# Agriculture and poverty: Farming for food or farming for money?

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**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 by white farmers. This has contributed to the huge disparities in the income levels of black and white agricultural households. In this paper two South African household surveys are used to analyse agricultural inequality using various decomposition techniques. It is found that inequalities within agriculture are higher and more pronounced along racial lines than inequalities among non-agricultural households. Agricultural inequalities also differ structurally from those in the rest of society and are explained largely by differences in the ownership of income-generating assets, and less so by racial wage inequalities. Furthermore, an analysis of agricultural poverty reveals extremely high poverty rates and meagre incomes among black subsistence and small-scale farmer households. These results have important implications for the type of transformation required in the South African agricultural sector, adding weight to the notion that commercialisation is crucial if agriculture is to contribute meaningfully to poverty reduction among the rural black community.*

**Key words**: Agricultural sector; poverty; inequality; household income sources

## 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, living in circumstances similar to those of the poor in 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 standards of living comparable to the wealthy in developed countries.

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The dualistic nature of the economy also manifests itself in the agricultural sector, where land ownership was previously reserved and remains controlled by white farmers. Various subsidies enabled white farmers to build successful commercial farms based on modern production technologies. Today many commercial farmers are able to compete globally 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 typically landless farm worker households who supply low-wage labour services, or subsistence and small-scale farmers, many of who live in the former homelands. These black agricultural households are typically poor and struggle to support themselves with income earned from agricultural activities. As a result they often rely on alternative sources of income such as welfare transfers and remittances.

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 South African household surveys. The notion of an agricultural household 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. Poor reporting on income earned from agricultural activities further exacerbates the problem.

The analysis here is based on the merged Income and Expenditure Survey of 2000 (SSA, 2002a) and Labour Force Survey of September 2000 (SSA, 2002b) (IES/LFS 2000). Section 2 motivates the use of the IES/LFS 2000 and explains how agricultural households are identified in the surveys. Section 3 reviews the demographics, income sources, poverty and inequality among the agricultural population and compares the results with those of the non-agricultural population. Section 4 comprises a general discussion and conclusion to the paper.

## 2. Defining agricultural households

### 2.1 Agricultural income variables in the IES/LFS 2000

The IES/LFS 2000 is the only comprehensive South African data source that combines detailed information on demographics, household income sources and expenditure patterns with employment data. Hence it is very appropriate for analysing poverty and income inequality in South Africa. However, defining agricultural households is complex for a number of reasons. Firstly,

there are various ways in which households partake in agricultural activities, be it formally or informally, as employees or farmers, as a main source of income or a source of food to the household, or simply as a hobby. Secondly, data problems in the IES/LFS 2000, which are documented in Pauw (2005a), add to the concerns about the reliability of income estimates. However, it is believed that various imputations, data cleaning and adjustments made (see Pauw, 2005a for details) allows for useful and reliable inferences to be made. A third concern is the suitability of a general household survey such as this in identifying agricultural households and, specifically, their income and expenditure patterns. However, through careful analyses, several of the income variables in the IES/LFS 2000 can be used to link households with the agricultural sector. These income variables include (1) income from agricultural wages, (2) direct and implicit income from consumption and sales of home produced agricultural commodities, and (3) 'gross operating surplus' (GOS) earned from agricultural activities.

### *2.1.1 Income from agricultural wages*

Agricultural wage data is arguably the most important link between households and the agricultural sector. In the IES/LFS 2000 employed respondents report both an occupation type and a sector of employment. Using this information agricultural workers are very broadly defined as any individual employed either as a skilled agricultural worker[2] or anyone employed in the agricultural industry.

Figure 1 (left-hand panel) shows that 59.8% of people employed in the agricultural sector specified their occupations as elementary and 11.9% as machine operators. Only 22.2% are classified as skilled agricultural workers. Unfortunately no distinction is made between farm workers and farmers in the IES/LFS 2000. Presumably many farm workers regarded themselves as elementary workers or machine operators, while 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 (the employers) are mostly agricultural households themselves (farmers). The remainder are employed in forestry and fisheries (5.8%) (see footnote 2),

[2] *Formally the classification is skilled agricultural and fisheries workers. No further disaggregation is available in the IES/LFS 2000 surveys.*

government services (6.1%), private services (3.5%) and other industries (5.9%).

Clearly, if either the occupation or industry classification were used to define agricultural workers, many agricultural households would be excluded, hence the decision to use a fairly broad definition of agricultural workers. The converse is also true: many non-agricultural workers are also inadvertently included in the analysis. Although this remains a drawback of the study it is estimated that around 90% of agricultural workers are almost certainly directly involved in agriculture.

