Republic of Rwanda

NATIONAL INSTITUTE OF STATISTICS OF RWANDA

# The Fifth Integrated Household Living Conditions Survey

# EICV5

## 2016/17

## Thematic Report

## Rwanda Multidimensional Poverty Report

# EICV5

## Integrated Household Living Conditions Survey
## (Enquête Intégrale sur les Conditions de Vie des Ménages)

-2016/2017 -

# Rwanda Multidimensional Poverty Index Report

December 2018

United Nations RWANDA Unity in Diversity

UKaid from the British people

WORLD BANK

The Rwanda Multidimensional Poverty Index Report is produced by the National Institute of Statistics of Rwanda (NISR).

Additional information about The Rwanda Multidimensional Poverty Index Report may be obtained from NISR:
P.O. Box 6139, Kigali, Rwanda;
E-mail: info@statistics.gov.rw;
Website: http://www.statistics.gov.rw

ISBN: 978-99977-43-31-2

Recommended citation:

National Institute of Statistics of Rwanda (NISR), The Rwanda Multidimensional Poverty Index Report, December 2018

## Acknowledgement

The Fifth Integrated Household Living Conditions Survey (EICV5) was conducted from October 2016 to October 2017, and is designed to provide accurate and up-to-date information that are useful to goverment, analysts, and the public as they seek to monitor and evaluate efforts to reduce poverty.

The NISR now conducts EICV surveys every three years, and this has been made possible by strong collaboration and support from our stakeholders, who are as interested as we are in supporting evidence-based decision making, and planning processes that are grounded on reliable and valid statistics.

We sincerely appreciate the support given by the Government of Rwanda for the development of statistics in the country, and are grateful for the help that we continue to receive from all government institutions.

We are most grateful to our development partners for the support that they have given for the collection and development of statistics in Rwanda, and especially for EICV5. They include UK Aid, the European Union, the World Bank, and the UN partners in the country.

The measurement and analysis of poverty and living standards is an exercise that requires considerable tecnical skills. We would like to thank NISR technical and management team for their work - from the planning and implementation of EICV5 through the analysis and publication of the results. We further appreciate the valuable technical support provided by the international experts. The generation and use of complex survey data can only be achieved through teamwork.


Yusuf Murangwa
**Director General, NISR**

# Table of Content

## List of tables

## List of figures

## Acronyms and Abbreviations

| | |
|---|---|
| **DHS** | Demographic and Health Surveys |
| **EICV** | Integrated Households Living Conditions Surveys |
| **EPRI** | Economic Policy and Research Institute |
| **MDGs** | Millennium Development Goals |
| **MPI** | Multidimensional Poverty Index |
| **NISR** | National Institute of Statistics of Rwanda |
| **OPHI** | Oxford Poverty and Human Development Initiative |
| **SDGs** | Sustainable Development Goals |
| **UNICEF** | United Nations Children's Fund |
| **UNDP** | United Nations Development Program |
| **WFP** | World Food Program |
| **WHO** | World Health Organization |

## Executive Summary

This report presents Rwanda's first national Multidimensional Poverty Index (MPI) which is based on EICV data. The analysis of Rwanda MPI used four dimensions with corresponding 14 indicators:

1. Education dimension with two indicators (school attendance and years of schooling),
2. Housing dimension with four indicators (electricity, floor material, overcrowding and source of cooking fuel),
3. Public Services dimension with three indicators (safe drinking water, improved sanitation and garbage disposal), and
4. Social services & economic activity dimension (assets for communication, bank account, health insurance, distance to health care facilities and working only in subsistence agriculture activities).

Each of the four dimensions is given an equal weight of 1/4 in the MPI. Values for the component indicators differ depending on the number of indicators under each dimension. Each of 14 indicators has Deprivation Cut-off which allows to measure the Uncensored Headcount Ratios. A person needs to be deprived in 2 out of 5 (40%) of weighted indicators to be identified as multidimensional poor. Censored Headcount Ratios indicate in which indicators the poor people are deprived in.

The main measurement of MPI indicators are:

### Uncensored and Censored Headcount Ratios

The uncensored headcount ratio of an indicator represents the proportion of people who are deprived in that particular indicator, irrespective of their poverty status. In 2016/17, the highest deprivations is found in cooking fuel with 99.1% of population being deprived in this indicator, whereas the lowest deprivation is in school attendance followed by sanitation with respectively, 8.0% and 12.8% of the population being deprived in those indicators.

The censored headcount ratio of an indicator represents the proportion of the population that is multidimensional *poor* and also *deprived* in that indicator. In 2016/17, the largest censored headcount ratio can be found in the indicator of cooking fuel (29%) whereas the lowest censored head count ratio is in school attendance (6.1%). This lowest censored head count ratio might be a result of various education policies and its viable link to economic development policies. At the Indicator level, the findings further indicate that both Censored and Uncensored Headcount ratios show a decreasing trend from EICV3 to EICV5 (Figure 3.1 and figure 3.2).

**Incidence of poverty (H), Intensity of poverty (A) and poverty Index (M0) at National level, by area of residence and province**

The Incidence of poverty (H) or the proportion of the population facing multiple deprivations in Rwanda reduced from 44% in 2010/11 (EICV3) to 33% in 2013/14 and to 29% in 2016/17 (EICV5). In 2016/17, the incidence of poverty is higher in rural area than in urban areas, 32.1% and 13.4% respectively. At province level, the highest proportion of multidimensional poor people (H) in 2016/17 (EICV5) is observed in Southern Province (36.0%) followed by the Eastern Province (32.2%) while the lowest deprived is City of Kigali (13.3%). However, the incidence of poverty seems to decrease overtime across the two areas and across all provinces.

The Intensity of poverty (A) or the share of deprivations each poor person experiences on average is 51.5% in 2016/17 compared to 51.7% in 2013/14 and 53.8% in 2010/11. That is, each poor person is, on average, deprived in slightly more than half of the weighted indicators in the three periods (Figure 3.5). Generally, the intensity slightly decreases over time but is still over 50% across all provinces, urban-rural, and at the National level.

The Multidimensional Poverty Index (Mo), which is the product of the percentage of poor people (H) and the average intensity of poverty (A), stands at 0.15 in 2016/17, 0.17 in 2013/14 and 0.24 in 2010/11 (Figure 3.8). Poverty disparities are also noted in both urban and rural areas and across provinces. In 2016/17, poor people in rural areas experience 0.17 of the deprivations that would be experienced if all

people were deprived in all indicators compared to 0.07 in urban areas. In EICV5, M0 is also highest in Southern province (0.19%) and lowest in City of Kigali (0.07). These disparities are also noted across all provinces in all three waves (EICV3, EICV4 and EICV5).

**Incidence of poverty (H), Intensity (A) and MPI (Mo) by quintile**

As expected, there is a negative association between the level of poverty (MPI) and household's wealth. In 2016/17 (EICV5), the level of the incidence of poverty (H) is 9 times higher among the least wealthy households than among the richest ones. Results show that 55.3% of people living in the least wealthy households are multidimensional poor, having dropped from 70.9% in 2010/11 (EICV3). Within the highest wealth households, the multidimensional poor people dropped from 13.8 in 2010/11 to 5.9% in 2016/17. In addition, the share of deprivations each poor person experiences on average (intensity of poverty) is the same across all wealth quintiles. Hence the improvement in the incidence and MPI is noted from EICV3 to EICV5 across all wealth quintiles; but the improvement of intensity of poverty is low across all wealth quintiles.

**Contribution of each indicator to the MPI at national level**

It is also useful to see the percentage contribution of each of the 14 indicators to overall multidimensional poverty in Rwanda.

The weighted percentage contribution of each indicator is depicted to show the composition of multidimensional poverty at the national level, for 2010/11, 2013/14 and 2016/17. As highlighted by the findings, the years of schooling indicator within Education dimension, the floor within the Housing dimension and Drinking Water indicator within Public services dimension are those that contribute the most to poverty. However, the proportion of contribution of these indicators increases over time, between 2010/11 and 2016/17; from 16.1% to 17.2% for the years of schooling indicator, 13.5% to 14.0% for the Floor indicator and 10.9% to 12.2% for the Drinking water indicator. Inversely, the Electricity that contributed at 10.2% to the MPI in 2010/11, reduced to 4.1% of contribution to MPI in 2016/17. The contribution of garbage disposal to MPI increased to 11.6% in 2016/17 from 7.5% in

2010/11. It can be also observed that those within Social Services & Economic Activity are the ones contributing the least to the MPI.

## Chapter 1: Overview of the Rwandan's multidimensional poverty measurement

Rwanda's government has elaborated the long term development strategies known as Vision 2020, and vision 2050 as well as the short term development plan known as Economic Development and Poverty Reduction Strategies (EDPRS) actually replaced by the National Strategy for Transformation (NST) to guide the national sectorial strategic plans and action plans for a rapid reduction of poverty and social and economic development. Development plans reaffirm the vital importance of investments in infrastructure and social services. It also recognizes poverty as being multidimensional, including monetary deprivation but also those in health, education, and other amenities. Therefore, through the Rwanda's National Development Strategy, the government recognizes the imbalance between economic development and social development, and pledges to undertake policies aimed at improving the socioeconomic indicators of the Rwanda. In addition to monetary poverty, measured using expenditures approach since the EICV1 of 2000/01, for the first time, with EICV data, NISR is going to measure the multidimensional poverty using the social dimension and indicators.

This introductive chapter on the MPI for Rwanda first gives an overview of the history of poverty measurement in Rwanda. Second, it explains in detail about the scene for research by describing the context of the study. Finally, it represents the purpose of measuring a range of indicators to capture the complexity of poverty and inform policy makers to relieve it.

### History of poverty measurement in Rwanda

Rwanda's official poverty measure is currently under the scope of the National Institute of Statistics of Rwanda (NISR) which lies under the Ministry of Finance and Economic Planning (MINECOFIN).

Each of the Integrated Household and Living Conditions Surveys EICVs) provides information on monetary poverty measured in consumption expenditure terms, but also provides complementary socio-economic information that facilitates understanding changes in households living conditions.

