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The recent evolution of consumption poverty in Rwanda

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WIDER Working Paper 2015/125

The recent evolution of consumption poverty in Rwanda

Andy McKay*

December 2015

Abstract: This paper analyses the evolution of consumption poverty in Rwanda between 2001/1 and 2010/11, using three comparable good quality household surveys analysed along with detailed price data. Rwanda achieved impressive growth over this period. The first half of the 2000s was associated with slow poverty reduction and an increase in inequality, while in the second half of the period there was faster consumption growth, a sharp fall in poverty, and a modest reduction in inequality. Overall the poverty situation in Rwanda remains sensitive to agricultural conditions when the surveys are conducted.

Keywords: Rwanda, poverty, household surveys, prices

JEL classification: I32, O12

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1 Country context and economic performance

Rwanda is a small, landlocked country in East Africa, neighbouring the Democratic Republic of Congo, Uganda, Tanzania and Burundi. It is characterized by the highest population density in Africa. It is a country which is very highly dependent on agriculture, predominantly food crop production but also some cash crops, historically coffee and tea, though now more diversified. It was historically quite well suited to agricultural production, given quite fertile soils, but environmental degradation has long been a major problem; and with rapid population growth in the past the average farm size is now only 0.7 ha, with much of this land not being easy to cultivate. Without doubt the country needs to diversify out of agriculture, but finding these alternative activities has been and remains a major challenge.

Rwanda though is best known for the high incidence of conflict the country has faced, most emphatically for the 1994 genocide where large numbers, variously estimated at between 500,000 and 1 million, were killed in a period of three months from April to July of that year.¹ Conflict in Rwanda though has a long history, pre-dating independence in 1962. The very strong ethnic dimension to the conflict is very well known, though other factors such as inequality and land scarcity seem also to be important. There has been extensive discussion and analysis of conflict in Rwanda (e.g. Uvin 2001; Verwimp 2003, 2004, 2005; Justino and Verwimp 2013; among many others; see also the Rwanda Genocide Programme in Yale University <http://www.yale.edu/gsp/rwanda/>).

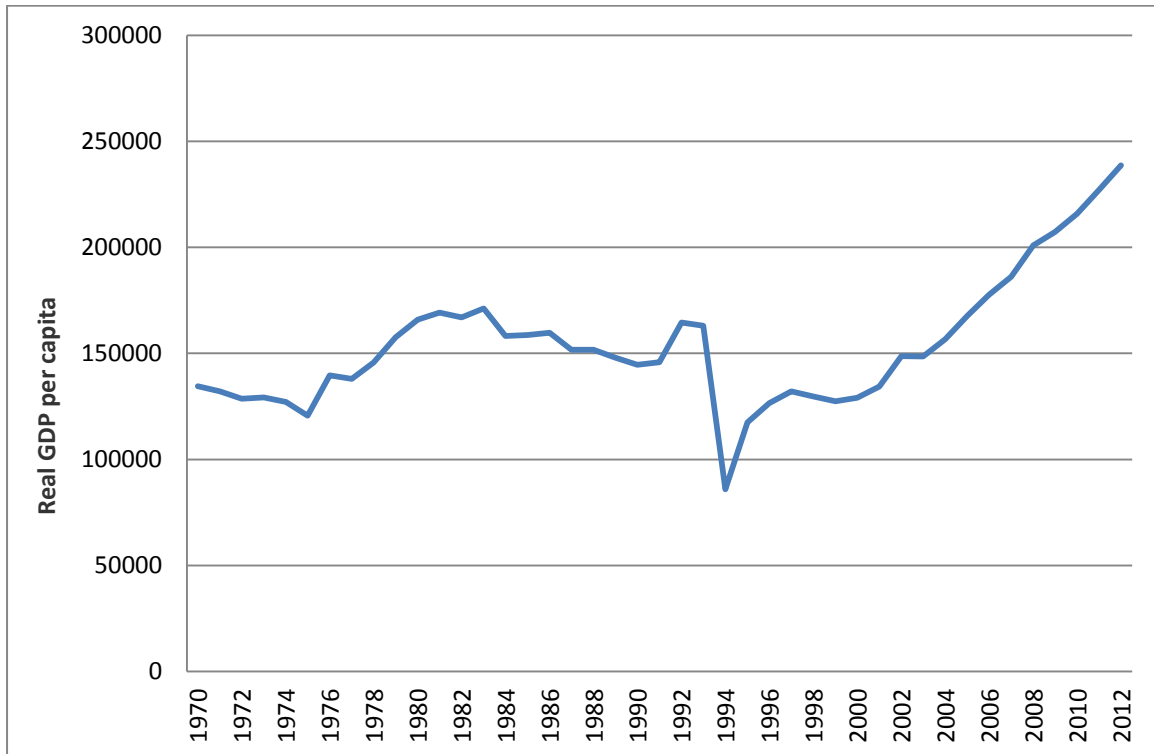
Since July 1994 the country has been relatively conflict-free apart from some border incursions, in particular in the late 1990s. Since 1994 the Government has had a strong focus on economic reconstruction; and the country has benefited from substantial aid inflows over this period. Very large numbers of policies have been put in place over this period, some rather controversial; these have included policies in relation to education, health, agriculture, resettlement, justice, infrastructure construction, social protection, privatization, trade policy changes, among many others. The focus of this paper is on the evolution of consumption poverty in Rwanda over the post-1994 period, where we benefit from three comparable, good quality household surveys in 2000/01, 2005/06 and 2010/11. Towards the end of the paper we will comment briefly on a less robust comparison between a survey in 1990 and the 2000/01 survey.

To set a longer term historical context, Figure 1 sets out the evolution of real per capita GDP in local currency since 1970, and Figure 2 shows the evolution of the population over the same period. Before 1994 there was a period of growth over the 1975-81 period, but there were periods of decline before and in particular after that. The reliability of the GDP data in the period of civil war (starting from 1990), in 1994 and immediately following is extremely questionable; but without doubt the genocide was associated with a major reduction in GDP. By about 1996 or 1997, with some reconstruction of institutions including the statistics office, the GDP estimates may become more reliable again.

But what the chart clearly shows is impressive growth since the mid-1990s, sustained since 2003 and seemingly faster in recent years. By 2006 Rwanda had reached a higher per capita GDP level than it has ever had pre-1994, and there has been impressive sustained growth since then at an average rate of five percentage points.

