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# Hunger in the former apartheid homelands: Determinants of converging food security 100 years after the 1913 Land Act<sup>1</sup>

LOUW PIENAAR<sup>2</sup> AND DIETER VON FINTEL<sup>3</sup>

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## ABSTRACT

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One hundred years after the implementation of the 1913 Land Act, the subject of land reform and rural development are still at the forefront of public discourse within South Africa. Much of the literature suggests that post-apartheid interventions have not been successful at improving small-scale agriculture, which is seen as an important vehicle for improving rural food security. Nevertheless, data from the General Household Survey indicate that household food security has improved in the post-2000 decade. In particular, this paper demonstrates that hunger levels have declined substantially since 2002 (as other estimates of poverty have also indicated), but more importantly that they have done so faster in former homelands regions. Using linear probability models, this paper seeks to isolate which factors have led to the convergence of homeland regions' hunger levels to the rest of the country. The historical context that is sketched here highlights the severe challenges faced by farmers in these areas; this raises the question how convergence in food security occurred, given that many agricultural interventions have not attained the success that was hoped for. In particular, the large reliance on social grants in homelands regions accounts for a part of the reduction in hunger levels. Communal gardens and connections to the agricultural market have reduced hunger within former homelands regions. The long-term sustainability of grants in bolstering food security is of concern, highlighting the need for greater market integration of small scale farmers in homeland regions.

Keywords: Food Security, Subsistence Farming, Apartheid Homelands, Social Pensions

JEL codes: Q18; Q12; C31; H55

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## **1. Introduction**

The year 2013 marks the centenary of the 1913 Natives Land Act in South Africa. This act still dominates public debate, as it laid the foundation for the formation of apartheid homelands and separate development. By 1994 the formalities of apartheid legislation, as well as the Land Act, had been dismantled, though many of the realities of separate development remain. This paper assesses the impact of post-apartheid rural and agrarian development using linear probability models of the prevalence of hunger, but also of the historic context and impact of the Land Act 100 years after its inception. As illustrated in the empirical section, differences in hunger levels were eliminated between homelands and non-homelands regions by 2010. This paper assesses the role that agriculture played in progress, as well as the role of government social assistance to households.

One of the sectors still heavily impacted by the effects of the Act is agriculture. In an African context, South Africa faces high levels of unemployment, and low levels of subsistence farming and informal employment, which threatens socioeconomic well-being and in particular food security of its households. It is a compelling argument that these differences have resulted from the long-term impacts of the Land Act and the Group Areas Act, both laws which limited Black South Africans in their ability to reside and trade in informal areas, and to gain access to land more broadly.

This paper starts with a review of the state of food security in South Africa, followed by a historical chronological context of farming since the 19<sup>th</sup> century in South Africa and a current assessment of farming in the former homeland areas. Together with the agricultural background, food security within these areas will be analysed in an attempt to empirically establish the impact of post-apartheid policy interventions and the impact of farming on food security. As late as 2004 (10 years after separate development was abandoned), differences in

food security persisted between former homeland regions and other parts of South Africa. The former were created on the basis of the demarcations of the 1913 Land Act, and 90 years after that, were still distinct in terms of relative food insecurity. However, as the evidence shows many of these differences were eliminated by 2010. The paper concludes with a discussion of policy issues to establish whether the current progress is sustainable into the future.

## **2. Food Security and Agriculture**

South Africa is currently classified as an upper-middle income country, yet it still ranks among the countries with the highest income inequality and has extremely high levels of absolute poverty (Pauw, 2007). Poverty is more pronounced in rural areas (Dercon, 2009); in South Africa this manifests by concentration of poverty in the former homeland areas, where 65% of the poor are located (Machethe, 2004). Many of the South African rural inhabitants are linked either directly or indirectly to agricultural activities (Pauw, 2007). It is expected that this sector should provide vital income and employment for rural inhabitants as is the case in many African countries (Ojediran, 2011).

Achieving higher levels of food security is considered to be one of the main elements of poverty alleviation (Altman, Hart, & Jacobs, 2009). The most basic definition of food security refers to the ability of an individual to obtain or have access to sufficient food (du Toit, 2011). To determine food security has, however, become a complex exercise because of the multiple definitions and indicators that exist in a wide range of disciplines (Altman, Hart, & Jacobs, 2009).

Household food security is heavily dependent on the income and the asset status of the household (Jacobs, 2009: 413). Other determinants of household food security are household composition, livelihood strategies and geographic location. Households typically access food through either subsistence production, markets, government transfers or other households

(Baiphethi & Jacobs, 2009: 460). It is well known that rural households historically produced most of their own food, but recent evidence suggests that there is an increase on market dependence for both urban and rural households (Baiphethi & Jacobs, 2009: 460). According to Baiphethi and Jacobs (2009) increases in household food production have the potential to improve food security of poor households because of lower dependence on buying food which often has high price inflation. Agriculture has also proven to be a crucial mechanism for rural growth and poverty alleviation (Birner & Resnick, 2010; Diao et al., 2010). However, in the context of agriculture's declining share in the economy over the long-run, and given the constraints placed by a century of restrictive legislation, the revival of this form of livelihood has pertinent constraints. The combined effects of political, economic, social and historical factors resulted in duality within the sector (Essa & Nieuwoudt, 2003). Thus, rural livelihoods in South Africa today are marked by ever-present legacies of poverty which are both racially and spatially defined (Neves & Du Toit, 2013).

The post-apartheid government has directed large amounts of public spending towards rural development and poverty alleviation. Currently a significant share of the public spending is devoted to social grants and improved services in these poor regions (Perret, Anseeuw, & Mathebula, 2005). Yet, there has been very limited improvement in rural livelihoods as many of the policy interventions such as land reform, smallholder support and rural development have been ineffective (Perret, Anseeuw, & Mathebula, 2005). Indeed, Hoogeveen & Özler (2004) show that immediate post-apartheid poverty increases were concentrated in rural homeland regions.

In the early post-apartheid years academics actively monitored whether reforms had led to an improvement in household welfare. While Census (1996 and 2001) and Income and Expenditure Survey (1995 and 2000) data showed that poverty had increased in the first half decade after transition (Hoogeveen & Özler, 2004; Leibbrandt & Levinsohn, 2005;

Ardington et al., 2006), alternative sources showed that it actually declined, and that steady improvements in welfare continued (Van den Berg, Louw, & Yu, 2008). Notably, the authors of the last paper cite the decline in reported hunger in the General Household Survey as a firm indicator of declining poverty. Figure 1 exploits the same data source, but differentiates hunger trends by whether households resided in former homelands or not<sup>4</sup>. It is evident that regardless of location, hunger declined for both adults and children in the post-2000 decade. It is also notable that hunger was initially higher in former homeland regions, but that the decline in prevalence thereof was much quicker here, so that hunger levels converged between regions. The question is how this differential in food security across homeland and non-homeland regions was eradicated in the period of a decade. One possible explanation is the rapid expansion of social grants, as emphasised by Van der Berg *et. al.* (2008) to substantiate a declining poverty trend. While they do not establish this link formally, they infer a link between declining poverty and better food security, and more pertinently the expansion of grants in establishing both. This paper attempts to quantify the impact of household agricultural activities on improvements in food security, while also controlling for the importance of social grants, in order to understand which of the policies had greater effect.

