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Working Paper Series

PROVIDE PROJECT

The Provincial Decision-making Enabling Project

Working Paper 2005:3

Quantifying the economic divide in South African agriculture: An income-side analysis

Elsenburg
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PROVIDE PROJECT

The Provincial Decision-making Enabling Project

Overview

The Provincial Decision-Making Enabling (PROVIDE) Project aims to facilitate policy design by supplying policymakers with provincial and national level quantitative policy information. The project entails the development of a series of databases (in the format of Social Accounting Matrices) for use in Computable General Equilibrium models.

The National and Provincial Departments of Agriculture are the stakeholders and funders of the PROVIDE Project. The research team is located at Elsenburg in the Western Cape.

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For the original project proposal and a more detailed description of the project, please visit www.elsenburg.com/provide

Quantifying the economic divide in South African agriculture: An income-side analysis [1]

Abstract

The dualistic nature of the South African economy manifests itself to a large extent in the agricultural sector, where ownership and access to land was previously reserved and is still mainly controlled today by white farmers. As a result black farmers were prevented from sharing in the profits derived from a thriving agricultural sector, contributing to the large disparities between the income levels of white and black agricultural households. In this paper the inequality in the distribution of income between the black and white agricultural populations is quantified using various decomposition and data exploratory techniques. Analyses of data from the Income and Expenditure Survey of 2000 and the Labour Force Survey of September 2000 (Statistics South Africa) suggest that not only are inequalities within agriculture higher and more pronounced along racial lines than inequalities within non-agriculture, but these inequalities can be explained to a large extent by differences in the ownership of income-generating assets such as land and productive capital. However, given the high poverty rates and meagre incomes among black subsistence and small-scale farmer households, much needs to be done in order to increase returns to non-commercial agriculture before it will become a solution to poverty reduction.

[1] The author of this paper is Kalie Pauw.

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1. Introduction

Despite South Africa's official status as an upper middle-income country it is characterised by extreme degrees of inequality in the distribution of income, assets and opportunities. Past discriminatory policies have left a large proportion of the population outside the economic mainstream and relatively poor, living in circumstances similar to those of the poor in typical third world countries. At the other end of the income spectrum is a small minority group that controls the country's productive assets, allowing them to enjoy a standard of living comparable to the wealthy in developed countries.

The dualistic nature of the economy also manifests itself in the agricultural sector, where ownership and access to land was previously reserved and remains controlled by white farmers. Agricultural subsidies enabled white farmers to build successful commercial farms based on modern production technologies. They are able to compete in a global environment and earn incomes comparable to those of the highest income groups in the country. On the other hand, African, Coloured and Asian agricultural households – collectively referred to as 'black' households in this paper – are either landless farm worker households who supply labour services at very low wages, or subsistence and small-scale farmers, many of who live in former homelands areas.[2] These black agricultural households are often poor and struggle to support themselves with income earned from agricultural activities. As a result they must rely on alternative sources of income such as government transfers or non-agricultural labour income.

Although the South African poverty and inequality literature is extensive, not much has been done to quantify poverty and inequality among South African agricultural households, possibly due to the complexities surrounding the identification of agricultural households in the 'traditional' household surveys conducted in South Africa. Furthermore, the notion of 'agricultural households' is complex as it may include farm worker households, small-scale subsistence farmers and large-scale commercial farmers, while agricultural activities may be practiced on a part-time, seasonal or full-time basis. In this paper two definitions for agricultural households are proposed and various poverty and inequality estimates are calculated. The focus is limited to an income-side analysis, i.e. other forms of deprivations such as access to basic services are not considered. Various agricultural and non-agricultural

[2] The definition of black people used in this paper is consistent with that used in the broad-based black economic empowerment initiative in agriculture (AgriBEE) (Department of Agriculture, 2004). Most black agricultural households in the Western Cape (75.2%) and Northern Cape (64.4%) provinces are classified as Coloured, while the rest of the country's black agricultural households are mostly African. Asian agricultural households are only found in KwaZulu-Natal, and even here they make up only 0.8% of the black agricultural households in the province.

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income sources are used to obtain a detailed overview of the nature of inequality among the agricultural population.

There are various sources of demographic and income/expenditure data available in South Africa. Statistics South Africa conducts a variety of regular surveys. Most suited to this particular study is the Income and Expenditure Survey of 2000 (IES 2000) (SSA, 2002a) as well as the LFS September 2000 (LFS 2000:2) (SSA, 2002b). The IES is conducted every five years and at present the 2000 dataset is the latest available version. The Labour Force Survey is conducted twice every year and the latest available version is the September 2003 (SSA, 2004) dataset. However, the LFS 2000:2 is used since it is based on the same sample of households as the IES 2000 and therefore the two datasets can be merged. The merged dataset integrates detailed person-level employment, education and demographic statistics from the LFS 2000:2 with the household-level income and expenditure data in the IES 2000. Although there are some concerns about the reliability of the IES and LFS datasets, whether merged or used separately, as well as the comparability of these with other datasets, it remains the most recent and comprehensive source of combined household income/expenditure and employment information in South Africa.[3]

The paper is structured as follows. In the absence of a formal definition of agricultural households in the South African literature, section 2 outlines how agricultural households are defined and identified for the purpose of this paper. It is important to be aware of the definitions used, since poverty and inequality results may be fairly sensitive to the inclusion or exclusion of specific households from the selected sample. Section 3 comprises detailed analyses of demographics, income sources, poverty and inequality in agriculture. The aim is to develop an understanding of who are involved in agricultural activities and in what capacity, to what extent agricultural households are deprived in terms of earnings, and the degree and nature of inequality among the agricultural population vis-à-vis the non-agricultural population. Section 4 is a general discussion and conclusion to this paper.

2. Defining agricultural households

2.1. Agricultural income variables in the IES/LFS 2000

Defining agricultural households is fairly complex given the various ways in which households partake in agricultural activities, be it formally or informally, as an employee or a farmer, as a main source of income or a source of food to the household, part-time or full time, or simply as a hobby. A number of income variables in the IES/LFS 2000 database are

[3] This merged database is referenced as IES/LFS 2000 in this paper and is the source of all figures and tables, unless indicated otherwise. For a detailed description of the database, an outline of the data problems, and data adjustments made to the version used in this paper, refer to PROVIDE (2005a).

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used to identify agricultural households, namely income from agricultural wages (see section 2.1.1), direct and implicit income from home consumption and sales (see section 2.1.2) and 'gross operating surplus' (GOS) from agricultural activities (see section 2.1.3). These are discussed in more detail below.

2.1.1. Income from agricultural wages

Information on wages earned from formal employment as 'agricultural workers' is arguably the most important link to the agricultural sector. All employed respondents in the IES/LFS 2000 are required to report their occupations and industries of employment. The occupation categories are based on the International Standard Classification of Occupations (ISCO) (see SSA, 2002b). One of these categories is 'skilled agricultural workers'. On the industry side 'agriculture, forestry and fishing' usually forms a single industry. The original International Standard Industrial Classification (ISIC) (see SSA, 2002b) codes supplied with the IES/LFS 2000 database were used to separate agriculture from this combined industry.

As shown in Figure 1 (left-hand panel) many people employed in the agricultural sector specified their occupations as elementary (59.8%) or machine operators (11.9%). Only 22.2% are actually classified as skilled agricultural workers. About 6.1% of people employed in the agricultural sector specified other occupation codes, such as managers, clerks or service workers. No distinction is made between farm workers and farmers in the ISCO codes. Presumably many farm workers see themselves as 'unskilled' and hence selected 'elementary occupations' as the most accurate description of the jobs they performed. Similarly, some farmers may view themselves as managers rather than skilled agricultural workers.

People classified as skilled agricultural workers also report a variety of industries (Figure 1, right-hand panel). Most of the skilled agricultural workers either select the agricultural sector (43.2%) or private households (35.5%) as their industry of employment. Presumably these private households are mostly agricultural households themselves (farmers). The remainder are employed in forestry and fisheries (5.8%), government services (6.1%), private services (3.5%) and other industries (5.9%). The latter is made up mostly of the manufacturing, wholesale and retail, and construction industries. Clearly, if either the occupation or industry classification were used to define 'agricultural workers', many people would be excluded. Consequently, we take a fairly broad view of 'agricultural workers' and include all people that are either employed in the agricultural sector or classified as skilled agricultural workers.