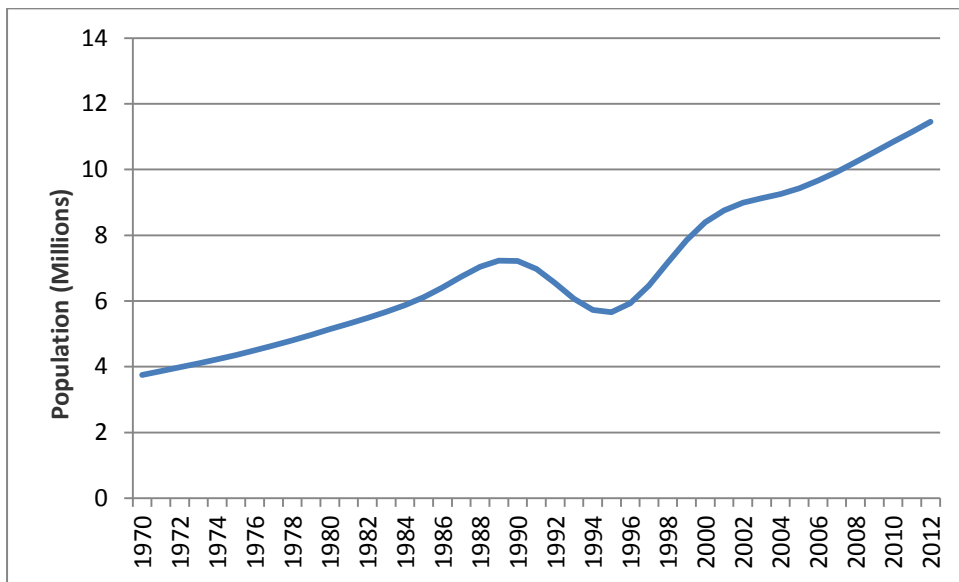
¹ A careful analysis by Verpoorten (2005) estimates the number of deaths as being in the range of 600,000 to 800,000.

Figure 1: Evolution of real per capita GDP in Rwanda, constant local currency units



Source: World Bank (2014).

Figure 2: Evolution of population in Rwanda, 1970-2012



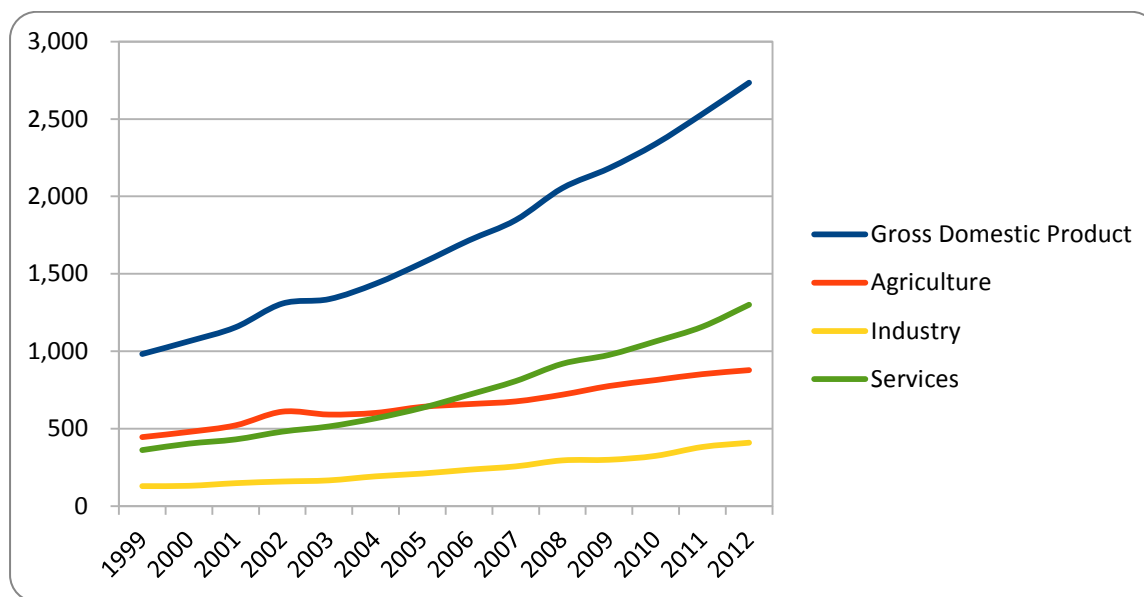
Source: World Bank (2014).

Figure 2 shows that the population growth rate has historically been high in Rwanda. Between 1970 and 1990 the population almost doubled, growing at an average rate of 3.3 per cent a year. The sharp reductions in population in the civil war and genocide period (1990-95) are very clear from the chart, significantly affected by migration as well as deaths due to conflict. Since 2000 the population growth rate has been slower than in the pre-war period, but still remains at 2.6 per cent. Population changes since 1995 also partly reflect international migration patterns as

well as fertility; but whatever the cause, a relatively fast growing population remains a concern in a land-scarce country which is highly dependent on agriculture.

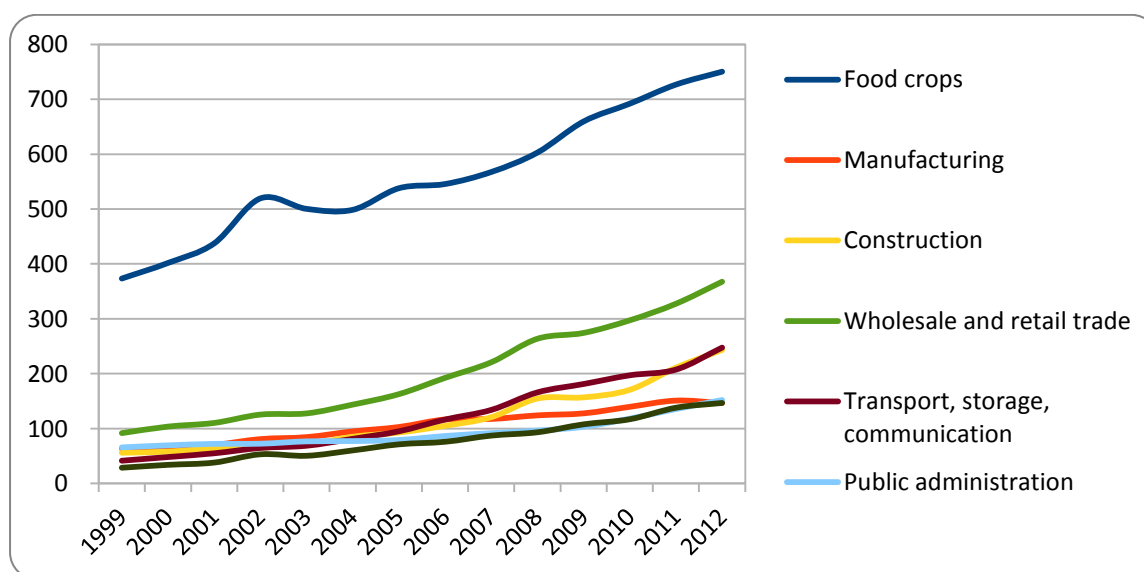
An analysis of growth by broad sector since 1999 (Figure 3) shows that there has been good growth in each of agriculture, industry and services, respectively at average rates of 5.0 per cent, 9.2 per cent and 10.3 per cent over this period. Over this period services has overtaken agriculture as the main contributor to GDP. But all sectors, agriculture included, show impressive and largely consistent growth over the period.

