product variables are provided.

A consolidated file to estimate the economic contribution of agricultural production is created by firstly, merging the Household Roster file with the Individual Derived file by individual identifier (pid). This merged file is then merged for the second time with the Household Questionnaire file by household identifier (w#_hhid), so that the household agricultural production data can be linked. This file is then merged for the third time with the Household Derived file by w#_hhid. Once this master file is created, it is saved and used for analysis. These steps are carried out for each wave used in this study in the NIDS data set.

5.3.2 Non-response codes

Many variables in Stata contain non-response codes (see Table 5.1 below), which are changed to “system missing”; once this is done, Stata interprets these as true missing values. This is true for variables that required ‘yes’ or ‘no’, numbers or figures and years as answers.

Table 5.1: Non-response codes for wave 1, 2 and 3

Type of item non-response	Non-response code	Year	Month
Don’t know	-9	9999	99
Refused	-8	8888	88
Not applicable	-5	5555	55
Missing	-3	3333	33
Not asked in Phase 2 of Wave 3	-2	2222	22

Source: NIDS wave 1, 2 and 3.

5.3.3 Procedure for estimating the value of agricultural goods consumed from home production

In section E of the Household Questionnaire file, there is a variable that captures the value of production for home consumption for the past 30 days. The total per annum value is calculated by summing across the value of all products that are likely to be produced by households, then multiplied by 12. The list of self-produced food items include: fruits and nuts, margarine, peanut butter, milk, eggs, sugar or sweets, salt and spices, soya products, red meat, samp, mealie meal, chicken, peas and beans, potatoes, other vegetables, fish, pulses and coffee.

5.3.4 Procedure for estimating the economic contribution of agricultural production based on the GM approach

The NIDS waves 1 to 3 have the following variables: quantity of crop harvested, quantity of crop consumed and sold, value of crop sales, and number of livestock owned, number of livestock consumed and sold, and the value of sales for livestock sold. In wave 2, the livestock section only has information about the value of livestock by-products for home consumption. Using these variables the GM can be calculated by adding the gross value of crop production plus the gross value of livestock production less the cost of farm production.

The methodology used in this study requires 3 steps to calculate the GM. Firstly, the gross value of crop production will be calculated by estimating the product of quantity harvested by the price. Where the price of crop production harvested will be assigned local market prices. Secondly, the gross value of livestock production will be estimated by adding the value of livestock sales plus the value of livestock production for home consumption. The GFI will be calculated as the sum of the gross values of crop and livestock production. Then, the GM will be calculated by subtracting the GFI from the variable cost.

5.4 Developing household level data set for the IES 2010/2011 data

This section shows how files were merged in Stata and how inconsistencies were managed.

5.4.1 The database

There are four different files in the IES 2010/2011 database. Firstly, the Total file contains annualised values for income and expenditure, per item per household. Secondly, the Household file contains information about households' characteristics, including household assets and number of persons supported by the members of the household. Thirdly, the Person

income file contains information regarding individual income sources. Lastly, the Person info file contains all information regarding the persons in the households. Three files contain information related to agricultural production. The Total file contains variables for estimating the total value of agricultural goods consumed from home production and the farm costs associated with this production. The Person info file contains one variable for identifying households that earned income from subsistence farming. Lastly, the House file contains one variable to identify subsistence producers.

To create a comprehensive file containing household particulars, characteristics, and agricultural variables, the Total, Person info and House files were merged.

5.4.2 Checking consistency in reporting

In the house file, one variable is directed towards agricultural production. The question is phrased as follows: In the last 12 months prior to the survey period has this household produced products and/or kept any livestock for own consumption or sale? The total file, has variables that recorded households that provided the values and costs associated with production for home consumption. The data in these files were not consistent and this section discusses how the dissimilarities were managed.

After the House and the Total files were merged it was discovered that 132 cases in the House file indicated that they are agriculturally inactive. Yet, these households provided positive values for agricultural goods consumed from own production in the Total file. For example:

- 1 case reported positive values for production for home consumption and input cost; and
- 131 households reported positive values for production for home consumption and zero for input cost. These households' status was changed to agriculturally active.

There were also 31 cases that indicated that they were not farming in the House file, but reported positive values for input cost and zero for production for home consumption. These households' status remained agriculturally inactive, but their input cost value was changed to zero.

In addition, the House file had 219 cases that indicated that they are agriculturally active. Once again this information was, however, not consistent with the Total file because all these households had recorded zero value for input cost and production for home consumption. These

households agricultural status was not changed. It is possible that these households were agriculturally active but did not harvest due to crop damage.

5.4.3 Procedure for estimating total cost and the value of agricultural goods consumed from home production

In the Total file, input cost and value of production for home consumption variables are all uniquely coded. For example, the first three digits of input costs are coded as "663" and the value of own consumption is coded as "661 and 662". The total value for input cost and value of production for home consumption for all households is calculated by aggregating the total values by household unique number across the whole sample.

5.5 Developing household level data set for the ARC data

The ARC sample survey has data for households' demographic, agricultural sales and production information. The data is divided into three sections, namely: crop, livestock and input cost. Initial examination of the agricultural variables revealed a number of problems. Household respondents were asked to provide a measuring unit which they used to harvest agricultural crops, and various units were provided. For example, households harvested crops in bags, boxes, basins and/or buckets. In addition, other crops, such as pumpkins, grapes, carrots, onion, spinach and bananas, were harvested per head or per bunch. Measurements of boxes, buckets and basins were taken in order to convert them to a standard unit.

The main challenges experienced during the 2015 survey includes the recall of agricultural goods and value of sales. Farmers highlighted that fruit trees were harvested at any time by other members of the household; as a result, household respondents could only provide estimates of crops harvested and livestock consumed. The type of information obtained was also dependent on the gender of the household member. In most cases, male respondents could not provide an answer to backyard garden activities, and these respondents had more information about cattle and communal farm activities. On the other hand, female respondents had more information regarding backyard garden activities and small livestock production.

5.5.1 Procedure for estimating the economic contribution of agricultural output based on the GM approach

In order to calculate the income for crop and livestock production, provincial market prices obtained from Stats SA and the Agricultural Abstracts released by DAFF were used. The value of crop and livestock will be calculated in the same manner as the NIDS national level data.

5.6 Conclusion

This chapter provided insight into how inconsistencies in all the data sets were managed, and how files were merged in order to estimate the GM of agricultural production.

Initial examination of all data sets revealed major differences, especially with regard to the agricultural variables in all the three data sets. Notably, the NIDS wave 1 and wave 3 have a set of crop, livestock and input cost variables related to agriculture. In the NIDS wave 2, however, section H of the household file does not have variables for farm cost, and the livestock section only has variables to estimate the value of livestock by-product.

Exploration of the IES data set revealed more inconsistencies. The status of agriculturally inactive households was changed to agriculturally active for cases that reported positive values for production for home consumption. More so, the status of agriculturally inactive households was left unchanged for cases that reported no imputed value for production for home consumption and positive values for input cost..

Finally, problems with the ARC data were managed by taking measurement of the bowls, bags basins and boxes that households used to harvest crops. This was necessary so that these units could be converted to standard units of measurements.

The next chapter addresses the second and third objective of this study. It investigates the value and economic contribution of agricultural production in the former homelands.

Chapter 6

Data Analysis, Results and Discussion

6.1 Introduction

The smallholder agricultural sector in the rural areas of South Africa contributes to food security and provides households with extra cash for purchasing other food and non-food items (Baiphethi & Jacobs, 2009; Van Averbeke & Khosa, 2007). Moreover, this sector is critical to our understanding of the role agriculture plays in household food security in these regions and the contribution by this section of the agricultural sector to the economy. However, the extent to which the economic contribution of agricultural production can be estimated is often dependent on available data.

This chapter investigates the economic contribution of agricultural production in the former homelands, based on nationally representative NIDS data, Stats SA's IES data, and the ARC's sample survey data. In addition, this chapter seeks to determine if the black subsistence sectors agricultural production is significant or not when compared with the commercial agricultural sector in South Africa.

Section 6.2 discusses and presents the results of households' demographic information, agricultural activities, and the economic contribution of black subsistence farmers' production based on the secondary and primary data from the ARC survey. Section 6.3 discusses and presents the results of households' demographic information, agricultural activities, and the economic contribution of black subsistence farmers' production in the former homelands of South Africa based on nationally representative IES 2010/2011 and NIDS waves 1, 2 and 3 data sets. This is followed by section 6.4, which presents the results for the estimates of the economic contribution of goods consumed from home production based on the NIDS and IES 2010/2011 data sets. Section 6.5 presents the estimates of the economic contribution of agricultural production based on the GM approach and section 6.6 concludes whether the economic contribution of the black subsistence agricultural sector in the former homelands is significant or not. Lastly, the conclusions are discussed in section 6.7.

6.2 Results of the ARC sample survey data

The ARC findings presented here are useful in showing what type of producers are in these areas, what they are producing and what kind of challenges they are facing. In addition, this

information will be useful in showing the value of agricultural production to farmers in the area calculated in terms of the annual GM per household.

6.2.1 Demographic information

The demographic information of the ARC 2013 and 2015 data is reported in Table 6.1 below. The secondary sample data was conducted in June, 2013 and a total of 96 households from 23 villages were interviewed. The primary sample data was conducted in November, 2015 and a total of 107 households from 20 villages were interviewed. These interviews were conducted through personal interviews with the household head. In cases where the household head was not available a well-informed adult from the household was alternatively interviewed.

It was observed that most households retained some of their harvest for home consumption and sold surpluses to the markets, while other households retained all harvest for home consumption. This phenomenon was observed in other studies (Chaminuka, *et al*., 2014; Petrovici & Gorton, 2005).

Table 6.1: Demographic information of the ARC 2013 and 2015 data

	ARC 2013		ARC 2015	
Total number of villages	23		20	
Total number of households interviewed	96		107	
Proportion of male to female. Male=1 and Female=0	46% Male 54% Female		41% Male 59% Female	
% Household head education				
1. No schooling	6		7.5	
2. Gr 0 to Gr 4	18		19	
3. Gr 5 to Gr 7	34		25	
4. Gr 8 to Gr 11	28		37	
5. Matric	6		7.5	
6. NQF level 2-4	1		2	
7. NQF level 5-8	6		2	
Household characteristics	Mean	Std. deviation	Mean	Std. deviation
Household size	7	3.09	9	0.32
Age:				
Male	61	11.38	63	1.63
Female	54	9.65	56	1.45
Hectares of land for plot	0.64	0.4	0.3	0.05
Hectares of backyard garden			0.7	0.06

Source: Author's calculation based on data from ARC 2013 and 2015 survey.

The average household size was 7 in 2013 and 9 in 2015. This result is consistent with values from a study in the Northern Province of 7 members (Makhura, 2001).

In the rural areas of South Africa, and particularly in the former homelands, the male members of the household tend to migrate to the urban areas to seek work, while the women remain

home and become the main caretakers of the household. Of the total number of households sampled in 2013, 46% or 44 were male headed households, while 54% or 52 were female headed households. In 2015, it was observed that 59% or 63 were female headed households, while 41% or 44 were male headed households. This result is consistent with the view that majority of rural farmers are women.

The household head is often responsible for the co-ordination of the households' social and economic activities. The age of the household head provides a crucial indicator for income source, as it determines whether a household benefits from the experience of an older person, state income grant or is subjected to the risk-taking behaviour of a younger household member. In 2013 the mean age of a female headed household was 54, and 61 for male headed households. In 2015 the mean age of a male headed household was 63, and 56 for female headed households. In both periods under review, male headed households were older than female headed households, suggesting that male headed households benefit from the experience of an older person and perhaps more diverse source of income, such as pension.

Another aspect of importance pertains to the level of education attained by the head of the household, who, normally are the decision-makers. The household heads level of education is an important attribute pertaining to their ability to perform basic calculation and do basic communication. Of the total number of respondents in the 2013 survey, 6% had no formal education, 18% had received an education of between Gr 0 to Gr 4, 34% had received and education of between Gr 5 to Gr 7, 28% had been through Gr 8 to Gr 11, 6% had received matric level education, and 7% had received post-matric level education. Of the total number of respondents in the 2015 survey, 7.5% had not attended school, 19% had received an education between Gr 0 to Gr 4, 25% had received an education between Gr 5 to Gr 7, majority (37%) had an education of between Gr 8 and GR 11, 7.5% had received matric level education, and 4% had received post-matric level education. These results suggest that majority of the household heads and respondents interviewed have the ability to perform basic communication and calculation for business purposes.

Land is one of the most limited resources facing rural households in South Africa. In 2013, the questionnaire did not distinguish between backyard garden arable land and arable land allotted by the chief. Households did, however, indicate the size of land for the main crop (maize) which was 0.64 ha on average. In 2015, the mean size of land for land away from home allotted by the chief was 0.3 ha, while the mean size for backyard garden was 0.7 ha. It seems that

backyard gardens are larger than the plots allotted to farmers by chiefs. This outcome is inconsistent with the results found by Makhura (2001) and Dovie *et al* (2003), perhaps incorrect reporting of land could have influenced this result. According to Makhura (2001) the average land size for smallholder farmers in the Northern Province was 0.26 ha for backyard gardens, and twice that observed in Thorndale, Limpopo (0.16 ha) (Dovie *et al*., 2003).