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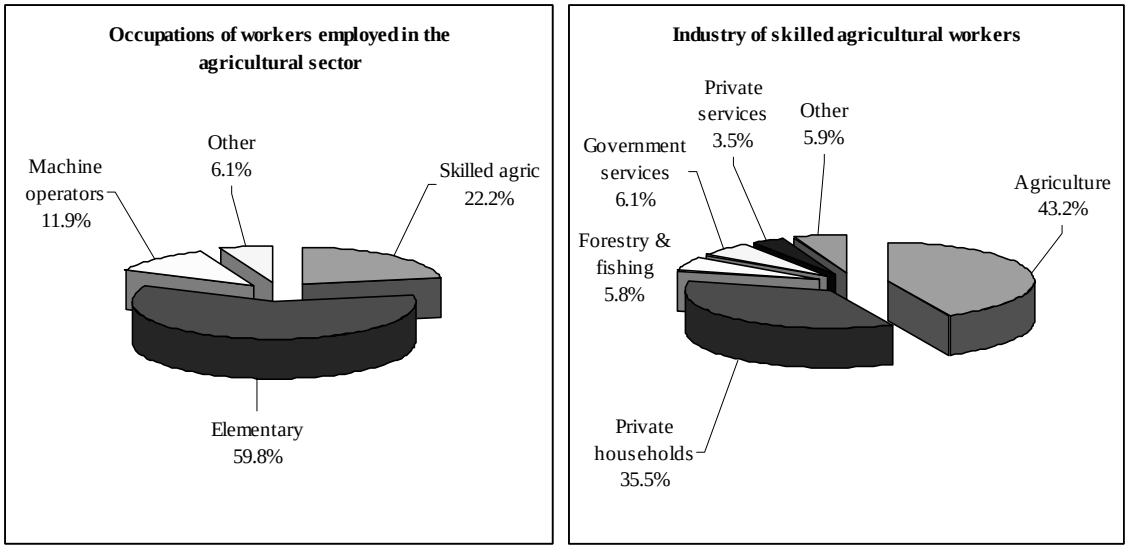
Figure 1: Industries and occupations of 'agricultural workers'



The household-level labour income variable in the IES/LFS 2000 is the sum of all wages reported by each employed household member. Wages earned by agricultural workers, defined as outlined above, are added up in a similar fashion to give a household-level agricultural labour income variable. This variable, expressed as a share of total household income, is used as one of the identifiers of agricultural households, specifically farm worker households (variable *aginclabsh*).

2.1.2. Direct and implicit income from home consumption and sales

The IES 2000 also contains information on 'home production for home consumption' (HPHC) that can be used to identify agricultural households. All households producing goods for own consumption, such as subsistence or small farmers, completed this section. All excess production not consumed by these households and sold in local markets presents a direct source of income to the household. The value of own produce or livestock consumed should also be regarded as indirect income to the household in the sense that the household 'sells' the goods to itself, since, if the household did not consume these goods, it could have sold it in the market. This treatment of home-consumed production captures the notion of opportunity cost in economics. Income from HPHC as a share of total income is the second variable used to identify agricultural households, and more specifically, perhaps, subsistence farming households (variable *inchphcsh*).

2.1.3. Gross operating surplus from agricultural activities

Households also report on income from gross operating surplus or GOS in the IES 2000. In an agricultural context GOS can be understood as a crude indication of the return on investments

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in physical capital stock and land owned by households. The inclusion of GOS is slightly problematic, since there is no information in the IES/LFS 2000 indicating whether GOS income is necessarily derived from agricultural land or capital. Hence, the assumption is made that if a household reports a positive value (even a small one) for either *aginclabsh* or *inchphcsh* any income from GOS reported by that household is assumed to relate to the ownership or use of agricultural land or capital at the disposal of the household. Variable *agincgossh* expresses income from 'agricultural GOS' as a share of total household income. This variable is used as a third identifier of agricultural households, most of which will presumably be commercial farming households.

This treatment of agricultural GOS is not ideal for two reasons. Firstly, it is possible that some agricultural households also earn GOS income from other non-agricultural investments, but no information is available in the IES 2000 regarding the source or nature of GOS income. This implies that 'agricultural GOS' is possibly overstated. Secondly, GOS is in actual fact a reflection of the return to physical capital stock *and* human capital (hence sometimes referred to as 'mixed' income) with no distinction as to the precise source of that income. The way in which the business is defined is critical, since farm owners would typically report their remuneration for labour services under GOS, while farm managers in the employ a commercial farming enterprise would typically report their income under salaries and wages. It is likely that some confusion exists among respondents in the IES 2000.[4] Therefore, in the event that a commercial farmer reports no agricultural labour income and does not sell or consume any home produce there is no way to 'link' that household to agriculture, and consequently information on income from 'agricultural GOS' may be lost for some households.[5]

2.2. Two definitions of agricultural households

Two types of agricultural households are defined for the purpose of these analyses. Under the *broad* definition any household that earns income from any of the three agricultural income sources described above is defined as an agricultural household. Under the *strict* definition a household has to earn at least half of its household-level income from these agricultural income sources to qualify as an agricultural household. Thus, to summarise:

- IF [*aginclabsh* > 0 OR *inchphcsh* > 0 OR *agincgossh* > 0] THEN the household is 'broadly' defined as an agricultural household.

[4] In an unpublished discussion document Simkins (2003) notes large changes in the levels of income from GOS (*incgos*) and income from labour (*inclab*) between 1995 (IES 1995, SSA, 1997) and IES 2000 – *incgos* fell significantly, while *inclab* increased.

[5] Note that only workers that report positive wage or salary income are required to specify their occupation and industry. Therefore, if a particular farmer's wage or salary is zero, no occupation or industry is specified.

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- IF [(*aginclabsh* + *inchphcsh* + *agincgossh*) > 0.50] THEN the household is 'strictly' defined as an agricultural household.

This formulation of agricultural households makes it possible to distinguish between those households that are generally 'involved' in agriculture, and those for whom agriculture is the household's main livelihood strategy. Households who do not derive a large share of their income from agriculture have other more important sources of income and as such are not solely dependent on their agricultural income. However, this does not say that there is no scope for improvements in the relative or absolute income earned from agricultural activities. It merely says that in the event of crop failures or employment losses in the agricultural sector many of these broadly defined agricultural households will not be affected to the same extent as the strictly defined agricultural households, i.e. strictly defined agricultural households, and especially the poor among them, may be more vulnerable to economic shocks.

3. Demographics, incomes sources, poverty and inequality

3.1. Depicting agricultural households

About 35.6% of South Africa's households reside in rural areas. Many rural inhabitants are linked to agricultural activities in some way or another. As a result a fairly large proportion of South African households are broadly defined as agricultural households. Figure 2 shows the proportions of rural households and agricultural households (broad and strict definitions) by province.

Figure 2: Rural and agricultural household shares

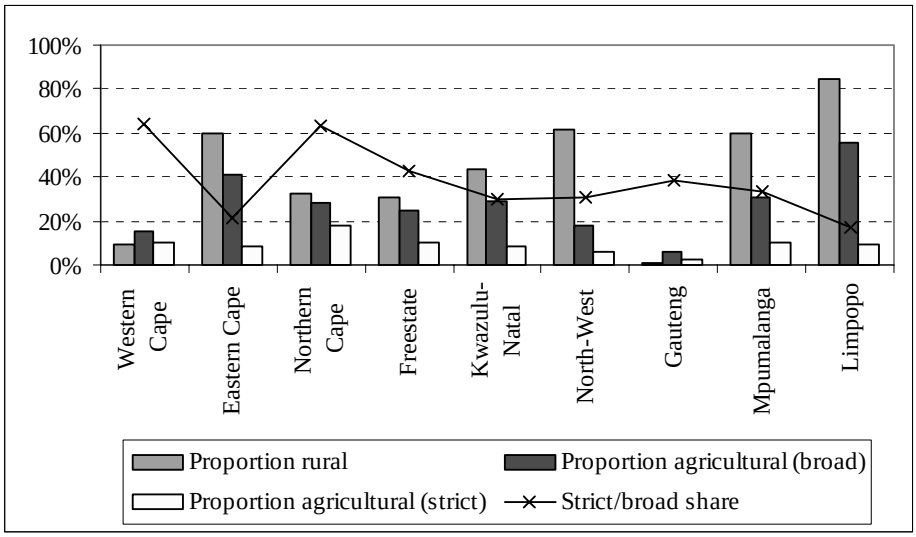

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Figure 2 shows that the share of rural households and the share of broadly defined agricultural households are generally correlated. On average the share of broadly defined agricultural households (24.5%) is about 68.8% of the share of rural households (35.6%). Exceptions to the rule are the Western Cape and Gauteng where the share of broadly defined agricultural households is actually larger than share of rural households. This is due to the incorporation of peripheral urban areas and informal housing areas, where agricultural activities often take place, into newly demarcated metropolitan areas. The City of Cape Town, for example, includes areas such as Phillippi, Paarl and Somerset-West where many large and small-scale farms are located. At the other end of the spectrum is the North West province where the rural household share is 61.4% compared to a broad agricultural household share of only 18.0%.