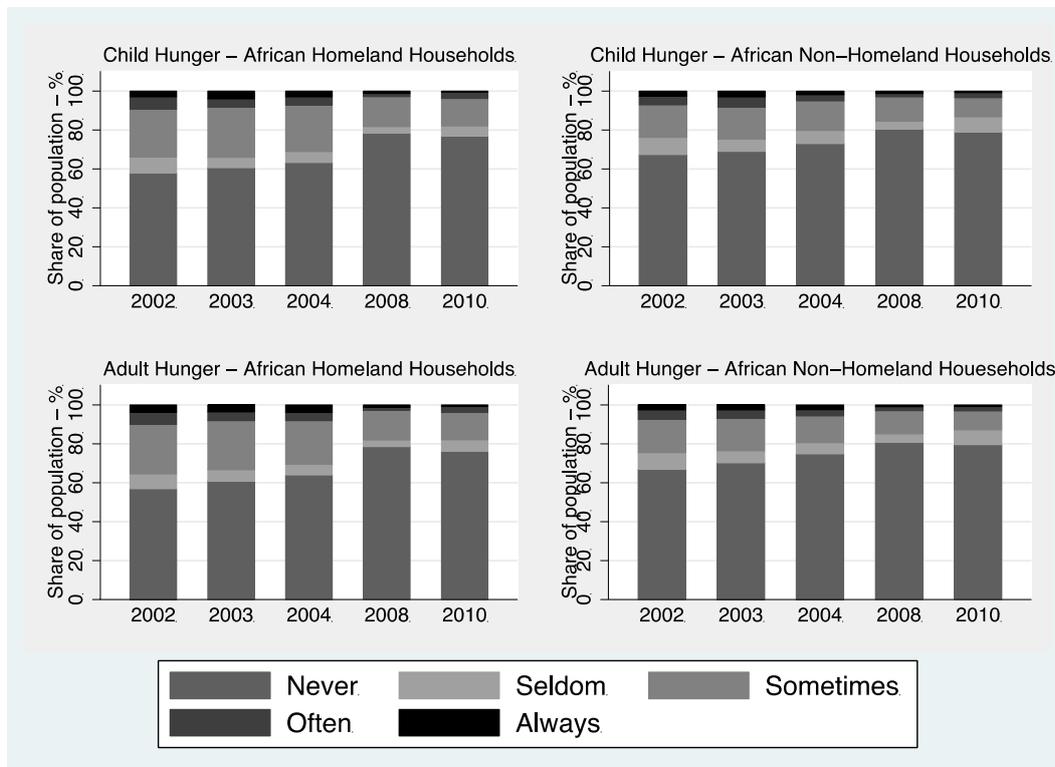
### **3. A Brief Historic Overview of African Farming in South Africa**

The history of South African agriculture is centered around two major themes; land ownership and land rights (Tihanyi & Robinson, 2011). Agriculture in the mid-19<sup>th</sup> century consisted of large white-owned settler farms with hired labour, some settler estates with

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<sup>4</sup> In the 2002-2004 data we identify homelands by former magisterial districts which are coded in the General Household Survey. While the correspondence of the boundaries is not perfect, some households that lived in a former magisterial district that partially contained a homeland would be classed as such; hence, some households that lived in areas adjacent to that homeland would also be classified as a homeland area. This is more conservative, as the homeland effects measured will be under rather than overstated, as some (wealthier) non-homelands regions are included in some of the homeland classifications. In the 2008-2010 data we identify homeland areas by enumerator area, so that this definition is more precise.

indigenous tenant farmers and free indigenous farmers farming on black owned land (Lahiff, 2000; Mbongwa et al., 2000; Mbongwa et al., 1996).



**Figure 1 Changes in hunger patterns for African households - by former homeland status. Own calculations from General Household Survey, 2002, 2003, 2004, 2008, 2010**

During the 19<sup>th</sup> century, black African farmers were the primary producers of staple grains and also kept large herds of livestock (Mbongwa, Van den Brink, & Van Zyl, 1996). More than 80% of the nearly half million hectares of white-owned land was farmed by African farmers by 1860. This was mostly a result of settler farmers struggling to compete with African farmers because of labour shortages. White landowners depended heavily on these payments from successful black tenant farmers for income (Oettle, Fakir, Wentzel, Giddings, & Whiteside, 1998).

The ultimate inability of white farmers to compete with black farmers resulted in the large settler farmers persuading the colonial government of the time to intervene on their behalf.

The interventions were designed to limit African competition in the marketplace and to establish native reserves to create artificial land shortages. These shortages forced African farmers to seek work on farms, enabling settlers to attain profitability. Measures that were used included various taxes (poll taxes on livestock and huts); road rents; location, vagrancy and pass laws; and enforced confinement to the reserves that were allocated to Africans (Mbongwa, Vink, & Van Zyl, 2000).

The 1913 and 1936 Land Acts under the Union of South Africa enforced *complete* discrimination in access to acquiring land (Mbongwa, Vink, & Van Zyl, 2000). This effectively prohibited blacks from acquiring land anywhere outside of boundaries stipulated by the Acts and made farming possible only in the allocated reserve areas (Lahiff, 2000). In contrast, 87 Acts were passed in the Union parliament which supported the needs of white commercial agriculture between 1910 and 1937 (Mbongwa, Van den Brink, & Van Zyl, 1996).

The apartheid government further entrenched these patterns. In the 1960's and 1970's, policy towards the regulation of the reserve areas was revised, and around 3.5 million people were forcefully evicted to the homelands, including tenants evicted from white farms (Lahiff, 2000).

Post-apartheid policy changes in the agricultural sector included the deregulation of the marketing system, abolishment of certain tax concessions, reduction in expenditure via the national budget, land reform, trade reform and new labour legislation (Groenewald & Nieuwoudt, 2003). The African National Congress (ANC) stipulated that the improvement of small-scale agricultural production and increased participation of emerging farmers in the economy were the pillars of the Reconstruction and Development Programme (RDP) (Makhura & Mokoena, 2003). The general aim of the new agricultural policy was to create a

unified economy, where both large and small farm enterprises can compete in harmony in the domestic and international markets (van Averbeke & Mohamed, 2006).

Towards undoing the effects of decades of policies that affected black South Africans, the new government initiated a series of land reform programmes from 1994, with the intent to redistribute 30% of total agricultural land to the previously disadvantaged. This intended to make land accessible and to enable security of tenure for these rural people and improved small-scale production capacity. (Lyne & Darroch, 2003).