Figure 3: Evolution of real GDP and its major components by sector, 1999 to 2012



Source: National Institute of Statistics of Rwanda, website.

Figure 4: Evolution of real output of main subsectors in Rwanda, 1999 to 2012



Source: National Institute of Statistics of Rwanda, website.

The evolution of main subsectors is shown in Figure 4. The food crop sector completely dominates in agriculture, with all other subsectors being small as a proportion of the total. The

food crop sector dominates agriculture and so shows the same consistent growth as agricultural GDP. In the service sector the largest components are wholesale and retail trade and transport, storage and communications, followed by the public sector. There is also a large increase in construction output towards the end of the period. The food sector growth may translate into reduced rural poverty; this is the sector in which the large majority of the population work, and in particular in which most of the poor work. Growth in some of the other non-agricultural sectors has also been associated with quite significant job creation over the period, a fact confirmed by analysis of the EICV survey data (NISR 2012b, 2012c).

What is also clear though is that agricultural growth has also been good. This paper will shortly analyse the extent to which this growth has translated into poverty reduction.

2 Data sets for analysing consumption poverty

Rwanda conducted a number of household surveys in the pre-genocide period, including a household budget survey in rural and urban areas in 1983 and 1984; and a number of agricultural surveys conducted in the 1980s and early 1990s in partnership with Michigan State University; their 1990 survey collected information on household incomes. A first Demographic and Health Survey was conducted in 1992. A population census was conducted in 1991, and later in 2002 and 2012.

Following the 1994 genocide three large scale household surveys have been conducted using very similar questionnaires, in relation to the key elements needed to estimate household consumption. The first survey (Household Living Conditions Survey or *Enquête Intégrale sur les Conditions de Vie des ménages*, EICV, in French) was conducted in 2000/01 (slightly earlier in urban areas); it used the 1991 census as a sampling frame, though because of the substantial population changes since 1991 also used a socioeconomic survey conducted in 1996/97. It followed a relatively standard integrated household survey approach; collection of frequent consumption data was based on repeat visits (10 over 30 days in urban areas, 7 over 14 days in rural areas), and it collected the wide range of socio-economic information conventionally collected in these surveys. Follow up EICV surveys were conducted in 2005/06 (EICV2) and 2010/11 (EICV3) following essentially the same model. In these cases the sample frame was based on the 2002 population census, which was also used ex post to revise the weights from the first survey (EICV1). The EICV3 survey had an enlarged sample size to give data, which would be representative at the new district level, following a reform in the structure of local government in 2005.

These surveys were used to estimate household consumption for each of the rounds. The measure of household consumption encompasses purchases of food and non-food as well as consumption of home-produced food and non-food. In addition, consumption aggregates include spending on education, frequent health expenses, expenses on housing and utilities (electricity and water), the value of wages received in kind, the estimated value of services derived from durable goods and the value of transfers received in kind from other households. As the data were collected with different periods of recall, the various components of the consumption aggregates were annualized and then combined. An adult equivalence scale commonly used in Rwanda was used to express household consumption on a per equivalent adult basis, so taking account of differences in the size and composition of households. The detailed methodology is described in detail in the appendix to the National Institute of Statistics of Rwanda's poverty report (NISR 2012a).

But for analysing consumption poverty it is also important to take account of price differences: between geographic locations; between months of the year; and between the periods of the different surveys. Fortunately for the case of Rwanda the situation in relation to price data was very positive. The Ministry of Agriculture had since 1999 been collecting food price data on a large number of commodities, twice a month, across a large number of markets in Rwanda, and consistently collected many of these prices up to the time of the 2010/11 survey. This was a very good source of food price data, which combined with budget weights computed from the EICV surveys could be used to construct a food price index capturing all the spatial and temporal differences. In the case of non-food items, the raw price data collected for the consumer price index in more urbanized areas of Rwanda was used as the basis for constructing a similar non-food cost of living index. The food and non-food indices were then combined to construct an overall cost of living index, which could then be used to deflate the consumption data computed from the survey.

The poverty line used in the analysis was an absolute line, in local currency; it was the same one used in the analysis of the EICV1 survey in 2001, which was RWF 118,000 per adult equivalent per year in 2010/11 prices (RWF 64,000 in January 2001 prices). This line had been set with reference to a minimum food consumption basket, judged to offer the required number of calories required for a Rwandan who was likely to be involved in physically demanding work, along with an allowance for non-food consumption. An extreme poverty line was also set as the cost of buying the food consumption basket if nothing was spent on non-food at all, corresponding to RWF 83,000 (RWF 45,000 in January 2001 prices). The consumption basket was an austere one, reflecting the pattern of consumption of poorer Rwandans at the time of the EICV1 survey.

3 The core pattern of change in consumption poverty

The analysis of consumption poverty on which this paper is based is that computed in the National Institute of Statistics Poverty report (NISR 2012a), in which the author was fully involved. Given that this source is relatively easily accessible this section comprises a summary of the core poverty results, following which a more detailed analysis will be presented in the subsequent sections. To begin with here some base data are presented, following which the poverty results will be discussed.