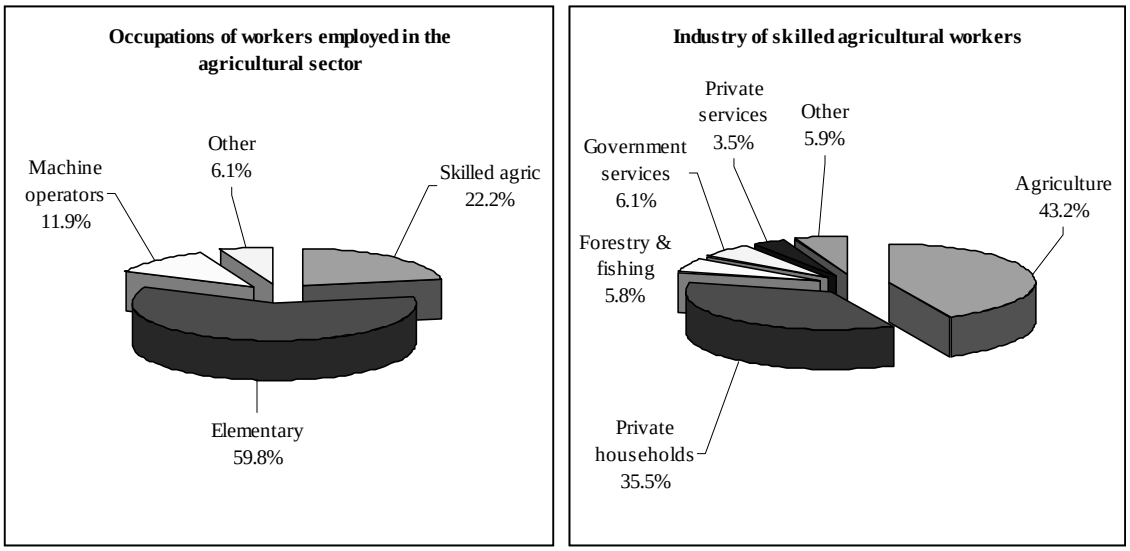


**Figure 1: Industries and occupations of agricultural workers (2000)**

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 are summed 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, and specifically 'farm worker households' (this variable is named *aginclabsh*).

*2.1.2 Direct and implicit income from home consumption and sales*

The IES/LFS 2000 also contains information on 'home production for home consumption' (HPHC) of agricultural commodities. Respondents provide estimates of the quantities of excess production not consumed by them but sold in local markets. This presents a direct source of revenue to the household that can be estimated. The value of own produce consumed should also be

regarded as an implicit income in the opportunity cost sense of the word, since the household could have sold these goods. Therefore, total direct and implicit income from home production sold or consumed, expressed as a share of total income, is the second variable used to identify agricultural households, or more specifically 'subsistence farming households' (variable *inchphcsh*).[3]

*2.1.3 Gross operating surplus from agricultural activities*

Households also report on income from 'gross operating surplus' (GOS) in the IES/LFS 2000. GOS includes returns on physical capital stock, land and human capital owned by households. There is no information in the survey that directly links reported GOS income to the agricultural sector as the source. Consequently, the assumption is made that if a household reports a positive value for either *aginclabsh* or *inchphcsh* any reported GOS income is assumed to originate from the agricultural industry. Variable *agincgossh* expresses income from agricultural GOS as a share of total household income and is used as a third identifier of agricultural households, namely 'commercial farming households'.

It is difficult to determine whether this approach causes an over- or underestimation of agricultural GOS. On the one hand, it is possible that some agricultural households also earn GOS income from other non-agricultural sources. On the other hand, since GOS is a reflection of the return to physical capital stock and human capital ('mixed' income) it may be that some farm owners report their remuneration for labour services under GOS, in which case the occupation or industry of employment is unknown. If such commercial farmers furthermore do not sell or consume any home produce there is no way to link that household to agriculture.

## 2.2 Two definitions of agricultural households

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

[3] *Pauw (2005a) and Gilimani (2006) include discussions of how estimates of direct and implicit income from home production were obtained through various data imputations and data adjustments. These adjustments were incorporated in the version of the IES/LFS 2000 used here.*

- IF [*aginclabsh* > 0 OR *inchphcsh* > 0 OR *agincgossh* > 0] THEN the household is 'broadly' defined as an agricultural household.
- IF [(*aginclabsh* + *inchphcsh* + *agincgossh*) > 0.50] THEN the household is 'strictly' defined as an agricultural household.