Perhaps more interesting in the context of this analysis is the gap between the shares of broadly and strictly defined agricultural households (see line graph in Figure 2). About 64.2% of broadly defined agricultural households in the Western Cape and 63.2% in the Northern Cape are also strictly classified as agricultural households, which is well above the national average of 29.7%. The proportions are much lower in other provinces, ranging from 42.6% in the Free State to a mere 16.8% in Limpopo. A large gap is an indication that only a small proportion of broadly defined agricultural households derive a meaningful share of their income from agricultural-related activities, which implies that incomes from non-agricultural activities are relatively more important to these households.

Table 1 summarises the agricultural household and population shares under the broad and strict definitions (compare Table 11 and Table 12 in the appendix for a provincial breakdown). 26.4% of black households in South Africa are broadly defined as agricultural households, compared to 8.8% of white households. In contrast, only 7.8% of black and 3.2% of white households are strictly defined as agricultural households. On average 24.5% of households are broadly and 7.3% strictly defined as agricultural households. Therefore, as mentioned previously (Figure 2), only 29.7% of broadly defined agricultural households are also strictly classified as agricultural households. The racial breakdown shows that the share of broadly defined agricultural households that also qualify under the strict definition is somewhat higher for white households (35.8%) than for black households (29.5%). Table 1 also shows the relevant population shares, i.e. the shares of people living in different agricultural households groups. The population shares are slightly higher than the household shares, mainly because agricultural households are typically larger in size than their non-agricultural counterparts. This is especially true for broadly defined black agricultural households.

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Table 1: Agricultural household and population shares by race

	Households			***Population***		
	Black	***White***	***Total***	***Black***	***White***	***Total***
Broad	26.4%	8.8%	24.5%	34.7%	8.8%	32.4%
Strict	7.8%	3.2%	7.3%	8.1%	3.6%	7.7%
Strict/broad share	***29.5%***	***35.8%***	***29.7%***	***23.4%***	***41.6%***	***23.8%***

Further investigation into 'how' agricultural households 'qualify' and why they farm may help to understand the large gap between the strict and broad agricultural household and population shares. Based on our definitions of agricultural households there are various ways in which households can qualify as agricultural households. Table 2 shows that under the broad definition of agricultural households 34.0% of black and 42.2% of white households qualify based on income earned from agricultural wages or salaries. About 17.5% of black and 56.7% of white households in this category qualify under the criteria that agricultural GOS is earned. In contrast about 75.9% of black and 76.2% of white households qualify under the criteria that income is derived from the sale and/or consumption of home produce.

However, under the strict definition income from labour plays a much more important role. About 77.9% of black and 58.6% of white households in this category earn more than half of their household-level income from agricultural wages or salaries alone. 10.7% of white and 4.3% of black households earn 50% or more of their income from agricultural GOS, making this a fairly important income source, especially for white households. In contrast only 4.9% of black and 5.1% of white households in this category earn a significant share of income from the sale and/or consumption of home produce.

Table 2: How do they qualify?

Broad definition	***aginclabsh > 0***	***inchphcsh > 0***	***agincgossh > 0***
Black	34.0%	75.9%	17.5%
White	42.2%	76.2%	56.7%
Strict definition	***aginclabsh > 0.5***	***inchphcsh > 0.5***	***agincgossh > 0.5***
Black	77.9%	4.9%	4.3%
White	58.6%	5.1%	10.7%

Note: The rows for the broad definition add to more than 100% since some households qualify on more than one account. The columns of the strict definition merely give an indication of which households would have qualified on a single account. The rows for the strict definition add up to less than 100% since some households only qualify once two or three of the income shares are added together.

Table 3 is useful for interpreting and understanding the previous one. It is based on a question in the LFS 2000:2 that asks respondents to indicate why they farm. Note that agricultural households that do not own or have access to their own land, e.g. farm workers, are excluded from the table.[6] By cross-tabulating this information with our definition of

[6] This implies that only about 31.5% of black and 57.9% of white households that are strictly defined as agricultural households according to our definition responded to the particular question.

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agricultural households some interesting inferences can be made. The majority of black farming households are involved in agriculture as a main or extra source of food (85.7% and 71.4% under the broad and strict definitions respectively). Most white farming households, on the other hand, are involved in agriculture as a main or extra source of income (66.1% and 90.7% under the broad and strict definitions respectively). Quite a number of broadly defined white agricultural households also partake in agricultural activities as an extra source of food (22.6%).

The last two columns of Table 3 summarise the response of households that qualify as agricultural households under the broad definition but not under the strict definition ('broad not strict'). While the response is not very different for black households, many of the white households falling in this category indicate that they farm as an extra source of food (48.0%). A fairly large proportion also farm as a hobby (10.7%).

Table 3: Why do agricultural households farm?

	Broad		***Strict***		***'Broad not strict'***	
	Black	***White***	***Black***	***White***	***Black***	***White***
Main food source	31.4%	6.0%	31.6%	5.2%	31.3%	7.1%
Extra food source	54.3%	22.6%	39.8%	3.0%	57.2%	48.0%
Main income source	4.5%	49.2%	15.6%	73.9%	2.3%	17.1%
Extra income source	6.2%	16.9%	9.0%	16.7%	5.6%	17.1%
Hobby	3.6%	5.3%	4.1%	1.1%	3.5%	10.7%
Total	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***

Note: Percentages of only those households who own or have access to farming land for own or commercial production (see LFS 2000:2) that are also broadly or strictly defined as agricultural households according to our definition.

3.2. Sources of household income

An analysis of the income sources of agricultural households may add some further insight. A number of household income sources can be identified from the IES/LFS 2000. In this paper total income (*totinc*) is made up of the following components:

- Income from labour (*inclab*): includes all wages and salaries earned from employment. Labour income can further be broken down into two components, namely agricultural labour income (*aginclab*) and non-agricultural labour income (*nonaginclab*), i.e. $inclab \equiv aginclab + nonaginclab$.

- Income from GOS (*incgos*): includes all income from gross operating surplus, which is an indication of the return on investments (or profits) or income from income-generating assets owned by the household. As mentioned previously, data limitations force the

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assumption that all GOS income earned by agricultural households is defined as agricultural GOS.

- Income from government and household transfers (*inctrans*): household transfers include all inter-household transfers, such as alimony, child maintenance payments, gifts etc. Government transfers mainly consist of welfare transfer payments, such as pensions, child grants, disability grants and unemployment insurance.

- Income from corporations (*inccorp*): includes dividend payments and other transfers from enterprises to households. Unfortunately no distinction can be made between transfers from agricultural and non-agricultural enterprises due to limited information.

- Income from HPHC (*inchphc*). Income from the sale of excess home produce or livestock. Also included is the value of home produce or livestock consumed.

Thus, total household income $totinc \equiv inclab + incgos + inctrans + inccorp + inchphc$. Table 4 shows the average income for broadly and strictly defined agricultural households (by race), broken down into its various components. The related income shares are also tabled. Clearly, white agricultural households under the broad and strict definitions earn significantly more than their black counterparts. Total income from labour is an important income source for all groups concerned, but income from non-agricultural labour contributes more than agricultural labour for both white and black households under the broad definition. Income from HPHC contributes little to overall income for all agricultural household groups.

Broadly defined black agricultural households rely a lot on transfer income (25.5%). In total only about 28.8% of their income comes from agricultural related activities. In contrast strictly defined black agricultural households rely relatively more on agricultural GOS (14.7%). About 80.5% of strictly defined black agricultural households' income comes from agricultural related activities, compared to 28.8% for broadly defined black agricultural households. White agricultural households' income sources follow a slightly different pattern, with income from GOS in particular playing a much more important role. Income from agricultural GOS adds 27.4% and 43.4% to broadly and strictly defined agricultural households' income respectively. The average strictly defined white agricultural household derives 92.1% of its income from agricultural activities, compared to 58.2% of broadly defined white agricultural households.