Table 1: Share of food in total household consumption, 2000/01, 2005/06 and 2010/11

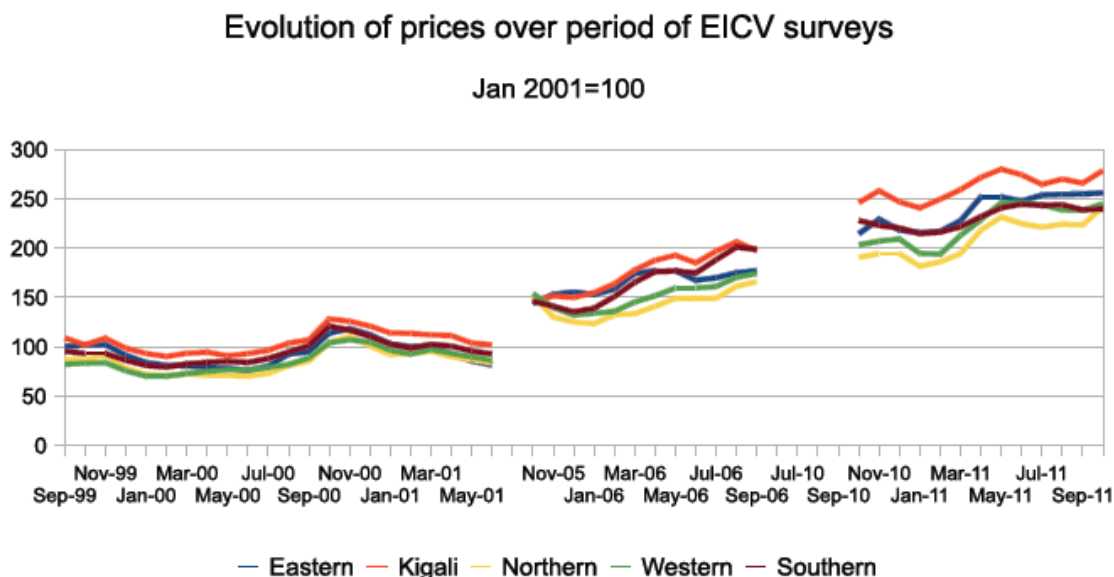
Province	2000/01	2005/06	2010/11
Kigali city	0.463	0.460	0.408
Southern province	0.672	0.656	0.651
Western province	0.729	0.661	0.637
Northern province	0.721	0.666	0.621
Eastern province	0.680	0.629	0.592
Total	0.677	0.635	0.605

Source: NISR (2012a, table 1).

The share of food in total consumption is reported in Table 1. Food accounted for more than two thirds of national consumption in 2000/01. The food share had fallen by 2010/11 but even then was still 60 per cent. These high food shares are characteristics of what is still a very poor country. Disaggregated by the five provinces of Rwanda some differences are revealed;

unsurprisingly the food share is much lower in Kigali province (which includes rural areas, as well as the capital city) than in the other four predominantly rural provinces. In all provinces the food shares consistently fall with each new survey.

Figure 4: Evolution of cost of living index over period of the EICV surveys



Source: NISR (2012a: 12).

The price index used in the poverty calculation is presented here in Figure 4. It is clear from the above calculations that the effects of food prices will dominate here; this is especially the case here because we used budget weights reflecting the consumption patterns of the poorest 60 per cent. The chart shows strong and regular patterns of seasonality; prices are lowest in January to March, following the main (Season A) harvest in November-December; they fall again in June-July, the time of the second (Season B) harvest. The pattern is a bit different in 2005/06 when the harvest was relatively poor, notably in the key growing areas of the northern and western provinces. It is also clear that Kigali is consistently the most expensive province, and the northern and western provinces, which are the key agricultural provinces, are the cheapest. It is also clear that there is significant inflation between the surveys years.

Comparable deflated measures of average real household consumption per adult equivalent are presented disaggregated by province in Table 2. The average increased from RWF 90,601 in 2000/01 to RWF 99,749 in 2005/06, an annualized rate of increase of 1.9 per cent; between 2005/06 it increased at an annualized rate of 4.5 per cent to reach 123,891 in 2010/11. The data show a very sharp differential in consumption levels between Kigali and the other provinces. The four remaining provinces have much more similar average consumption levels.

Table 2: Mean household consumption aggregates per adult equivalent, 2000/01, 2005/06 and 2010/11 (RWF deflated to January 2001 prices)

	2000/01	2005/06	2010/11
Kigali city	253,243	289,504	324,844
Southern province	68,481	71,550	106,754
Western province	76,602	87,448	92,896
Northern province	73,408	76,095	109,995
Eastern province	71,397	89,901	104,487
Rwanda	90,601	99,749	123,891

Source: NISR (2012a, table 2).

Table 3: Percentage of the Rwandan population identified as poor

Province	2000/01	2005/06	2010/11
Kigali city	22.7%	20.8%	16.8%
Southern province	65.5%	66.7%	56.5%
Western province	62.3%	60.4%	48.4%
Northern province	64.2%	60.5%	42.8%
Eastern province	59.3%	52.1%	42.6%
Total	58.9%	56.7%	44.9%

Source: NISR (2012a, table 3).

The distribution of poverty according to the above poverty line, consistently applied across the three years, is presented in Table 3. What this table shows at the national level is a modest reduction in poverty, of 2.2 percentage points between 2001/01 and 2005/06, the period over which the increase in household consumption was also modest. But it then shows a sharp reduction of 11.8 percentage points between 2005/06 and 2010/11, the period over which consumption growth was much higher. It seems then there is quite a strong association between the rate of consumption growth and poverty reduction.

Looking by province, there is again the same sharp difference shown by the consumption data between Kigali province and the others. Among the others the Southern province has the highest level of poverty and made the least progress over this 10-year period, though even there poverty fell by nine percentage points over this period.

An analysis of the depth of poverty (Table 4) also shows a general pattern of reduction, again the reductions being greater between 2005/06 and 2010/11 than between 2000/01 and 2005/06. In this respect though the differences between Kigali and the other provinces are less striking, so that the poor in Kigali, though not numerous, are indeed quite poor. And the poverty line does not reflect the different consumption requirements which the urban poor may have compared to the rural poor.

Table 4: Depth of poverty by province (as proportion of poverty line)

Province	2000/01	2005/06	2010/11
Kigali city	0.366	0.346	0.284
Southern province	0.422	0.416	0.340
Western province	0.396	0.395	0.340
Northern province	0.431	0.400	0.340
Eastern province	0.415	0.357	0.302
Total	0.414	0.393	0.329

Source: NISR (2012a, table 5).

We now turn to consider inequality. The national and province level Gini coefficients are reported in Table 5. Inequality increased nationally and in most provinces between 2000/01 and 2005/06; this increase in inequality combined with the relatively modest consumption growth explains the low rate of poverty reduction between 2000/01 and 2005/06. In contrast inequality fell nationally and in most provinces between 2005/06 and 2010/11; in this case falling inequality compared with much faster consumption growth is associated with much faster poverty reduction.