6.2.2 Economic contribution by type of product

To generate income, households sold some of their produce for cash, while other households' retained all harvest. In many cases the activities generating such income are as diverse as the product itself. Agricultural activities were divided into three important categories, which include grain and vegetables, fruit production, and livestock production. The next section provides the results of farming households' agricultural activities and the annual average gross value of production per household.

Table 6.2 below shows the annual average gross value of grains and vegetables harvested per household in 2012 prices, as well as the number of farming households that produced and harvested the crops in 2013. This study found that the 2013 questionnaire focused more on the number of households that produced crops instead of the quantities of crops harvested. For example, 90 farmers indicated that they produced maize, while 33% harvested. Some households cited that poor farm management, diseases and water shortages was the main reason why crops were not harvested. Furthermore, household respondents' cited that they had a problem with recalling quantities harvested. Farmers mainly produced maize, followed by legumes, cabbage, potatoes, and pumpkin and/or butternut. In terms of income the annual average gross value of maize harvested per household (R1 660.23) generated the highest value, while beetroot generated zero amount.

Table 6.2: Annual average gross value of crop harvested per household (hh) in 2013 (in Rands – 2012 prices)

Crop output	Number of farmers that produced	Number of farmers that harvested	% of farmers that harvested	Annual average gross value per hh in R.
Maize	90	30	33	1 660.23
Sorghum	4	3	75	641.50
Legume	71	25	35	720.59
Amadumbe[10]	3	1	33	140.00
Sweet potatoes	44	13	30	308.91
Potatoes	59	27	46	539.66
Cabbage	63	33	52	97.89
Spinach	18	1	6	214.45
Pumpkin/butternut	57	12	21	232.04
Onion	38	16	42	133.82
Carrot	38	13	34	17.69
Tomato	38	8	21	258.86
Other Green Veg.	13	2	15	5.00
Beetroot	4	0	-	-

Source: Author's calculation based on data from ARC 2013 survey.

Table 6.3 below shows the annual average gross value of grain and vegetables harvested per household in 2012 prices, as well as the number of farming households that produced and harvested the crops in 2015. This study discovered that maize yielded the highest annual average gross value (R1 534.30) for farming households. Maize was the most important crop produced and consumed by households in the surveyed area, followed by legumes, cabbage, spinach and pumpkin or butternut.

[10] Amadumbe (Colocasia esculenta) or African potato is a wetland herbaceous plant (DAFF, 2010).

Table 6.3: Annual average gross value of crop harvested per household (hh) in 2015 (in Rands - 2012 prices)

Crop output	Number of farmers that produced	Number of farmers that harvested	% of farmers that harvested	Annual average gross value per hh in R.
Maize	104	104	100	1 534.30
Sorghum	3	3	100	815.33
Legume	87	85	98	699.18
Sweet potatoes and amadumbe	56	56	100	693.00
Potatoes	76	75	99	618.91
Cabbage	78	77	99	306.61
Spinach	78	78	100	326.80
Pumpkin/butternut	67	66	98	280.90
Onion	43	41	95	133.27
Carrot	44	44	100	217.10
Tomato	39	39	100	24.00
Other Green Veg.	5	5	100	10.00
Beetroot	7	6	86	79.00

Source: Author's calculation based on data from ARC 2015 survey.

Focusing on the number of farming households that produced and harvested fruit crops in 2013. Table 6.4 below shows the annual average gross value of fruit crops harvested per household in 2012 prices, as well as the number of farming households that produced and harvested the crops in 2013. This study found that a high number of farmers produced oranges, followed by guava fruit, bananas, stone fruit, mangoes and mandarins. It was discovered that few farmers harvested fruit crops in the period under review. For example, 77 farmers indicated that they produced oranges, and only 33% harvested this crop for consumption and/or sale. Analysis of the data indicated that bananas (R835.81) generated the highest gross value per household followed by, pawpaw's (R660.28) and mangoes (R632.58).

Table 6.4: Annual average gross value of fruit crop harvested per household (hh) in 2013 (in Rands - 2012 prices)

Crop output	Number of farmers that produced	Number of farmers that harvested	Proportion of farmers that harvested	Annual average gross value per hh in R.
Oranges	77	25	33	542.15
Mandarins	24	2	8	75.00
Bananas	55	23	42	835.81
Avocadoes	19	3	16	228.20
Guava	62	13	21	327.39
Stone fruit	43	7	16	415.95
Mangoes	43	8	19	632.58
Pineapple	8	2	25	181.00
Litchi	11	4	36	860.00
Pawpaw	13	4	31	660.28
Other fruit	2	0	-	-

Source: Author's calculation based on data from ARC 2013 survey.

Focusing on the number of farming households that produced and harvested fruits in 2015. Table 6.5 below shows the annual average gross value of fruit crop harvested per household in 2012 prices, as well as the number of farming households that produced and harvested the crops in 2015. The most common types of fruits produced by farmers in 2015 was oranges, followed by bananas, guavas, mangoes, mandarins and stone fruits. It was determined that the consumption and sale of bananas (R919.20) generated the highest annual average gross value of production per household, followed by oranges (R820.34).

Table 6.5: Annual average gross value of fruit crop harvested per household (hh) in 2015 (in Rands - 2012 prices)

Crop output	Number of farmers that produced	Number of farmers that harvested	% of farmers that harvested	Annual average gross value/hh in R
Oranges	80	76	95	820.34
Mandarins	44	43	98	359.27
Bananas	55	54	98	919.20
Avocadoes	14	12	86	562.00
Guava	54	53	99	141.30
Stone fruit	42	40	95	388.25
Mangoes	48	44	92	680.71
Pineapple	11	11	100	248.84
Litchi	4	4	100	135.00
Pawpaw	2	2	100	485.00
Grapes	2	2	100	117.50
Other fruit	3	3	100	230.00

Source: Author's calculation based on data from ARC 2015 survey.

Table 6.6 below provides a summary of farming households that reared livestock in 2013, as well as the annual average gross value of livestock consumed and/or sold in 2012 prices. This study found that majority of farmers reared chickens, followed by cattle, sheep, goats, pigs, and geese or ducks. This study also found that the gross value of cattle (R12 250) generated the highest income, followed by sheep (R1 581.82), goats (R1 233.33), chicken (R436.73), and duck and or geese (R100).

Table 6.6: Annual average gross value of livestock consumed and/or sold per household (hh) in 2013 (in Rands - 2012 prices)

Livestock production	Number of farmers	Min.	Max.	Mean	Standard deviation	Annual average gross value per hh/annum in R	% of farmers that sold or consumed
Cattle	50	1	37	7	7.44	12 250	8
Sheep	35	1	28	11	7.21	1 581.82	31
Goats	34	1	25	7	5.62	1 233.33	26
Chickens	84	1	100	15	15.61	436.73	62
Pigs	10	1	7	3	1.88	0	-
Duck and/or geese	9	1	11	6	3.57	100.00	22

Source: Author's calculation based on data from ARC 2013 survey.

Table 6.7 below provides a summary of farming households that reared livestock in 2015, as well as the annual average gross value of livestock consumed and/or sold in 2012 prices. The most common types of livestock reared by farmers was chicken, followed by cattle, sheep, goats, pigs and geese or ducks. It was, however, determined that the consumption and sale of

cattle (R12 855.77) generated the highest value, followed by goat production (R5 044.44). It was determined from both the 2013 and 2015 data sets that households reared mainly small stock. This outcome is not uncommon because majority of farmers in remote rural areas operate low-cost production enterprises.

Table 6.7: Annual average gross value of livestock consumed and/or sold per household (hh) in 2015 (in Rands - 2012 prices)

Livestock	Number of farmers	Min.	Max.	Mean	Standard deviation	Annual average gross value/hh in R	% of farmers that sold and/or consumed
An analysis of surplus farmers in 2013							
Cattle	60	1	50	8	9.3	12 855.77	43
Sheep	43	1	62	16	12.3	4080.95	49
Goats	37	1	45	10	9.5	5044.44	41
Chickens	96	1	253	19	28.9	1901.82	75
Pigs	29	1	13	4	4	1070.00	52
Duck and/or geese	11	1	52	10	14.6	787.73	46

Source: Author's calculation based on data from ARC 2015 survey.

6.2.3 Impediments to farming in the OR Tambo District area

Smallholder farming in South Africa is constrained by a number of resources. Many of these challenges have tended contribute to the loss of farming activity among farmers. The major constraints cited by farmers from the ARC's secondary and primary surveys are inadequate access to water, lack of fencing, lack of markets, and inputs.

Table 6.8 below summarises farmers' perceptions about impediments to farming based on ARC 2013 data. This study found that majority of farmers indicated that lack of fences exposes them to theft. Farmers in the same survey period also indicated that inadequate access to water contributes to poor quality of harvested crop. It was discovered that high input costs impedes farming and contributes to low output levels. In addition, farmers cited that lack of money impedes farming because farmers have difficulty in paying for labour, buying inputs and implements.

In 2015, many farmers indicated that inadequate access to water was a serious challenge (see Table 6.8.). It is possible that the drought experienced in the 2014/2015 period could have influenced this result. Farmers in the same survey period indicated that lack of fences (51%) exposes them to theft. Other challenges include lack of markets (48%), followed by inputs (42%), money (25%), implements (14%), and limited labour (12%) which all impeded farming.

Table 6.8: Impediments to farming at OR Tambo District municipality

	2013		2015	
Variable	**Farmers responses**		**Farmers responses**	
	N=96	**%**	**N=107**	**%**
Money	38	36	27	25
Labour	15	16	13	12
Water	61	64	76	71
Fences	67	70	54	51
Implements	41	43	15	14
Markets	28	29	51	48
Inputs	46	48	45	42

Source: Author's calculation based on data from ARC 2013 and 2015 survey.

6.2.4 Gross value and GM per household

Table 6.9 below shows estimates of the gross value of crop and livestock agricultural production and the annual GM per household (hh) in 2012 prices. This study found that the annual GM for households in 2013 was R1 958.32/hh and R8 892/hh in 2015.

Table 6.9: GM per household (hh) (in Rands - 2012 prices)

Sample period		**2013**	**2015**
		R	**R**
	Gross value for crop production	167 517.33	618 430.15
	Gross value for livestock output	100 410	586 210.36
	Total gross value	267 927.33	1 204 640.51
	Total farm cost	79 929	253 108
	GM	1 958.32	8 892.83

Source: Author's calculation based on data from ARC 2013 and 2015 survey.

The GM of crop and livestock production was significantly higher in 2015 than in 2013. It seems likely that respondents withheld information in 2013 regarding income. The GM in 2013 is most likely undervalued, considering that it was the first time that the ARC had conducted its survey in the area. In addition, the 2013 survey focused more on production and not on quantities harvested and consumed.

6.2.5 Summary of the ARC results

The ARC's sample survey between 2013 and 2015 shows the value and role of smallholder farming in the OR Tambo District municipality where small farms are widespread. The GM

analysis method was used to estimate the economic contribution of households' agricultural production. In terms of crop production it appears that few farmers reported that they harvested crops in 2013 compared to 2015. This result may be because household respondents withheld information and it was discovered that the ARC 2013 questionnaire administrators focused more on the number of producers compared to the quantities harvested.

An analysis of the 2013 secondary sample survey revealed that subsistence farming households harvested very little of what they planted. Farmers cited that the low level of harvest was due to a lack of fencing which exposes them to theft. Farmers also indicated that inadequate access to water and poor management was the main cause for crop losses. In terms of crop production farmers, favoured the production of maize and oranges. In terms of livestock production, farmers reared mostly small stock, such as chicken. Using the ARC 2013 data it was estimated that the annual GM per household was R1 958.32 in 2012 prices (see Table 6.9).

An analysis of the 2015 sample survey revealed that farmers produced a variety of crops and a higher number of farmers harvested what they planted compared to 2013. In 2015 farmers also favoured the production of maize and oranges. Similar to the 2013, farmers in the region mainly reared small stock, such as chicken, and generated higher gross value from large stock. Using the ARC 2015 data it was estimated that the annual GM per household was R8 892.83 in 2012 prices.

It is important to note that the GM per household estimated from both data sets generated positive values. This suggests that few purchased inputs enter the production process. Furthermore, this is evidence that farmers derive a livelihood from subsistence agricultural production. It is further acknowledged that the contribution made by these farmers seems far less than the potential, given all the resources the farmers have in their possession. What is needed, is to find ways to improve their productivity in order to increase the economic contribution of this vital sector without undermining current subsistence production. This can be achieved by enabling farmers to access drought resistant crop varieties and educating them on how to reduce post-harvest losses.

In summary, smallholder agriculture can make a difference to those who use it as one among an array of strategies. The results of the ARCs data show that where farming is encouraged by policy - through programmes such as the ARC-DRDLR project - it can provide a sustainable source of income and food. It is, therefore, anticipated that consistent information capturing in these areas through surveys can provide a wealth of information in terms of identifying the

activities that are unique to these farmers. Moreover, the economic level of these activities can be pursued with more vigour if they are identified and supported by the relevant institutions and organisations.