Table 4 also shows the income sources of those households that qualify as agricultural households under the broad definition but fail to do so under the strict definition ('broad not

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strict'). These households earn a very small share of their labour income from agricultural labour, while agricultural income sources only contribute 11.0% and 11.4% to total household income for black and white households respectively. Household in this category tend to rely more on non-agricultural labour income, transfer income (in the case of black households) and income from corporations (in the case of white households). Interestingly black households in this category earn a total of R21,957, which is comparable with the income levels of broadly and strictly defined black agricultural households.

Table 4: Agricultural household income sources (annual, 2000 prices)

	Broad		*Strict*		*'Broad not strict'*	
	Black	***White***	*Black*	*White*	*Black*	*White*
Agricultural and non-agricultural labour income (levels)						
aginclab	3,752	49,979	10,995	129,710	727	5,476
nonaginclab	8,779	54,569	2,163	14,347	11,543	77,020
Total income by income source (levels)						
inclab	12,531	104,548	13,158	144,057	12,270	82,496
incgos	1,487	52,158	2,662	133,871	996	6,549
inctrans	5,305	11,688	1,224	4,700	7,010	15,588
inccorp	742	13,254	143	5,416	992	17,629
inchphc	758	8,629	921	20,223	690	2,158
totinc	***20,823***	***190,277***	***18,108***	***308,267***	***21,957***	***124,419***
Shares of labour income						
aginclab	29.9%	47.8%	83.6%	90.0%	5.9%	6.6%
nonaginclab	70.1%	52.2%	16.4%	10.0%	94.1%	93.4%
inclab	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***
Shares of total income						
inclab	60.2%	54.9%	72.7%	46.7%	55.9%	66.3%
incgos	7.1%	27.4%	14.7%	43.4%	4.5%	5.3%
inctrans	25.5%	6.1%	6.8%	1.5%	31.9%	12.5%
inccorp	3.6%	7.0%	0.8%	1.8%	4.5%	14.2%
inchphc	3.6%	4.5%	5.1%	6.6%	3.1%	1.7%
totinc	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***
Agricultural income shares						
Total "agricultural income" *(aginc = aginclab + agincgos + inchphc)*	5,997	110,766	14,578	283,804	2,413	14,183
Share of total income	***28.8%***	***58.2%***	***80.5%***	***92.1%***	***11.0%***	***11.4%***

Note that the agricultural labour income variable (*aginclab*) reported in Table 4 is not a true reflection of agricultural wages since it is a household-level variable, which means that it is not necessarily the annual wage of a single household member. The average wage of black agricultural workers as reported in the IES/LFS 2000 is R8,904 per year, which is also not a true reflection of an average, full-time, annualised agricultural wage since seasonal and part-time workers' are included in the estimation process. White agricultural workers earn substantially more, reporting an average salary of R101,869. The comparative non-

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agricultural annual salaries/wages are R25,569 and R98,784 for black and white workers respectively.

Low returns to subsistence agriculture, low agricultural and rural wages, and limited employment opportunities in rural areas all contribute to the fact that poverty is often a rural phenomenon, and especially high among agricultural households. Previously Table 4 showed that black agricultural households are considerably worse off than white agricultural households in terms of income levels. This result is true for all provinces, as shown in Table 5, which compares average incomes of black/white agricultural households (all strict definition) with those of non-agricultural households. In all provinces black agricultural households also earn less than their non-agricultural counterparts. In contrast, white agricultural households earn more than non-agricultural households on average, although this result is not consistent across all provinces.

Table 5: Average annual income of (strict) agricultural and non-agricultural households

	Agricultural households			***Non-agricultural households***		
	Black	***White***	***Total***	***Black***	***White***	***Total***
Western Cape	24,899	138,876	34,043	51,531	164,851	79,525
Eastern Cape	16,102	148,292	22,813	21,915	153,481	30,045
Northern Cape	16,437	299,111	78,092	31,700	165,497	53,656
Free State	11,377	653,225	48,482	24,481	141,624	41,322
Kwazulu-Natal	15,959	108,368	17,509	31,662	176,282	43,285
North-West	24,059	768,432	69,344	27,809	137,041	34,288
Gauteng	19,793	222,082	25,150	39,197	172,278	61,667
Mpumalanga	18,232	198,261	22,314	28,861	145,680	36,831
Limpopo	19,081	558,836	36,482	24,131	132,471	26,289
Average	***18,108***	***308,267***	***32,181***	***32,326***	***164,754***	***47,805***

Note: Includes all people living in agricultural households, not necessarily only those involved in agriculture and their dependants.

The exceptionally high income levels reported by white agricultural households in provinces such as the Free State, North-West and Limpopo warrants further investigation. Table 6 compares the breakdown of total agricultural income (*aginc*) across provinces. Clearly, most of the total income earned by agricultural households (Table 5) is derived from agricultural income sources. In particular 99.0%, 96.0% and 80.5% of white agricultural households' total income in the aforementioned provinces comes from agricultural income. Furthermore, the majority of this income is reported as income from agricultural GOS.

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Table 6: Components of average agricultural income of (strict) agricultural households

	Black agricultural households (strict)					***White agricultural households (strict)***				
		Components of aginc					***Components of aginc***			
	aginc	***aginclab***	***agincgos***	***inchphc***	***aginc share of totinc***	***aginc***	***aginclab***	***agincgos***	***inchphc***	***aginc share of totinc***
Western Cape	21,026	98.1%	1.7%	0.2%	84.4%	123,396	91.0%	2.8%	6.2%	88.9%
Eastern Cape	12,383	60.4%	24.5%	15.1%	76.9%	132,980	35.5%	39.6%	24.9%	89.7%
Northern Cape	14,849	88.7%	8.8%	2.5%	90.3%	284,249	63.1%	34.1%	2.8%	95.0%
Freestate	8,876	83.1%	7.3%	9.5%	78.0%	646,636	30.6%	63.5%	5.9%	99.0%
Kwazulu-Natal	13,393	73.7%	21.9%	4.4%	83.9%	108,369	93.9%	5.8%	0.3%	100.0%
North-West	20,969	80.5%	14.4%	5.1%	87.2%	737,321	24.5%	70.7%	4.8%	96.0%
Gauteng	15,918	77.4%	16.0%	6.6%	80.4%	151,460	49.1%	36.3%	14.6%	68.2%
Mpumalanga	13,792	67.8%	24.9%	7.3%	75.6%	184,228	46.1%	12.0%	41.9%	92.9%
Limpopo	13,741	52.3%	38.9%	8.7%	72.0%	449,933	40.4%	57.7%	1.9%	80.5%
Total	***14,578***	***75.4%***	***18.3%***	***6.3%***	***80.5%***	***283,804***	***45.7%***	***47.2%***	***7.1%***	***92.1%***

The majority of strictly defined black agricultural households are farm worker households earning wages from formal employment in the agricultural sector (see Table 2). This implies that the average income of R18,108 reported in Table 5 is more a reflection of farm worker households' income than it is a reflection of subsistence or commercial farming households' income. Under the very crude assumption that black households reporting a value of 0.5 or higher for *inchphcsh* are subsistence farmers, while households reporting a value of 0.5 or higher for *agincgossh* are commercial farmers, and households reporting a value of 0.5 or higher for *aginclabsh* are farm worker households, incomes for these three 'types' of black agricultural households can be compared.

Consider Table 7 below, which compares total income levels for these various types of black agricultural households. Unfortunately limited numbers of sample observations within certain provinces make some of the estimates less reliable. In particular, the shaded cells in the 'subsistence' and 'commercial farmer households' columns are based on sample sizes of less than 10 observations (not the weighted frequencies as reported in the table). In the 'adjusted mean' estimate these shaded observations were dropped. Data reliability issues aside, the results seem to suggest that black commercial farmers (R28,789) are better off than both farm worker (R15,520) and subsistence farmer (R12,149) households.