Table 5: Evolution of inequality in Rwanda

	2000/01	2005/06	2010/10
Kigali city	0.559	0.586	0.559
Southern province	0.425	0.446	0.373
Western province	0.445	0.492	0.395
Northern province	0.457	0.431	0.438
Eastern province	0.403	0.436	0.362
National	0.507	0.522	0.490
Ratio of 90th to 10th percentile	7.066	7.100	6.36

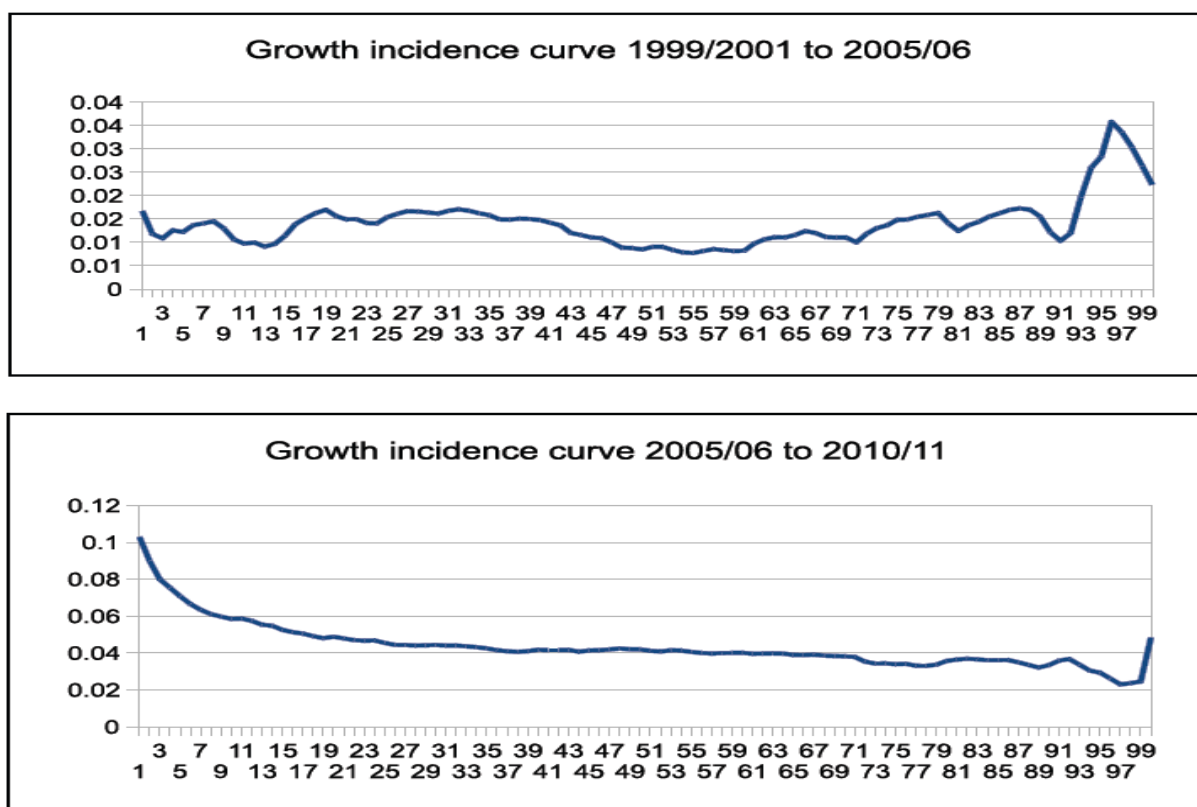
Source: NISR (2012a, table 9).

Growth incidence curves for these periods illustrate these patterns visually (Figure 5). The growth incidence curve for the earlier period shows much faster consumption growth for the top decile and a fairly flat pattern for the rest of the distribution. By contrast the curve for the later period is very clearly downward sloping, and the growth rates are particularly fast in the lower percentiles. The inequality figures clearly reflect the patterns revealed by these growth incidence curves.

So in summary the pattern revealed by the survey data shows two very distinct periods. In the first period, over which GDP growth was also more modest (per capita GDP actually fell in 2001-02), consumption growth was also modest, inequality rose and the incidence and depth of poverty only fell slightly, to an extent which was not statistically significant. In the second period, GDP growth was higher and consumption growth was much higher. Inequality also fell and there was a significant growth at the bottom of the distribution; reflecting all this both the incidence and depth of poverty fell significantly and by a large magnitude.

It is important though to bear in mind that poverty results reflect the economic conditions of the time period over which the data was collected, and can reflect exceptional circumstances in these years. To some extent the relatively disappointing harvest in 2005/06 could partly explain both the lack of progress between 2000/01 and 2005/06 and the faster progress between 2005/06 and 2010/11 as well as the attendant changes in inequality. In other words the rapid progress in the second period here will not necessarily be repeated in the next survey.