6.3 Results of nationally representative data sets

In 2011 Stats SA included three questions related to agriculture in the Population Census 2011 that would be used to identify all households involved in agriculture in the country. The main objective was to have a complete frame of all individuals and entities agriculture. There is, however, a gap in production data, particularly for the smallholder subsistence agricultural sector in South Africa. For example, some surveys such as Stats SA's IES provide limited information about smallholder subsistence farmers' income. On the other hand, nationally representative data, such as the NIDS can provide a solution to the gap in information, particularly for smallholder subsistence farmers.

The next section will present the demographic information, agricultural activities and economic contributions of output produced by black farming households in the former homelands, with a view to showing the significance of agricultural production from the former homelands.

6.3.1 Results of IES 2010/2011 data

The IES 2010/2011 data have been weighted using a calibrated weight variable. Figure 6.1 below shows the geographical spatial distribution of farming households in South Africa.

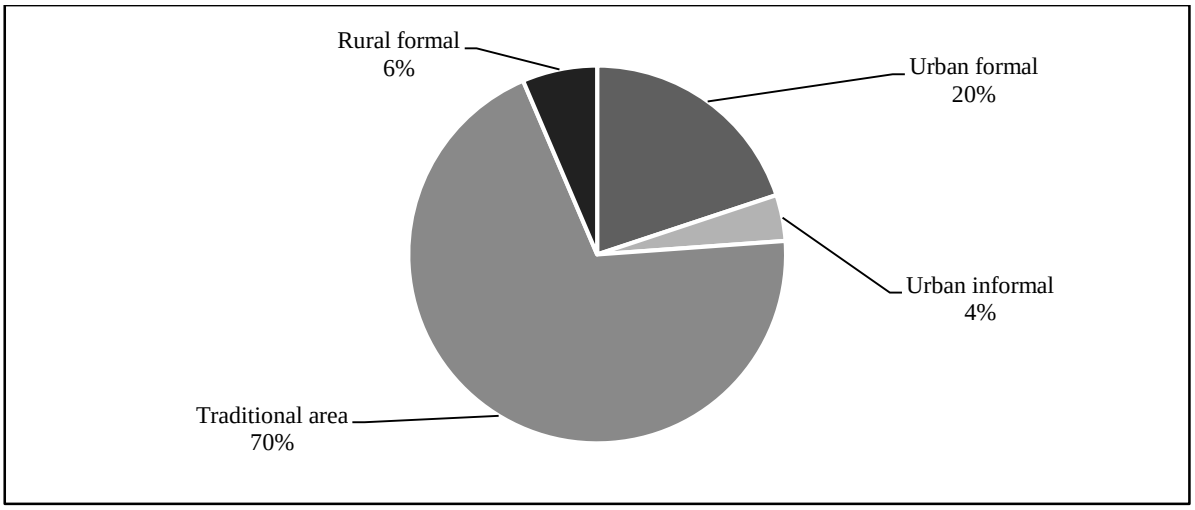

Figure 6.1: Percentage of farming households by settlement type

Source: Author's calculation based on data from IES 2010/2011.

Figure 6.1 shows that 70 % of agriculturally active households were residing in the traditional areas or former homelands, followed by urban formal (20 %), rural formal (6 %) and urban informal (4 %) areas. According to Stats SA the demarcation of areas surrounding the former homelands have changed, which now includes the surrounding rural areas in South Africa. For clarity, the term former homelands will be used interchangeably with the term traditional areas.

6.3.1.1 Demographic information of black farming households

Table 6.10 below shows the demographic information for the total number of black households in the former homelands of South Africa and the number of black farming households in the former homeland areas.

Table 6.10: Demographic information of black farming households in the former homelands

Demographic Information	**IES 2010/11**	
Total number of black households in the former homeland areas	3 674 977	
Total number of black households involved in agriculture in the former homeland areas	1 560 347	
Characteristics	**Mean**	**Std. Deviation**
Household size	6	2.77
Average age of household head	54	15.85
Proportion of household heads that are agriculturally active by gender	56.62% Female 43.38% Male	

Source: Author's calculation based on data from IES 2010/2011.

This study found that there are 7973 cases of households that indicated that they are black and residing in the traditional areas, which weight up to 3 674 977 households nationally. Regarding the total number of black agriculturally active households' there is one question in the House file directed towards the participation of household members in agriculture, which is stated below.

Survey question: *In the past 12 months prior to the survey period has this household produced products and/or kept any livestock for own consumption or sale?*

This study found that there are 3 338 cases of black farming households in the traditional areas, which weight up to 1 560 347 farmers nationally and the average household size was 6 members. In addition, there were more agriculturally active female-headed households

(56.62%), compared with agriculturally active male headed households (43.38%). This outcome is in line with economic theory about the participation of women in agriculture.

Figure 6.2 below shows the number of black farming households found in the traditional areas, by gender and province. This study found that there are 1 941 cases of female headed households that indicated that they were agriculturally active during the time of survey, which weight up to 883 398 female headed farming households across the country. Similarly, this study found that there are 1 397 cases of male headed households which weight up to 676 949 male headed farming households in the former homelands across the country. This study found that there are more female headed households in the EC, KwaZulu-Natal (KZN), Mpumalanga (MP) and Limpopo (LP) provinces, while the Northern Cape (NC), Free State (FS) and North West (NW) have more male headed households.

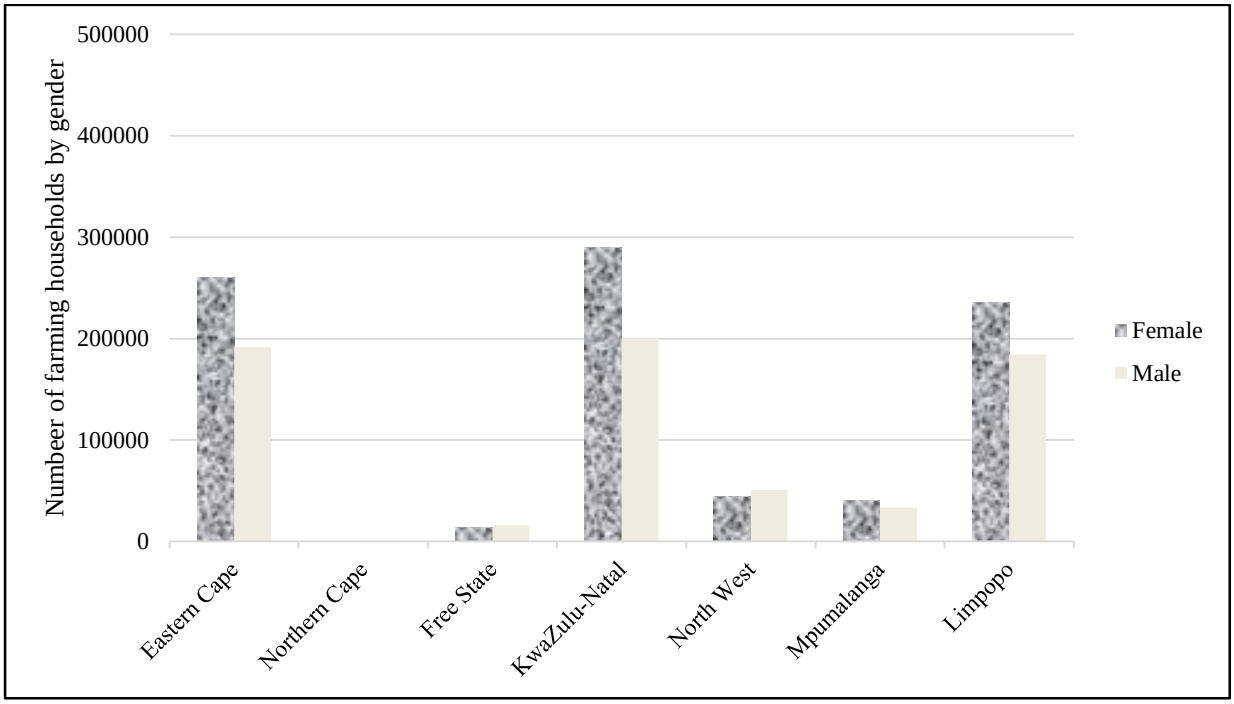

Figure 6.2: Number of black farming households in former homelands by gender and province

Source: Author's calculation based on data from IES 2010/2011.

A follow up question in the Total file of the IES 2010/2011 data set seeks to identify the number of households that earned income from subsistence agricultural production. The survey question is stated below.

Survey question: *Income from subsistence farming, yes or no?*

Table 6.11 below shows the number of black farming households in the traditional areas who earned income from subsistence farming. The results show that out of the total number of agriculturally active households (1 560 347), there were 44 cases of agriculturally active households that earned income from selling surplus output. The national representative figure weight up to 20 788 households. This result suggests that only 1.33% of agriculturally active households sold surpluses to the market. It is likely that respondents withheld information about income. Furthermore, this result may also suggest that agricultural production in the traditional areas is not consistent and farmers may not consistently sell surpluses throughout the year.

Table 6.11: Demographic information of black farming households who earned income from subsistence farming

Demographic Information	**IES 2010/11**	
Total number of household earning subsistence income	20 788	
Characteristics	Mean	Std. Deviation
Household size	6	2.35
Average age of household head	53	11.31
Proportion of household heads by gender	46.76% Female 53.24% Male	

Source: Author's calculation based on data from IES 2010/2011.

The mean household size (6 members) for income earning farming households is consistent with the results for the total number of black farming households (1 560 347). The mean age (53) of the household head for income earning farming households was slightly less than the mean age of non-surplus producing subsistence black farming households. Interestingly, there are more male headed households (53.24%) that indicated that they earned income from subsistence production, compared with female headed households (46.76%).

Figure 6.3 below shows the percentage of black subsistence farming households who earned income from subsistence farming by province. From the total number of households (20 788) that indicated that they earned income, 44 % are from KZN, 39 % from the EC, 11 % from the NW and 6 % each from MP and LP provinces.

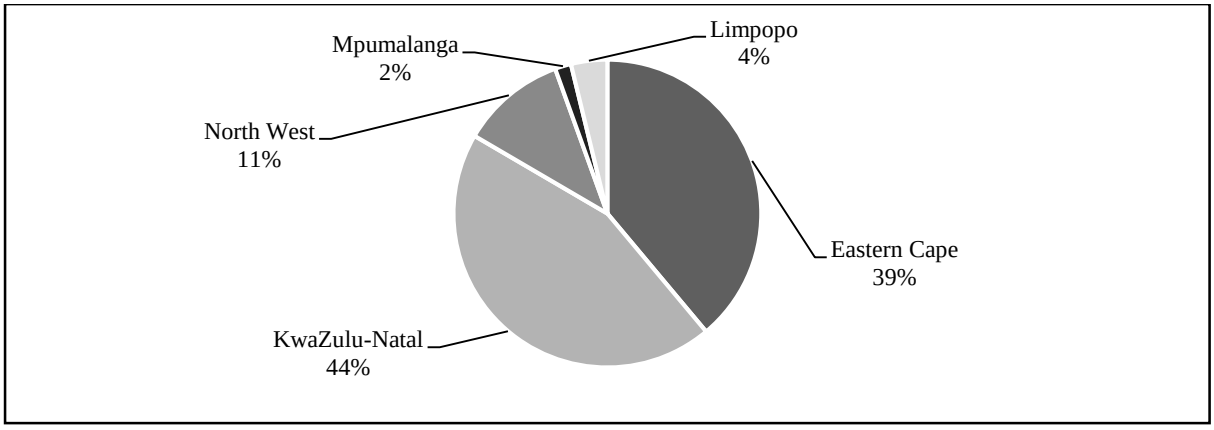

Figure 6.3: Percentage of black farming households who earned income from subsistence farming by province

Source: Author's calculation based on data from IES 2010/2011.

The former homeland areas of the Northern Cape indicated an absence of income-earning agriculturally active households. This result is understandable, considering the vastness of the region and the dispersed nature of households in the region. It seems uneconomical that these farmers would trade with one another as frequently as agriculturally active households who are in close proximity to one another.

6.3.2 Results of the NIDS data sets

The NIDS data have been weighted by a post-stratified weight variable. The geographical spatial distribution of farming households in South Africa based on the NIDS data is shown in Figure 6.4, Figure 6.5 and Figure 6.6. The NIDS geographical distribution is divided into three geographical types, namely, urban, traditional and farm areas. In the NIDS wave 1, 69% of farming households were residing in the traditional areas, followed by the urban areas (22%) and the farms (9%) – see Figure 6.4 below. The results for wave 2 in Figure 6.5 below show that 61 % of farming households were residing in the traditional areas, 34% in the urban areas and 5% lived in farm areas. Using the wave 3 data it was determined that 67 % of farming households resided in the traditional areas, 23% in the urban areas and 10% lived in farm areas – see Figure 6.6 below.

According to the NIDS data, approximately two-thirds of the agriculturally active population involved in subsistence agricultural production reside in the traditional areas of South Africa. This result is consistent with the result from the IES 2010/2011data.