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Table 7: Comparing incomes of black "farm worker" and "farmer" households

	Farm worker households (aginclabsh > 0.5)			*Subsistence farmer households (inchphcsh > 0.5)*			*Commercial farmer households (agincgossh > 0.5)*		
	No. of households	*Mean (aginc)*	*Mean (totinc)*	*No. of households*	*Mean (aginc)*	*Mean (totinc)*	*No. of households*	*Mean (aginc)*	*Mean (totinc)*
Western Cape	95,737	21,018	24,840				609	38,086	38,086
Eastern Cape	76,664	11,242	13,570	14,862	10,512	13,893	7,508	14,926	19,220
Northern Cape	25,186	12,682	14,080				116	6,044	9,404
Freestate	59,269	8,277	10,541	902	18,402	19,500	1,512	14,898	16,684
Kwazulu-Natal	135,461	11,776	13,279	7,042	7,331	9,550	8,936	31,320	41,132
North-West	35,200	17,158	20,162	3,277	11,256	12,201	808	246,000	246,600
Gauteng	54,116	15,216	18,029	5,053	17,968	18,553	953	8,159	8,159
Mpumalanga	49,101	9,914	11,764	1,235	6,248	8,756	3,065	12,347	17,716
Limpopo	60,708	10,487	11,853	4,839	8,414	10,575	9,483	20,221	28,312
Mean income	***591,443***	***13,239***	***15,520***	***37,211***	***10,765***	***13,089***	***32,990***	***26,509***	***33,078***
Adjusted mean*	***591,443***	***13,239***	***15,520***	***26,744***	***9,295***	***12,149***	***28,992***	***21,438***	***28,789***

Note(*): The 'adjusted mean' is calculated by omitting the shaded cells, representing provinces with sample sizes of less than 10 observations, from the estimate. See discussion in text.

3.3. Agriculture and poverty

Poverty is loosely defined by The World Bank as the "*inability to attain a minimal standard of living*" (as cited in Woolard and Leibbrandt, 2001:42). Poverty analysis, therefore, is an attempt to define this minimal standard of living or welfare level in terms of a poverty line, and to then study those households or individuals that fall below it. Various absolute and relative poverty lines are used in South Africa. In recent years the 40th percentile cut-off point of adult equivalent per capita income has become quite a popular poverty line.[7] This is equal to R5,617 per annum in 2000 prices (IES/LFS 2000). The 20th percentile cut-off of adult equivalent income, which is equal to R2,915 per annum in 2000 prices, is sometimes used as the 'ultra-poverty line'. The poverty headcount ratio can now be calculated using the Foster-Greer-Thorbecke class of decomposable poverty measures (see PROVIDE, 2003 for a discussion). The poverty rate (*P0*) is calculated as the share of the population living in poverty, i.e. all people living in households where the adult equivalent per capita income is below the poverty line are deemed poor. Estimates of the depth (*P1*) and severity (*P2*) of poverty for the strictly defined black agricultural population are provided in Table 13 in the appendix. The discussion here focuses mostly on the average poverty rates within population subgroups, i.e. *P0*.

Figure 3 shows the poverty rates associated with the above-mentioned upper and lower bound poverty lines. The horizontal lines represent the national average upper and lower bound poverty rates of 30.6% and 53.5% respectively. The large differences between provinces are apparent, with Gauteng and the Western Cape enjoying the lowest incidence of

[7] The adult equivalent household size variable, *E*, is calculated as $E = (A + \alpha K)^{\theta}$, with *A* the number of adults per household and *K* the number of children. In this paper we follow May *et al*. (1995) in setting the parameters α and θ equal to 0.5 and 0.9 respectively.

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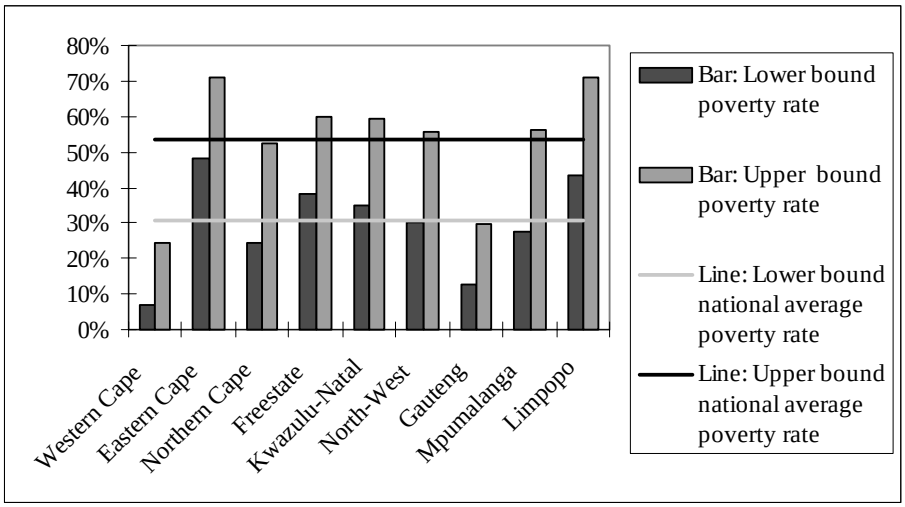
poverty. The Eastern Cape and Limpopo have very high poverty rates, averaging 71.1% of the population in both these provinces.

Figure 3: Poverty rates for the population as a whole, by province (lower and upper bound)



Most of the poverty in South Africa is explained by poverty among black people. Even at the upper bound poverty line only 1.1% of the white agricultural population and 1.0% of white non-agricultural populations are deemed poor. Poverty rates among the black agricultural and non-agricultural population are shown in Figure 4. In sharp contrast to the white population the poverty rates among the black agricultural and non-agricultural populations are 70.5% and 57.7% respectively, shown as the two horizontal lines in the figure. The figure also shows that there is not much variation in black agricultural and non-agricultural poverty rates between provinces, except for the Western Cape where poverty is significantly lower. In general, it can be concluded that poverty is lower among the black non-agricultural population than among the agricultural population.

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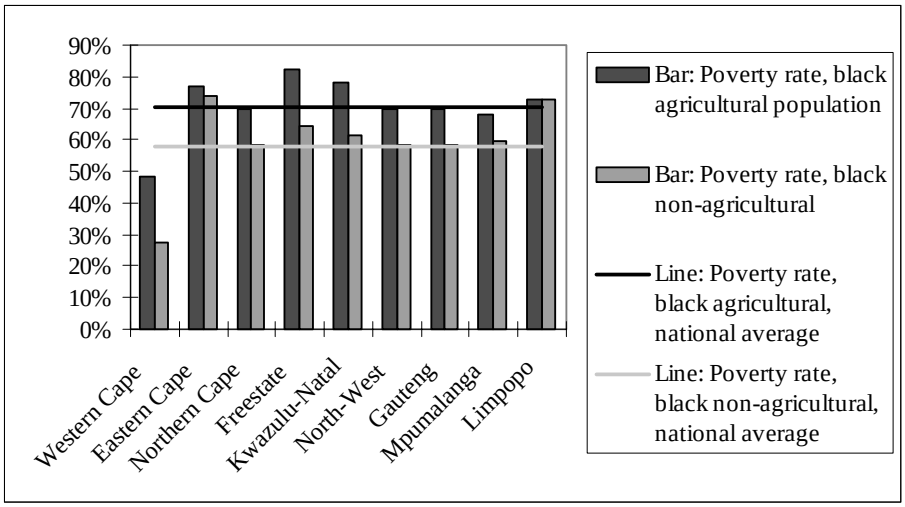
Figure 4: Poverty among (strict) black agricultural and non-agricultural households



Note: The upper bound poverty rate of R5,617 per adult equivalent is used for this graph.

This raises questions about agriculture as a solution to poverty. Surely if the black non-agricultural population is better off the implication is that job creation in the non-agricultural sector is a more desirable policy objective than the creation of more opportunities in agriculture where returns appear to be low. The results also put the findings of Machete (2004) in a different light. His main finding from a survey conducted among smallholder farmers in the Limpopo province is that since "*rich*" agricultural households derive a larger share of their income from agricultural activities than "*poor*" agricultural households, agriculture must be good for poverty alleviation, a view that appears to be widely held among development economists. This misleading notion is based on his findings that agriculture is "*a major contributor to total household income*" and that "*the contribution seems to increase as household become richer*" (2004:6). This may be true, but the figures here suggest that black agricultural households, on average, are poorer than their non-agricultural counterparts. Any judgement about the potential of agriculture as a poverty alleviation tool should, after all, be based on comparisons of agricultural incomes and non-agricultural incomes.