## **4. Data, Methodology and Descriptive Analysis**

### **4.1. Data and Descriptive Analysis**

This section illustrates the current situation with regards to farming and food security in the former homeland areas of South Africa. Smallholder African farmers are predominantly settled in the former homeland areas which comprise approximately 13% (16 million ha) of total agricultural land (Fenyés & Meyer, 2003). Agriculture in the former homelands is commonly known for its subsistence orientation and extremely marginalized when compared to the commercial sector (Lahiff, 2000). Production is mostly aimed at sourcing staple foods for household consumption and can be produced on anything from gardens to demarcated fields and open rangelands.

To understand the current state of subsistence farming and food security in these areas better, the General Household Survey (GHS) has been used to capture a static picture in 2010. Considering the lack of data on smallholders, and, more specifically, subsistence farming in many datasets<sup>5</sup>, the GHS of 2010 was selected as the most comprehensive to date. In later

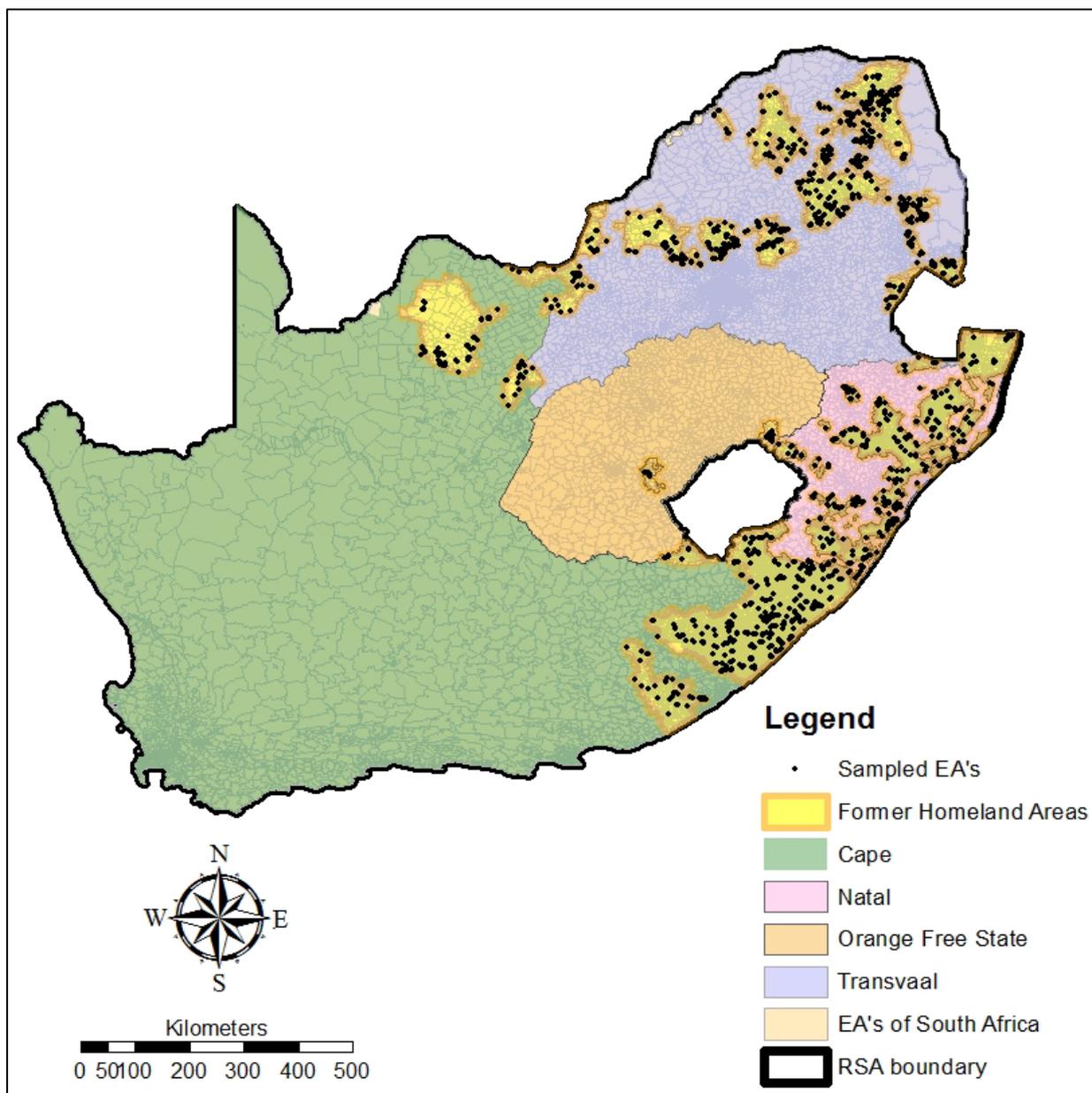
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<sup>5</sup> These include the National Food Consumption Survey (NFCS); General Household Survey (GHS); Income and Expenditure Survey (IES); Food Security and Vulnerability Information and Mapping System (FIVIMS); Labour Force Survey and the Community Survey (CS) just to mention a few (Du Toit, 2011). Government policy in South Africa is mostly informed by the surveys from Statistics South Africa which are the GHS, IES, LFS and CS.

analysis, additional years of this survey are added, though the sample is limited to variables that are consistently enumerated over time.

To be able to assess and describe subsistence farming, this paper exploits Geographic Information System (GIS) information to locate the former homeland areas in South Africa with information from the Department of Rural Development and Land Reform (2004). This indicates the former TBVC/Homeland areas as they were spatially administered under the Land Acts of 1913 and 1936. Census Enumerator Area (EA) and Primary Sampling Unit (PSU) (which can be identified in the GHS from 2008 onwards) layers are used to locate households situated within the former homeland areas of South Africa. The EA is the smallest geographical unit used to enumerate or divide a country for census purposes, dividing sub-places into small regions consisting of no more than 185 dwelling units (Mokgokolo, 2011). By selecting EA's whose central points are inside the boundaries, the former homeland households were sampled. Figure 2 shows the locations of the homelands EA's that were sampled in the GHS of 2008-2010.

The former homelands areas are indicated in yellow while the all the EA's within South Africa are indicated by grey lines. The black dots represent the specific sampled EA's that were used within the GHS 2010, which were considered to be inside the homeland boundaries. The geographic information of the TBVC/Homeland states can be further analysed as it was spatially administered under the Land Acts of 1913 and 1936.



**Figure 2: Location of homelands and enumerator areas in GHS 2010. Own compilation based on Department of Rural Development and Land Reform (2004)**

The former Homeland/Bantustan areas consisted of 10 distinct states which took up 13.96 % of the total 122.1 million hectares of land in South Africa. Out of the ten former states, the Transkei area was the biggest with 4.42 million hectares, followed by Bophuthatswana and KwaZulu with 3.80 and 3.61 million hectares respectively (see Table 1).

A breakdown of the sample used in the study is displayed in Table 2. It includes all black South African households sub-divided into Homeland and non-Homeland areas.