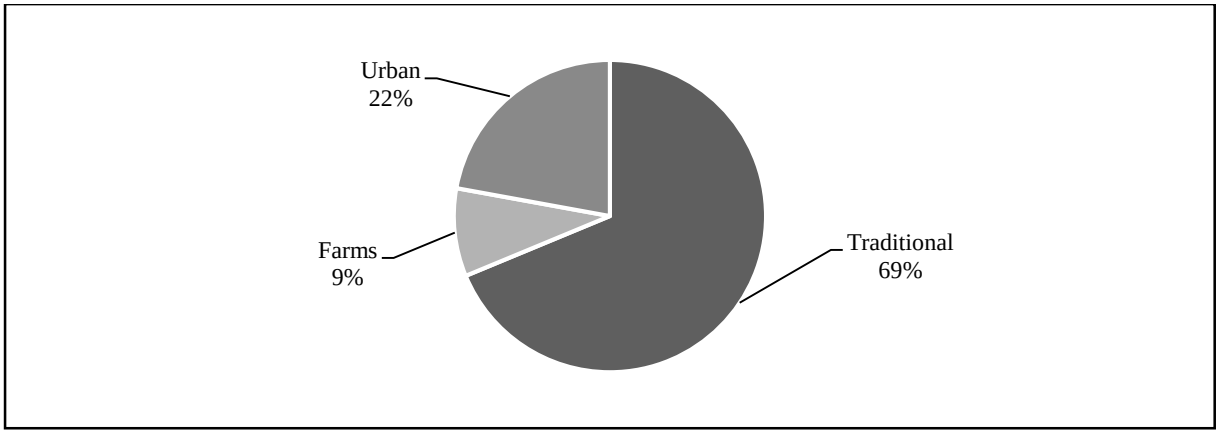

Figure 6.4: Percentage of farming households in South Africa based on the NIDS wave 1

Source: Author's calculation based on data from NIDS wave 1.

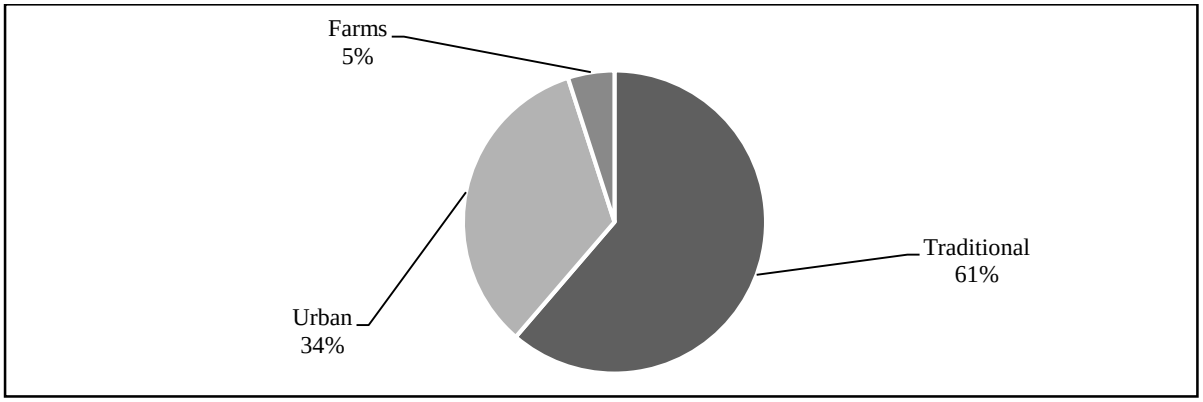

Figure 6.5: Percentage of farming households in South Africa based on the NIDS wave 2

Source: Author's calculation based on data from NIDS wave 2.

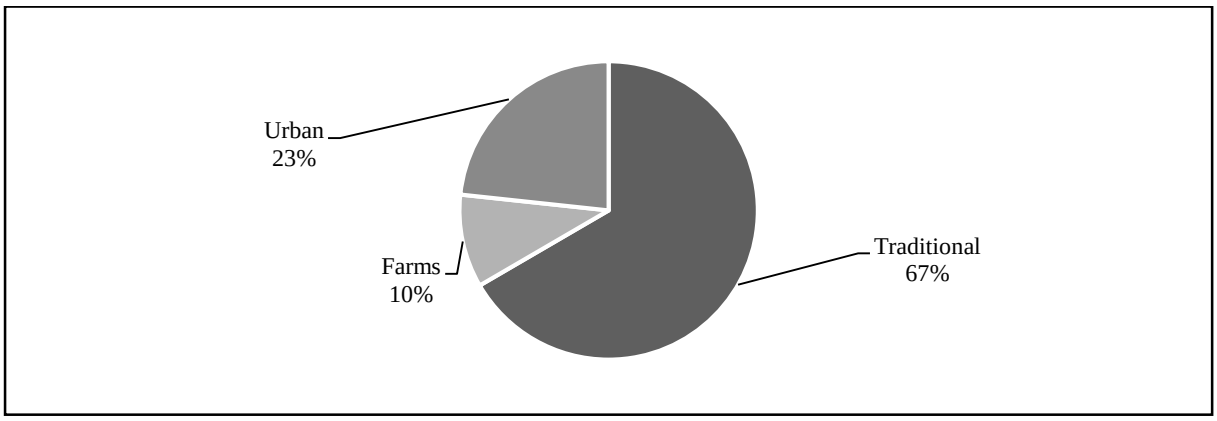

Figure 6.6: Percentage of farming households in South Africa based on the NIDS wave 3

Source: Author's calculation based on data from NIDS wave 3.

6.3.2.1 Demographic information of black subsistence farming households

The information in Table 6.12 below shows the demographic information of black agriculturally active households that were involved in agriculture outside of formal employment and not part of a commercial farming enterprise in the former homeland areas. In other words, they were subsistence farmers who sold surplus output.

Using the NIDS wave 1 data, this study found that there were 2 161 cases of black households who indicated that they resided in the former homelands in 2008, which weight up to 3 159 781 million households nationally. Using the NIDS wave 2 data, this study found that there were 2 558 cases of black households who indicated that they resided in the former homelands in 2010/2011, which weight up to 3 726 094 million households nationally. Interestingly, the number of black households in wave 2 is consistent with the number of households estimated using Stats SA's IES 2010/2011 (see Table 6.10). Using the NIDS wave 3 data, this study found that there were 3 026 cases of black households who indicated that they resided in the former homelands in 2012, which weight up to 4 172 171 million households nationally.

Table 6.12: Demographic information of black subsistence farming households based on all the NIDS waves

	NIDS WAVE 1 (2008)		NIDS WAVE 2 (2010)		NIDS WAVE 3 (2012)	
Total number of black HH in Traditional Areas (TAs)	3 159 781		3 726 094		4 172 171	
Total number of black HH involved in agriculture in TAs outside of paid employment (OPE)	999 099		477 724		644 125	
Total number of black HH in tribal areas not part of a commercially-farming enterprise i.e. subsistence farmers	916 352		461 650		620 301	
Proportion of Male to Female household head	57.60	Female	64.88	Female	66.45	Female
	42..40	Male	35.13	Male	33.51	Male
Hectares of land	**Percent (%)**					
Less than 5000m^2			43.84		90.03	
5000m2 but less than 1ha			8.65		4.75	
1ha but less than 5ha			35.05		5.11	
5ha but less than 10ha			6.64		0.11	
10ha but less than 20ha			5.44		0	
20ha or more			0.37		0	
	Percent (%)					
Age Groups:						
0-19	0.82		0.15		2.35	
20-29	3.03		3.17		7.59	
30-39	9.63		13.56		17.12	
40-49	22.6		21.06		18.20	
50-59	21.73		21.72		23.21	
60-69	24.9		24.60		20.70	
70+	17.28		15.74		10.83	
Characteristics	**Mean**	**Std. deviation**	**Mean**	**Std. deviation**	**Mean**	**Std. deviation**
Age	55	0.717	55	1	51	1.0
Household size	5	0.149	6	0.267	5	0.1769

Source: Author's calculation based on data from NIDS wave 1, 2 and 3.

Regarding the number of black subsistence farming households, the NIDS wave 1, 2 and 3 household questionnaires have two questions that are directed towards the participation of household members in subsistence agriculture, which are discussed next.

Survey question: *Over the last 12 months has anyone in this household participated in growing food or raising livestock other than as part of paid employment?*

This question refers to agricultural activities in the last 12 months and is about production, ownership and consumption of agricultural assets. Using the NIDS wave 1, it was determined that there were 779 such cases which responded positively, which weight up to 999 099 households. Using the NIDS wave 2, it was found that there were 319 cases which responded positively, which weight up to 477 724 households. Using the NIDS wave 3, it was determined that there were 586 cases which responded positively, which weight up to 644 125 households.

In order to exclude commercially orientated households, a follow up question is included in the questionnaire.

Survey question: *Are these agricultural activities all part of a commercial enterprise which is run as a separate business with its own accounts?*

This question is about agricultural activities in the last 12 months and it is used to screen households that are running their farm as a separate business. There are 62 cases who responded positively in wave 1, 13 cases who responded positively in wave 2, and 17 cases who responded positively in wave 3. These cases are subsequently excluded from the rest of the analysis because this study is focusing on subsistence farmers only. The analysis will, therefore, be based on 717 cases in wave 1, 306 cases in wave 2, and 569 cases in wave 3. Nationally, these cases weight up to 916 352 households in wave 1, 461 650 households in wave 2, and 620 301 households in wave 3 who are subsistence farmers involved in agriculture outside of paid employment and not commercially orientated.

Interestingly, the number of subsistence farmers decreased between wave 1 in 2008 and wave 2 in 2010/2011. Then, in the NIDS wave 3, this number increased. It is likely that seasonal and definitional differences could have played a role in the number of farming households that reported that they were agriculturally active. Moreover, South Africa experienced a severe drought in 2007/2008 and the financial crises of 2008/2009 could have resulted in the decreased number of farmers that indicated that they were farming between those periods. In the NIDS wave 2, the number of agriculturally active farmers was significantly lower than the figure estimated (1 560 347) from the IES 2010/2011 data set. This is expected, given that the Stats SA's IES questionnaire does not seek to distinguish between the different types of agriculturally active producers. For example, the question does not ask whether farmers are commercially orientated or not.

The household characteristics of subsistence producers are discussed next. The household head's age was estimated to be 55 in wave 1 and 2, and 51 years in wave 3. The average household size across all waves was 5 based on wave 1 and 3, and 6 based on wave 2. The proportion of female headed households was higher than that of males in all surveys. The results for household size and gender proportion of household head in the NIDS wave 2 is consistent with the results in Stats SA data for the 2010/2011 survey in Table 6.10. Moreover, these results are also in line with economic theory. For example, it is not surprising that there are more female headed households than male headed households that are involved in subsistence farming. Women are usually the caretakers of the homestead, while the men seek jobs outside of the traditional areas. This study found that the majority of household heads interviewed were between the ages of 40 and 60 years.

Households were requested to indicate the type of land tenure they have access to in wave 1. The survey question related to land stated below.

Survey question (found in wave 1 only): *Has anyone in the household grown or taken care of animals on any of the following types of land in the last 12 months?*

Table 6.13 below shows the type of land tenure black subsistence farming households had access to in 2008 (wave 1). Firstly, this study found that approximately 63 % of the households in the former homelands cultivated crops or raised livestock on land in or near an informal or urban settlement in which the household lives. Secondly, this study found that 12 % of households cultivated crops or raised livestock on a portion of land that falls in a communal area. Thirdly, it was discovered that 6 % of households cultivated crops or raised livestock on a commercial farm which is owned by a member of the households. Fourthly, it was found that less than 1 % of households cultivated crops or raised livestock on reform project land and on an equity share scheme on a commercial farm. Lastly, only 1 % cultivated crops or raised livestock on land that a household member has access to because of his/her status as employee on a commercial farm. It is evident that, majority of the households' had access to and used land that was near their homestead.

Table 6.13: Type of land tenure accessed by black subsistence farming households

Undertaken Agricultural activities	Yes (%)	No (%)
A commercial farm which is owned by a member of this household	6.22	93.24
Land to which a member of this household has access because of his/her status as employee on a commercial farm	1.00	98.23
A land reform project on state land	0.17	99.16
An equity share scheme on a commercial farm	0.35	98.97
On a portion of land that falls in a communal area	12.02	86.93
Land in/near an informal or urban settlement in which the household lives.	63.14	36.51

Source: Author's calculation based on the data from NIDS wave 1.

The household questionnaire in the NIDS wave 2 and 3 required households to provide information about land access. The question is stated below.

Survey question (found in wave 2 and 3 only): *Does this household have access to land that is, or could be, used for agricultural purposes?*

Table 6.14 below shows the number of black subsistence farming households in the NIDS wave 2 and 3 who had access to land for agricultural purposes. Based on the NIDS wave 2 data, this study found that majority of farmers with access to land were found in the EC (198 318), followed by KZN (73 164), LP (21 560), FS (7 227), MP (4 681), NC (1 313), and NW (1 073). This study found that majority of household who indicated that they had access to land during the NIDS wave 3 survey were found in the EC (119 258), followed by LP (170 760), KZN (143 394), MP (20 718), NW (15 469), FS (6 961), and NC (879). It seems likely that definitional differences and interpretations of the question could have led to the large variations in results between the two waves. It is, however, evident that the EC, KZN, LP and MP provinces reported a higher number of farmers with access to land. On the other hand, NW, FS and the NC reported the lowest number of farmers with access to land in both waves.