This formulation makes it possible to distinguish between those agricultural households that are generally 'involved' in agriculture (broad definition) and those for whom agriculture is the household's main livelihood strategy (strict definition). Households who do not derive a large share of their income from agriculture have other more important sources of income and as such are less vulnerable to agricultural income shocks. Most of the results reported in the latter part of this paper are for strictly defined agricultural households.

## 3. Demographics, incomes sources, poverty and inequality

### 3.1 Depicting agricultural households

About 35.6% of South Africa's households reside in rural areas, with many rural inhabitants linked to agricultural activities. This is reflected in the fairly large proportion of South African households that are broadly defined as agricultural households. Figure 2 shows the proportions of rural and agricultural households (broad and strict definitions) by province.

It is evident that the share of rural households and the share of broadly defined agricultural households are generally correlated. On average the ratio of rural households to broadly defined agricultural households is about 1 to 0.7. It is particularly interesting to look at 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% (see Table 1). 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 (low share) is an indication that only a small proportion of broadly defined agricultural households derive a meaningful share of their income from agricultural-related activities, implying that non-agricultural incomes are relatively more important to these households.

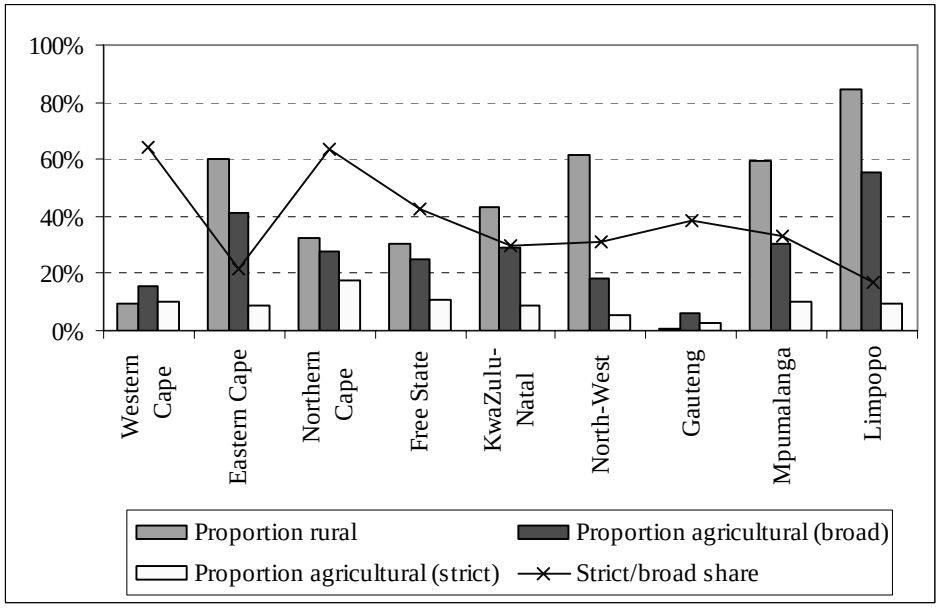


**Figure 2: Rural and agricultural household shares (2000)**

Table 1 summarises the agricultural household and population shares under the broad and strict definitions. About 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 households and 3.2% of white households are strictly defined as agricultural households. The share of broadly defined agricultural households that also qualify under the strict definition is higher for white households (35.8%) than for black households (29.5%). The population shares are slightly higher than the household shares, mainly because agricultural households are typically larger in size, especially in the case of black agricultural households.

**Table 1: Agricultural household and population shares by race (2000)**

| | **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%** |

*Note*: The population shares refer to *all people* living in agricultural households, i.e. not necessarily only those household members that are involved in agriculture.

Further investigation into 'how' agricultural households 'qualify' and why they farm may help to understand why the gap between the agricultural household and population shares is so different between racial groups. 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 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 HPHC.

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? (2000)**

| **Broad definition** | **Positive income from agricultural labour earned (aginclabsh > 0)** | **Positive income from home production (inchphcsh > 0)** | **Positive income from agricultural GOS (agincgossh > 0)** |
|---|---|---|---|
| Black | 34.0% | 75.9% | 17.5% |
| White | 42.2% | 76.2% | 56.7% |
| **Strict definition** | **Income share from agricultural labour greater than 50% (aginclabsh > 0.5)** | **Income share from home production greater than 50% (inchphcsh > 0.5)** | **Income share from agricultural GOS greater than 50% (agincgossh > 0.5)** |
| Black | 77.9% | 4.9% | 4.3% |
| White | 58.6% | 5.1% | 10.7% |

*Note*: The rows under the broad definition add to more than 100% since some households qualify on more than one account. The cells in the strict definition section of the table give an indication of the share of households that would have qualified on a single account, hence the row totals under the strict definition add to less than 100%, with some households only qualifying once two or three of the income sources are combined.