**Table 1: Land Area of Former Homelands.**

<b>Former Homeland States</b>	<b>Hectares</b>	<b>% of Total RSA</b>
Transkei	4426338	3.63
Bophuthatswana	3801642	3.12
KwaZulu	3606063	2.96
Lebowa	2217131	1.82
Ciskei	799223	0.66
Gazankulu	739838	0.61
Venda	648729	0.53
Kangwane	351214	0.29
Kwandebele	325893	0.27
Qwaqwa	104985	0.09
<b>Total Area</b>	<b>17021056</b>	<b>13.96</b>

**NOTES: Source: Own Calculations from General Household Survey (GHS) 2010. Figures are weighted by sampling weights.**

**Table 2: Sample of black Farming Households in South Africa**

<b>GHS 2010</b>	<b>All Black Homeland Households</b>		<b>All Black non-Homeland Households</b>		<b>Total</b>
	<b>Survey</b>	<b>Population</b>	<b>Survey</b>	<b>Population</b>	
South Africa	9845	4794694	9826	5901897	10696591
Involved in Farming	4788	2191252	1257	686584	2877836

**NOTES: Source: Own Calculations from GHS 2010. Population figures are weighted by sampling weights.**

Approximately 4.79 million black individuals reside in the former homeland areas, of which 2.19 million are involved in agricultural production. Many fewer black farming households (approximately 686 000) were located outside of the homeland areas. Of these, the majority were urban inhabitants: only 28% of the households were listed as living in rural or tribal areas. Yet, when these two farming groups are compared, we see that there are already significant differences between those in the former restricted areas and those outside.

Table 3 indicates key differences between black farming households in South Africa across regions. African homeland households were, on average, more advanced in age, had lower education and were more likely to be headed by females compared to their non-homeland counterparts. Important differences are also manifest in terms of household incomes, with homeland households having much lower salary income of R1446.29 per month compared to the R2979.79 of non-homeland households. This shows that non-homeland farming households have greater access to salary income, while homeland households have typically higher dependence on (lower) government social grants.

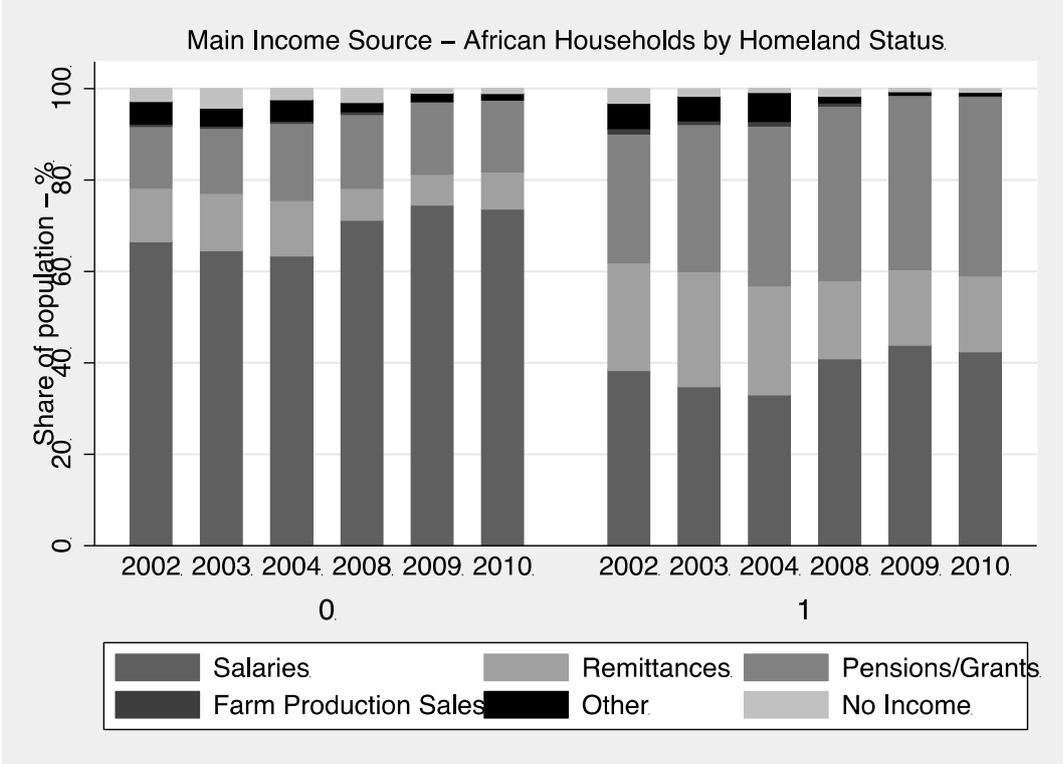
On average, homeland households received more than R1000 in total grants per month, with 2 recipients. Average non-homeland households received only 1 grant per household that made up much less at R631.01. The main grants for homeland households were old age grants, reflective of the many elderly people that reside in the former homelands and the families that are dependent on them for livelihoods. Another important source of income was remittance payments, which averaged to R214 for homelands households compared to the comparable non-homelands figure of R143.

Figure 3 adds a time dimension, and illustrates that social grants progressively played a greater role as a main source of income for black African households in homeland and non-homeland regions. However, the expansion was much larger in former homelands, with the role of remittances and labour income waning over time in these regions.

**Table 3: Descriptive Statistics of All African Farming Households by Homeland Status**

Name of Variable	Units	All African Homeland Households	All African non-Homeland Households
Age of Head	Years	52.01	46.96
Education of Head	Years	5.77	7.29
Gender of Head	% Male	0.49	0.63
HH Salary Income	Rand	1446.29	2979.79
HH Remittance Income	Rand	213.97	143.16
HH Grant Income	Rand	1000.15	632.01
War veterans Grant	Rand	2.71	1.30
Child support Grant	Rand	364.19	219.38
Care dependency Grant	Rand	7.86	3.54
Foster care Grant	Rand	37.92	37.80
Grant in Aid	Rand	0.03	0.00
Disability Grant	Rand	132.40	127.32
Old Age Grant	Rand	455.07	242.67
HH size	Number	4.68	4.03
Grant receivers in HH	Number	2.06	1.27
Economically active in HH	Number	0.54	1.02
Elderly living in HH	Number	0.29	0.15
Total Observations	n	2191252	686584

NOTES: Source: Own Calculations from GHS 2010. Figures are weighted by sampling weights.



**Figure 3: Composition of Main Household Income by Source - by homeland status. Own Calculations from General Household Survey, 2002, 2003, 2004, 2008, 2009, 2010**

Moving now into more detailed analysis of farming in the homeland areas of South Africa, Table 4 provides descriptive statistics related to farming. The sample is limited to households that indicated that they had access to land for farming. The main source of income was government grants at 49% of African farming households, while salaries and remittances ranked second and third with 24% and 16% respectively. This suggests that the farming activities themselves did not provide sufficient means for a livelihood in homelands regions. These households mainly (79%) produced agricultural products as an extra source of food for the households, while only 6% did so for their main food supply. Together, this still highlights a fragile small-scale farming sector, on which households could not rely.