Table 6.14: Number of black subsistence farming households with access to land

Province	Have access to land wave 2	Have access to land wave 3
Eastern Cape	198 318	119 258
Northern Cape	1 313	879
Free State	7 227	6961
KwaZulu-Natal	73 164	143 394
North West	1 073	15 469
Mpumalanga	4 681	20 718
Limpopo	21 560	170 760
Total	307 336	477 439

Source: Author's calculation based on data from NIDS wave 2 and 3.

The household questionnaire in the NIDS wave 2 and 3 also required households to provide information about land size. The question is stated below.

Survey Question (found in waves 2 and 3 only): *How many hectares of land, for agricultural purposes, if any, does the household have access to?*

Table 6.15 below shows the size of land cultivated by black subsistence farming households in the traditional areas by percentage based on wave 2 data. This study found that from the total number of households (460 650) that indicated that they are subsistence producers in wave 2, only 290 997 indicated the size of land they have access to. Farmers that had access to land less than 5000m^2 were 33.74% in the EC, followed by KZN (3.84%), LP (2.67%), FS (2.48%) and NC (0.15%). Households with access to land size between 5000m^2-9999m^2 were found in the EC (4.97%) and KZN (3.69%) provinces. Households with access to land size between 1ha – but less than 5ha, were found in the EC (21.52%), KZN (9.95%) and Limpopo (3.58%) provinces. Households with access to land size between 5ha – but less than 20ha were found in the EC (6.88%) and KZN (5.2%) provinces. It is evident that producers in the EC and KZN had access to a diverse range of land size for cultivation.

Table 6.15: Percentage of black subsistence farming households with access to land

Size of land	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Mpumalanga	Limpopo	Total
Less than 5000m^2	33.74	0.15	2.48	3.84		0.96	2.67	43.84
5000 – 9999m^2	4.97			3.69				8.65
1 ha but less than 5 ha	21.52			9.95			3.58	35.05
5 ha but less than 10 ha	4.39			2.25				6.64
10 ha but less than 20 ha	2.49			2.95				5.44
20 ha or more					0.37			0.37
Total	67.11	0.15	2.48	22.67	0.37	0.96	6.25	100

Source: Author's calculation based on data from NIDS wave 2.

Table 6.16 below shows the size of land cultivated by black subsistence farming households in the traditional areas by percentage based on wave 3 data. Using the post-stratified weight in wave 3, the following results were obtained. From the total number of households (644 125) that indicated that they are subsistence producers in wave 3, only 455 255 indicated the size of land they had access to. The number of farmers with access to land less than 5000m^2 was high in Limpopo (29.6 %), followed by, KZN (28.69 %), EC (23.7 %), Free State (1.53 %) and the NC (0.17 %). The number of farmers with access to land sizes between 5000m^2 and 9999m^2 was high in LP (3.59 %), followed by MP (0.49 %), KZN (0.39 %), EC (0.2 %), NW (0.06 %) and the NC (0.02 %). Farmers with access to land sizes between 1 ha but less than 5 ha were mainly found in LP (3.62 %), KZN (0.82 %), MP (0.54 %) and the NW (0.12 %). Only farmers in KZN (0.11 %) indicated that they had access to land sizes between 5 ha but less than 10ha. In comparison with the NIDS wave 2 results, it is clear that producers in wave 3 from LP, MP, NW and KZN had a diverse range of access to land sizes. The differences observed could suggest that more subsistence farmers were interviewed in LP, MP and NW Provinces, compared with wave 2, and perhaps farmers had a better understanding of the question in wave 3. In addition, as in wave 2, the majority of farmers in wave 3 had access to land sizes less than 5000m^2. This is in line with economic theory and also with the results in the NIDS wave 1. Generally smallholder farmers have access to and make use of land that is in near their homestead. In wave 3, farmers' access to land size ranged between <5000m^2 and 10 ha. However, in wave 2, this was between <5000m2 and over 20ha. It seems that farmers prefer to cultivate smaller pieces of land.

Table 6.16: Percentage of black subsistence farming households with access to land

Size of land	Eastern Cape	Northern Cape	Free State	KwaZulu-Natal	North West	Mpumalanga	Limpopo	Total
Less than 5000m^2	23.7	0.17	1.53	28.69	3.22	3.12	29.6	90.3
5000 – 9999m^2	0.2	0.02		0.39	0.06	0.49	3.59	4.75
1 ha but less than 5 ha				0.82	0.12	0.54	3.62	5.1
5 ha but less than 10 ha				0.11				0.11
Total	23.9	0.19	1.53	30.2	3.4	4.15	36.81	100

Source: Author's calculation based on data from NIDS wave 3.

6.3.2.2 Agricultural activities of black subsistence farming households

Figure 6.7 below shows the number of black subsistence farming households by type of activity across all three waves.

Using the NIDS wave 1 data, this study found that of the 717 cases of agriculturally active households, there were 269 cases of crop farmers, 243 cases of livestock and crop farmers and there are 177 cases of livestock farmers. These cases weight up to 376 269 crop farmers, 343 788 crop and livestock farmers, and 156 768 livestock farmers nationally.

Using the NIDS wave 2 data this study found that of the 306 cases of agriculturally active households, there were 132 responses for crop and livestock, 85 responses for crop only and 68 for livestock only. These responses weight up to 220 660 crop and livestock farmers, 120 909 crop farmers, and 85 581 farmers involved in livestock farming.

Using the NIDS wave 3 data this study found that of the 569 cases of agriculturally active households, there were 233 cases of crop and livestock farmers, 175 cases of crop farmers and 148 cases of livestock farmers. These responses weight up to 245 084 crop and livestock farmers, 212 789 crop farmers, and 150 858 livestock farmers.

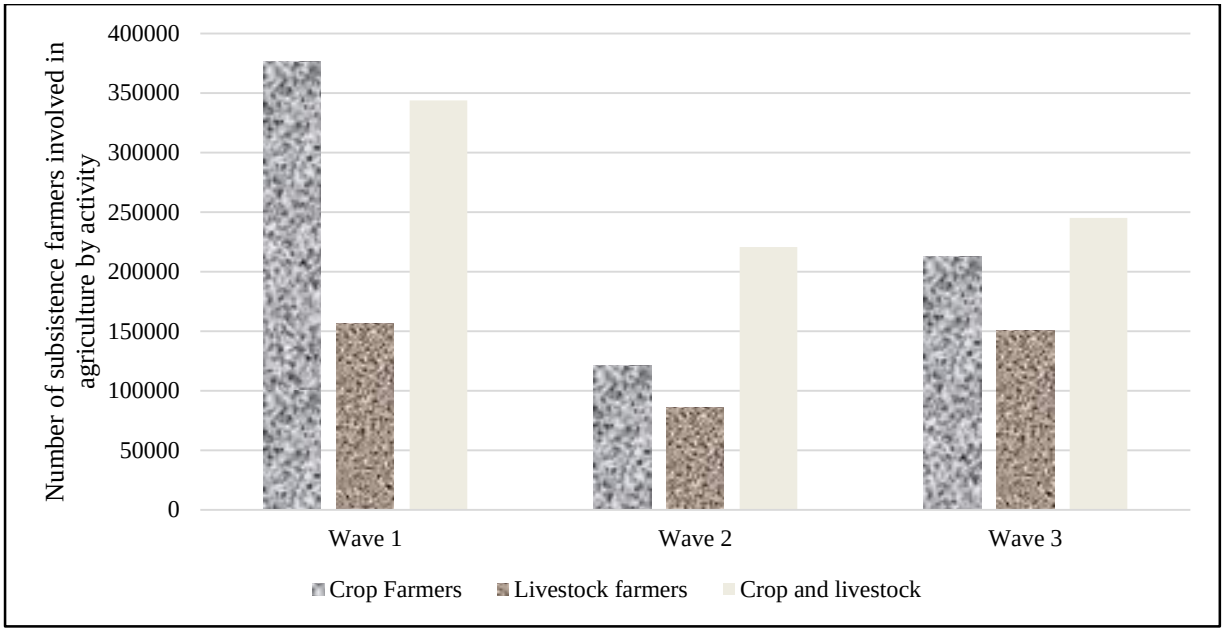

Figure 6.7: Number of black subsistence farming households by type of activity

Source: Author's calculation based on data from NIDS wave 1, 2 and 3.

It is evident that farmers in wave 1 produced mainly crops, followed by crop and livestock producers, and livestock producing households only. These results are, however, different from the trend observed in wave 2 and wave 3. Farmers in wave 2 and wave 3 generally favoured crop and livestock production, followed by crop producers and livestock rearing households. This outcome may suggest that farmers opted to diversify their production after the drought and 2008/2009 financial crises.

6.3.2.3 Number and percentage of black subsistence farming households by type of product

Table 6.17 below shows the number and percentage of subsistence farming households that produced crops and reared livestock based on wave 1, 2 and 3. This study found that the most important grain produced by subsistence farming households between wave 1 and wave 3 in the former homeland areas was maize. In wave 1, other crops of value to farmers included: green vegetables (44.41%), followed by fruits (16.42%), potatoes (12.34%), legumes (11.03%), and pumpkin or butternut (9.38%). In wave 2, other crops of value to farmers included: green vegetables (33.10%), followed by potatoes (29.45%), pumpkin or butternut (23.62%), legumes (12.69%), and onions (12.03%). In wave 3, other crops of value to farmers included: legumes (51.91%), followed by green vegetables (25.05%), potatoes (17.72%), and pumpkin or butternut (13.96%). On the other hand, the production of sorghum among subsistence farming households between wave 1 and wave 2 was below 2%.

This study found that the most common types of livestock produced between wave 1 and wave 3 are chicken, followed by cattle, goat, sheep, pig, and duck and/or geese. It is not unexpected that majority of subsistence farming households produced chicken, because poultry is a relatively cheap source of protein and the investment required to produce it is lower than that of cattle, goat and sheep. Goat meat is also important meat among black people. Goat is usually slaughtered for appeasing the ancestors. Duck and geese was kept by a small percentage of farmers in wave 1. It is likely that, the low reporting of duck or geese influenced the removal of this variable in subsequent NIDS waves.

Table 6.17: Number and percentage of crop and livestock subsistence farming households

	Wave 1/2008		**Wave 2/2010-2011**		**Wave 3/2012**	
Major crops	**N**	**%**	**N**	**%**	**N**	**%**
Maize	635 296	69,33	261 826	56.72	355 978	57.39
Sorghum	2 520	0.28	1 102	0.24	10 975	1.77
Other fields crop	25 081	2.74				
Tomato	58 656	6.40				
Potato	113 103	12.34	135 961	29.45	109 932	17.72
Pumpkin/butternut	85 942	9,38	109 021	23.62	86 580	13.96
Carrot	42 282	4.61				
Amadumbe	42 326	4.62	45 579	9.87	30 096	4.85
Legume	101 074	11.03	58 600	12.69	322 029	51.91
Onions			73 987	12.03	80 686	13.00
Green vegetables	406 973	44.41	152 714	33.10	155 370	25.05
Beetroot	4 645	0,51				
Fruits	150 435	16.42	135 961	3.39	79 437	12.81
Livestock production						
Cattle	243 074	26.52	147 640	31.98	188 850	30.44
Sheep	88 712	9.68	102 850	22.28	115 088	18.55
Goat	226 193	24.68	143 310	31.04	169 926	27.39
Pig	15 598	1.70	33 517	7.26	44 981	7.25
Chicken	336 143	36.68	218 617	47.35	310 923	50.12
Duck and/or geese	29 848	3.25				

Source: Author's calculation based on data from NIDS wave 1, 2 and 3.

6.3.2.4 GFI by type of activity

Figure 6.8 below shows the estimated annual value of GFI in 2012 prices by type of commodity produced by subsistence farming households in the former homeland areas. Using the NIDS wave 1 data this study found that the estimated GFI from livestock by-products generated the highest value for farmers (R475 million). Similarly, livestock by-products also generated the highest value (R484 million) for farmers based on the NIDS wave 2 data. In contrast, the GFI from livestock products (R1 180 million) generated the highest income for farmers based on the NIDS wave 3 data. It is evident that livestock and livestock by-product contributes significantly to farmers' income in the former homelands of South Africa. The economic contribution of horticultural crops yielded the least value for farming households in all the waves.