As reported in the EICV reports, the approach used in Rwanda to measure poverty is the estimated food component of the consumption poverty line as the cost of a food bundle that provides a predetermined minimum required level of food energy. The official extreme poverty line is then calorie based, and the

consumption-based absolute poverty measure is estimated after converting the household consumption level to an adult equivalent scale based on the recommended nutritional requirements of 2,500 kcal per person per day. The total poverty line (simply referred to as the 'poverty line') is obtained by adding to the food component the cost of the non-food allowance. The household and all members of the households are considered to be poor if the per capita consumption expenditure is less than the consumption poverty line. This poverty line is adjusted at the time of the poverty estimation to account for the inflation in order to track the evolution of poverty over time and evaluating the effects of policies and programs on the incidence of poverty or to compare to earlier and similar surveys.

As it can be seen in Table 1.1, the official consumption poverty rate has shown a strong declining trend between 2000/01 and 2013/14. In particular, the proportion of people living below the official poverty line has dropped from 58.9% to 39.1% (a reduction of 19.8 Percentage points). This strong decline might be associated with a number of factors including increased allocations of poverty eradication programs like One Cow per family (Girinka program), Vision 2020 Umurenge Program (VUP), and establishment of the Business Development Fund (BDF) to support business projects through business advisory schemes and play a special role on advocating for funds. Crop Intensification program and Land use consolidation, irrigation schemes and Akarima k'Igikoni (vegetable gardening) have also been among the priority programs that were put in place by the Ministry of Agriculture to handle the problem of food insecurity and malnutrition.

In addition, the table 1.1 identifies very large disparities between rural and urban areas. And though both areas have shown a stark reduction of their poverty rates, it is in rural rather than in urban areas that poverty is most prominent and severe.

**Table 1. 1: Official poverty rates in Rwanda since EICV 2000/01 (% of population living below national poverty line)**

| | 2000/01 | 2005/06 | 2010/11 | 2013/14 |
|---|---|---|---|---|
| | | | | |
| Rwanda | 58.9 | 56.7 | 44.9 | 39.1 |
| Urban | - | 28.5 | 22.1 | 15.9 |
| Rural | - | 61.9 | 48.7 | 43.8 |

Source: EICV datasets since 2000/01 to 2013/14

It is argued that even if consumption offers a more robust measurement of poverty, with properly designed framework, multidimensional poverty indices have advantage of better reflecting human well-being. Thus, with the EICV 2016/17, the government of Rwanda has judged important to introduce through the NISR, the multidimensional poverty analysis, first to complete the monetary poverty by the social multidimensional poverty and second to reflect human well-being better than resource-based approaches.

**Context of MPI analysis in Rwanda**

In the last 16 years, the government of Rwanda made effort to rise up the economic situation of Rwanda that has improved substantially. Rwanda's GDP per capita increased from US$ 211 per capita in 2001 to US$ 774 in 2017. The GDP at constant 2014 prices increased from 2,041 billion in 2001 to 6,307 billion in 2016, registering an average growth rate of 6% between 2015 and 2016.

Efforts were also observed in social sectors during this period where Rwanda made great strides in education, with the Net Attendance Rate in Secondary School increasing from 10.4% in 2005/06 to 23.0% in 2013/14, and Literacy Rate among people aged 15-24 increased from 76.9% to 86.2%. Access to improved sanitation also showed strong progress – whereas in 2005/06 only 58.5% of people had access to improved sanitation, and whereby in 2013/14 the improved sanitation increased to 83.4%. Also, Rwanda did much better in terms of life expectancy, with 64.5 years in 2012 compared to 51.2 years in 2002. Rwanda's infant mortality rate (IMR) reduced from 107 deaths of infants per 1000 women in 2000 to 32 deaths in 2014/15. This also holds true for maternal mortality, where the Maternal Mortality Ratios decreased from 1,071 per 100,000 live births in 2000 to 210 in 2014/15. Monetary Poverty has reduced sharply from 58.9% in 2000/01 to 39.1% in 2014 and extreme poverty reduced by more than half, from 40.0% to 16.3.
Looking to track these human development indicators, the Ministry of Finance and Economic Planning (MINECOFIN) together with the National Institute of Statistics of Rwanda (NISR), have led efforts to run extensive consultations on the MPI in Rwanda during 2016/17, jointly with UNDP.

The technical supporters (OPHI Experts and UNDP) presented the relevance of multidimensional poverty

and its methodologies. After the presentations and initial interchange regarding poverty measures, OPHI Experts together with NISR participants made discussions and consult other institutions and organizations in charge of social development to determine the indicators that will be considered when developing Rwanda multidimensional poverty and the survey on which the MPI will be based.
Rwanda's MPI reflects therefore the National Plan and, its structure has been discussed and adopted by groups of NISR Statisticians, experts, technicians and leaders from health, education, and other social sectors and the measure presented in this reports builds on these efforts.

Until recently, many countries have measured poverty only by consumption or income. But no one indicator (such as consumption/income) can capture the multiple aspects of poverty. The global Multidimensional Poverty Index (MPI) is a new international measure of acute poverty developed by Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Program Human Development Report Office (UNDP HDRO). The MPI complements monetary poverty measures by reflecting the acute deprivations that people face simultaneously in other dimensions which are also essential to guarantee a dignified life. Following the Human Development Index (HDI), the MPI shares the same three global dimensions: education, health and living standards.

The MPI is based on the concept of *capability*. Nobel laureate in 1998, Professor Amartya Sen (1999) have argued that social evaluation should be based on the extent of the freedoms that people have to further the objectives that they value. The term 'capability' or 'capability set' provides information on the array of *functioning's* that a person could achieve. Poverty in this framework becomes 'capability failure' – people's lack of the capabilities to enjoy key 'beings and doings' that are basic to human life. The concept is inherently multidimensional.

The first global MPI was released in 2010 with an aim to encourage the development of national versions of the MPI, which are tailored to their national circumstances. It has been updated regularly and published in every *Human Development Report* subsequently. Furthermore, the website of the Oxford Poverty and Human Development Initiative (OPHI, www.ophi.org.uk) carries detailed tables, graphics, policy briefings, and academic papers on this index.

The Rwanda Multidimensional Poverty Index (MPI is a complement to the 2010/11, 2013/14 and 2016/17 Integrated Household and Living Conditions Surveys (EICVs)[1]. In fact, the government of Rwanda intends to improve not only the income but also the quality of life of the Rwandan population. This version which broadens the definition of poverty to include education, housing, public services, social services & economic activity alongside income or consumption is also recognized at international level.

**Objectives of the analysis**

The objectives of the Rwanda multidimensional poverty is to produce estimates that could enable actors in Rwanda to make progress in social indicators, reduce multidimensional poverty characteristics and advance in national, regional and international social goals.

The National MPI indicators have been selected in order to provide a clear way of designing programs that deliberately target the poor. They can also help in monitoring and evaluating plans and programs. One of the main purposes is to compare area of residence and provinces in terms of MPI poverty and thereby allow government and other stakeholders to focus services and policies accordingly. Targeted regional interventions can thus be more easily achieved.

Rwanda's MPI can serve as a tool for good governance – for policy coordination, investigating monitoring and readjusting and determining which group of people should be targeted by future policies in order to accelerate progress.

This analysis is also an attempt to construct a national MPI baseline that will be a yardstick to measure its progress over time and to tease out the impact of integrated policies/program. It can thus help government to assess how its various policies are affecting people, particularly the poor. To see the extent of progress the government has achieved over the years, comparisons are made with the latest

[1] The EICV1, 2000/01 and EICV2, 2003/04 were excluded from this report because the administrative entities, and definition of variables were different from the three last EICV surveys used in this report.

available data–such as, EICVs (2010/11, 2013/14 and 2016/17).

Rwanda's MPI seeks also to enable private sector, and NGO actors to fix the domains of intervention not only in economic aspects, but also in social domains for the socially poor people.

The multidimensional poverty measurements will help to evaluate some indicators of the SDGs. The effectiveness of integrated policies was stressed in the preamble of the SDG document *Transforming Our Lives*, which observed the following: "The interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new Agenda is realized." That report built upon the Secretary General's evidence-based hope that the SDGs would "inject new impetus for embracing integrated approaches to development." A key reason for this is cost effectiveness. When integration is lacking, synergies are not realized. When policy coherence is evident, progress accelerates.

Finally, it is important to have a national MPI to complement Rwanda's consumption poverty measure. It is imperative to analyze if the last decade's reduction in consumption poverty was accompanied by a reduction in multidimensional poverty.

## Chapter 2: Methodology and EICV data

After an overview, this chapter explains in a brief manner how data were collected and analyzed in order to tease out the multidimensional poverty indicators in Rwandan context. From EICV1, poverty was analyzed by using the consumption approach only. From EICV5, NISR has added multidimensional poverty analysis which uses the social dimensions and indicators to measure poverty. This is a complement to monetary poverty approach as stipulated in SDGs 1.2.2 (reduce poverty in all its dimensions). After a development of Alkire-Foster measurement framework and its adaptation in Rwanda National MPI context, a section focuses on a description of EICV dataset used in this report.

### 2.1 Alkire Foster methodology (OPHI, 2015)

The global MPI, which was developed by Alkire and Santos (2010) and updated in 2013 in collaboration with the UNDP, and first appeared in the 2010 *Human Development Report*, is one particular adaptation of the adjusted headcount ratio $(M_0)$ proposed in Alkire and Foster (2011) and elaborated in Alkire et al. (2015). The Alkire-Foster method offers numerous benefits for the evaluation of both poverty-relevant developments and policy measures (Suppa, 2016). This section outlines the methodology and relevant properties that are used in the subsequent sections to understand the change in Rwanda's multidimensional poverty.

Sabina Alkire and James Foster created a new method for measuring multidimensional poverty. It identifies who is poor by considering the intensity of deprivations they suffer, and includes an aggregation method. Mathematically, the MPI combines two aspects of poverty: $MPI = H \times A$

Incidence ~ the percentage of people who are multidimensional poor, or the headcount: $H$

Intensity of people's poverty ~ the average percentage of dimensions in which poor people are deprived: $A$

### 2.1.1. The Multidimensional Poverty Index: an Adjusted Headcount Ratio

Suppose a particular point in time, there are $n$ people in Rwanda and their wellbeing is evaluated by $d$ indicators.[2] We denote the achievement of person $i$ in indicator $j$ by $x_{ij} \in \square$ for all $i = 1,\ldots,n$ and $j = 1,\ldots,d$. The achievements of $n$ persons in $d$ indicators are summarized by $n \times d$ dimensional matrix $X$, where rows denote persons and columns denote indicators. Each indicator is assigned a weight based on the value of a deprivation relative to other deprivations. The relative weight attached to each indicator $J$ is the same across all persons and is denoted by $w_j$, such that $w_j > 0$ and $\sum_{j=1}^{d} w_j = 1$.