Perhaps further investigation is needed. Since agriculture is primarily practiced in rural areas, it is a livelihood strategy of rural households. A comparison of urban and rural poverty rates reveals that the urban poverty rate (35.6%) is significantly lower than the rural poverty rate (75.0%). Certainly, this explains part of the difference between agricultural and non-agricultural poverty rates. Figure 5 shows that rural black agricultural households earn an average of R16,930 per annum, compared to R18,907 for rural black non-agricultural households. However, the poverty rate among the agricultural population is 72.2%, which is slightly lower than the 76.4% among the non-agricultural population, mainly because non-agricultural black households are larger in size than black agricultural household in rural areas

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(4.6 compared to 4.0 members), which affects the adult equivalent per capita income of the household.[8]

The above results are certainly important. However, a comparison of the different 'types' of black agricultural households in rural areas is also necessary. Figure 5 reveals that commercial farmer households enjoy the lowest poverty rates of all rural black households. Farm worker households also have a lower poverty rate (72.5%) than non-agricultural households. However, the extremely high poverty rate (90.0%) among the black subsistence farming population is alarming. At present the majority of broadly defined agricultural households produce agricultural commodities for own consumption, i.e. as a source of food and not as a source of income (see Table 2 and Table 3). As long as this is the case agriculture will not be a solution to poverty.[9] The suggestion is that only commercially based agricultural activities may be a solution to rural poverty alleviation.

[8] A poverty line based on unadjusted household incomes would give a different result. It is, however, standard practice in the poverty literature to adjust income for size and (sometimes) structure of the household.

[9] As mentioned previously the LFS 2000:2 contains questions relating to the farming activities of households who own or have access to farming land for own or commercial production (see section 3.1, Table 3). If we use this information to identify agricultural households we find that the poverty rate among the rural black agricultural population is 80.4% compared to 70.4% among the rural black non-agricultural population. This appears to contradict the results here, but can be explained by the fact that the LFS 2000:2 definition includes many subsistence farmers who not qualify under our strict definition of agricultural households (see Table 2), while it also excludes farm worker households. The high poverty rate among these subsistence farmers therefore dominates the results.

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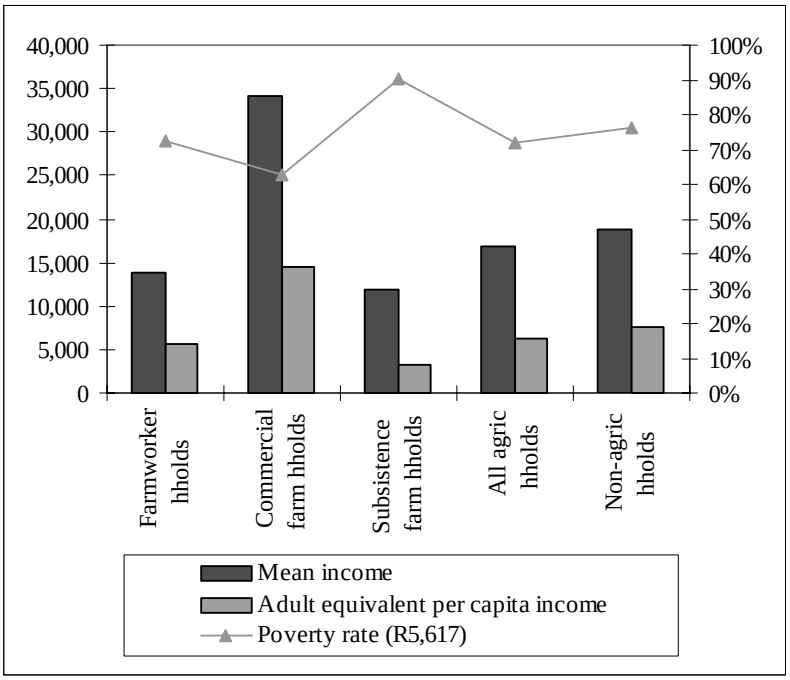
Figure 5: Income levels and poverty rates: rural black agricultural and non-agricultural



Note: Only national-level estimates are provided here. Table 14 in the appendix contains selected provincial-level results, which, due to limited numbers of observations, are less reliable. Also note that the bars in the figure represent the average of total household income, while the poverty rate is based on adult equivalent per capita income of the household.

3.4. The economic divide in agriculture

South Africa has one of the most unequal distributions of income in the world. Various inequality measures exist in the literature (see PROVIDE, 2003 for an overview). The Gini coefficient is perhaps the best-known inequality measure. Mathematically the Gini coefficient varies between zero and one, although in reality values usually range between 0.20 and 0.30 for countries with a low degree of inequality and between 0.50 and 0.70 for countries with highly unequal income distributions. There are various formulas that can be used to calculate the Gini coefficient (see Sen, 1997 for an overview). McDonald *et al*. (1999) follow Stuart (1954) by defining the Gini coefficient (G) in terms of covariances. Formally,

$$G = \frac{2\,\mathrm{cov}\left(y, F(y)\right)}{\mu},$$

where $F(y)$ is the cumulative density function of income (y), and μ is the mean population income. The Gini coefficient can be decomposed into elements measuring the inequality in the

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distribution of the income components specified previously (section 3.2). Consider the following equation (see Leibbrandt *et al.*, 2001a, 2001b, and McDonald *et al.*, 1999):

$$G = \sum_{k=1}^{K} \left\{ \left[\frac{\text{cov}(y_k, F(y))}{\text{cov}(y_k, F(y_k))} \right] \left[\frac{2\,\text{cov}(y_k, F(y_k))}{\mu_k} \right] \left[\frac{\mu_k}{\mu} \right] \right\} = \sum_{k=1}^{K} R_k G_k S_k$$

The income measure (y) is defined such that $y = \sum_k y_k$ for income sources (y_k) indexed over $k \in \{inclab, incgos, inctrans, inccorp, inchphc\}$. S_k is the share of the k^{th} income source in total income, G_k is the Gini coefficient measuring the inequality in the distribution of income component k and R_k is the Gini correlation of income from source k with total income. The larger the product of these three components, the greater the contribution of income source k to total inequality as measured by G. S_k and G_k are always positive and less than one, while R_k can fall anywhere in the range [-1, 1] since it shows how income from source k is correlated with total income. Table 8 shows the product $R_kG_kS_k$ for various population subgroups.[10]

Table 8: Gini decomposition ($R_kG_kS_k$)

Income sources	***Total population***	***Black population***	***White population***	***Agricultural population***	***Non-agric population***	***Black agric population***	***White agric population***
Labour	0.57	0.53	0.36	0.41	0.58	0.39	0.23
GOS	0.05	0.03	0.07	0.26	0.04	0.10	0.37
Transfers	0.02	0.03	0.01	0.02	0.02	0.02	0.00
Corporations	0.05	0.02	0.05	0.01	0.06	0.00	0.01
HPHC	0.00	0.00	0.00	0.04	0.00	0.02	0.03
Gini	***0.70***	***0.61***	***0.48***	***0.73***	***0.69***	***0.53***	***0.64***

Note: Strictly defined agricultural households. Compare Table 15 (broad definition).

Overall inequality (first column) is driven mainly by inequalities in the distribution of labour income. As far as within-group inequalities are concerned the Gini estimates suggest that inequality is higher among black people than white people (0.61 compared to 0.48). There is also evidence that inequality among the agricultural population is higher than inequality among the non-agricultural population (0.73 compared to 0.69), although comparative Gini coefficient estimates under the broad definition suggests otherwise (see Table 15). However, what is interesting to note here is that income from GOS plays a large role in inequality among the agricultural population, explaining approximately 35.6% of the Gini coefficient. This reflects the importance of agricultural GOS income relative to total household income as well as inequalities in the distribution of agricultural assets such as land, productive capital and human capital.

[10] Leibbrandt et al. (2001a) also show how the Gini coefficient for a particular income component (G_k) is driven by inequality among those earning income from that source (G_A) and the proportion of households with no access to that source ($1 - P_k$). Therefore, $G_k = P_k G_A + (1 - P_k)$. Such further analysis falls beyond the scope of this paper.

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Exploring the agricultural population further reveals that inequality among the black agricultural population is lower than inequality among the white agricultural population (0.53 compared to 0.64). While inequality in the distribution of GOS income explains some of the inequality among black households, most of it is driven by inequalities in the distribution of labour income. Inequality among the white agricultural population is completely different, with most of the overall inequality driven by inequalities in the distribution of GOS.[11]

An alternative measure of inequality is the Theil-T (T) or Theil-L (L) indices. These measure are very different from other inequality measures and are derived from the notion of entropy in information theory (see PROVIDE, 2003 for a discussion). Estudillo (1997) uses the following formulas, where y_i is the welfare measure (income), n the population size and μ the population mean of income (also see section 6.2 in the appendix):

$$T = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{\mu}\ln\left(\frac{y_i}{\mu}\right) \text{ and } L = \frac{1}{n}\sum_{i=1}^{n}\ln\left(\frac{\mu}{y_i}\right).$$

As shown in Table 9 the Theil-T inequality measure also suggests that inequality is higher among the agricultural population than among the non-agricultural population (1.70 compared to 1.04). This result is consistent also when the broad definition of agricultural households is used (see Table 15).