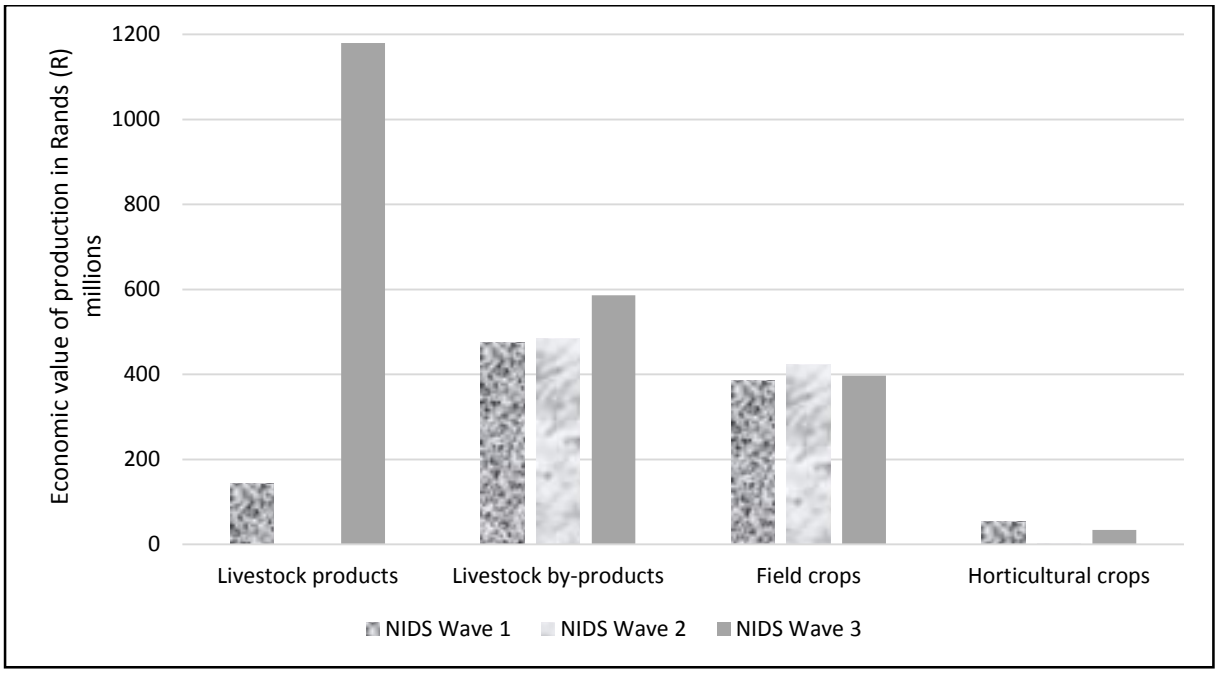

Figure 6.8: GFI by type of product based on the NIDS wave 1, 2 and 3 (in Rands million - 2012 prices)

Source: Author's calculation based on data from NIDS wave 1, 2 and 3.

Note: There are no variables to estimate the GFI for animal production in the NIDS wave 2.

6.3.2.5 On-farm expenditure by type of activity

Figure 6.9 below shows the estimated value of farm cost in 2012 prices incurred by farming households in the former homeland areas. Using the NIDS wave 1 data, this study found that fertiliser, manure chemicals, dipping, veterinary services and seeds (R65,6 million) generated the highest on-farm expenditure for agriculturally active households. Similarly, based on the

NIDS wave 3 data, this study found that fertiliser, manure chemicals, dipping, veterinary services and seeds (R67 million) also generated the highest on-farm expenditure for agriculturally active households based on the wave 3 data. It is clear from Figure 6.9 that in wave 1 and wave 3, the highest farm expenditure came from fertiliser, manure chemicals, dipping, veterinary services and seeds, followed by feed, labour, ploughing costs, and repairs and maintenance.

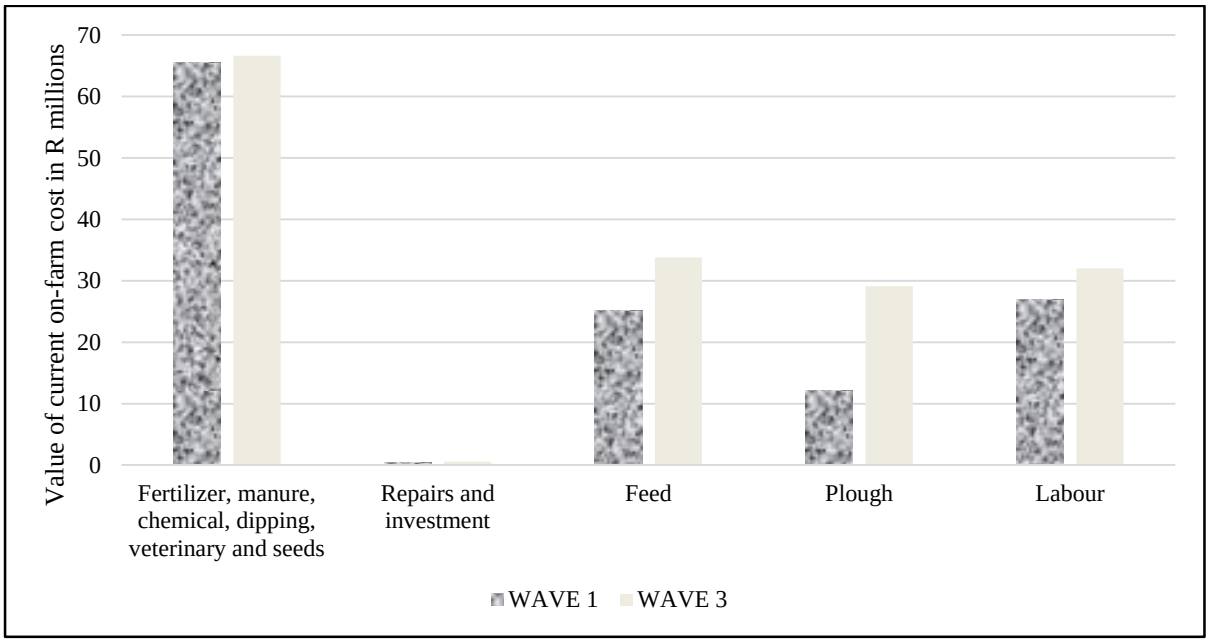

Figure 6.9: Current on-farm expenditure based on the NIDS wave 1, 2 and 3 (in Rands million - 2012 prices)

Source: own calculations all NIDS waves

Note: NIDS wave 2 has no variables to estimate the current on-farm cost

6.4 The economic contribution of agricultural production consumed from home production

The variables to estimate the economic contribution of agricultural production would appear to be the self-reported values of agricultural produce consumed from home production. These variables of self-reported values of goods consumed from home production are provided in the NIDS wave 1, 2 and 3, and IES 2010/2011 data sets. The next section presents the estimated values of agricultural goods consumed from home production based on the NIDS and IES data set.

Variables to measure the economic contribution of agricultural production are found in Section E of the NIDS household questionnaires. The survey question is stated below.

Survey question: *what was the value of rands of […] eaten from own production in the last 30 days?*

This question was used as a screening question for the food spending and consumption of particular items in the last 30 days before the interview. To estimate an accurate value of this production, only food items[11] that are likely to have been grown in the former homelands of South African households are included.

Table 6.18 below shows the annual estimates of the value of goods consumed from home production in current prices. This study found that the estimated value of agricultural goods consumed from home production was R207 million based on data from wave 1, R80,5 million based on data from wave 2, and R529 million based on data from wave 3. With the exception of wave 2, the value of household own consumption from home production increased between wave 1 and wave 3, despite the decrease in the number of agriculturally active households between wave 1 and wave 3. This outcome is consistent with economic theory, which states that the spending of non-durable goods increases overtime.

The IES 2010/2011 summary questionnaire was used to estimate households' total value of agricultural produce consumed from home production and the cost associated with this production. There are several variables used to estimate the total value of agricultural produce consumed from home production and the cost associated with this production. Only 425 cases of the 3338 that reported that they are agriculturally active reported a value for agricultural produce consumed from home production. These cases weight up to 198 365 households. Using the IES 2010/2011 data the estimated total savings from agricultural goods consumed from home production was R359 million in current prices (see Table 6.18 below).

11 The food items included: maize, samp, red meat, chicken, dried peas and beans, potatoes, other vegetables, fruit, eggs, fish, margarine, peanut butter, coffee, milk, sugar or jam and salt.

Table 6.18: Annual estimated value of agricultural goods consumed from home production (in Rands million – current prices)

Date of survey release	2008		2010/2011		2012	
	Number of HHs	Value of own consumption from home production (R million)	Number of HHs	Value of own consumption from home production (R million)	Number of HHs	Value of own consumption from home production (R million)
NIDS Waves	916 352	207	461 650	80,5	620 301	529
Stats SA's IES 2010/2011			198 365	359		

Source: Author's calculation based on data from NIDS, IES 2010/2011.

6.4.1 Comparison of the estimated value of agricultural production consumed from home production

In investigating the 2010/2011 figures estimated in this study two main issues arise with regard to the accuracy of the value of agricultural goods consumed from home production and the cost of production.

Firstly, this study found that there is a significant difference between the value of goods consumed from home production between the NIDS and IES data sets in 2010/2011. It is likely that some households may be too pessimistic or may overestimate the contribution of self-produced goods. For example, the estimated number of farming households that consumed from home production in the former homeland areas was 461 650 based on the NIDS wave 2. Using the IES 2010/2011 this study found that only 198 365 households reported a value for consumption from home production. Yet, households from the IES 2010/2011 data set reported the highest value of agricultural goods consumed from home production. The difference in the estimated values is alarming and raises concerns about the accuracy of self-reported goods consumed from home production.

Secondly, using the IES 2010/2011 data, this study found that, there is a significantly higher number of households that incurred input cost compared to the number of farmers that consumed goods from home production. This is alarming because, by definition subsistence farming households incorporate few purchased inputs into their production process. For

example, this study found that there were 3 193 such cases of households that incurred costs, which weight up to 1 497 702 households. Furthermore, his study found that the total input cost for farming households was R4 322 million in 2010/2011. This value is significantly higher than the value of agricultural goods consumed from home production. It is possible that respondents overestimated the value of farm input cost. Therefore, relying solely on these estimates will most likely lead to inaccurate estimates.

The results from the NIDS and Stats SA's IES 2010/2011 are evidence that black farmers in the former homelands make significant savings from the agricultural produce consumed from home production. The extent to which these numbers vary, however, raises concerns about the accuracy of self-reported values for agricultural produce consumed from home production. According to the UNSD report, it is possible that households inaccurately assigned values to self-produced food items (UNSD, 2005). According to the UNSD:

> "The self-reported values from own production introduce an additional, and unnecessary, source of inequality into measured consumption. For example, it may seem unreasonable that two households, who produce the same quantity of food in the same location, can value that output differently. A household might fall below the poverty line just by being too pessimistic when valuing their own food production because they think prices are lower than what they actually are. Secondly, if respondents report values for their self-produced food items that are lower than market prices then the incidence of poverty could be inflated, especially in rural areas where subsistence food production is important."

In order to avoid this source of measured inequality in the measurement of agricultural produce consumed from home production, the next section estimates the economic contribution of agricultural production based on the GM approach using market prices.

6.5 Economic contribution of agricultural production in former homelands based on NIDS waves 1, 2 and 3

Several studies (Dovie, *et al*., 2006; Dovie, *et al*., 2003; Braker, *et al*., 2002) have used the GM approach to estimate the economic contribution from agricultural production. In the spirit of promoting similar analysis, the GM approach will be used to estimate the economic contribution of agricultural production of black farming households based on data from the NIDS wave 1, 2 and 3.

The second objective of this study requires estimation of the economic contribution of agricultural production in the former homelands. The NIDS data set provides variables to directly estimate GFI and GM. New variables were created for the NIDS data sets to estimate the economic contribution of agricultural production. The estimated value of GFI and GM in 2012 prices based on wave 1 in 2008, wave 2 in 2010/2011 and wave 3 in 2012 is presented in Table 6.19 below.

Table 6.19: GFI and GM per household based on NIDS wave 1, 2 and 3 (in Rands - 2012 prices)

	Agricultural crop produce income (1)	**Livestock produce income (2)**	**GFI 1+2=(3)**	**Farming cost (4)**	**Annual GM per household**
	Value of crop production harvested (in R million).	Value of produce consumed from home production plus value of sales (in R million).	Total amount (in R million)	Total cost (in R million)	Annual GM per household (in R)
Wave 1	440	622	1 062	130	1 017.85
Wave 2	427	484[12]	911		1 973.00
Wave 3	431	1 759	2 190	162	3 535.42
Comparison with the result of reviewed study					
Aliber and Mdoda (2015) based on IES 2010/2011	Former homeland		Value of agricultural consumption from home production		
	Decile 1-10		7 948,4		

Source: Author's calculation based on data from the NIDS wave 1, 2 and 3.

Note: The estimated GM for wave 2 was not calculated because there are no variables for variable cost in the NIDS wave 2 data set.

The economic contribution of agricultural production based on the annual GM per household increased between wave 1 and wave 3. This study found that the annual GM per household was R1 017.85 based on wave 1, and R3 535.42.00 based on wave 3. The GM per household for wave 2 could not be calculated due to missing farm cost variables. The annual GFI per household was R1 973.00 in 2012. Although the ARC's 2015 annual GM results (see Table 6.9) cannot be up scaled for comparing with the NIDS data one can see that the annual GM per household across both data sets has been consistently increasing.

Using the NIDS data this study found that the estimated GFI in 2012 prices was R1 062 million based on wave 1, R911 million based on wave 2, and R2 190 million based on the data from

12 Only the value of animal by-product is included in this calculation.

wave 3. This contribution of agricultural production to farmers' livelihood warrants further investigation. Furthermore, the statement that the NIDS may offer data for policy analysis needs to be qualified. A review of literature in this study indicated that the economic contribution of small-scale agriculture in the former homelands was R7 948 million (Aliber and Mdoda, 2015) based on the IES 2010/2011 data. According to Aliber and Mdoda (2015) the perception that the economic contribution of the black small-scale agricultural sector in South Africa is trivial, is not accurate.