For single-dimensional analysis, people are identified as poor as long as they fail to meet a threshold called the 'poverty line' and non-poor otherwise. In multidimensional analysis based on a counting approach – as with the adjusted headcount ratio – a person is identified as poor or non-poor in two steps. In the first step, a person is identified as deprived or not in each indicator subject to a deprivation cutoff. We denote the deprivation cutoff for indicator $j$ by $z_j$ and the deprivation cutoffs are summarized by vector $z$. Any person $i$ is deprived in any indicator $j$ if $x_{ij} < z_j$ and non-deprived otherwise. We assign a *deprivation status score* $g_{ij}$ to each person in each dimension based on the deprivation status. If person $i$ is deprived in indicator $j$, then $g_{ij} = 1$ ; and $g_{ij} = 0$ otherwise. The second step uses the weighted deprivation status scores of each person in all $d$ indicators to identify the person as poor or not. An overall *deprivation score* $c_i \in [0,1]$ is computed for each person by summing the deprivation status

[2] The meaning of the terms 'dimension' and 'indicator' are slightly different in Alkire and Foster (2011) and in Alkire and Santos (2010). In Alkire and Foster (2011), no distinction is made between these two terms. In Alkire and Santos (2010), however, the term 'dimension' refers to a pillar of wellbeing and a dimension may consist of several indicators.

scores of all $d$ indicators, each multiplied by their corresponding weights, such that $c_i = \sum_{j=1}^{d} w_j g_{ij}$. A person is identified as poor if $c_i \geq k$, where $k \in (0,1]$; and non-poor, otherwise.[3] The deprivation scores of all $n$ persons are summarized by vector $c$.

After identifying the set of poor and their deprivation scores, we obtain the adjusted headcount ratio $(M_0)$. Many countries refer to this as the Multidimensional Poverty Index (MPI). The *focus* axiom requires that while measuring poverty the focus should remain only on those identified as poor.[4] This entitles us to obtain the censored deprivation score vector $c(k)$ from $c$, such that $c_i(k) = c_i$ if $c_i \geq k$ and $c_i(k) = 0$, otherwise. The $(M_0)$ is equal to the average of the censored deprivation scores: $M_0 = MPI = \frac{1}{n}\sum_{i=1}^{n} c_i(k)$.

### 2.1.2. Properties of the Multidimensional Poverty Index

We now outline some of the features of $M_0$ that are useful for policy analysis. The first is that $M_0$ can be expressed as a product of two components: the share of the population who are multidimensional poor

[3] For $k = 100\%$, the identification approach is referred to as the *intersection approach*; for $0 < k \leq \min\{w_1, \ldots, w_d\}$, it is referred to as the *union approach* (Atkinson, 2003); and for $\min_j\{w_1, \ldots, w_d\} < k < 1$, it is referred to as the dual cut-off approach by Alkire and Foster, or more generally as the *intermediate approach*.

[4] In the multidimensional context, there are two types of focus axioms. One is deprivation focus, which requires that any increase in already non-deprived achievements should not affect a poverty measure. The other is poverty focus, which requires that any increase in the achievements of non-poor persons should not affect a poverty measure. See Bourguignon and Chakravarty (2003), and Alkire and Foster (2011).

or Multidimensional Headcount Ratio $(H)$ and the average of the deprivation scores among the poor only, or Intensity $(A)$. Technically: $M_0 = MPI = \frac{q}{n} \times \frac{1}{q} \sum_{i=1}^{n} c_i(k) = H \times A$;

Where $q$ is the number of poor.[5] This feature has an interesting policy implication for inter-temporal analysis. A certain reduction in $M_0$ may occur either by reducing $H$ or by reducing $A$. This difference cannot be understood by merely looking at $M_0$. If a reduction in $M_0$ occurs by merely reducing the number of people who are marginally poor, then $H$ decreases but $A$ may not. On the other hand, if a reduction in $M_0$ occurs by reducing the deprivation of the poorest of the poor, then $A$ decreases, but $H$ may not.[6]

The second feature of $M_0$ is that if the entire population is divided into $m$ mutually exclusive and collectively exhaustive groups, then the overall $M_0$ can be expressed as a weighted average of the $M_0$ values of $m$ subgroups, where weights are the respective population shares. We denote the achievement matrix, the population, and the adjusted headcount ratio of subgroup $\ell$ by $X^{\ell}$, $n^{\ell}$ and $M_0(X^{\ell})$, respectively. Then the overall $M_0$ can be expressed as:

$$M_0 = MPI = \sum_{\ell=1}^{m} \frac{n^{\ell}}{n} M_0(X^{\ell}).$$

[5] This feature is analogous to that of the Poverty Gap Ratio, which is similarly expressed as a product of the Headcount Ratio and the Average Income Gap Ratio among the poor.

[6] Apablaza and Yalonetzky (2011) have shown that the change in $M_0$ can be expressed as $\Delta M_0 = \Delta H + \Delta A + \Delta H \times \Delta A$, where $\Delta x$ is referred to as change in $x$.

This feature is also known as *subgroup decomposability* and is useful for understanding the contribution of different subgroups to overall poverty levels.[7] Note that the contribution of a subgroup to the overall poverty depends both on the poverty level of that subgroup and that subgroup's population share.

The third feature of $M_0$ is that it can be expressed as an average of the censored headcount ratios of indicators weighted by their relative weight. The Censored Headcount Ratio of an indicator is the proportion of the population that is multidimensional poor and is simultaneously deprived in that indicator. Let us denote the Censored Headcount Ratio of indicator $j$ by $h_j$. Then $M_0$ can be expressed as: $M_0 = MPI = \sum_{j=1}^{d} w_j h_j = \sum_{j=1}^{d} w_j \left[ \frac{1}{n} \sum_{i=1}^{n} g_{ij}(k) \right]$;

Where $g_{ij}(k) = g_{ij}$ if $c_i \geq k$ and $g_{ij}(k) = 0$, otherwise. Similar relationships can be established between $A$ and the deprivations among the poor. Let us denote the proportion of poor people deprived in indicator $j$ by $h_j^p$. Then, dividing both sides of the above relationship by $H$, we find:

$$A = \frac{MPI}{H} = \sum_{j=1}^{d} w_j \frac{h_j}{H} = \sum_{j=1}^{d} w_j h_j^p .$$

Breaking down poverty in this way allows an analysis of multidimensional poverty to depict clearly how different indicators contribute to poverty and how their contributions change over time. Let us denote the contribution of indicator $j$ $j$ to $M_0$ by $\phi_j$. Then, the contribution of indicator $j$ to $M_0$ is:

$$\phi_j = w_j \frac{h_j}{MPI} = w_j \frac{h_j^p}{A}$$

[7] See Foster, Greer and Thorbecke (1984) for a discussion of this property.

## 2.2. Alkire Foster methodology applied to Rwanda National MPI analysis

Rwanda's national MPI applies a set of dimensions, indicators, and cut-offs that reflect its priorities as expressed in the national plans, and that can be implemented using the EICV3 (2010/11), EICV4 (2013/14) and EICV5 (20916/17) datasets. This section describes the choice of these parameters.

### 2.2.1. Unit of identification and analysis

The unit of identification refers to the entity that is identified as poor or non-poor – usually the individual or the household. In the case of Rwanda's MPI, the unit of identification is the household: the household members' information is considered together and all household members receive the same deprivation score. This acknowledges intra-household caring and sharing – for example, educated household members reading for each other, and multiple household members being affected by someone's severe health conditions. In addition, it allows the measure to include indicators that are specific to certain age groups (like, for instance, school attendance or years of schooling).

The unit of analysis, meaning how the results are reported and analysed, is the individual. This means that, for instance, the headcount ratio is the percentage of people who are identified as poor, rather than the percentage of households that are identified as poor.

### 2.2.2. Dimensions and Indicators

Rwanda's first national Multidimensional Poverty Index (MPI) has four dimensions: Education, Housing, Public Services, and Social Services & Economic Activity. The indicator choice reflects Rwanda's context and political priorities, as well as the data available in the EICV3 (2010/11), EICV4 (2013/14) and EICV5 (2016/17) datasets. In total, 14 indicators were used in this national index, instead of the 10 used for the global measure. Two indicators are under the Education dimension (school attendance and years of schooling), four indicators are under Housing (electricity, floor material, overcrowding and source of cooking fuel); under Public Services there are three indicators (safe drinking water, improved sanitation and garbage disposal), and five indicators are under Social Services & Economic Activity (assets for

communication, bank account, health insurance, distance to health care facilities and working only in subsistence agriculture activities).

Each of the four dimensions is given an equal weight of 1/4 in the MPI. Values for the component indicators differ (see table 2.1). A person needs to be deprived in 2/5 (40%) of weighted indicators to be identified as multidimensional poor.

### 2.2.3. Deprivations weights

The weights used in this report assign 25% of the total weight to each of the four dimensions of Education, Housing, Public Services, and Social Service & Economic Activity. Within Education, the different indicators had the same weight, with school attendance and years of schooling each weighted at 1/8 (12.5%). As already mentioned, the Housing dimension includes four indicators: electricity, floor, overcrowding and cooking fuel. The first three indicators were weighted each 7.5%, and cooking fuel received a lower weight of 2.5%. The reason behind is that it is known that the source of cooking energy is still rudimentary in Rwanda (with solid fuels, such as wood, charcoal and dung, being the most common sources), and the percentage of households deprived in this indicator is very high and could affect the whole dimension if the equal weight is given. Within Public Services, the indicators of safe drinking water, sanitation and garbage disposal were weighted as 8.33% each. The dimension of Social Services & Economic Activity contains five indicators (bank account, health insurance, assets for communication, distance to health care facilities, and subsistence farming); each indicator is equally weighted, receiving a weight of 5%. Overall, the weights add up to 100%.