In terms of land ownership, most of the households involved in crop farming indicated that they owned the land. This was typically because many of these farmers were listed as backyard farmers. Yet, adding the number of households farming on tribal land to those that keep livestock for communal grazing, more than 50% of the black farming households do not have title deeds to land for farming. This serves as a reminder of the persistent impact of the land acts on these households.

Figure 4 highlights that homeland households were more likely to participate in some form of farming than African non-homeland households. Conditional on farming, the composition of land rights changed substantially, so that the low levels of ownership highlighted above for 2010 represent an improvement on the past situation. While homelands farmers cultivated tribal lands (which they did not own), ownership grew dramatically among this group towards 2010.

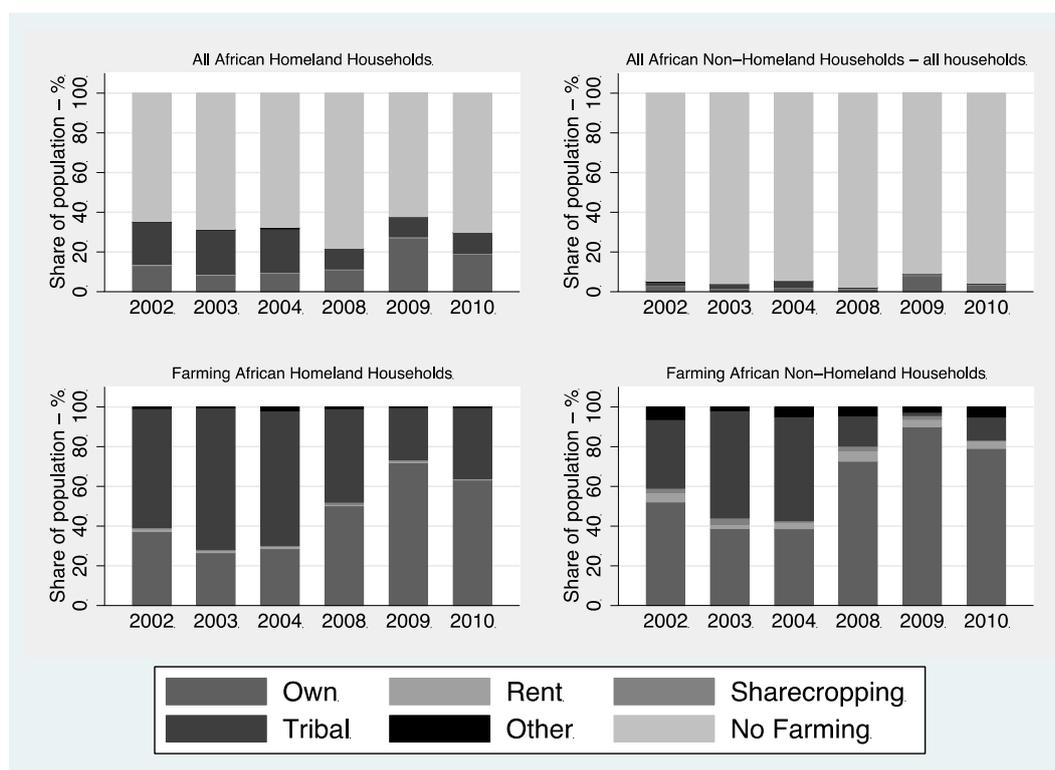
**Table 4: Description of Homeland Farming.**

Name of Variable	Sample	Population	%
<b>Main Income Source</b>			
Grants	2456	1077192	49.16
Salaries	1075	520621	23.76
Remittances	736	351562	16.04
Income from a business	222	105651	4.82
Pensions	51	20753	0.95
No income	19	11090	0.51
Other income sources	25	11043	0.50
Sales of farm products and services	17	7691	0.35
<b>Why Produce</b>			
Extra food source	3846	1746593	79.71
Main Food Source	284	137975	6.30
Extra Income Source	196	84229	3.84
Leisure Activities	111	53958	2.46
Main Income Source	48	22599	1.03
<b>Land Ownership</b>			
Owens the land	2175	922137	42.08
Communal Grazing	1491	700377	31.96
Tribal authority	1021	517808	23.63
Other (specify)	11	6662	0.30
Sharecropping	11	6059	0.28
Rents the land	11	5537	0.25
State land	9	5285	0.24
<b>Sell Produce</b>			
Do not Sell	4194	1916630	87.47
Local buyers from this district	223	101654	4.64
Buyers from neighbouring cities and towns	21	10988	0.50
Formal markets in South Africa	19	4591	0.21
Other	9	3757	0.17

**NOTES: Own Calculations from GHS 2010. Population figures are weighted by sampling weights**

Only 4.64% of the more than 2 million black farming households sold their produce in 2010, which stands in stark contrast to the vibrant historical picture sketched above, where black farmers out-competed white farmers in the marketplace. Those that do, mainly supply their produce to the local buyers in the areas or informal market chains. Similar to findings in the literature, there is considerable variation in the sizes of land for smallholder cultivation; plots are generally extremely small and in the range of between 0 - 1.5 ha per household. Furthermore, a substantial proportion of these households produce on less than 0.5 ha and only a small percentage of households cultivate on plots greater than 5 ha (Lahiff, 2000).

More than 70% of black households in GHS 2010 practice crop farming on plots smaller than 2 hectares, with the majority (56.8%) farming on less than half a hectare. This suggests that household farmers are unlikely to realise economies of scale in the homelands, and explains limitations in market penetration.



**Figure 4 Black households' land tenure - by former homeland status. Own calculations from General Household Surveys, 2002, 2003, 2004, 2008, 2009, 2010**

**Table 5: Distribution of Land Size Among African Homeland Crop Farmers**

Land size	Sample	Population	%
Less than 0.5	2791	1244983	56.82
Between 0.5 – 1	311	154414	7.05
Between 1 – 2	102	50496	2.30
Between 2 – 5	31	12298	0.56
More than 20	3	1481	0.07
Between 5 -10	2	669	0.03
Between 10-20	5	2281	0.10
More than 20	7	3070	0.14
Communal Grazing (Livestock)	1491	700377	31.96

NOTES: Own calculations from GHS 2010. Population figures are weighted by sampling weights

## 5. Results from Regression Analysis

The analysis continues with linear probability models<sup>6</sup> to establish which factors were associated with the prevalence of hunger<sup>7</sup> within households, using data from the 2010 General Household Survey. The objective is to understand whether household agriculture has a significant role to play in combating hunger and bolstering food security in the former apartheid homelands, or whether other forms of economic activity or social grants have been dominant in increasing food security in these regions. Each column represents a separate Ordinary Least Squares regression. Because the dependent variable is binary, each of the coefficients can be interpreted as the marginal increase in the probability of hunger associated with that characteristic, or the marginal difference relative to the base group. Hence, negative coefficients highlight household characteristics that are good for food security. Should introducing another variable to the model result in a coefficient that was initially statistically significant to become insignificant, we know that there is a large degree of correlation between the new variable and the previously significant variable. For example, more concise models control for whether the household was found in a former homeland, which highlights statistically larger incidence of hunger (see for instance column 1 of Table 6). However, once controlling for income types, this homeland effect becomes statistically insignificant, so that the mechanism through which this type of household suffers from more hunger can be “explained” by the unfavourable composition of income in former homelands regions. The rest of the analysis will offer similar arguments. It should be noted, however, that some of the associations discussed here should not be interpreted causally - this danger will be noted when relevant.