Table 9: Theil inequality measures

	Total population	***Black population***	***White population***	***Agricultural population***	***Non-agric population***	***Black agric population***	***White agric population***
Gini	0.70	0.61	0.48	0.73	0.69	0.53	0.63
Theil-T	1.08	0.78	0.50	1.70	1.04	0.60	0.87

Note: The Gini and Theil estimates are not directly comparable. Estimates are for strictly defined agricultural households. Compare Table 15 (broad definition).

The Gini and Theil-T estimates suggest that inequalities among the white agricultural population and the black agricultural population are both lower than overall agricultural inequality. This is an indication that overall agricultural inequality is probably driven mostly by inequalities between black and white agricultural households. The large difference in between white and black agricultural households' average incomes (Table 5) supports this notion. In order to explore this further both the Theil inequality measures can be decomposed into measures of inequality within a population subgroup and a measures of inequality between population subgroups (see Leibbrandt *et al.*, 2001b). Therefore,

[11] Note that labour income includes agricultural and non-agricultural labour income. The interpretation of income from GOS is also difficult given the way in which it is defined for agricultural households as well as the way in which agricultural households report on it (as discussed earlier).

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$$T = T_B + \sum_{i=1}^{n} q_i T_i \quad \text{and} \quad L = L_B + \sum_{i=1}^{n} p_i L_i \,,$$

where the component T_B (L_B) is the between-group contribution and is calculated in the same way as T (L) but assumes that all incomes within a group are equal. T_i (L_i) is the Theil inequality measure within the i^{th} group, while q_i (p_i) is the weight attached to each within-group inequality measure. When the Theil-T is used weight is the proportion of income accruing to the i^{th} group, while for Theil-L it is the proportion of the population falling within that group.

Table 10: Theil decomposition: black and white agricultural population (strict)

Income weights	q_i	T_i	$\sum_{i=1}^{n} q_i T_i$	T_B	$T = T_B + \sum_{i=1}^{n} q_i T_i$
Black agric population	0.48	0.60	***0.29***		
White agric population	0.52	0.87	***0.45***		
Sum			*0.74*	***0.96***	***1.70***
Population weights	p_i	L_i	$\sum_{i=1}^{n} p_i L_i$	L_B	$L = L_B + \sum_{i=1}^{n} p_i L_i$
Black agric population	0.96	0.50	***0.48***		
White agric population	0.04	0.75	***0.03***		
Sum			*0.51*	***0.55***	***1.06***

The black agricultural population make up 95.8% of the total agricultural population but only earn 48.3% of the income. When using income weights it can be seen that 0.29 (17.1%) of the overall inequality within agriculture is attributed to the black population, while 0.45 (26.3%) is attributed to the white population. The remainder 0.96 (56.6%) is explained by inequality between white and black people in agriculture. When using population weights relatively more of the within-group inequality is attributed to inequality among the black agricultural population.

When compared to inequality among the black and white non-agricultural population (not shown in the table) the between-group component (T_B) only explains about 39.0% of overall inequality when income weights are used. This suggests that the racial divide is much more pronounced within agriculture. Sensitivity testing revealed that these results are fairly robust at a sub-national level. In fact, KwaZulu-Natal is the only province where the contribution of between-group inequality is lower for black and white agricultural households than their non-agricultural counterparts (see PROVIDE, 2005b for a discussion).

4. Discussion and conclusions

The results presented in this paper paint a picture of a highly unequal and racially divided agricultural sector. Typically, black agricultural households are either small-scale or subsistence farming households deriving a relatively small share of their income from

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agricultural activities, or as farm worker households earning low wages but relying on these wages as a main source of income. White agricultural households on the other hand are farmers or farm managers earning relatively high incomes and sharing in the profits of the commercial farming enterprises managed or owned by them.

Although inequality is also prevalent in the rest of the South Africa, the nature of inequality is markedly different within agriculture. Firstly, evidence suggests that agricultural inequality is higher than inequality among the non-agricultural population, at least at a national level and for strictly defined agricultural households. Secondly, inequalities in the distribution of GOS explains much more of the inequality among the agricultural population than among the non-agricultural population. This is a reflection of the inequalities in the ownership of land and other productive assets. Inequalities in the distribution of income from labour play a less important role in overall agricultural inequality than is the case for non-agriculture. This perhaps explains why the current focus in agricultural policy is on the correction of inequalities in the distribution of assets (land), while employment equity enjoys more attention as a policy option of choice to redistribute income in the non-agricultural sector. Thirdly, the Theil decomposition results suggest that inequality *between* the black and white agricultural populations contributes more to overall agricultural inequality than is the case for the black and white non-agricultural population. The fact that overall inequality and the racial divide are more pronounced within agriculture provides further justification for agricultural reforms being placed high on the political agenda.[12]

While the political, social and even economic need for agricultural reform cannot be denied, it is extremely important to remain sober about agriculture as a livelihood strategy for low-income black people in South Africa. Without questioning the possibility of increasing returns to low-income black agricultural households through various agricultural support mechanisms or through an expansion of agricultural activities, nor questioning the potential of black farmers to become successful entrepreneurs, nor questioning the fact that low-income agricultural households are often better nourished than their non-agricultural counterparts, the results in this paper seem to suggest that small-scale farming as it is practiced by many black farmers in this country at present does not generate sufficient income to support the household. While many black people are involved in agriculture in the broad sense, very few of these households derive a significant share of their income from agricultural activities. They are often forced or they choose to rely on alternative sources of income. The majority of black farming households indicate that they partake in agricultural activities as a main or extra source of food rather than a source of income. As long as this remains the motivation for farming agriculture is unlikely to be a significant contributor to poverty reduction.

[12] These results reflect national averages but do not necessarily hold for certain individual provinces. See PROVIDE (2005b) for various provincial-level analyses.

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The high poverty rate among the black agricultural population across South Africa is evidence of this failure of small-scale or subsistence agriculture to pull people out of poverty. At present even strictly defined black agricultural households only earn an average of about R18,108 per annum, 80.5% of which comes from agricultural income sources. This is lower than the average black non-agricultural household income (R32,326) and substantially less than the average white agricultural household's income of R308,267. A breakdown into different types of black rural agricultural households suggests that black commercial farmers are better off than farm worker households, and significantly wealthier than subsistence farmer households (Figure 5). This is interesting as it suggests that agriculture may be a solution to *rural* poverty. However, the fact remains that subsistence agriculture should not be seen as the way forward. Machete cites a number of studies and concludes that "*unless agriculture reaches some degree of commercialisation* [it's] *impact … on poverty alleviation is limited*" (2004:3). These results support his notion.

By far the majority of strictly defined black agricultural households are farm worker households, many of whom, despite being formally employed, earn very low incomes and face high levels of poverty. From an agricultural policy point of view it is also important to consider what the future holds for these households. Estimates based on the Census 2001 (SSA, 2003) and the IES/LFS 2000 show that the agricultural sector is at present still an important source of job opportunities, with almost one million employees or about 10% of South Africa's workforce employed in this industry. However, recent years have seen a trend of labour shedding emerging in the formal agricultural sector (see Vink, 2000). Given pressures on the commercial agricultural sector to remain competitive in the global environment these trends are likely to continue, thus putting further pressure on agricultural wages and/or jobs. The creation of alternative employment opportunities for agricultural workers, whether in the agricultural sector as commercial farmers or in the non-agricultural sector, arguably remains one of the most important challenges facing agricultural policymakers in South Africa today.