### 2.2.4. Cut-offs

Thresholds are used to decide whether a person is multidimensional poor, using the Alkire and Foster measurement framework. It involves the following steps: (a) a dimension-specific cutoff (deprivation cutoff) – where a person is considered deprived in each indicator if their achievement falls below the cutoff; and (b) a cross-indicator cutoff (or poverty cutoff) - where a person is considered to be poor if the weighted sum of their deprivations meets or exceeds the poverty cutoff.

For Rwanda's MPI the poverty cutoff is chosen to be at 2/5 of indicators; that is, a person who is deprived in $k \geq 40\%$ of the weighted indicators is considered multidimensional poor. In the results section, we present the poverty figures for alternative poverty lines.

**Table 1. 2: Rwanda's national MPI – Dimensions, indicators, deprivations weights, and cut-offs**

| Dimension | Indicator | Deprivation Cut-off | Indicator Weight | Dimension Weight |
|---|---|---|---|---|
| **Education** | School Attendance | At least one school-aged child (7-15 years) in the household is not attending school | 12.5% | 25% |
| | Years of Schooling | There is no household member that has completed at least 6 years of schooling | 12.5% | |
| **Housing** | Electricity | Household does not have improved electricity (not connected to electricity from EWSA or other electricity distributors, bio gas, generator, solar panel, batteries + bulb) | 7.5% | 25% |
| | Floor | Household does not have improved floor (not wooden floor, clay tiles, cement, or bricks) | 7.5% | |
| | Overcrowding | Household has more than 4 members per sleeping room | 7.5% | |
| | Cooking Fuel | Household uses non-improved cooking fuel (doesn't use gas, biogas, solar power, electricity, or oil kerosene) | 2.5% | |
| **Public Services** | Sanitation | Household does not have improved sanitation (no flush toilet or pit latrine with slab) | 8.33% | 25% |
| | Drinking Water | HH does not have access to safe drinking water (no piped water into dwelling, piped water into yard/plot, public tab/standpipe, tube well or borehole, protected well, protected spring, or rainwater, OR source of water is more than 500m in rural areas and more than 200m in urban areas) | 8.33% | |
| | Garbage Disposal | Household does not dispose of garbage in | 8.33% | |

| Dimension | Indicator | Deprivation Cut-off | Indicator Weight | Dimension Weight |
|---|---|---|---|---|
| | | publicly managed refuse area, rubbish collection service, or composting heap in own property | | |
| **Social Services & Economic Activity** | Bank Account | No household member has a bank account | 5.0% | 25% |
| | Health Insurance | There is at least one household member with no health insurance | 5.0% | |
| | Assets for Communication | Household does not own any of the following assets: radio, TV, any type of phone (fixed or mobile), computer | 5.0% | |
| | Distance to Health Care Facilities | Household lives more than 3km away from a health center or hospital | 5.0% | |
| | Subsistence Farming | Household is only engaged in agricultural work | 5.0% | |

Source: Elaborated by NISR after consultation with stakeholders, partners and OPHI (November 2016)

## Description of data (EICV3, EICV4, and EICV5)

The data used in this report to compute Rwanda's national poverty measure are from the "Enquête Integrale sur les Conditions de vie de Ménages" (EICV) or Integrated Household Living Conditions Survey. Till now, 5 series of this survey were conducted, EICV1, EICV2, EICV3, EICV4 and EICV5 for the years 2000/01, 2004/05, 2010/11, 2013/14 and 2016/17, respectively.

The EICV analysis initiated in 2000/01 was designed to measure poverty based on the aggregate consumption items in Rwanda. Since 2000, EICV has been conducted every five year until 2010 and from 2010 onwards it started to be conducted every three years whereby its latest wave is 2016/17. The sample of households is usually divided into 10 equally sized cycles and distributed across the country to minimize climatic and regional variation over the period of fieldwork. Interviewers visit households on several occasions over each cycle in order to aid household's recall of all their consumption items.

The EICV has been the main source of information to monitor poverty and living conditions in the country, to evaluate the achievements of the successive national poverty reduction strategies as well as

to track the MDGs and now the SDGs in the Rwanda. EICV includes questions on main sources of income and household's consumption, demographic characteristics, education, health, employment, household assets, household amenities, water supply and sanitation. The survey also has the advantage for being representative at the provincial, and at district level since the EICV4, which allows for greater regional disaggregation and comparisons in the MPI.

The survey methodology has changed little over its 10 years, making it ideal for monitoring changes in the country. In fact, in 2013/14, for the first time the achieved sample size of 14,308 households in the EICV4 was sufficient to provide estimates which are reliable at the level of the district.

The EICV4 survey, conducted over a period of 12 months between October 2013 and October 2014, is the most complex survey since the series started. The survey had three components. In addition to the cross-sectional sample, analyzed in this report, the EICV4 included a panel survey methodology for the first time, using a subsample of EICV3 households. At the same time as the EICV4 cross-sectional and panel surveys were being carried out, the NISR conducted an independent survey of individuals and households sampled from the VUP (Vision 2020 Umurenge) list of beneficiaries using the same EICV4 questionnaire and field methodology. The VUP sample is analysed in the thematic report on Social Protection.

For the cross-sectional analysis, a new sample of 12,312 households was drawn using the fourth Rwanda Population and Housing Census (RPHC4) as a sampling frame for enumeration areas as primary sampling units. Households and household members interviewed as part of the panel survey that remained in the same village as in EICV3 are also included in the cross-sectional sample, bringing the total number of households analysed was 14,419.

The EICV5 survey conducted between October 2016 and October 2017, uses the same sample frame and procedures and had the same components as for the EICV4, where the total number of households analysed was 14,580.

As the EICV surveys have economic and social variables, they are appropriate for the MPI measurement using social indicators and to develop the overlaps of Multidimensional Poverty with Monetary Poverty in Rwanda.

**Table 2. 1: What to consider about Rwanda National MPI**

| | |
|---|---|
| **Title** | Non-monetary poverty report:<br>Evidence from Multidimensional Poverty Analysis between 2010/11 and 2016/17 |
| **Institution** | National Institute of Statistics of Rwanda (NISR) |
| **Dataset** | EICV3, EICV4 and EICV5 datasets |
| **Decomposition** | Decomposition by Indicators |
| | Decomposition by Urban/Rural areas |
| | Decomposition by Province |
| | Decomposition by Wealth quintile |
| **Years** | 2010/11, 2013/14, 2015/16 |
| **Implementers** | NISR |
| | OPHI |

Source: Elaborated by NISR

# Chapter 3: Main findings

This chapter provides the main results of the Rwanda Multidimensional Index (MPI) using EICV3 (2010/11), EICV4 (2013/14) and EICV5 (2016/17), as well as its partial indices; the incidence of poverty or the proportion of people identified as multidimensional poor (H), the intensity of poverty or the average proportion of weighted indicators in which the poor are deprived in (A) and the overlaps of Multidimensional Poverty with Monetary Poverty in Rwanda. In addition, this chapter presents also disaggregated results by area of residence and by province and by quintile.

## 3.1. Rwanda uncensored and censored headcount ratios

### Uncensored headcount ratios for each indicator

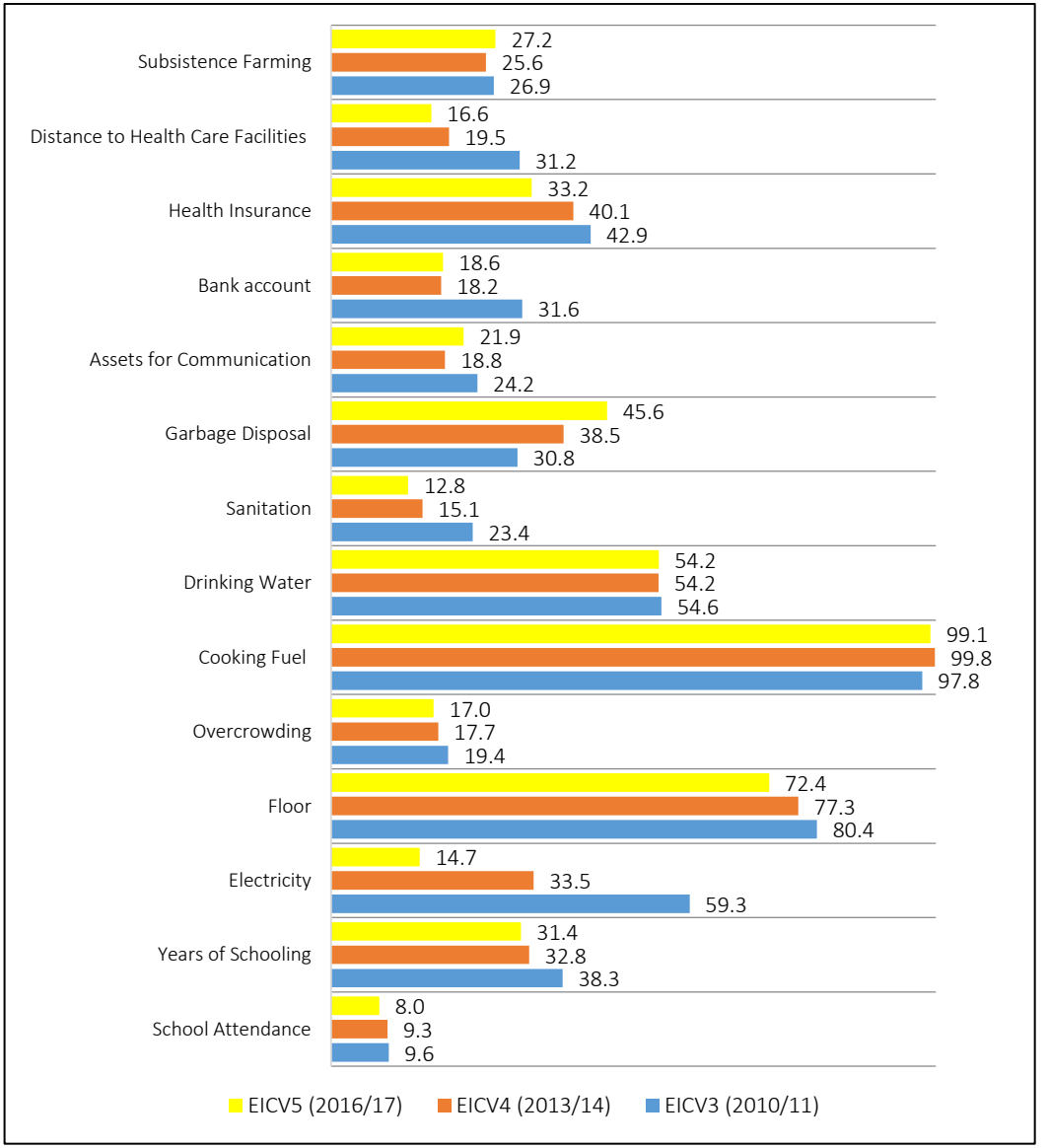
The uncensored headcount ratio of each indicator represents the proportion of people who are deprived in that particular indicator, irrespective of their poverty status. Figure 3.1 presents these rates using the EICV3, EICV4 and EICV5 results, and allows identifying main pockets of deprivation. As can be seen in Figure 3.1, in 2016/17, the highest deprivations are for cooking fuel, with 99.1% of the population being deprived in this indicator, followed by the housing floor materials (72.4%) and drinking water (54.2%). These are the indicators in which over 50% of Rwandan people are deprived in.