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<sup>6</sup> These are estimated by Ordinary Least Squares rather than by a probit or a logit model, as it eases interpretation. Average marginal effects do not differ substantially, and we do not wish to predict propensity scores, so that we continue with this method to aid the discussion.

<sup>7</sup> Hunger is defined as “Always” or “Often” going hungry due to a lack of sufficient food in the preceding 12 months. Results presented here consider this question for adults, though they are similar when analyzing child hunger, and are also robust to classifying “Sometimes” as hungry.

**Table 6: Linear Probability Models of Adult Hunger by Household, GHS 2010**

<i>Dependent: Adult Hunger Dummy</i>		1	2	3	4
	Homeland Dummy	0.008**	-0.003	0.005	0.012***
Main Income Source (Base: Salary)	Remittances		0.043***	0.065***	
	Pensions/Grants		0.034***	0.042***	
	Sale of Farm Products		-0.018***	-0.018***	
	Other Non-Farm Income		0.030*	0.023	
	No Income		0.146***	0.107***	
Interaction of Main Income Source with Homeland	Remittances			-0.040***	
	Pensions/Grants			-0.015*	
	Sale of Farm Products			-0.005	
	Other Non-Farm Income			0.027	
	No Income			0.103*	
Reason for Production (Base: Not Farming)	Main Source of Food				0.030*
	Main Source of Income				-0.029***
	Extra Income				-0.01
	Extra Food				0.017
	Leisure				-0.016
Reason for Production Interacted with Homeland	Main Source of Food				-0.037*
	Main Source of Income				0.048
	Extra Income				0.016
	Extra Food				-0.02
	Leisure				-0.005
	Constant	0.031***	0.020***	0.018***	0.029***
	R-squared	0.000	0.014	0.017	0.001
	N	19952	19290	19290	19216
	F statistic	3.858	53.384	.	29.592

NOTES: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Own calculations from GHS 2010. Hunger is defined as a binary variable indicating whether adults in the household had “often” or “always” experienced hunger in the preceding 12 months. Homelands are identified by linking enumerator areas to homeland boundaries in ArcGIS. Regressions are weighted to reflect population totals and standard errors are clustered at the PSU level.

Table 6 investigates the prevalence of adult hunger among all black households<sup>8</sup> in South Africa. Specification 1 shows that in 2010 former homeland regions still experienced statistically significantly higher levels of hunger compared to non-homeland regions (though the magnitude is small), with a 0.8 percentage point difference<sup>9</sup>. Specification 2 proceeds to control for a set of indicators that denote the main income source of the household. Most

<sup>8</sup> Similar results hold true for child hunger, and are available on request.

<sup>9</sup> As shown below, by 2008 hunger differences are negligible, but re-emerge after the financial crisis.

importantly, as mentioned above, the homeland effect is reduced to statistical insignificance, so that the uneven distribution of various income types across these regions explains the difference (as depicted in Figure 3). Relative to salaried households, households whose main income source stem from grants, remittances and those with no income, register significantly higher levels of hunger. This is not to say that grants and remittances cause hunger to be higher, it simply suggests that households that depend on these forms of incomes are at a disadvantage relative to households with direct connections to the labour market. The sale of farm products places households at a distinct advantage relative to households that derive income mainly from salaries, which suggests that the role of agriculture is not only important for the generation of income, but has direct food security impacts. Specification 3 differentiates these associations by whether households are situated in homelands or not. The main effects represent non-homeland regions, while the interactions show whether there are significant differences for households in former homelands relative to non-homelands regions. Notably, having no income increases the prevalence of hunger by 10 percentage points more in a homeland relative to non-homeland regions, suggesting that these households are more isolated from other modes to offer food security. However, households that are dependent on remittances and grants have a lower probability of experiencing hunger when they reside in homeland regions – this reflects the high dependence on these income sources in former homelands (see Figure 3), and that they are important for mitigating hunger.

Specification 4 explores the role of agriculture more deeply, according to households' stated purpose for engaging in food production. It is evident that in non-homelands regions, households that farm for a main source of food are about 3 percentage points more likely to experience adult hunger than non-farming households are. This association likely represents a pull factor (households that are hungry tend to farm for food) rather than a causal relationship from choosing to farm for income that in turn leads to hunger. However, the large negative

interaction term on this category (that is larger than the positive main effect in absolute value) with homeland status suggests that in these regions production for a main source of food does indeed reduce hunger successfully. As a result, subsistence farming does tend to offer food security in homelands regions. Households that set out to produce food for a main *income* source generally experience about a 3 percentage point lower hunger rate (with no significant differences for homeland regions), echoing the results from specifications 2 and 3. This suggests that market-orientated agriculture also improves household food security, though subsistence agriculture only does so in homeland regions. Hence, the subsequent analysis limits itself only to African households that live within former homelands and that indicate they have access to land which they could cultivate.

Table 7 presents an exploration of hunger patterns of African adults *within* former homelands regions that had access to farming land. Specification 5 suggests that hunger is only significantly lower (compared to households that did not farm with crops) in households that rented their land or conducted sharecropping. However, the number of households in these groups is very small, so that not much weight should be attached to these results. It is somewhat surprising, however, that farmers that owned their land or had access to tribal lands were not statistically significantly better or worse off compared to households that did not cultivate crops. Specification 6 sheds light on this observation. Once controlling for a set of land size indicators, it is evident that both these groups experienced significantly higher levels of hunger. Additionally, those that farmed on progressively larger lands experienced lower hunger rates compared to households that did not cultivate crops. Hunger reduction is therefore subject to economies of scale in crop production. Does ownership and farming on tribal lands therefore disadvantage producers in reducing household hunger? Two explanations are possible: firstly, given that we have controlled for the size of the land, the coefficients may display the effect for the smallest farmers, suggesting that land owners are

not successful at curtailing household hunger; secondly, the null effect found for tribal lands in specification 5 may simply be masking the effect that tribal lands and sharecropped lands are generally larger than other land types, (so that a food security disadvantage on tribal lands is cancelled out by a large farm advantage, both of which we see in specification 6). Controlling for a range of other factors in specification 7 makes tenure status insignificant in determining hunger, and larger lands tend to positively influence hunger. The reason for this is the other factors that have been introduced and themselves proxy for economies of scale. In the first instance, it is evident that rather than cultivating crops on a farm, food gardens in schools, homes and communities are highly successful at reducing hunger. These operations are usually smaller, however are likely to be accompanied by a pool of shared knowledge and shared risks, so that households can reduce their exposure to hunger. Furthermore, education of the household head reduces hunger rates significantly, though by a small magnitude. These two impacts suggest that knowledge, whether learnt at school or shared in the community, and risk sharing are important in improving food security.