Table 3 is useful for interpreting and understanding the previous one. It is based on a question in the IES/LFS 2000 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. Thus, when cross-tabulated with our definition of agricultural households only about 31.5% of black and 57.9% of white households that are strictly defined as agricultural households responded to the particular question.

From the table it is clear that the majority of black agricultural 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 agricultural

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). This suggests that black and white farmers have very different motivations for farming, explaining to a large extent the low strict/broad shares presented previously. It also explains in part the large differences in agricultural income levels between black and white agricultural households (see section 3.1).

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%).

**Table 3: Why do agricultural households farm? (2000)**

| | 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%** |

## 3.2 Sources of household income

An analysis of the income sources of agricultural households adds further insight into the income generation processes. In this study total income (*totinc*) is disaggregated into income from labour (*inclab*), which in turn is broken down into agricultural (*aginclab*) and non-agricultural labour income (*nonaginclab*), income from GOS (*incgos*), income from government transfers and household remittances (*inctrans*), income from corporations (mainly dividend income) (*inccorp*) and income from HPHC (*inchphc*).

Table 4 shows the mean income estimates and related income shares for broadly and strictly defined agricultural households by race. 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 heavily on transfer income (25.5%), most of which comprises welfare transfer payments from government. In total only about 28.8% of their income comes from agricultural-related activities. In contrast strictly defined black agricultural households rely 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 white 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 includes columns for broadly defined agricultural households that fail to qualify under the strict definition ('broad not 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. Households 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 to the income levels of broadly and strictly defined black agricultural households.

Note that the agricultural labour income variable (*aginclab*) reported in Table 4 is not necessarily a reflection of the level of agricultural wages since it may include wages of more than one household member employed as an agricultural worker. The average wage of black agricultural workers as reported in the IES/LFS 2000 is R8,904 per year, while that of white agricultural workers is R101,869.[4] The comparative non-agricultural annual wages are R25,569 and R98,784 for black and white workers respectively.

[4] *These wage estimates are not adjusted for part-time or seasonal agricultural workers.*

**Table 4: Annual agricultural household income and income sources (Rand, 2000 prices)**

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

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. 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.[5]

[5] *Low sample numbers, especially for white agricultural households, cause some of the provincial-level estimates to have wide confidence intervals.*

**Table 5: Annual income: (strict) agricultural and non-agricultural households (Rand, 2000 prices)**

| | 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** |

The exceptionally high income levels reported by white agricultural households in provinces such as the Free State, North-West and Limpopo immediately attract attention. Table 6 compares the breakdown of total agricultural income (*aginc*) across provinces. On average, strictly defined agricultural households derive a large share of their total income from agricultural sources. These figures are 80.5% for black and 92.1% for white households respectively. However, whereas agricultural labour income is the dominant income source for black households, GOS income is important for white households. Furthermore, what distinguishes the three aforementioned provinces from the rest is that white agricultural households in these provinces report the largest income shares from GOS of all households, namely 63.5% in the Free State, 70.7% in North West and 57.7% in Limpopo.

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 (see Table 7). Data reliability issues aside (see table note), the results seem to suggest that black commercial farmers (R33,078) are better off than both farm worker (R15,520) and subsistence farmer (R13,089) households.

**Table 6: Components of annual agricultural income: (strict) agricultural households (Rand, 2000 prices)**

| | Black agricultural households (strict) | | | | | White agricultural households (strict) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Components of agricultural income (share of aginc) | | | | | Components of agricultural income (share of aginc) | | | |
| | Agricultural income (*aginc*) | Labour (*aginclab*) | GOS (*agincgos*) | Home production (*inchphc*) | *aginc* share of total income | Agricultural income (*aginc*) | Labour (*aginclab*) | GOS (*agincgos*) | Home production (*inchphc*) | *aginc* share of total income |
| 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% |
| Free State | 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%** |

**Table 7: Comparing incomes of black farm worker households, subsistence farmer households and commercial farmer households (strict) (Rand, 2000 prices)**

| | Farm worker households (aginclabsh > 0.5) | | | Subsistence farmer households (inchphcsh > 0.5) | | | Commercial farmer households (agincgossh > 0.5) | | |
|---|---|---|---|---|---|---|---|---|---|
| | No. of house-holds | Mean (aginc) | Mean (totinc) | No. of house-holds | Mean (aginc) | Mean (totinc) | No. of house-holds | 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** |

*Note*: The estimates in the shaded cells are based on sample sizes of less than 10 observations per cell. Weighted frequencies (number of households) are reported in the table.