On the other hand, some indicators show lower rates of deprivation. In particular, the uncensored headcount ratios are the lowest for school attendance (8.0%), sanitation (12.8%), electricity (14.7%), distance to health facilities (16.6%), and overcrowding (17.0). Regarding the education dimension, successful implementation of education policies like free education at primary and secondary, food for schooling program are among the major interventions geared towards increasing the participation of disadvantaged groups in education.

When observing the uncensored headcount ratios over time, it is clear that from 2010/2011 to 2016/17, there is a decreasing trend in 10 out of the 14 indicators. Those showing the largest reductions are access to electricity (reduced by 44.6% points from EICV3 to EICV5) followed by distance to health care facilities

(14.6% points of decrease), bank account (13% points of decrease), sanitation (10.6% points of decrease), and years of schooling (6.9% points of decrease). In turn, from 2010/11 to 2016/17, the proportion of people deprived in garbage disposal increased by 7.7% points, those deprived in assets for communication increased by 3.1% from EICV4 to EICV5. Subsistence farming increased by 1.6% from EICV4 to EICV5, while drinking water remained unchanged between 2013/14 and 2016/17.

**Figure 3. 1: Uncensored headcounts ratios 2010/11 to 2016/17, proportion of people deprived in each indicator**




Source: Data from EICV3, EICV4 and EICV5

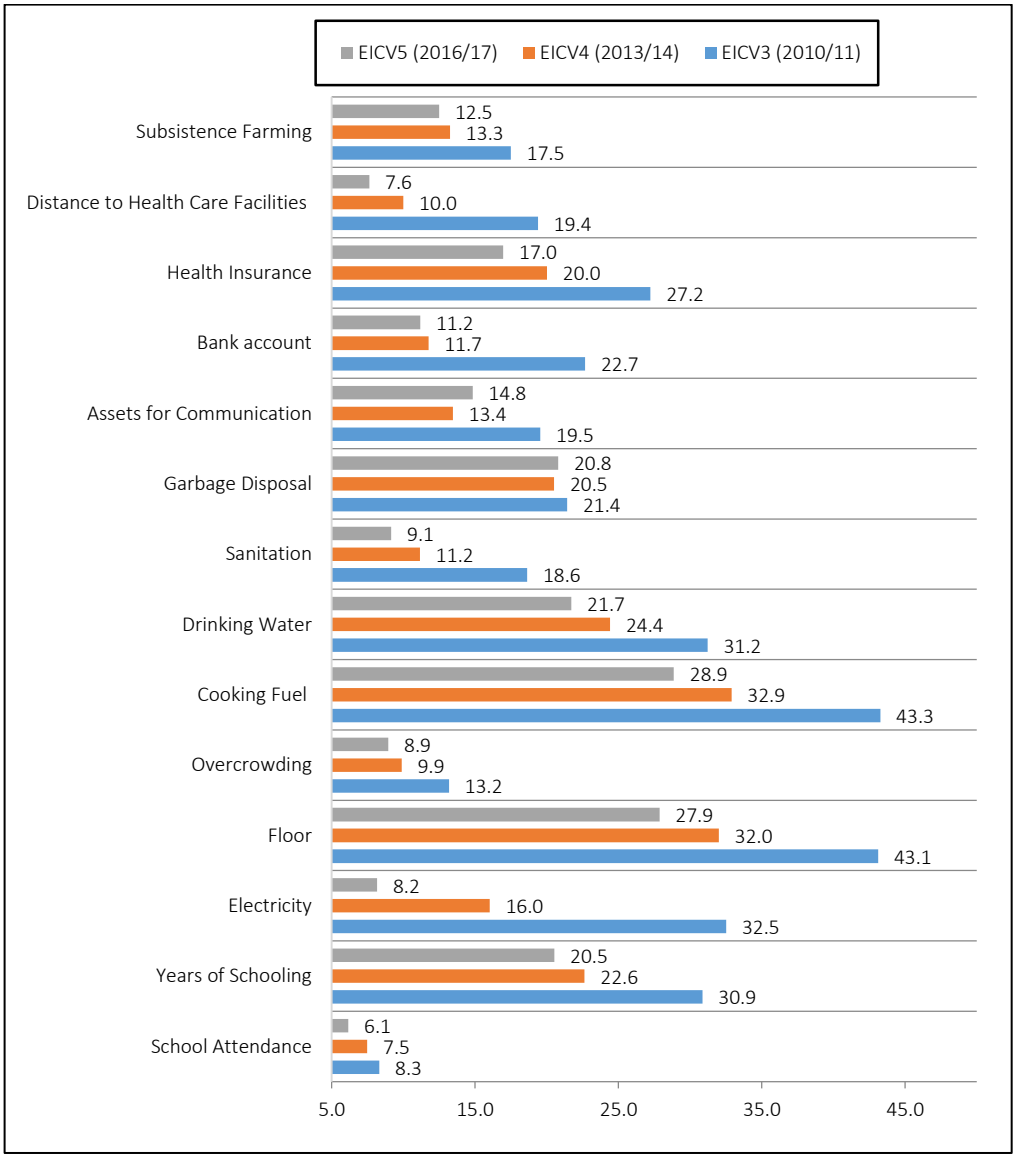
**Censored headcount ratios for each indicator at national level, urban/rural, province, and quintile**

In order to show the deprivations that create the poverty and to orient the decision makers as well as the development actors on how they can reduce the poverty, the MPI was broken down by indicator to examine its composition (Figure 3.2). The censored headcount ratio of an indicator represents the proportion of the population that is multidimensional poor and also deprived in that indicator.

Rwanda made improvement in 12 out of 14 Indicators from 2010/11 to 2016/17 in terms of censored headcount ratios. In 2016/17, the largest censored headcount ratio can be found for the indicator of cooking fuel, where 29% of the population is multidimensional poor and deprived in cooking fuel (they live in households that cook with non-improved cooking fuel like wood or dung), followed by the deprivation in flooring materials (27.9%). Inversely, the lowest deprivation was observed for school attendance with 6% of poor people being deprived in this indicator in 2016/17 followed by the deprivation in Distance to health care facilities (7.6).

Apart from garbage disposal that doesn't show any shift, it is important to notice that for any indicator considered, this situation has improved from 2010/11 to 2016/17, electricity, floor, cooking fuel, sanitation, health insurance and Distance to health care facilities being the indicators that have improved the most (all with reductions above 10 percentage points from 2010/11).

**Figure 3. 2: Censored Headcount Ratios at indicators level ($k$ = 40%) or proportion of people who are MPI poor and deprived in each indicator**




Source: Data from EICV3, EICV4 and EICV5

By area of residence, it is observed that, in 2016/17, for any indicator considered, the rural area is more deprived than urban area and this situation is also true for the two previous periods (2013/14 and 2010/11). The difference in deprivation by indicator between urban and rural is high for floor, cooking fuel, years of schooling, drinking water, garbage disposal and assets for communication. However the deprivation for all indicators decreases over time in both urban and rural areas from 2010/11 to 2016/17. Years of schooling is the deprivation that shows the highest decrease in both urban and rural, where the difference of censored headcount ratio between urban and rural was 23% in 2010/11, 16% in 2013/14 and 14% in 2016/17.

## 3.2. Incidence of multidimensional poverty over time (H)

This section shows the Rwanda Incidence of multidimensional poverty or the proportion of people identified as multidimensional poor (H), using EICV3 (2010/11), EICV4 (2013/14), and EICV5 (2016/17)). As said earlier, a person needs to be deprived in 2/5 (40%) of weighted indicators to be identified as multidimensional poor.