The results in this dissertation are somewhat consistent with those of Aliber and Mdoda's (2015). The estimated value of R911 based on the NIDS wave 2 is significant for the subsistence agricultural sector in the former homelands of South Africa. There is, however, a large difference between the estimated value of black agricultural production in the former homelands based on the NIDS wave 2 in this study and the figure estimated by Aliber and Mdoda (2015) of R7 Billion. Keeping in mind that Aliber and Mdoda's approach applies an indirect method based on food expenditure data of households, we can expect an upward bias with regard to the value of agricultural produce.

The suitability of the IES 2010/2011 data as a tool to measure the subsistence agricultural sectors contribution is debatable. For instance, there is only one survey question used to identify farming households, which states: *In the past 12 months prior to the survey period has this household produced products and/or kept any livestock for own consumption or sale?* This question makes the assumption that all farming households in the former homelands are similar, which is not true. From this question one cannot distinguish between commercial farmers, small-scale or subsistence farmers. If this question is used as a tool to identify subsistence farming households then the estimated value of agricultural consumption from home production may be inaccurate. At the same time, if households who provided a value for consumption from home production were all considered as subsistence farmers, this too would be questionable. It is unreasonable assume that commercial farmers do not consume agricultural produce from home production.

6.6 Significance of the economic contribution of agricultural production

The third objective of this study requires investigating whether the value of agricultural production by the black subsistence sector is significant or not, when compared with the commercial farm sector. In order to address this objective, the GFI reported by Stats SA in the annual commercial agricultural surveys is compared with the value estimated in this study

based on NIDS wave 1, 2 and 3. All figures in Table 6.20 are expressed in 2012 prices. The results are presented in Table 6.20 below.

Table 6.20: Comparison of the value of GFI between black subsistence farmers and the commercial sector (in Rands million)

	Comparison of the value of agricultural production between subsistence farmers in the former homelands and the commercial sector (in Rands million)		
Year	**2008**	**2010/2011**	**2012**
Value of agricultural production by commercial sector			
Stats SA: GFI	117 439	145 740	147 440
Value of agricultural production by black farmers in the former homelands			
NIDS: GFI	1 062	911	2 190

Source: Author's calculation and compilation based on data from Stats SA Agricultural Surveys 2008 and 2009, 2010, 2012, and NIDS wave 1, 2 and 3.

Table 6.20 above shows that the values of GFI contributed by the commercial agricultural sector as reported by Stats SA was increasing between 2008 and 2012. The GFI of the commercial agricultural sector was R117 439 million (Stats SA, 2011) in 2008, R145 434 million (Stats SA, 2012c) in 2011 and R147 440 million (Stats SA, 2012c) in 2012. Using the NIDS wave 1, wave 2 and wave 3 data this study found that the economic contribution of the black subsistence agricultural sector was 1%, 0.6% and 1.5% of the commercial agricultural sectors GFI in 2008, 2010/2011 and 2012, respectively. It may seem that the economic contribution of the black subsistence agricultural sector in the former homelands is insignificant when compared with the commercial agricultural sector. However, these measures of economic wellbeing detract from much of what contributes to other factors – such as social and cultural bonds – that contribute to human wellbeing but have nothing to do with income generation. This is true particularly for households in the former homelands of South Africa and perhaps in many rural parts of Africa, where communities are more concerned about preserving resilient environments, social and cultural systems. Evidently, the estimated values of economic contribution from the former homelands of South Africa omit much of what contributes to human wellbeing. The economic values of agricultural production from the former homelands may, therefore, be viewed as substantial.

6.7 Conclusion

This chapter estimated the value and economic contribution of agricultural production based on the GM approach. The ARC's sample survey data provided variables to directly estimate the economic contribution of agricultural production in the OR Tambo District area. Using the

ARC's sample survey data it was determined that the annual GM per household in 2012 prices was R1 958.32 in 2013 and R8 892.83 in 2015. Based on these estimates it was acknowledged that the rural development project introduced by the ARC and DRDLR did achieve some change in the mind-set of farmers in the area. What is needed, however, is to find ways to further improve their productivity in order to increase the economic contribution of this vital sector.

Interrogation of the NIDS and IES data sets revealed that there are two main types of variables provided to estimate the economic contribution of agricultural production. The first type are self-reported values of agricultural produce consumed from home production. The second type are the value of sales for livestock and crop production, and the quantities of agricultural produce harvested and consumed for crop and livestock production.

An appropriate proxy to measure the economic contribution of agricultural production would seem to be variables of self-reported values of agricultural produce consumed from own production. Using the NIDS data it was determined that the estimated value of agricultural goods consumed from home production in current prices was R207 million based on wave 1 data, R80,5 million based on wave 2 data, and R529 million based on wave 3 data. Using the IES 2010/2011 data it was determined that the value of agricultural produce consumed from home production was R359 million in current prices. However, self-reported values of agricultural production add a source of inequality to the measurement of output because households may overestimate or underestimate the value of goods. In order to avoid errors in the measurement of agricultural production, the GM approach was used to directly estimate agricultural production.

It was discovered in this chapter that key variables to directly estimate subsistence farmers' agricultural production are also found in the NIDS data sets. The NIDS was particularly useful because it is a nationally representative study. This study found that the annual GM per household in 2012 prices in the former homelands was R1 017.85 million in 2008 based on wave 1 and R3 535.42 million in 2012 based on wave 3. It was discovered that the NIDS wave 2 data in 2010/2011 does not have variables to estimate farm input cost and the value of livestock output sold and consumed. As a result, it was found that the annual GFI of crop and livestock by-product was R1 973.00 per household based on wave 2. These results are not directly comparable to the ARC's sample results in 2013 and 2015 however this sectors contribution in terms of GM contributes positively to households' income.

This study found that the estimated value of GFI in 2012 prices contributed by black subsistence farming households in the former homelands was R1 062 million based on wave 1 data, R911 million based on wave 2 data, and R2 190 million based on wave 3 data. Furthermore, the black subsistence sector was found to be 1%, 0.6% and 1.5% of the South African commercial agricultural sector in 2008, 2010/2011 and 2012, respectively. The value of agricultural production in the former homelands of South Africa seems trivial when compared with the commercial agricultural sectors GFI. However, measures of economic contribution such as GFI undermine other factors – such as social and cultural bonds – that contribute to human wellbeing. The economic values of agricultural production from the former homelands may be viewed as substantial when considering that these households place more value on preserving resilient environments, social and cultural systems which cannot be measured monetarily. There is no doubt that agriculture should be supported as a viable livelihood strategy. Moreover, this sector is in need of more targeted support to subsistence farmers to in order to enable this sector to become more competitive and contribute to the much needed jobs in the economy.

Chapter 7
Summary, Conclusion, Limitations and Recommendations for Future Research

7.1 Introduction

This study set out to estimate the value and economic contribution of agricultural production in the former homelands of South Africa and propose a method for estimating this sectors economic value.

The issue of finding a basis for measuring this sectors true contribution is critical to our understanding of the role agriculture plays in household food security in these regions and the contribution by this section of the agricultural sector to the economy. Yet, two decades into the Democratic South Africa we are still unable to accurately measure this sectors value. In South Africa, adjustments to the estimated gross value of production arising from commercial agriculture to include guess-estimates for homeland agriculture have always been made. However, guess-estimates on the share of national production originating from the former homeland areas is based on derivatives of past census information, which are now probably outdated. It is against this backdrop that the agricultural sector in the former homelands is investigated.

This chapter is divided into three main parts. Section 7.2 provides a summary of the study, as a way to provide a background of this dissertation. In section 7.3 the conclusions are drawn. In section 7.4 the recommendations are discussed. This is followed by section 7.5, which discusses recommendations for future research.

7.2 Summary of findings

The overall goal of this study was to determine the value and economic contribution of agricultural production in the former homelands of South Africa. The specific objectives of the study was to propose (i) a direct method for estimating the economic contribution of the agricultural production from black farmers in the former homelands, then (ii) estimate the economic contribution of agricultural production, and (iii) investigate whether the agricultural

sector in the former homelands is significant or not when compared with the commercial agricultural sector in South Africa.

This study analysed the agricultural sector in the former homelands using three different data sets, which include the Stats SA's IES 2010/2011, all the NIDS waves between 2008 and 2012, and the ARC's sample survey conducted in 2012 and 2015.

The history of the black agricultural sector prior to South Africa gaining independence is analysed to determine the causes of the poor performance of this sector in the homelands. The background of the black agricultural sector may provide clarity with regard to the observed trends in the agricultural sector in the former homelands. It was discovered that the performance of the black agricultural sector declined mainly after 1948. This has been attributed to the rising populations in the homelands due to the segregationist policy of apartheid.

In the 1980s, the South African government was under increasing pressure to bring an end to the apartheid policy. The South African government focused on improving the economy in the homelands by developing the agricultural sector. The state intervened by introducing agricultural policies in an effort to improve the economic landscape of these areas. Studies reveal that policies such as the FSP did have a positive impact on agricultural output in the homelands where FSP was initiated. However, success of the FSP was limited mainly because the programme ignored the effects of internal and external influences, including natural, historical and political influences.

The economic contribution of agricultural production is also discussed with a view to show the production trends in the homelands between 1970 and 1990. In majority of the homelands, average annual agricultural growth rate increased between 1970 and 1980. However, average annual agricultural growth rate decreased in majority of the homelands in the mid-1980s. This was mainly due to severe weather conditions that affected production between 1980 and 1990 in South Africa. From these results it is evident that the poor performance of the agricultural sector in the homelands was not because of poor farming on the part of farmers as suggested by the former South African government. However, a combination of environmental and political factors contributed to the poor performance of the agricultural sector in the homelands.

The findings of previous studies which directly estimated the economic contribution of agricultural production are covered to determine a suitable method to estimate the economic

contribution of household agricultural production. Three out of the four studies reviewed used a direct method to estimate the economic contribution of agricultural production.

In this study the GM approach is used as a method to estimate the economic contribution of subsistence farming households' agricultural production. Additionally, the econometric model used by Dovie et al. (2003, 2006) is used to directly estimate the economic contribution of household agricultural production.

Missing cost variables in the NIDS and ARC data sets only allows estimation up to GM. On the other hand, the IES data set only enables estimation of agricultural goods consumed from home production. As a result, this study estimated the GM per household for the NIDS and ARC data sets.

7.3 Conclusion

The main objective of this study was to investigate the value and economic contribution of agricultural production in the former homelands and determine whether this sector is significant or not when compared with the South African commercial agricultural sector.

The second objective of this study aims to investigate the economic contribution of agricultural production in the former homelands. Table 7.1 below provides a summary of the estimated economic contribution of agricultural production in 2012 prices in the former homelands of South Africa.

Table 7.1 Annual GM per household (in Rands - 2012 prices)

Source of data		**ARC sample survey**	**NIDS**	
Economic contribution of agricultural production estimated as:		Annual GM per household	Annual GM per household	GFI in million R.
Year	2008		1017.85	1 062
	2010/2011		1 973.00	911
	2012		3 353.42	2 190
	2013	1 958.32		
	2015	8 892.83		

Source: Author's calculation and compilation of NIDS wave 1, 2 and 3, IES 2010/2011, ARC 2013 and 2015, and Aliber and Mdoda (2015).
Note: The estimated annual GM per household for NIDS 2010/2011 is actually the annual GFI per household.

Using the ARC 2013 and 2015 data, it was estimated that the annual GM per household in 2012 prices was R1 958.32 in 2013 and R8 892.83 in 2015. These results are not nationally

representative; however, it is evident that subsistence farmers' make positive significant savings from agricultural production.

Using the NIDS, this study found that the estimated annual GM per household in 2012 real prices was R1 017.85 based on wave 1 data, R1 973.00 based on wave 2 data, and R3 535.42 based on wave 3 data. These results are nationally representative and they seem to be consistent with the numbers from the ARC 2013 and 2015 survey, although not directly comparable.

This study found that the estimated value of GFI in 2012 real prices for farmers in the former homelands of South Africa was R1 062 million based on wave 1 data, R911 million based on wave 2 data, and R2 190 million based on wave 3 data using the NIDS data. This contribution of agricultural production to farmers' livelihood should not be warrants further investigation.

In order to investigate the reliability of the NIDS data, the reviewed results by Aliber and Mdoda (2015) are compared with the estimated result of the GFI value for black farmers in the former homelands based on the NIDS data. According to Aliber and Mdoda (2015), the estimated value of small-scale agricultural production in the former homelands was R7 948 million based on the IES 2010/2011 data. Evidently, this value is significantly higher than the value estimated in this study based on the NIDS wave 2 in 2010/2011. An upward biased result is expected from the approach used by Aliber and Mdoda (2015). These authors approach indirectly measures the contribution of agricultural production using household food expenditure data. Moreover, the IES questionnaire has limited variables to identify a specific group of farmers compared with the NIDS which has three questions used to differentiate commercial from subsistence farmers. The NIDS may offer reliable data for analysing the agricultural sectors economic contribution by sector because it provides variables to directly estimate this sectors contribution. Moreover, the NIDS provides variables used to distinguish between the different types of farmers. In so doing, it may provide a better data set to accurate estimate the black subsistence sectors economic contribution.