### 3.3 Agriculture and poverty

Standard income poverty analysis attempts to define a pre-determined minimum standard of living in terms of a money-metric poverty line, and to then study those households or individuals that fall below it. In this paper we follow May *et al.* (1995) in using the 20th and 40th percentile cut-off points of adult equivalent per capita income as lower and upper bound poverty lines representing income levels associated with 'extreme poverty' and 'poverty' respectively. The adult equivalent per capita income measure is calculated by dividing total household income by an adjusted household size variable, $E = (A + \alpha K)^{\theta}$. $A$ represents the number of adults and $K$ the number of children under ten years of age. Following May *et al.* (1995), the parameters $\alpha$ and $\theta$ are set equal to 0.5 and 0.9 respectively. The parameter $\alpha < 1$ accounts for the fact that children typically require a lower level of spending, while $\theta < 1$ accounts for economies of scale enjoyed by larger households, such as shared housing costs.

The 20th and 40th percentiles in the IES/LFS 2000 distribution of adult equivalent per capita income are equal to R5,617 and R2,915 per annum respectively (2000 prices). The poverty headcount ratio can now be calculated using the Foster-Greer-Thorbecke (FGT) class of decomposable poverty measures, with the simplest measure, the poverty rate ($P_0$) calculated as the share of the population living in poverty. Estimates of the depth and severity of poverty ($P_1$ and $P_2$) can also be calculated using the FGT poverty formula, although analyses of these measures are largely excluded from this paper.

Figure 3 shows the poverty rates ($P_0$) associated with the selected 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.[6] The large differences between provinces are apparent, with Gauteng and the Western Cape enjoying the lowest incidence of poverty. The Eastern Cape and Limpopo provinces have very high poverty rates, with the upper bound poverty rate estimated at 71.1% in both provinces.

[6] *Estimates of South African poverty rates are usually in the region of 45% to 55%, depending on the choice of poverty line.*

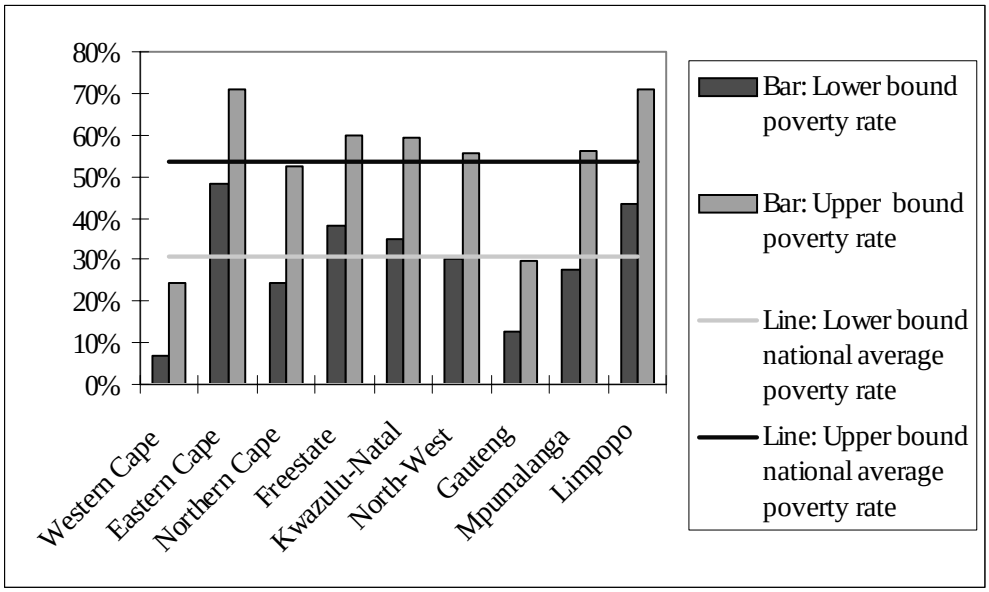


**Figure 3: Upper and lower bound poverty rates by province (2000)**

Poverty in South Africa is largely 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 populations 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. Estimates of the depth ($P_1$) and severity ($P_2$) of poverty for the strictly defined black agricultural population are provided in Table 11 in the Appendix.