### 3.2.1. Incidence of Multidimensional Poverty at national, urban/rural, province

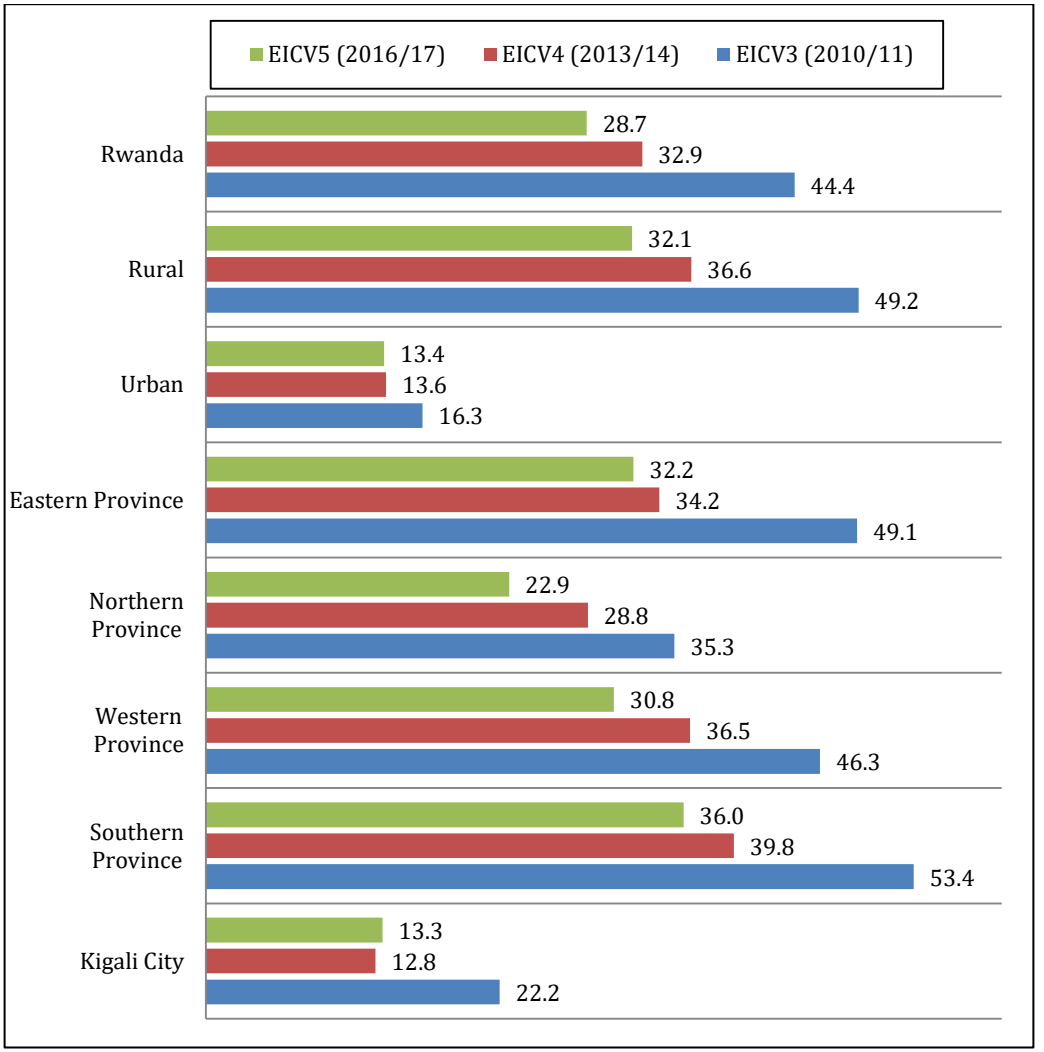
As indicated in figure 3.3, the incidence of multidimensional poverty dropped from 44.4% in 2010/11 to 29% in 2016/17, yielding a decrease of 15 percentages points between two extreme periods (2010/11-2016/17).

It appears however that, despite poverty disparities between urban and rural areas, the highest drop of multidimensional poor people is more significant in rural areas (17.1% points, from 49.2% in EICV3 to 32.1% in EICV5) compared to urban areas (2.9 points from 16.3% in EICV3 to 13.4% in EICV5). The overall decreasing trend of multidimensional poor people in rural areas might be a result of various rural development policies (crop intensification and land use consolidation programs). The above rural development and social protection strategies, increase economic opportunities for the rural poor, raise their income and thus, reduce their vulnerability.

At province level, and for all three rounds (EICV3, EICV4 and EICV5), the least incidence of poverty is observed in City of Kigali and the highest deprived is Southern province. However, the incidence of poverty seems to decrease overtime across all provinces except the City of Kigali, where one can observe an increase of 0.5% from 2013/14 to 2016/17 (Figure 3.3). This can be attributed to the internal migration effect, where young employed people, qualified or not come in Kigali to search for job or to create informal jobs, that could not (for many cases) bring the improvement of their life condition. This is a tentative of explanation; however a deep analysis is needed.

In general one can observe that the reduction of poverty was higher between 2010/11 and 2013/14 than between 2013/14 and 2016/17, for this it is important to analyse the sustainability of the programs initiated during the EDPRS1&2 (Girinka, VUP umurenge, Akarima k'igikoni).

**Figure 3. 3: Incidence of Multidimensional Poverty at national, urban/rural and province**

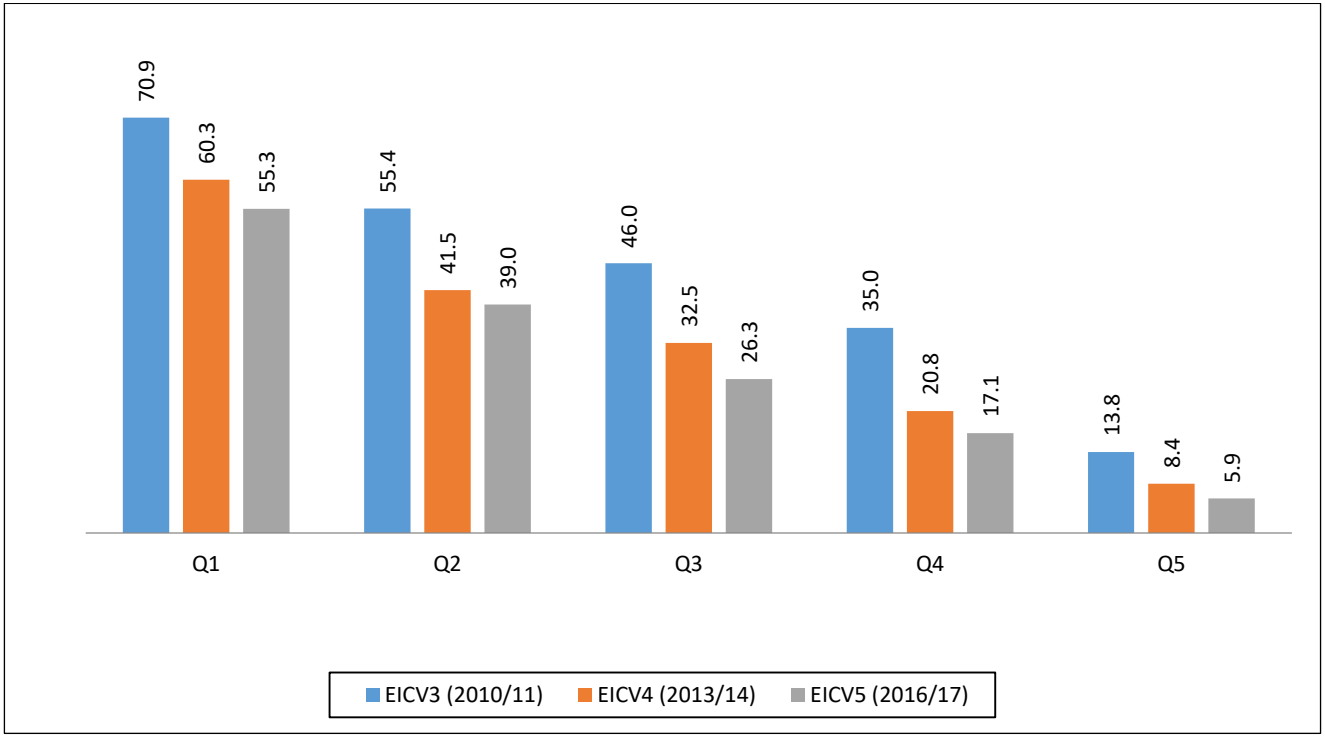



Source: Data from EICV3, EICV4 and EICV5

### 3.2.2. Incidence of Multidimensional Poverty by quintile

In addition, poverty is inversely proportional to wealth quintiles (figure 3.4). As clarified by the findings, in 2016/17, the highest proportion of multidimensional poor people (55.3%) are found in the lowest wealth quintiles (Q1) while only 5.9% of multidimensional poor people is found in the highest quintiles (Q5). This means that in 2016/17, the incidence of poverty is 9 times higher in the poorest than in richest people. It is also observed that the percentage of multidimensional poor people has declined over time in all wealth quintiles. At the lowest wealth quintile, the incidence of poverty reduced by 15.6% (from 70.9% in 2010/11 to 55.3% in 2016/17), and 7.9% drop is marked among richest population (from 13.8% in 2010/11 to 5.9% in 2016/17). Interestingly enough, the incidence of poverty dropped around 2 times higher in the poorest population (Q1) than in Richest (Q5).

**Figure 3. 4: Incidence of multidimensional poverty by Quintile (k = 40%)/Proportion of MPI Poor people by quintiles**




Source: Data from EICV3, EICV4 and EICV5

## 3.3. Intensity of people's poverty (A)

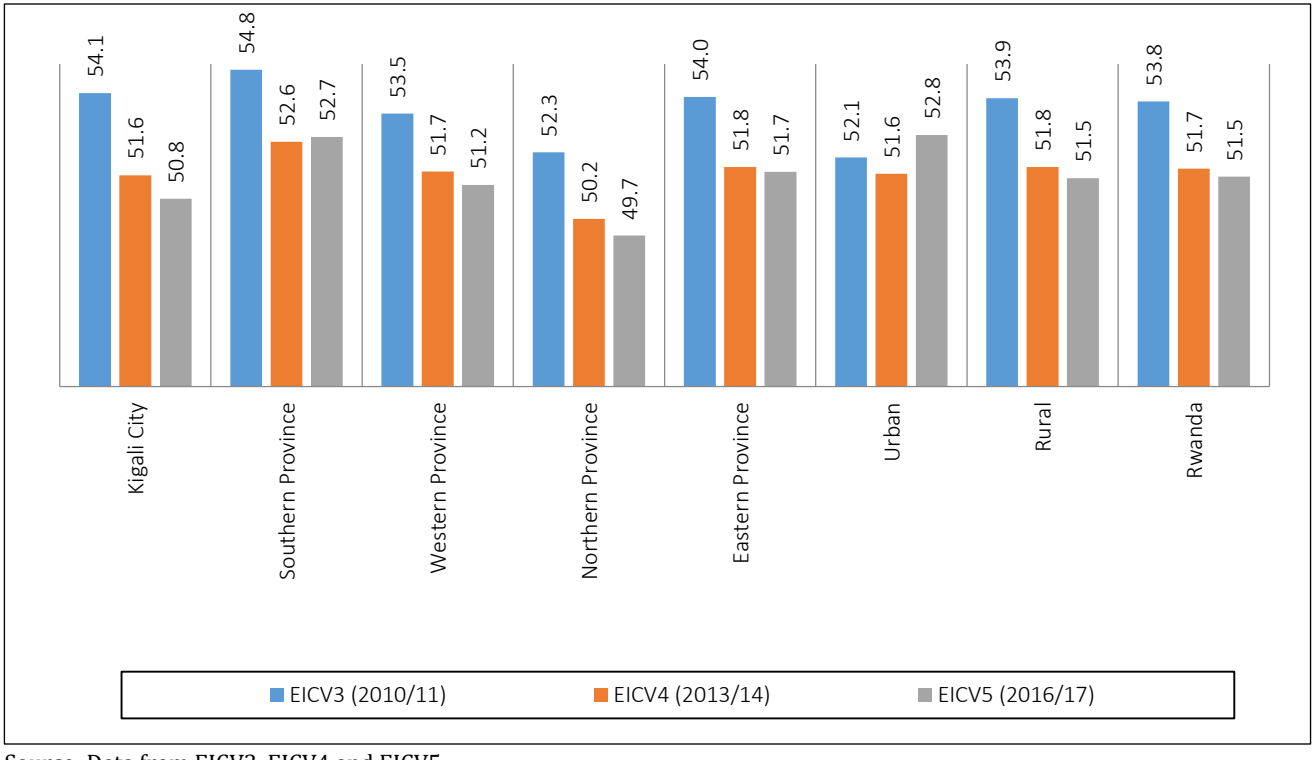
This part of the report describes the intensity of poverty, which reflects the share of deprivations each poor person experiences on average, at national and decentralized levels. It also shows the intensity gradient among the poor over time.