In order to address the third objective in this study, the economic contribution of black farming households' production is compared with the economic contribution of the commercial agricultural sector. Table 7.2 below provides a summary of the estimates of GFI of the black subsistence agricultural sector in the former homelands based on the NIDS data and the commercial agricultural sector in South Africa. With the exception of wave 2, the GFI of the black subsistence agricultural sector increased from R1 062 million in wave 1 to R2 190 million in wave 3. It is evident that subsistence agricultural production plays a vital role in rural

households. The decrease observed in the value of GFI in 2010/2011 is most likely, the result of the drought in 2007/2008 and the financial crises of 2008/2009, which caused a decrease in the number of farmers that indicated that they were agriculturally active.

Table 7.2: GFI of the agricultural sector (in Rands million)

	Comparison of the value of agricultural production between subsistence farmers in the former homelands and the commercial sector (in Rands million)		
Year	**2008**	**2010/2011**	**2012**
	Value of agricultural production by commercial sector		
Stats SA: GFI	117 439	145 740	147 440
	Value of agricultural production by black farmers in the former homelands		
NIDS: GFI	1 062	911	2 190

Source: Author's calculation based on data from NIDS and compilation of Stats SA data

Using the NIDS wave 1, wave 2 and wave 3 data it was estimated that the economic contribution of the black subsistence agricultural sector was 1%, 0.6% and 1.5% of the commercial agricultural sectors GFI, respectively. These figures may depict a desolate agricultural sector in the former homelands. However, the economic values of agricultural production from the former homelands may be viewed as substantial when considering that these households place more value on preserving systems which do not have a monetary value.

Emphasis in this study has been on estimates of economic contribution. However, the researcher acknowledges that economic growth is not a good measure of human development and while economic contribution is important, it is not sufficient to bring about improvements in the quality of life and reduce poverty and unemployment. Progress still needs to be made in the rural areas of South Africa. For perspective, the farmers in the ARC survey cited that they are in need of reliable access to water, inputs and markets. More importantly, the provision of basic services such as access to education, roads and sufficient agricultural training are considered as crucial elements to achieve long-term growth.

7.4 Limitations

Addressing the following issues facilitated the goal of having a better understanding of the characteristics of farming households' agricultural production in the former homelands and the contribution of this sector to the economy in South Africa.

This study was hampered by a lack of variables in national surveys. For example, the NIDS wave 2 did not consistently include agricultural questions about farm input cost and livestock production quantities consumed and sold. In addition, current versions of the IES Questionnaire

does not ask households about the quantities and values of agricultural goods consumed and produced. This lack of information constitutes a shortcoming of this study, since livestock variables and input cost are important variables for estimating the economic contribution of household production. It is anticipated that consistent information capturing by Stats SA and NIDS will allow a better understanding of the value and significance of the agricultural sector in South Africa. In order to overcome this shortfall, this study added the ARC's primary and secondary data to complement the national level data with the aim of showing the value of extracting households level agricultural production information.

The researcher also discovered that some households were reluctant to provide income information from agricultural production in the ARC's 2013 and 2015 survey. In addition, some households could not recall the exact quantities of harvested agricultural goods and income received. Having observed this problem, the researcher made a request to the respondents to provide the possible range of quantities harvested and the income received from agricultural production. This enabled the farmers to indicate average values of quantities and income.

7.5 Recommendations for future research

The value and economic contribution of subsistence agricultural production to the South African economy is a narrow research field, but expansion of this topic is desirable in our current economic context so that the relevance of agricultural production in growth and poverty reduction can be understood.

Comprehensive data on the quantities harvested, consumed and income earned from agricultural goods sold needs to be gathered from different regions or provinces to generate a production and income map which can be applied towards providing targeted assistance to farming households who are:

a) Vulnerable to post harvest losses, droughts and other ecological factors that negatively affect agricultural production. During data collection some households indicated that they harvested very little of the crops they planted. Comprehensive data on household production can be used to identify such farming households.
b) Already efficient in the production of specific products that have potential to graduate to a commercial scale. This would make a better case when motivating for increase in funding to train farmers in sustainably producing agricultural goods.

This dissertation directly estimated the subsistence sectors agricultural production from the former homelands of South Africa using national level data. The approach in this dissertation digs deeper than many other studies, but still just uncovers the tip of the iceberg. Further research should consider directly estimating the economic contribution of agricultural production for commercial and subsistence farmers in all the settlement types in South Africa. This information can be critical to our understanding of the role agriculture plays in food security and facilitate a better understanding of the importance of agricultural production to the economy in South Africa.

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Appendix A

ARC • LNR
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UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Agricultural Development Questionnaire 2015
Questionnaire Cover
This questionnaire is to be administered to the breadwinner and/or another household member who is knowledgeable about the household's agricultural production activities.

My name is... I would like to ask you some questions about your household agricultural production activities. The data collected will be used for a research study for the Agricultural Research Council (ARC) and University of Pretoria (UP).

Refusals (if applicable)	**Yes**	**No**
Your participation is voluntary: Are you willing to participate in this study?	1	2

SURVEY IDENTIFICATION	
Date (dd/mm/yr)	
Village Name	
GPS Code	
SURVEY RECORD NUMBER	
HH NUMBER	
PROVINCE (CODE)	
DISTRICT (CODE)	
LOCAL MUNICIPALITY	
ENUMERATOR NAME	
PROVINCE (CODE)	**DISTRICT (CODE)**
01= EASTERN CAPE	**11= OR Tambo**
02= KWAZULU NATAL	**22= uMkhanyakude**

DETAILS OF RESPONDENT IN HH

1. Breadwinner (HH head)……..
2. Other……

SECTION A: HOUSEHOLD DEMOGRAPHICS								
A1. Individual names of people living in household: HH head first	A2. Relationship to breadwinner (Code No. 2)	A3. Gender Male: 1 Female: 2	A4. Age	A5. Highest education (Code No. 5)	A6. Employment: earning any cash or in-kind income now? Yes: 1 No:2	A7. Employment in past 30 days to 6 months? (Code No. 7)	A8. No. of months away from home in last 12 months	A9. Reason for absence (Code No. 9)

Code (2) Relationship to HH head	Code (5) Education	Code (7) Employment	Code (9) Absence
01 = breadwinner/household head	01=no schooling	01=has found a job, about to start	01 = employment
02 = absentee breadwinner/household head	02= Gr 0 to Gr4	02=student/scholar, prefers not to work	02 = searching for employment
03 = wife/husband of breadwinner/Hh head	03=Gr 5/ to Gr 7	03=homemaker prefers not to work	03 = schooling (NQF: 1)
04 = son or daughter	04=Gr8 to Gr 11	04=retired, prefers not to seek formal job	04 = student (NQF: 2 - 8)
05 = grandparent (In laws)	05= Matric	05=too young to work	05 = personal reasons
06 = grandchild	06=NQF level 2 - 4	06=too old to work	06 = to escape violence
07 = sister or brother	07= NQF level 5 -8	07=seasonal worker	07 = visiting friends/family
08 =son/daughter in law	~~08 = Degree~~	08=lacks skills for available jobs	
09 = niece/nephew/cousin	~~09 = Post graduate~~	09=cannot not find any job	08 = living with other partner
10=aunt/uncle	10 = OTHER	10=handicapped, illness, etc.	09 = prison
11 = great-grandparent		11=cannot find good work	10 = vacation
12 = household helper		12=contract worker	11 = in hospital or clinic
13=lodger		13=retrenched	12 = business
14 = OTHER		14=other reason	13 = other

SECTION B: AGRICULTURAL PRODUCTION									
B1. Over the last 12 months has anyone in this household participated in growing food or raising livestock (excluding paid employment)?								Yes	1
								No → Stop interview	2
								Yes	No
B2. Has anyone in this household grown crops or taken care of animals on any of the following types of land in the last 12 months?								1	2
B2.1 A commercial farm which is owned by a member of this household								1	2
B2.2 A land reform project on government land								1	2
B2.3 Land to which a member of this household has access because of his/her status as employee on commercial farm								1	2
B2.4 A backyard garden								1	2
B2.5 Communal land								1	2
B3. CROP PRODUCTION								1	2
Crops	**B3.1Grown in last rainfall season Yes:1 No:2**	**B3.2Does HH practise intercropping? If yes, which crops? (Please tick)**	**B3.3Area cultivated (units: use code)**	**B3.4Annual output (units: use code)**	**B3.5Crop losses (e.g. pests)(units: use code)**	**B3.6Home consumption(units: use code)**	**B3.7How much was sold(units: use code)**	**B3.8.What was the value of sales**	**B3.9.Where was goods sold**
Grains, Starches									
Maize									
Groundnuts									
Sorghum									
Cassava									
Soya									
Other, specify									
Vegetables									
Tomato									
Sweet potato									
Cabbage									

Crops	B3.1Grown in last 12 month Yes:1 No:2	B3.2Does HH practise intercropping? If yes, which crops? (Please tick)	B3.3Area cultivated (units: use code)	B3.4Annual output (units: use code)	B3.5Crop losses (e.g. pests)(units: use code)	B3.6Home consumption(units: use code)	B3.7How much was sold(units: use code)	B3.8.What was the value of sales	B3.9.Where was goods sold
Spinach									
Onions									
Beans									
Carrots									
Other, specify									
Fruit									
Oranges									
Bananas									
Avocado									
Mango									
Other, specify									

Code for Area cultivated (2)	
1 = 1 Ha/10 000m^2	3 = Other
2 = 1/2 Ha/ 5000M^2	
If still unsure refer to image	

B4. LIVESTOCK PRODUCTION

	Livestock	B4.1 Has a household member owned [...] during the last 12 months?		B4.2How many […] are in the HH possession at the moment?	B4.3 In the past 12 months how many did the household sell?	B4.4What is the total amount you got from the sale?	B4.5 In the past 12 months, how many [...] did the HH slaughter or use for own consumption?	B4.6 In the past 12 months how many [...] did HH lose due to theft, illness or other loss?	B4.7 How many [...] did household give away as gifts?
		Yes	No	Number (If none, write 0)	Number (If none, write 0)	Rands	Number (If none, write 0)	Number (If none, write 0)	Number (If none, write 0)
1	Cattle								
2	Sheep								
2	Goats								
4	Pigs								
5	Chickens								
6	Donkeys								
7	Mules and Horses								
8	Ducks								
9	Other...								

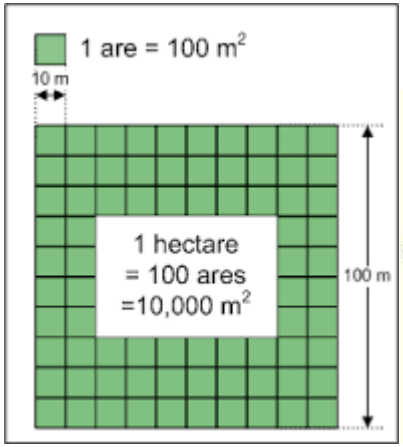
Interviewer

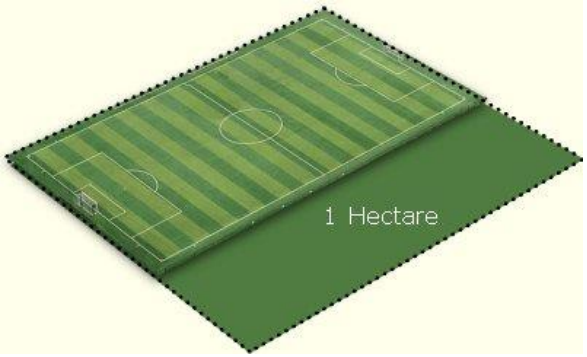
- **Read out each item.**
- **For each item with yes, go to C2.**
- **If household member does not know, indicate with (-).**

SECTION C: FARMING COSTS					
	C1.In the past 12 months did your household spend on […]?		C2.Where does Household get input?	C3.How many months of the year did household buy or acquire input?	C4.In the months when you did buy, what was the amount spent on […]?
Type of input	Yes	2=No	Name of company or Government	Number of months	Rands
01 - Buy or acquire hired labour	1	2			
02 - Buy or acquire fertilizer	1	2			
03 - Buy or acquire, such as animal dung	1	2			
04 - Buy or acquire other agro-chemicals, such as sprays, herbicides, insecticides and blue death	1	2			
05 - Buy or acquire ploughing services for example tractors, ploughs or planters	1	2			
06 - Buy or acquire seeds and seedlings	1	2			
07 - Buy or acquire dipping services	1	2			
08 - Buy or acquire other veterinary services and products, such as medicines and veterinary care	1	2			
09 - Buy or acquire animal feed for example chicken feed	1	2			

	C1.In the past 12 months did your household spend on […]?		C2.Where does Household get input?	C3.How many months of the year did household buy or acquire input?	C4.In the months when you did buy, what was the amount spent on […]?
Type of input	**Yes**	**2=No**	**Name of company or Government**	**Number of months**	**Rands**
11- Repair and maintain machinery, fences, buildings and hand tools					
12-other…					

Code sheet





Code for Units of measurement (Indicate code for unit and write quantity/value e.g. 1 = 1/2 full Bakkie)			
01= Bakkie	03= Boxes	05= small plastic bags (bunches)	07= Other
02= crate (e.g milk crate)	04= tons	06= 25l drums	