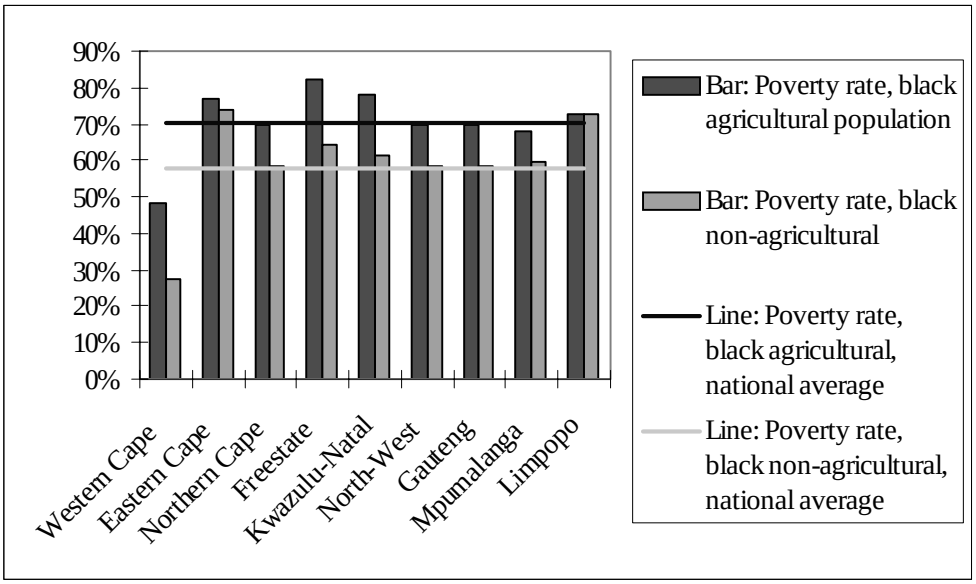


**Figure 4: Upper bound poverty rates: (strict) black agricultural and non-agricultural populations (2000)**

The large difference in poverty rates between the black agricultural and non-agricultural population could be indicative of a tendency for poor (rural) people to turn to farming as an extra source of food or income due to a lack of alternative opportunities. A comparison of urban and rural poverty rates (not shown graphically) 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. Looking at income levels in rural areas, 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.[7] 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 (4.6 compared to 4.0 members), which affects the adult equivalent per capita income of the household.

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

[7] *Compare Table 7, which shows similar estimates for urban and rural black agricultural households combined.*

black subsistence farming population – many of whom report that they 'farm for food' rather than money (see Table 2 and Table 3) – is alarming.