Older household heads are also associated with lower household hunger levels. This is a pattern that is also observed in the rest of the specification: household incomes from grants that are targeted at older individuals (the old age pension and the war veterans' grant) significantly reduce hunger, while other grants do not. Furthermore, the size of these effects is larger than those for total salary and remittance income. Evidently, then, within farming communities in former homelands, grants have become a vital channel to combat socioeconomic differentials, as also discussed above. However, the greater role of grants targeted at older individuals provides a more nuanced picture in this regard: Klasen and Woolard (2009) have shown that households that receive particularly old age pensions are a safety net for the rural unemployed; the primary reason is that the amount of this grant is substantial relative to many other grants. While this household formation pattern also hedges

against hunger (as noted in these results), Klasen and Woolard (2009) also show that this behaviour isolates individuals from labour market incomes. Hence, grants represent a double-edged sword: on the one hand they reduce socioeconomic distress; on the other hand they perpetuate a reliance on resources outside of the labour market.

Other government interventions are also associated significantly with hunger prevalence; while loans to farmers tend to reduce hunger levels, inputs that were freely given to farmers are positively associated with it. The latter is likely not a causal relationship, as households that are targeted for free inputs are those that were initially more prone to distress and hunger at the same time. Once controlling for all of these aspects, it is evident that the gender of the household head and the receipt of land in the land reform programme do not affect hunger levels significantly. The physical environment does play a role, however, with low quality water associated with hunger. This correlation may also be spurious, however, in the sense that a third factor (community circumstances, for instance) influences both hunger and water quality, so that institutions could influence environmental management, but also represent the causal effect on hunger.

**Table 7: Linear Probability Models of Adult Hunger by Household**

<i>Dependent: Adult Hunger Dummy</i>		5	6	7
Property Rights (Base: Households that	Own	-0.008	0.028***	-0.012
	Rent	-0.036***	0.004	-0.03
	Sharecropping	-0.036***	-0.014	-0.052*
	Tribal	0.014	0.042***	-0.009
	State	0.116	0.156	0.105
	Other	-0.036***		-0.035
Land Size (Base: Households that did not plant crops)	0-0.5ha		-0.038***	0.056***
	0.5-1ha		-0.018	0.073**
	1-2ha		0.046	0.129*
	2-5ha		-0.084***	0.019
	5-10ha		-0.066***	0.082*
	10-20ha		0.554*	0.623*
	>20ha		-0.073***	
Location of Land (Base: Households that	Farm			-0.002
	Backyard Garden			-0.056**
	School Garden			-0.075***
	Communal Garden			-0.119***
	Fallow public land			-0.124*
	Other			-0.066*
log(household income type)	Education			-0.004***
	Age			-0.001*
	Salary			-0.002*
	Remittance			-0.004***
	Child Support Grant			0.000
	Old Age Pension			-0.005***
	Disability Grant			-0.001
	Care Dependency Grant			0.003
	Foster Grant			0.003
Grant in aid			0.001	
War veterans grant			-0.014**	
Government Assistance Received by Household	Training			0.024
	Visit			-0.018
	Grant			0.163
	Loan			-0.124***
	Inputs on loan			0.063
	Inputs for free			0.067**
	Dipping of livestock			-0.016
	Other			-0.048
Constant	Female household head			0.01
	Water polluted			0.027**
	Land degraded			0.009
	Land Grant			-0.02
	Constant	0.036***	0.036***	0.103***
R-squared	0.003	0.012	0.054	
N	4693	4676	4562	
F statistic	.	7.016	2.97	

NOTES: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01. Own calculations from GHS 2010. Hunger is defined as a binary variable indicating whether adults in the household had “often” or “always” experienced hunger in the preceding 12 months. Homelands are identified by linking enumerator areas to homeland boundaries in ArcGIS. Regressions are weighted to reflect population totals and standard errors are clustered at the PSU level.

Table 8 turns the attention to explaining convergence in hunger between homeland and non-homeland regions over time, as depicted in Figure 1. To achieve this, we pool the data from the 2002, 2003, 2004, 2008 and 2010 General Household Surveys<sup>10</sup> and build linear probability models similar to those for 2010, but this time relying on variables for which common definitions could be found across all years. In each instance, time dummies, a homeland indicator and the interactions between these are included. Time dummies represent the proportional decline in hunger for non-homeland regions relative to 2002 (the base year) after controlling for other factors, while the homeland dummy represents the hunger premium in that year; the interactions test whether the decline in hunger was faster in the former homeland regions. Additional controls for income sources, and land characteristics are included to monitor whether initial homeland differences and the convergence can be attributed to changes in these factors.

Specification 1 in Table 8 repeats the analysis in Figure 1 in parametric form, highlighting that in 2002 hunger rates were about 2.7 percentage points higher in former homelands regions relative to non-homelands areas. By 2004, hunger rates in non-homeland regions had declined by 1.7 percentage points from 2002, and by just more than 4 percentage points in 2008 and 2010 (both statistically significantly). Notably, the interaction effects are large, negative and statistically significant, indicating that the rates of decline in hunger were faster in homelands regions. In particular, by 2008 the decline of 2.9 percentage points relative to 2002, eliminates the initial 2.7 percentage point initial homeland hunger premium. Hence, by 2008 at the latest, hunger differences between homeland and non-homeland regions were eliminated. However, the financial crisis followed, so that by 2010 this improvement reversed slightly, so that the interaction effect is smaller than the 2.7% and a slight gap in hunger rates

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<sup>10</sup> The intermediate years are excluded, as it is not possible to identify magisterial districts or census enumerator areas in order to define a household as living within a former homeland.

re-emerges between homeland and non-homeland regions. It is clear, then, that hunger tends to be more responsive to upswings and downswings in the economy in the homelands.

The following columns progressively control for other variables in an attempt to render the homelands coefficient and its interaction with time statistically insignificant; if this is the case, we know that that particular factor “explains” the initial difference and the convergence over time.

Specification 2 investigates whether the differential change in main income sources across region (as highlighted in Figure 2) can explain the differences in hunger patterns. In Table 1 it was evident that this control eliminated the homelands difference in 2010. While controlling for income sources accounts for large variations in hunger, the expansion of grants in the homelands region does not account entirely for time changes and convergence patterns in hunger. The decline in hunger for both former homelands and non-homelands households remains steep and statistically significant, despite conditioning on income source. Grants therefore do not play the role in explaining the entire declining hunger trend. However, the coefficient on the homelands dummy halves, so that about half of the initial differences in hunger across regions can be explained by the greater access to salary incomes that non-homelands households enjoy.