Figure 5: Growth incidence curves for Rwanda

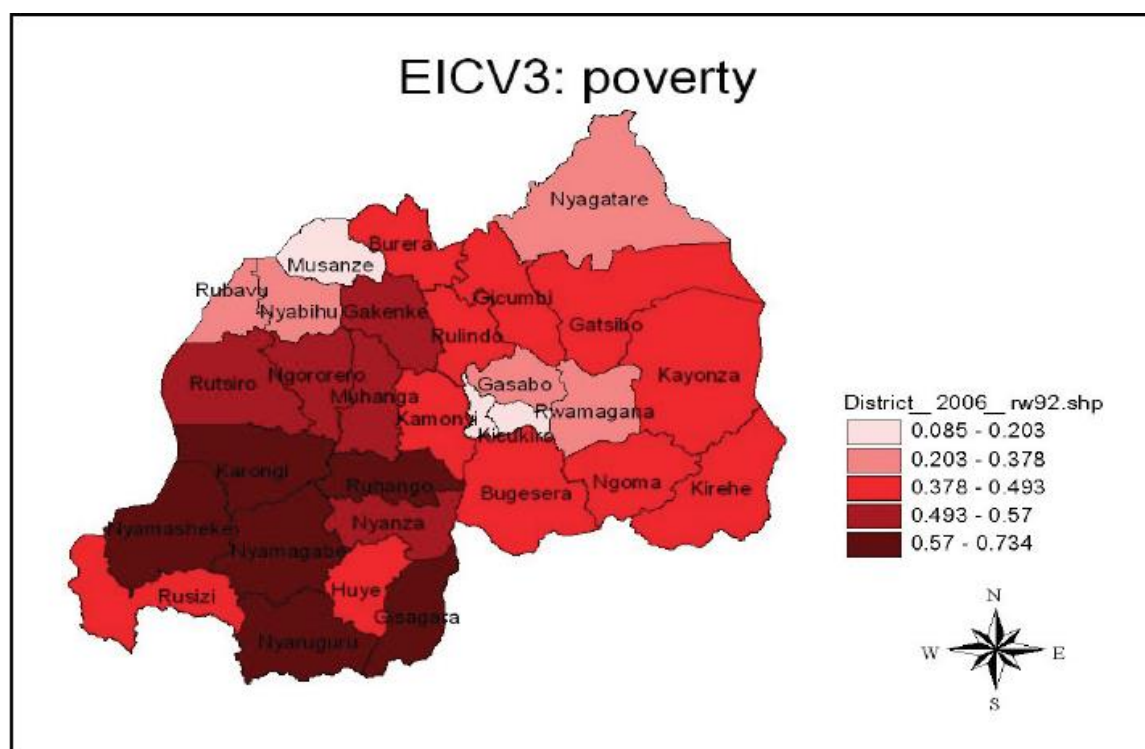


Source: NISR (2012a: 22).

4 More in depth analysis of the change in consumption poverty

To begin with we consider the more detailed geographic pattern of poverty. It has already been noted that the sample size of the 2010/11 was sufficient to enable disaggregation to the district level. The pattern of poverty by district is shown in Figure 6. What this shows is high levels of poverty in the South-West of the country. Some of this corresponds to the former province of Gikongoro, identified as the poorest province in the EICV1 survey; this seems to continue to be the case here.

Figure 6: Pattern of poverty in Rwanda by district, 2010-11



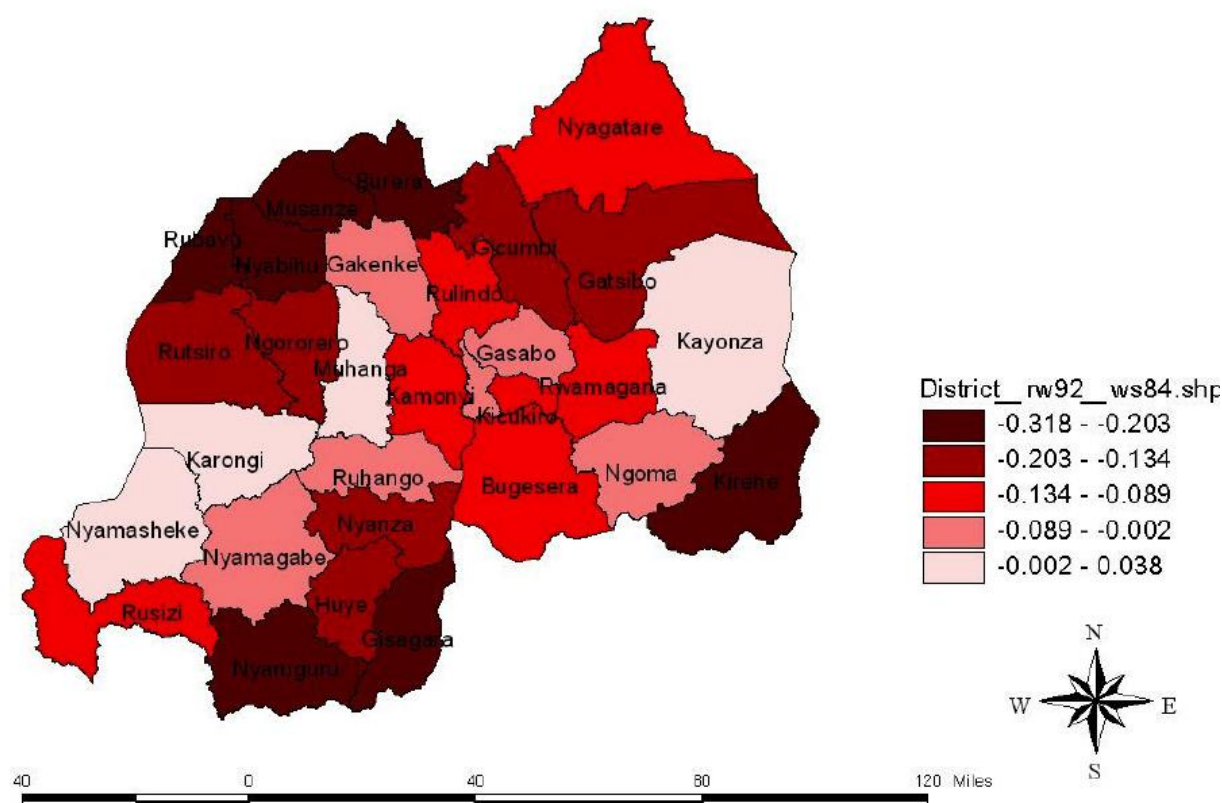
Source: NISR (2012a, table 17).

The EICV2 sample was designed to be representative at the level of the 12 former provinces, and not at the level of the new districts; estimates can still be produced for the new districts based on the EICV2 data but are likely to have a high confidence interval. Nonetheless it is still possible to test for statistically significant change between 2005/06 and 2010/11. District level estimates for both surveys and for the change in poverty between them are reported in Appendix Table A1; the EICV2 standard errors are indeed wider than for EICV3, but still 13 out of the 30 observed changes in poverty are statistically significant at the 5 per cent level.

The changes in poverty at the district level are reported in Figure 7, which reveals a striking pattern: the levels of poverty reduction are highest in districts located on the borders and much less in districts which have no border. All the darkest colours in the map are cases of statistically significant reductions. This is the case even for the two very poor southern districts bordering Burundi, Gisagara and Nyaraguru. It is also the case that more urbanized locations, notably Huye and Nyanza in the Southern province have a more positive poverty reduction record than less urbanized locations. This suggests that cross border trade may be a very important part of the poverty reduction story, as is urbanization; it is less urbanized more remote districts not adjacent to borders that had the poorest poverty reduction record over this period.

Figure 7: Changes in poverty in Rwanda between 2005/06 and 2010/11, by district

reduction in poverty: EICV2-3



Source: author's computation for the Rwanda EICV survey data base.