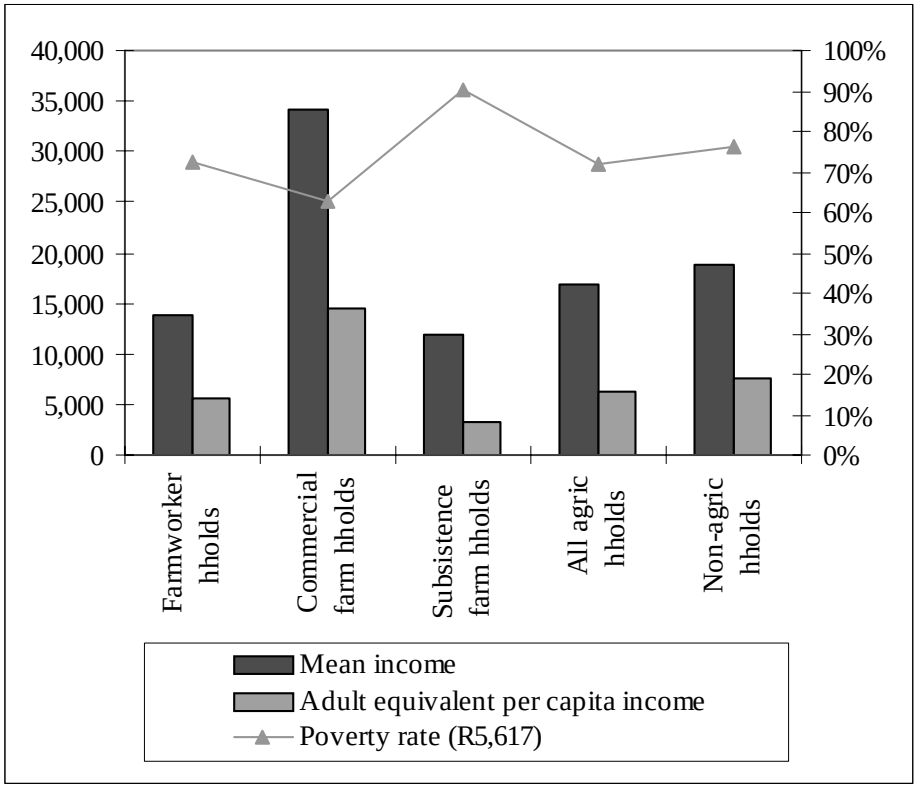


**Figure 5: Annual household income levels and poverty rates: rural black (strict) agricultural and non-agricultural households (Rand, 2000 prices)**

*Note*: Only national-level estimates are provided here. The bars in the figure represent the average of total household income, while the poverty rate is based on adult equivalent per capita income.

Table 12 in the Appendix contains selected provincial-level results.

### 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. 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. The Gini coefficient ($G$) can be defined in terms of the covariance between the cumulative density function $F(y)$ of income ($y$) (see McDonald *et al.*, 1999):

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

The parameter $\mu$ represents the population mean income. The Gini coefficient can be decomposed into elements measuring the inequality in the distribution of the income components, for example those specified in section 3.2. Consider the following equation (see Leibbrandt *et al.*, 2001a and McDonald *et al.*, 1999):

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

The income measure ($y$) is defined such that $y = \sum_k y_k$ for income sources ($y_k$). $S_k$ is the share of the $k^{\text{th}}$ 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]. Table 8 shows the product $R_kG_kS_k$ for various population subgroups.

**Table 8: Gini decomposition by various population sub-groups ($R_kG_kS_k$) (2000)**

| Income sources | Total population | Black population | White population | Agricultural population (strict) | Non-agric population | Black agric population (strict) | White agric population (strict) |
|---|---|---|---|---|---|---|---|
| Labour (*inclab*) | 0.57 | 0.53 | 0.36 | 0.41 | 0.58 | 0.39 | 0.23 |
| GOS (*incgos*) | 0.05 | 0.03 | 0.07 | 0.26 | 0.04 | 0.10 | 0.37 |
| Transfers (*inctrans*) | 0.02 | 0.03 | 0.01 | 0.02 | 0.02 | 0.02 | 0.00 |
| Corporations (*inccorp*) | 0.05 | 0.02 | 0.05 | 0.01 | 0.06 | 0.00 | 0.01 |
| HPHC (*inchphc*) | 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*: Compare Table for broadly defined agricultural households.

Overall inequality in South Africa (first column) is driven 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 the comparative Gini coefficient under the broad definition suggests otherwise (see Table 13 in the Appendix). Interestingly, income from GOS explains about

35.6% (0.26/0.73) of overall inequality among the agricultural population. This reflects the inequalities in the distribution of agricultural assets such as land and physical/human capital.

Exploring inequalities within the agricultural population further reveals that black agricultural inequality is lower than white agricultural inequality (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 total labour income. In stark contrast white agricultural inequality driven largely by the unequal distribution of GOS.

Two alternative measures of inequality are the Theil-T ($T$) and Theil-L ($L$) indices. These measures are very different from other inequality measures in that they are derived from the notion of entropy in information theory. Estudillo (1997) defines $T$ and $L$ in terms of a welfare measure ($y_i$), the population size ($n$) and the population mean income ($\mu$):

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

As shown in Table 9 the Theil-T and Theil-L inequality measures also suggest that inequality is higher among the agricultural population than among the non-agricultural population. Interestingly, unlike in the case of the Gini coefficient, this result is consistent under the broad definition (see Table 13, which compares the Gini and Theil-T results).

**Table 9: Theil inequality measures by various population sub-groups (2000)**

| | Total population | Black population | White population | Agricul-tural population (strict) | Non-agric population | Black agric population (strict) | White agric population (strict) |
|---|---|---|---|---|---|---|---|
| Theil-T | 1.08 | 0.78 | 0.50 | 1.70 | 1.04 | 0.60 | 0.87 |
| Theil-L | 0.98 | 0.70 | 0.42 | 1.06 | 0.97 | 0.50 | 0.75 |

Both the Gini and Theil indices suggest that inequalities among the white agricultural population and the black agricultural population are 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 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). This decomposition is calculated as follows:

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

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 $i^{\text{th}}$ group, while $q_i$ ($p_i$) is the weight attached to each within-group inequality measure. For Theil-T the weight is the proportion of income accruing to the $i^{\text{th}}$ group, while for Theil-L the weight is the population share of that group.