### 3.3.1. Intensity of poverty at national, urban/rural and province

When considering the intensity of poverty in Rwanda, it appears that each poor person is, on average, deprived in more than half of the weighted indicators, and this situation shows slight variation over time and at the national level, urban-rural and in all provinces (figure 3.5). At the national level, the intensity of poverty shows a slight improvement from 53.8% in 2010/11 to 51.5% in 2016/17.

About 84.3% of Rwanda population is concentrated in rural area in 2016/17 (see annex table B 5), but the intensity of poverty shows a very slight difference between rural and urban areas. The intensity decreased slightly in rural areas from 53.9% in 2010/11 to 51.5% in 2016/17, a difference of 2.4% between the two extreme periods. In urban area we observe also a slight decrease of 1.3% of intensity from 2010/11 and 2013/14, while there is an increase of 1.2% of intensity from 2014/13 to 2016/17.

**Figure 3. 5: Intensity of poverty at national level, urban/rural and province**




Source: Data from EICV3, EICV4 and EICV5

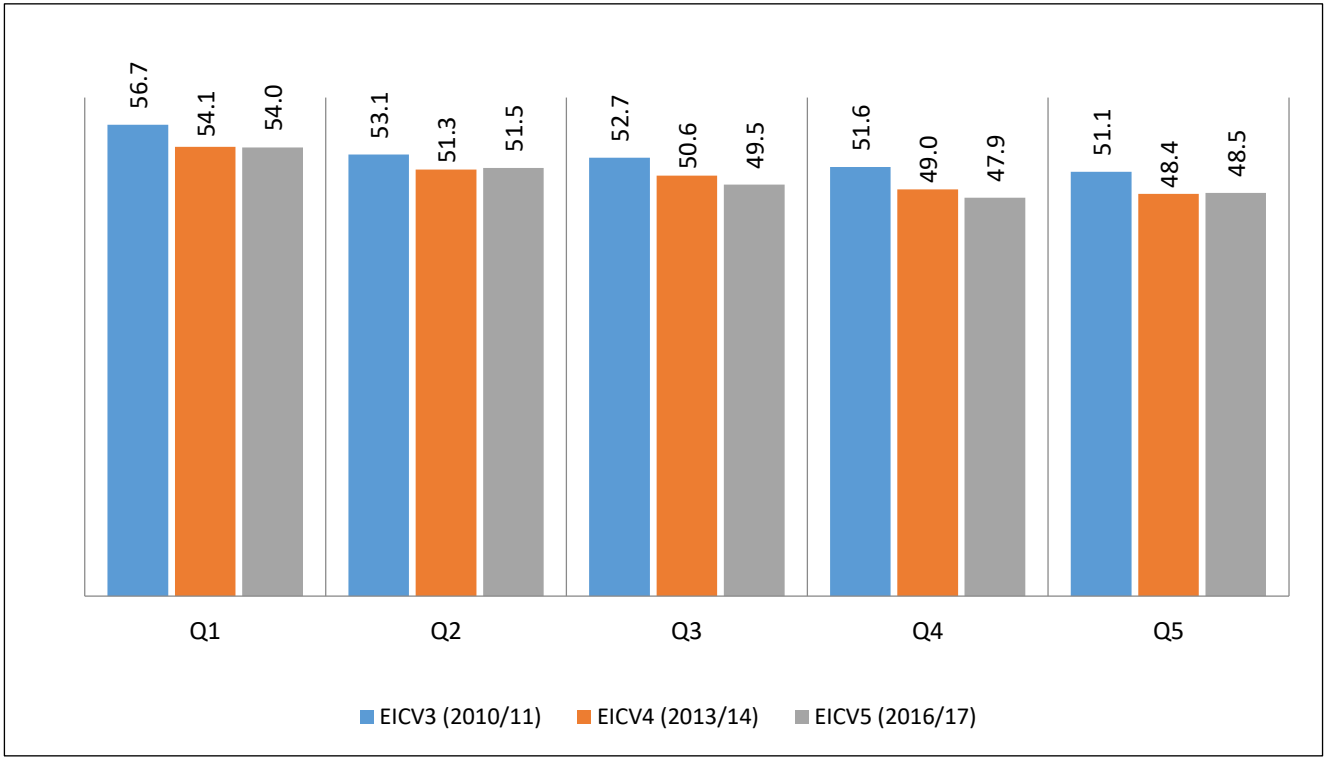
For any of the three periods considered, the Northern Province has the lowest intensity of poverty, while the South Province has the highest one (figure 3. 5). City of Kigali is therefore being overtaken by the Northern Province in this aspect of reducing the intensity of poverty. Perhaps this may be due to the fact that City of Kigali concentrates the population coming from different parts of the country (the job seekers and poor people with aspirations of exercising small economic activities). Though the intensity of poverty

is still very high (over 50%) in 4 provinces across all surveys, it is interesting that the intensity is gradually decreasing from EICV3 (2010/11) to EICV5 (2016/17).

### 3.3.2. Intensity of poverty by quintile

Figure 3.6 further indicates that, in 2016/17, the intensity of poverty (the share of deprivations each poor person experiences on average) decreases as wealth quintiles increase. The intensity of poverty seems to be the highest (54.1%) in the lowest wealth quintiles (Q1) and only 48.5% as the average shares of deprivations each poor person experiences is found in the highest quintiles (Q5). Also the intensity of poverty decreased from EICV3-EICV5 in all wealth quintiles. At the lowest wealth quintile, the intensity of poverty reduced slightly by 2.7% (from 56.7% in 2010/11 to 54.0% in 2016/17), and drop was the same (2.6%) among the richest population (from 51.1% in 2010/11 to 48.5% in 2016/17). When observing each wealth quintiles over time, it appears that the decrease of intensity is to some extent high between 2010/11 and 2013/14 than between 2013/14 and 2016/17 where the pattern is almost the same between the two last periods.

**Figure 3. 6: Intensity of poverty by Quintile (K-value)=40%)**




Source: Data from EICV3, EICV4 and EICV5

### 3.3.3. Intensity gradient among the poor over time

Figure 3.7, figure 3.8 and figure 3.9 depict the distribution of the intensity of poverty among the poor in 2010/11, 2013/14 and 2016/17 respectively. In 2010/11, 17.4% of all poor people in Rwanda experienced deprivations in the lowest intensity band (40% - 49.99%). In 2013/14 and 2016/17, there

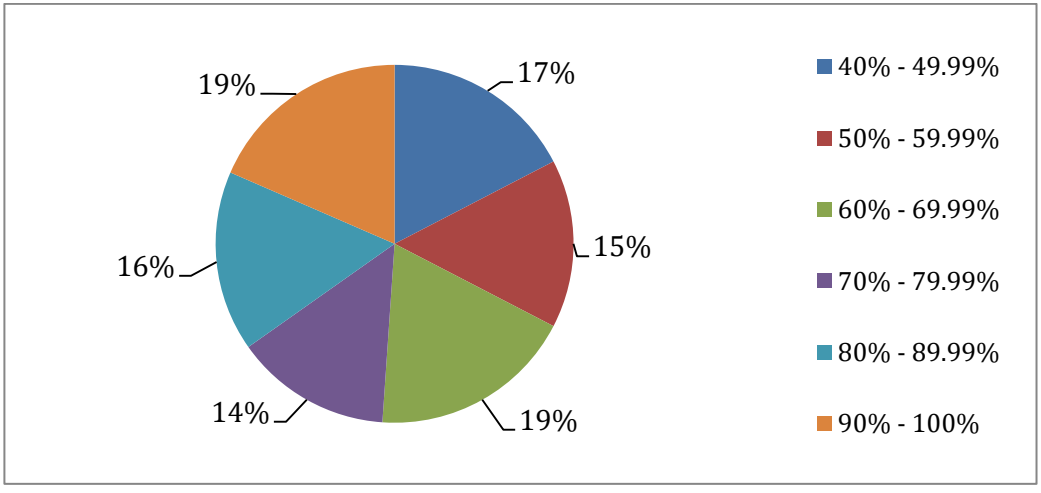
was a decline where 13.8% and 10.2% respectively of all poor people in Rwanda experienced deprivations in the lowest intensity band . Also, 18.5% of the Rwandan poor were deprived in 90% or more of the weighted indicators in 2010/11, where this proportion increased to 20.7% of the poor by 2013/14 and to 21.9% in 2016/17. This implies that, even if Rwanda has been able to raise a significant proportion of people out of multidimensional poverty, those that remain living in poor conditions still experience a high proportion of average deprivations – that is, there are more intensely poor.