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6. Appendix

6.1. Additional tables

Table 11: Agricultural and non-agricultural households by province and race

Agricultural households (broad definition) by province and race							
	Agricultural households			*Non-agricultural households*			
	Black	**White**	**Total**	**Black**	**White**	**Total**	***Grand total***
Western Cape	140,640	24,579	165,219	671,495	218,356	889,851	***1,055,070***
Eastern Cape	581,474	13,833	595,307	771,348	73,759	845,107	***1,440,414***
Northern Cape	43,175	9,187	52,362	111,557	23,328	134,885	***187,247***
Freestate	161,698	10,939	172,637	442,479	83,131	525,610	***698,247***
Kwazulu-Natal	585,772	9,289	595,061	1,315,779	144,639	1,460,418	***2,055,479***
North-West	138,063	4,897	142,960	609,104	42,288	651,392	***794,352***
Gauteng	167,465	24,194	191,659	2,391,520	483,080	2,874,600	***3,066,259***
Mpumalanga	191,204	6,685	197,889	415,958	34,563	450,521	***648,410***
Limpopo	568,693	4,499	573,192	441,197	17,229	458,426	***1,031,618***
Total	***2,578,183***	***108,104***	***2,686,287***	***7,170,438***	***1,120,372***	***8,290,810***	***10,977,097***
Agricultural households (strict definition) by province and race							
	Agricultural households			***Non-agricultural households***			
	Black	**White**	**Total**	**Black**	**White**	**Total**	***Grand total***
Western Cape	97,635	8,516	106,151	714,500	234,419	948,919	***1,055,070***
Eastern Cape	122,272	6,540	128,812	1,230,550	81,052	1,311,602	***1,440,414***
Northern Cape	25,887	7,221	33,108	128,845	25,294	154,139	***187,247***
Freestate	69,230	4,248	73,478	534,947	89,823	624,769	***698,247***
Kwazulu-Natal	174,293	2,973	177,266	1,727,258	150,955	1,878,214	***2,055,480***
North-West	41,494	2,688	44,182	705,672	44,497	750,169	***794,351***
Gauteng	71,439	1,943	73,382	2,487,546	505,331	2,992,877	***3,066,259***
Mpumalanga	64,198	1,489	65,687	542,964	39,758	582,723	***648,410***
Limpopo	93,243	3,106	96,350	916,647	18,621	935,268	***1,031,618***
Total	***759,691***	***38,725***	***798,416***	***8,988,929***	***1,189,751***	***10,178,680***	***10,977,096***

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Table 12: Agricultural and non-agricultural population by province and race

Agricultural population (broad definition) by province and race							
	Agricultural households			***Non-agricultural households***			
	Black	**White**	**Total**	**Black**	**White**	**Total**	***Grand total***
Western Cape	601,886	57,628	659,513	2,662,507	665,653	3,328,160	***3,987,673***
Eastern Cape	3,292,819	48,396	3,341,215	3,249,002	225,276	3,474,278	***6,815,493***
Northern Cape	205,119	31,534	236,653	554,204	74,465	628,668	***865,321***
Freestate	782,378	33,574	815,952	1,694,136	239,851	1,933,987	***2,749,939***
Kwazulu-Natal	3,155,806	29,922	3,185,728	5,287,706	517,673	5,805,379	***8,991,107***
North-West	768,355	23,883	792,239	2,601,752	187,869	2,789,621	***3,581,860***
Gauteng	448,800	58,867	507,667	5,874,020	1,368,584	7,242,604	***7,750,271***
Mpumalanga	1,034,370	37,627	1,071,996	1,754,596	169,517	1,924,112	***2,996,108***
Limpopo	3,394,270	18,577	3,412,847	2,055,640	95,476	2,151,116	***5,563,963***
Total	***13,683,802***	***340,009***	***14,023,811***	***25,733,562***	***3,544,364***	***29,277,925***	***43,301,736***
Agricultural population (strict definition) by province and race							
	Agricultural households			***Non-agricultural households***			
	Black	**White**	**Total**	**Black**	**White**	**Total**	***Grand total***
Western Cape	399,835	30,280	430,115	2,864,558	693,000	3,557,558	***3,987,673***
Eastern Cape	613,660	22,323	635,983	5,928,160	251,350	6,179,510	***6,815,493***
Northern Cape	100,421	24,467	124,888	658,901	81,532	740,433	***865,321***
Freestate	314,790	11,837	326,627	2,161,724	261,588	2,423,312	***2,749,939***
Kwazulu-Natal	675,011	11,464	686,475	7,768,501	536,132	8,304,633	***8,991,108***
North-West	191,868	13,281	205,149	3,178,239	198,471	3,376,711	***3,581,860***
Gauteng	141,526	5,838	147,365	6,181,293	1,421,613	7,602,906	***7,750,271***
Mpumalanga	270,684	11,490	282,173	2,518,281	195,654	2,713,935	***2,996,108***
Limpopo	495,028	10,340	505,369	4,954,881	103,713	5,058,594	***5,563,963***
Total	***3,202,824***	***141,320***	***3,344,144***	***36,214,539***	***3,743,053***	***39,957,592***	***43,301,736***

Note: Includes all people living in agricultural households, not necessarily only those involved in agriculture and their dependants.

Table 13: FGT poverty indices for black agricultural and non-agricultural people

	P0		***P1***		***P2***	
	Black agric	***Black non-agric***	***Black agric***	***Black non-agric***	***Black agric***	***Black non-agric***
Western Cape	0.481	0.272	0.135	0.098	0.057	0.048
Eastern Cape	0.770	0.736	0.414	0.418	0.266	0.272
Northern Cape	0.695	0.582	0.277	0.266	0.137	0.152
Freestate	0.823	0.645	0.458	0.347	0.296	0.220
Kwazulu-Natal	0.779	0.616	0.415	0.312	0.262	0.194
North-West	0.694	0.585	0.371	0.289	0.237	0.177
Gauteng	0.437	0.360	0.208	0.148	0.128	0.082
Mpumalanga	0.680	0.595	0.329	0.269	0.197	0.154
Limpopo	0.729	0.725	0.377	0.380	0.237	0.236
South Africa	***0.705***	***0.577***	***0.355***	***0.290***	***0.220***	***0.178***

Note: Estimates are based on the upper-bound poverty line of R5,617 per adult equivalent per annum and are for strictly defined agricultural households. *P0* is the poverty rate, while *P1* and *P2* relate to the depth and severity of poverty.

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Table 14: Income levels and poverty rates: rural black agricultural and non-agricultural

	Income levels				***Poverty rates***			
	Farm-worker household	***"Com-mercial" farmer household***	***"Sub-sistence" farmer household***	***Non-agricultural***	***Farm-worker household***	***"Com-mercial" farmer household***	***"Sub-sistence" farmer household***	***Non-agricultural***
Western Cape	21,077	23,878		29,966	42.9%	0.0%		33.2%
Eastern Cape	13,628	19,220	13,893	13,823	76.7%	59.8%	84.9%	85.7%
Northern Cape	12,083			32,369	74.3%			48.3%
Free State	8,839	11,998	19,500	21,312	90.2%	16.6%	58.1%	68.9%
Kwazulu-Natal	12,840	42,735	7,298	16,995	81.0%	54.9%	99.1%	82.9%
North-West	21,895	246,600	12,201	21,750	62.8%	0.0%	98.1%	65.7%
Gauteng	15,012			28,562	67.0%			25.4%
Mpumalanga	11,515	17,905	8,756	22,582	73.7%	64.7%	95.9%	64.9%
Limpopo	11,723	28,009	10,575	19,963	74.9%	72.1%	96.5%	76.6%
Total	***13,941***	***34,171***	***11,786***	***18,907***	***72.5%***	***62.6%***	***90.0%***	***76.4%***

Table 15: Gini decomposition ($R_kG_kS_k$) and Theil index

Income sources	***Agricultural population***	***Non-agric population***	***Black agric population***	***White agric population***
Labour	0.43	0.56	0.40	0.25
GOS	0.12	0.04	0.05	0.25
Transfers	0.05	0.02	0.05	0.02
Corporations	0.04	0.06	0.03	0.03
HPHC	0.02		0.01	0.02
Gini	***0.66***	***0.68***	***0.54***	***0.58***
Theil	***1.23***	***0.97***	***0.67***	***0.78***

Note: Broadly defined agricultural population.

6.2. Notes on Theil-L and Theil-T inequality measures

The Theil indices are members of the Generalised Entropy (*GE*) class of inequality measures. They can all be expressed in terms of the following general formula (see Litchfield, 1999).

$$GE(\alpha) = \frac{1}{\alpha^2 - \alpha}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{y_i}{\mu}\right)^{\alpha} - 1\right]$$

The value of *GE* ranges from 0 to ∞, with zero representing an equal distribution of income. The parameter α ($\alpha \geq 0$) is the weight given to the distances between incomes at different parts of the income distribution. The commonest values of α are 0, 1 and 2. It can be shown that *GE*(0) and *GE*(1) with L'Hôpital's Rule become the Theil-L and Theil-T measures respectively. In *GE*(0) or Theil-L, which is also sometimes called the mean log deviation, more weight is given to distances at the lower end of the income distribution, i.e. *GE* is more sensitive to changes at this end of the distribution. In *GE*(1) or Theil-T equal weights are applied across the distribution.

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