**Table 10: Theil decomposition: (strict) black and white agricultural populations (2000)**

| **Using income weights: Theil-T** | **Income weights** | **Within group Theil-T estimate** | **Weighted within group Theil estimate** | **Between group estimate** | **Overall Theil-T estimate** |
|---|---|---|---|---|---|
| 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** |
| **Using population weights: Theil-L** | **Population weights** | **Within group Theil-L estimate** | **Weighted within group Theil estimate** | **Between group estimate** | **Overall Theil-L estimate** |
| 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 makes up 95.8% of the total agricultural population but only earns 48.3% of the income. When using income weights 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.

In contrast the between-group component ($T_B$) for inequality among the black/white non-agricultural population (not shown in the table) only explains about 39.0% of overall inequality (income weights). This suggests that the racial divide is much more pronounced within agriculture. Sensitivity testing reveals 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 (Pauw, 2005b).

## 4. Discussion, conclusion and policy implications

The results presented 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 agricultural activities, or 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 South Africa, the nature of agricultural inequality is markedly different. 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 explain a much larger share of overall agricultural inequality than it does in non-agriculture. This is a reflection of the unequal distribution of agricultural land and productive capital. Inequalities in the distribution of income from labour play a less important role in overall agricultural inequality than is the case for non-agriculture. These factors perhaps explain why transformation in agriculture is focused on the land redistribution, while employment equity policies enjoy more attention in the non-agricultural sectors. 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.[8]

However, while the political and social need for agricultural reform cannot be denied, it is extremely important to remain sober about agriculture as a solution to poverty. Without questioning the possibility of increasing returns to black agricultural households through agricultural support programmes, the results in this paper seem to suggest that incomes earned by black

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

agricultural households at present is insufficient to lift these households out of poverty. While many black households are involved in agriculture, very few of these households derive a significant share of their income from agricultural activities that enables them to rely solely on this source of income. Behind this observation lies the fact that the majority of black farming households partake in agricultural activities merely 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.

The high poverty rate among the black agricultural population across South Africa is further indicative of the failure of agriculture to pull people out of poverty. Even strictly defined black agricultural households only earn an average of about R18,108 (2000 prices) per annum, 80.5% of which comes from agricultural income sources. This is lower than the average black non-agricultural household income (R32,326). However, a breakdown into different types of black rural agricultural households suggests that black commercial farmers' income levels are on par with those of black non-agricultural households, and far higher than incomes of farm worker households. They are also significantly wealthier than subsistence farmer households (see Figure 5). This result is important as it suggests that agriculture may yet become a solution to rural poverty, but only if, as Machete (2004:3) concludes, "*some degree of commercialisation*" is achieved. Otherwise agriculture's "*impact … on poverty alleviation* [will be] *limited*". The results in this paper support these sentiments.

**Acknowledgements**

A previous version of this paper was presented at the Agricultural Economics Association of South Africa's Conference in September 2005. Comments and suggestions from conference participants, as well Beatrice Conradie, Sumayya Goga, Liberty Ncube, Scott McDonald, Melt van Schoor and various others are greatly appreciated.

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## Appendix

**Table 11: FGT poverty indices: (strict) black agricultural and non-agricultural populations (2000)**

| | $P_0$ | | $P_1$ | | $P_2$ | |
|---|---|---|---|---|---|---|
| | **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 |
| Free State | 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** |

**Table 12: Income levels and poverty rates: (strict) rural black agricultural and non-agricultural populations (Rand, 2000 prices)**

| | **Income levels** | | | | **Poverty rates** | | | |
|---|---|---|---|---|---|---|---|---|
| | **Farm-worker house-hold** | **"Com-mercial" farmer house-hold** | **"Sub-sistence" farmer house-hold** | **Non-agri-cultural** | **Farm-worker house-hold** | **"Com-mercial" farmer house-hold** | **"Sub-sistence" farmer house-hold** | **Non-agri-cultural** |
| 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 13: Gini decomposition ($R_kG_kS_k$) and Theil index: (broad) agricultural and non-agricultural populations (2000)**

| **Income sources** | **Agricultural population (broad)** | **Non-agric population** | **Black agric Population (broad)** | **White agric population (broad)** |
|---|---|---|---|---|
| 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-T** | **1.23** | **0.97** | **0.67** | **0.78** |