We turn now to other characteristics associated with poverty. A central factor will be the economic activity a household is able to undertake. The survey records information on the activities individuals undertaken and also on the incomes they are able to earn from these activities, and this is used as the basis for looking at how the type of employment is associated with poverty. Here household incomes are divided into agricultural self-employment income, non-farm self-employment income, farm wage income, non-farm wage income and transfer income. Households are then classified into those earning more than half of their income from these sources, and two cases of more diversified livelihoods, to give the classification reported in Table 6.

More than half the sample obtain the majority of their income from agriculture in both years; these households are poorer than average in both years. By contrast those obtaining more than half their income from non-farm wage or self-employment activity, more than a third of households in 2005/06 and more than a quarter in 2010/11, are much less poorer than average; even those relying primarily on transfer income are less poorer than average. But the group which is strikingly poor is those earning a majority of their income from farm wage work; earning half of income from this source is very difficult to do because the payments are so low. Those with diversified livelihoods are often not less poor than average, and are certainly not if over 30 per cent of their income comes from farm wage work. It is very striking here that farm wage work is really the work of the poorest, who almost certainly lack enough land (or good enough land) of their own as well as often livestock; as elsewhere in East Africa, this is an activity which people generally will not want to undertake. However, many of those reliant on agriculture on their own land are still very poor.

Table 6: Population shares and incidence of, poverty classified by the main household activity

	Share of population (%)		Percentage in poverty	
	EICV2	EICV3	EICV2	EICV3
Mostly agriculture	56.6	52.2	62.8	52.2
Mostly farm wage	4.3	3.6	88.1	76.6
Mostly non-farm wage	7.3	10.7	36.6	22.8
Mostly non-farm self-employment	27.0	16.2	46.5	24.2
Mostly transfers	1.5	2.2	45.6	28.6
Diversified, but farm wage more than 30%	1.0	4.1	77.3	76.2
Diversified, but farm wage less than 30%	2.3	11.1	28.4	47.6
Total	100.0	100.0	56.7	44.9

Source: NISR (2012a, table 7).

The percentage of revenue (so not taking account of input costs to avoid negative figures) receiver from different sources by poor and non-poor is presented in Table 7. Agriculture is of course by far the biggest source, more so for the poor than the non-poor. Non-farm self-employment and wage income is also important for both poor and non-poor but much more for the latter. Farm wage income is though important for the poor and more so in 2010/11 than 2005/06; this may suggest increased demand for farm wage labour in 2010/11 associated with higher production levels, or may suggest the presence of some increasingly impoverished households. Transfers are slightly more important for the non-poor than the poor; these are a combination of public and private transfers.

Table 7: Percentages of revenue from different sources overall, for non-poor and poor households

Income type	Overall		Non-poor households		Poor households	
	EICV2	EICV3	EICV2	EICV3	EICV2	EICV3
Agriculture	56.3	49.5	50.1	44.1	61.0	56.2
Farm wage	6.2	9.0	2.5	4.6	9.0	14.4
Non-farm wage	9.1	14.2	13.7	17.7	5.6	10.0
Non-farm self-employment	23.7	19.0	28.6	25.0	19.9	11.7
Transfers	4.7	8.2	5.0	8.6	4.4	7.8
All	100.0	100.0	100.0	100.0	100.0	100.0

Source: NISR (2012a, table 8).

In general though the data shows a very clear association between poverty and agriculture, whether on own-account or especially when working for someone else; non-farm activities are often, but not always, associated with households who are non-poor. But some non-farm wage work may be poorly paid (e.g. domestic work) and some non-farm self-employment activity may be low return; thus these activities do not guarantee an escape from poverty.

Analysis of the survey data on agriculture shows the increase in production and commercialization; there is also a very big increase in fertilizer use between 2005/06 and 2010/11. There are changes in production patterns, for instance less cultivation of sweet potato and beer bananas, potentially a response to policy initiatives in this area. There has been a big

increase in anti-erosion or soil conservation initiatives. But land areas are continually getting smaller, and there is still very limited use of irrigation.

Among female-headed households, widowed household heads are more likely to be poor and extremely poor than other categories. Poor households seem to have more dependents (infants, children and elderly people) than non-poor households and this difference is especially striking in relation to extremely poor households.

5 Comparison with the pre-1994 situation

As noted above the surveys carried out in Rwanda prior to 1994 were significantly different from those which took place afterwards. The 1990 survey referred to above did though collect quite detailed data on incomes of rural households. McKay and Loveridge (2005) sought to compare income data from this survey with that collected from rural households in the 2000/01 EICV survey. The methodologies of the two surveys were quite different, so considerable care is needed in making this comparison. The authors took considerable care to define comparable concepts of income; they were also able to compare anthropometric indicators between the two surveys, a more clearly comparable indicator.

This comparison showed that anthropometric outcomes for children under five had improved between 1990 and 2000/01, despite a significant reduction in the average land size cultivated over the period. The comparison also showed that average household income by 2000/01 had risen above its 1990 value, and this is consistent with other data on agricultural production for this period. In both years agriculture was by far the largest income source, with the next biggest sources being agricultural labour or unskilled wage work, but cultivation patterns had changed over the period (with increased cultivation of cassava in particular) and by 2000/01 households were selling a much smaller proportion of their output than they had in 1990. This is probably a natural household reaction to the devastating events of the intervening years.

But this increasing average income masked a much more complex reality. The richest 30 per cent of the sample in 2000/01 were significantly better off, but the remaining 70 per cent were in fact worse off. In other words inequality seemed to have increased significantly between these two dates. Again here there is evidence that the poorest groups doing significantly worse than average over this period, something also seen for the comparison over the post-war period above. Inequality would seem to have increased between 1990 and 2000/01 and certainly increased again between then and 2005/06; even if inequality had fallen in 2010/11, the absolute level of inequality in Rwanda is high compared to neighbouring (and most Sub-Saharan African) countries. The difficult situation in which the poor live and their slow progress over time seems to be a consistent message in the case of Rwanda.

And yet despite the increasing inequality over this period and significant reductions in the land size cultivated, the anthropometric data, which ought to be readily comparable between these years, did in fact suggest slightly better outcomes for children in the poorest groups in 2000 compared to 1990 in contrast with the income data. Anthropometric outcomes were certainly very bad in 1990, especially among the poorest groups; it is hard to identify the factors underlying the improvement but it may be a consequence of increased consumption of production by the household itself and changes in cultivation patterns. Again, anthropometric outcomes were still very poor on average by 2000/01. The EICV surveys though did not collect anthropometric data in later rounds, so progress in this area needs to be tracked via the DHS surveys.