Specification 3 therefore turns to changes in households’ property rights in an attempt to explain the patterns. In this case, the homeland and time coefficients hardly change relative to specification 1, so that the greater increase in land ownership in homeland regions is also dismissed as an explanation for the faster rate of decline in hunger amongst former homelands households. Specification 4 attempts to understand whether scale economies assisted in reducing hunger among farmers (in other words: did only commercial, large-scale farming result in reductions in hunger); however, all coefficients reveal statistically insignificant differences compared to non-farming households, and the coefficients of interest are

unaffected. Specification 5 keeps all the preceding factors in the model and also conditions on changing household composition. These factors also do not “explain” the faster decline in hunger in former homelands regions. Whilst households with more children also faced higher levels of hunger, those with more pension-age adults experienced lower levels of hunger. Children therefore raise the dependency burden, while the elderly lighten the burden (likely through the additional pension income they bring to the household, as argued before). Evidently it is still not possible to fully account for *initial* homelands and time differences. Results are similar to before.

Specification 6 is the first to eliminate initial differences in hunger between homelands and non-homelands regions. As before, the controls for various incomes from grants reveal the importance of pension income in reducing hunger. Controlling for whether households received a land grant (in other words, who were the subjects of land reform) contributes to “eliminating” the initial homelands hunger premium (though not the time patterns in hunger reduction). Households that received these grants faced significantly higher levels of hunger; this is, however, not to say that land reform *caused* hunger. It is merely the case that households that were initially subject to higher levels of hunger were also recipients of land reform, and the program did not completely eliminate these initial disparities. Alternative identification strategies would remove this selection bias. What is important, however, is that controlling for this factor “explains” higher hunger rates in former homelands regions, by rendering the homelands coefficient statistically insignificant. Again, this does not suggest that hunger differences were eliminated by land reform, but it does suggest that land reforms successfully reached households that had greater levels of hunger. Nevertheless, Keswell & Carter (2012) present evidence on the impact of South Africa’s land reform program, showing that after 3 years, the treatment effect is a 50% increase in household consumption.

## **6. Conclusions and Policy Discussion**

While it is easy to paint a dire picture of socioeconomic circumstances in former homeland regions, this paper shows that hunger levels in these regions converged on those in other parts of South Africa. The descriptive and historical analysis shows how former homeland regions were set up for small-scale intensive farming that had little scope for success. Nevertheless, by 2008 hunger decreased substantially in these regions. Social grants undoubtedly had a large role to play in this regard; they expanded rapidly over the period of 2002-2010 in all regions, but dependence on them grew faster in former homelands regions. Access to these grants (or a lack of salary income) explains a large part of hunger differences across the region types. In particular, receiving social pensions reduced hunger substantially. However, this paper illustrates that economies of scale and tenure systems are also important for food security; nevertheless, very small farmers (those in gardens of various types) also successfully reduce adult hunger levels. These results therefore support the notion that the food security legacy of the 1913 Land Act and other apartheid legislation can be tackled by improving the capacity of small scale farmers. While controlling for land reform programmes eliminates differences in hunger across regions, the estimates here cannot state causally that land reform has assisted food security in these regions. The more convincing evidence coming from this paper is that interventions that equip communities to farm together can reduce hunger, emphasising the role of risk and knowledge sharing; while social grants mitigate the effect of hunger on households, this is perhaps not a fiscally sustainable way forward in comparison to the benefits of promoting small-scale agriculture in communities. As noted by Klasen and Woolard (2009), especially sizable social pensions result in household formation patterns that isolate individuals from the mainstream of the labour market. While one of the legacies of the 1913 Land Act (hunger in the homelands) has been plastered over with social grants, the deeper issues of effectiveness of small scale farmers and their links to the market economy are

likely to provide longer term relief for these regions, so that policymakers should pay attention to these factors to ensure future food security.

**Table 8: Linear Probability Models of Adult Hunger**

<i>Dependent Variable: Adult Hunger</i>		1	2	3	4	5	6
Year (Base: 2002)	2003	-0.004	-0.007*	-0.004	-0.004	-0.007	-0.006
	2004	-0.017***	-0.018***	-0.017***	-0.016***	-0.018***	
	2008	-0.043***	-0.040***	-0.043***	-0.043***	-0.044***	
	2010	-0.042***	-0.036***	-0.042***	-0.042***	-0.038***	-0.029***
	Homeland	0.027***	0.010*	0.023***	0.024***	0.011*	0.008
Interactions with Homeland	2003	-0.014**	-0.011	-0.013*	-0.013*	-0.011	-0.012*
	2004	-0.003	-0.001	-0.001	-0.002	-0.001	
	2008	-0.029***	-0.026***	-0.026***	-0.028***	-0.029***	
	2010	-0.019***	-0.018***	-0.017**	-0.020***	-0.022***	-0.023***
Household Income Source (Base: Salary Income)	Remittances		0.068***			0.067***	0.072***
	Pensions/Grants		0.048***			0.054***	0.042***
	Sales of Farm Products		0.038***			0.036***	0.033
	Other non-farm		0.047***			0.046***	0.049***
	No Income		0.167***			0.169***	0.194***
(Base: Households that did not plant crops)	Own			0.003		-0.025	-0.029
	Rent			0.007		-0.002	-0.013
	Sharecropping			0.017		-0.001	-0.006
	Tribal			0.015***		-0.015	-0.016
Land Size (Base: Households that did not plant crops)	0-0.5ha				0.010***	0.017	0.012
	0.5-1ha				0.005	0.01	0.003
	1-2ha				0.089	0.088	0.075
	2-5ha				0.002	0.006	0.009
	5-10ha				-0.038***	-0.026	-0.035
	10-20ha				0.070*	0.090*	0.164**
	>20ha				0.048	0.063	0.056
	Number of Children in					0.002***	0.003***

	household						
	Number of Elderly in household					-0.011***	-0.007***
	Education of head						-0.006***
	Age of head						0.000***
	Age of head squared						-0.000***
log(Household income type)	Child Grant						-0.001
	Old Age Pension						-0.005***
	Disability Grant						0.002***
	Care Dependency Grant						0
	Foster Care Grant						0.001
	Grant in Aid						0.007*
	War Veterans Grant						-0.008***
	Land Grant Dummy						0.018*
	Constant	0.073***	0.051***	0.073***	0.072***	0.048***	0.081***
	R-squared	0.011	0.032	0.011	0.011	0.035	0.051
	N	95485	94694	95090	95012	94104	55395
	F statistic	42.604	63.13	29.93	24.53	35.877	31.898

\* p<0.1, \*\* p<0.05, \*\*\* p<0.01

NOTES: \*\*\*Significant at 1% level \*\*Significant at 5% level \*Significant at 10% level. Standard errors are clustered at the enumerator area level and household weights applied, Own calculations from GHS 2002, 2003, 2004, 2008, 2009, 2010

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