6 Conclusions

In many ways Rwanda has made very impressive progress in the period since 1994, showing very impressive and generally sustained growth. This growth translated into substantial poverty reduction over the period 2005/06 to 2010/11, a period in which inequality fell. Given the events that the country has gone through this represents impressive progress.

But a number of caveats are also needed. In particular, the impressive poverty reduction over the 2005/06 to 2010/11 period is likely to reflect the levels of agricultural harvests in these two periods. As such it is likely to give an exaggerated estimate of progress which may not be able to be repeated in later years. This fluctuation of agricultural output also probably accounts for the slow progress between 2000/1 and 2005/6. This is a very important point in an economy which remains very highly dependent on agriculture. Inequality, while it fell in the third survey, remains very high compared to all neighbouring countries for which data is available.

Further, the growth, while impressive, is driven in part by substantial aid inflows, though many other factors are also important and may help to generate a more sustainable growth. There was also a large increase in commercialization in agriculture over this period. In part of course this reflects the higher production volumes, but the impact of substantially improved infrastructure and of cross border trade seem both to be important factors. Rwanda also seems to have been successful in creating significant new employment over the period (especially 2005/06 to 2010/11) of both skilled and unskilled jobs, mostly outside agriculture (NISR 2012b, 2012c). Social protection interventions may be starting to have significant impacts, though the evaluation evidence for this is not yet available.

But inequality in Rwanda, though falling in the latest survey results (and being a target for policy actions after the increase between 2001/01 and 2005/06), remains very high. There appears to remain a significant group of poor people who have certainly benefited less from recent progress, and some who may not have benefited at all. Land pressure is an ever-present concern, with many cultivating very small areas. Increasing numbers seem to depend on agricultural wage labour, the least well remunerated activity of all.

Without doubt Rwanda has made very impressive progress in terms of growth and poverty reduction in the now 20 years since 1994, progress also confirmed in terms of non-monetary indicators based on the DHS data (Verpoorten 2013). But the situation of the poorest households remains a serious concern.

References

- Justino, P. and P. Verwimp, (2013). 'Poverty Dynamics, Violent Conflict, and Convergence in Rwanda'. *Review of Income and Wealth*, 59(1): 66–90.
- McKay, A. and S. Loveridge (2005), 'Exploring the Paradox of Rwandan Agricultural Household Income and Nutritional Outcomes in 1990 and 2000'. Staff Paper 2005-06. East Lansing, MI: Michigan State University.
- National Institute of Statistics of Rwanda (NISR) (2012a). *The Evolution of Poverty in Rwanda from 2000 to 2011: Results from the Household Surveys (EICV)*. Kigali: NISR.
- NISR (2012b) *EICV 3 Thematic Report - Economic Activity*. Kigali: NISR.
- NISR (2012c) *The Third Integrated Household Living Conditions Survey (EICV 3) - Main indicators Report*. Kigali: NISR.
- Uvin, P. (2001). 'Reading the Rwandan Genocide'. *International Studies Review*, 3(3): 75–99.
- Verpoorten, M. (2005). 'The Death Toll of the Rwandan Genocide: A Detailed Analysis for Gikongoro Province'. *Population*, 60(4): 331-367.
- Verpoorten, M. (2013). 'Growth, Poverty and Inequality in Rwanda: A Broad Perspective', Paper prepared for GAPP project, issued as WP2014/138. Helsinki: UNU-WIDER.
- Verwimp, P. (2003). 'Testing the Double-Genocide Thesis for Central and Southern Rwanda'. *Journal of Conflict Resolution*, 47(4): 423-442
- Verwimp, P. (2004). 'Death and Survival During the 1994 Genocide in Rwanda'. *Population Studies*, 58(2): 233-45.
- Verwimp, P. (2005). 'An Economic Profile of Peasant Perpetrators of Genocide: Micro-level Evidence from Rwanda'. *Journal of Development Economics*, 77(2): 297–323.

Appendix

Appendix Table A1: Poverty estimates at district level in 2005/06 and 2010/11, with standard errors

District	Estimate EICV2	Standard Error EICV2	Estimate EICV3	Standard Error EICV3	Difference	Standard error difference
Nyarugenge	10.3	2.67	10.1	2.38	0.2	3.58
Gasabo	26.8	5.13	26.0	3.99	0.8	6.50
Kicukiro	20.3	4.85	8.3	1.94	12.0**	5.22
Nyanza	64.5	4.65	49.8	3.68	14.7**	5.93
Gisagara	79.7	5.1	59.4	3.7	20.3**	6.30
Nyaruguru	85.0	2.55	61.6	2.45	23.4**	3.54
Huye	61.2	3.87	46.6	3.99	14.6**	5.56
Nyamagabe	75.5	4.15	73.3	3.16	2.2	5.22
Ruhango	63.5	4.16	60.4	3.53	3.1	5.46
Muhanga	52.7	4.57	53.6	3.11	-0.9	5.53
Kamonyi	55.6	3.73	46.7	3.06	8.9	4.82
Karongi	60.4	3.46	61.7	3.22	-1.3	4.73
Rutsiro	67.7	4.61	53.0	3.11	14.7**	5.56
Rubavu	60.5	5.45	35.8	4.32	24.7**	6.95
Nyabihu	54.8	5.88	28.6	3.51	26.2**	6.85
Ngororero	65.2	5.94	51.9	3.5	13.3	6.89
Rusizi	55.1	5.04	45.0	3.93	10.1	6.39
Nyamasheke	59.6	4.5	63.4	3.25	-3.8	5.55
Rulindo	52.1	5.82	42.9	3.08	9.2	6.58
Gakenke	57.9	6.02	56.6	3.39	1.3	6.91
Musanze	51.9	6.21	20.1	2.15	31.8**	6.57
Burera	75.9	4.76	45.2	3.92	30.7**	6.17
Gicumbi	62.7	3.84	49.3	7.49	13.4	8.42
Rwamagana	41.9	5.65	30.4	3.06	11.5	6.43
Nyagatare	49.3	4.3	37.8	3.93	11.5**	5.83
Gatsibo	56.7	4.68	43.1	2.64	13.6**	5.37
Kayonza	39.9	6.04	42.6	3.49	-2.7	6.98
Kirehe	69.9	7.12	47.9	2.81	22.0**	7.65
Ngoma	49.1	4.43	47.6	2.86	1.5	5.27
Bugesera	58.2	6.64	48.4	4.85	9.8	8.22

Source: computed from the EICV survey data set.