**Table 3 1: Percentage distribution of poor people by intensity gradient**

| Intensity gradient | EICV3 (2010/11) % | EICV4 (2013/14) % | EICV5 (2016/17) % |
|---|---|---|---|
| 40% - 49.99% | 17.4 | 13.8 | 10.2 |
| 50% - 59.99% | 15.2 | 17.2 | 13.5 |
| 60% - 69.99% | 18.5 | 13.8 | 15.1 |
| 70% - 79.99% | 14.1 | 16.1 | 17.6 |
| 80% - 89.99% | 16.3 | 18.4 | 21.7 |
| 90% - 100% | 18.5 | 20.7 | 21.9 |
| Total | 100.0 | 100.0 | 100.0 |

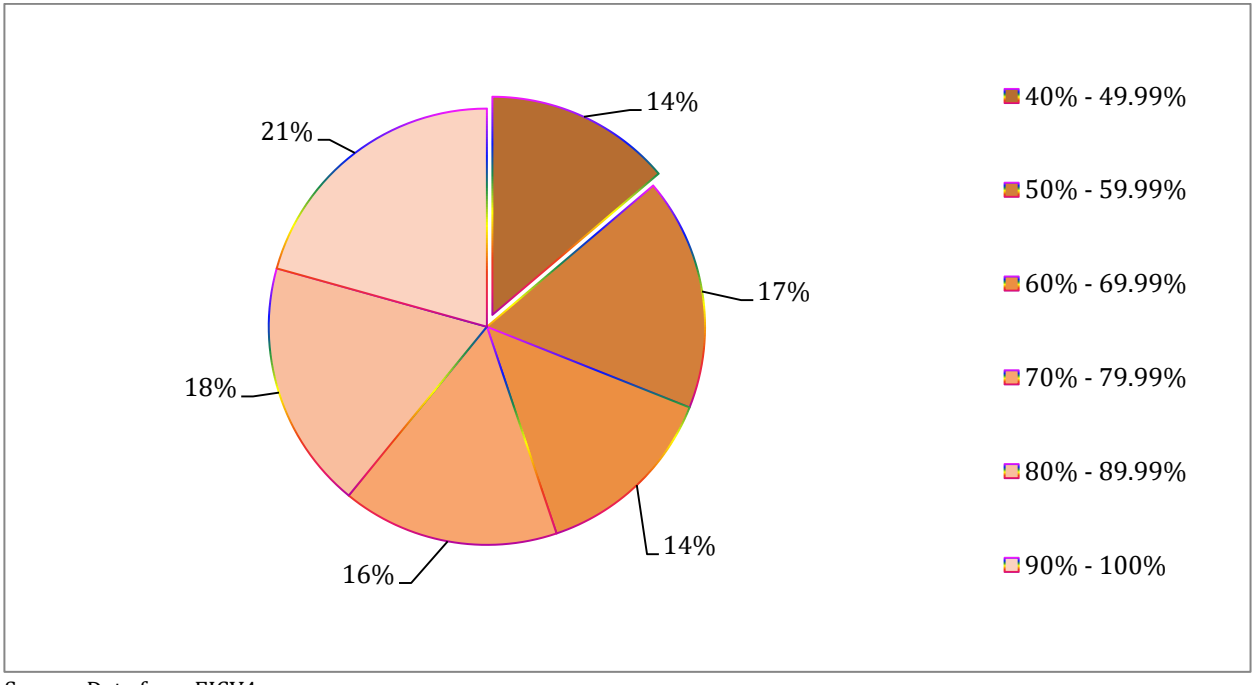
Source: Data from EICV3, EICV4 and EICV5

**Figure 3. 7: Intensity Gradient among the Poor, 2010/11 (EICV3)**



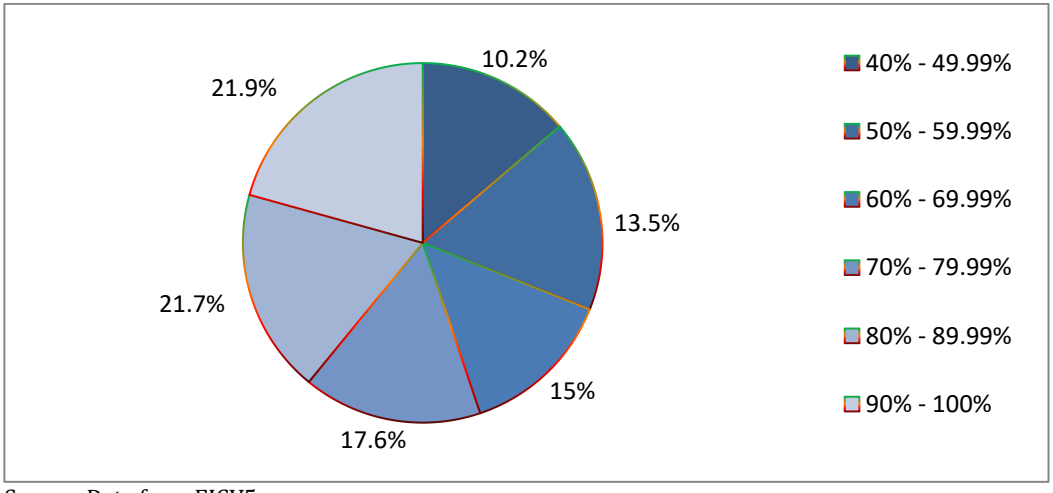

Source: Data from EICV3

**Figure 3. 8: Intensity Gradient among the Poor, 2013/14 (EICV4)**




Source: Data from EICV4

**Figure 3. 9: Intensity Gradient among the Poor, 2016/17 (EICV5)**




Source: Data from EICV5

## 3.4. Multidimensional Poverty Index (MPI)

The MPI, is the product of H and A and the MPI is the preferred statistic of poverty used to declare whether poverty has fallen or risen over time, because it takes into account progress at two levels – H and A. There are situations in which only one statistic goes down over time and not the other – but both are important. If we used only the headcount ratio, for example, we might have a rise in poverty some year, whereas if we used MPI the fuller picture would see a fall.

### 3.4.1. MPI poverty Index at national, urban/rural and province

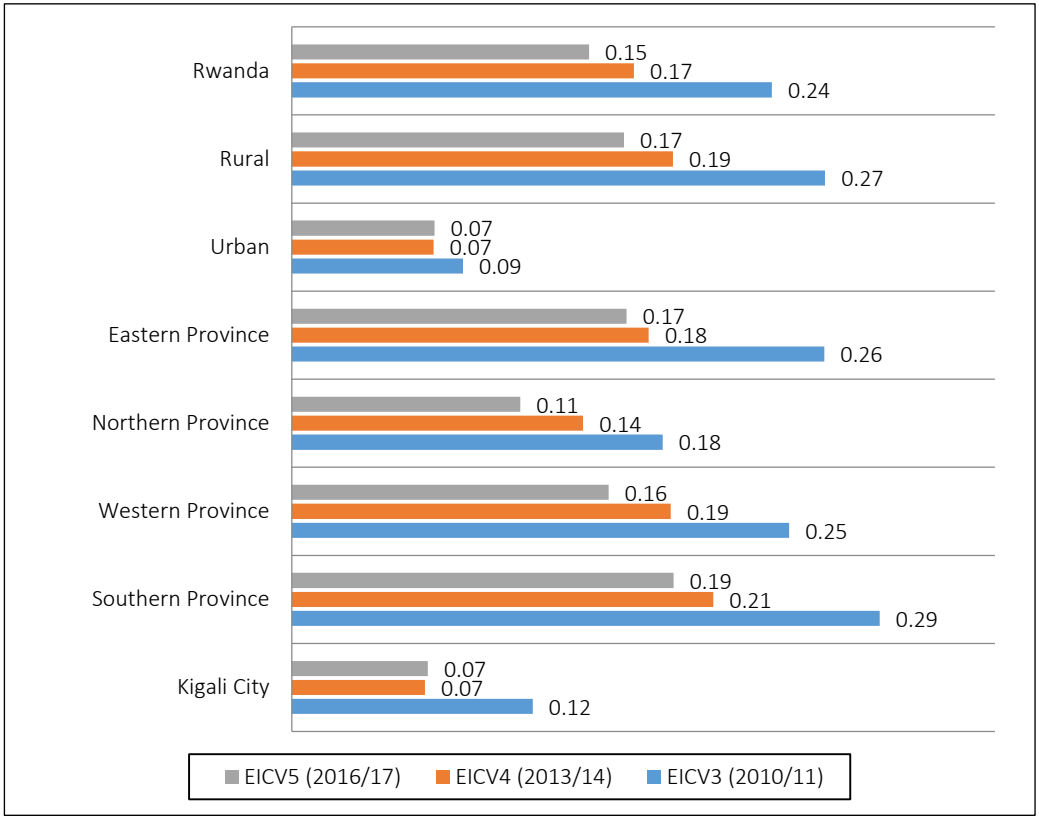
At national level, the MPI reduced from 0.239 in 2010/11 to 0.148 in 2016/17 (figure 3.10). This means that in 2016/17, multidimensional poor people in Rwanda experienced 15% of the total deprivations

that would be experienced if all people were deprived in all indicators compared to 24% in 2010/11, yielding a drop of 9% of MPI from 2010/11 to 2016/17.

The MPI seems to be very high in rural than in urban areas. In spite of such disparities between urban-rural, the MPI seems to be enormously decreasing in rural areas from 0.27 in 2010/11 to 0.17 in 2016/17 compared to urban areas that only reduced from 0.09 in 2010 to 0.07 in 2014, and remained practically unchanged from 2013/14 to 2016/17.

By provincial levels, the MPI seems to be highest in Southern Province (0.29) and lowest in City of Kigali (0.07) in EICV5, and this is true during the three periods under study. However, the MPI has been reducing over time from EICV3 to EICV5 in four provinces except for City of Kigali where the sharp decrease was marked from EICV3 to EICV4 and remains unchanged from EICV4 to EICV5. Thus as the baseline for Sustainable Development Goal 1 (No poverty), the target is to end poverty in all its forms in the next 15 years.

**Figure 3. 10: Multidimensional Poverty Index at national, urban/rural and province**




Source: Data from EICV3, EICV4 and EICV5

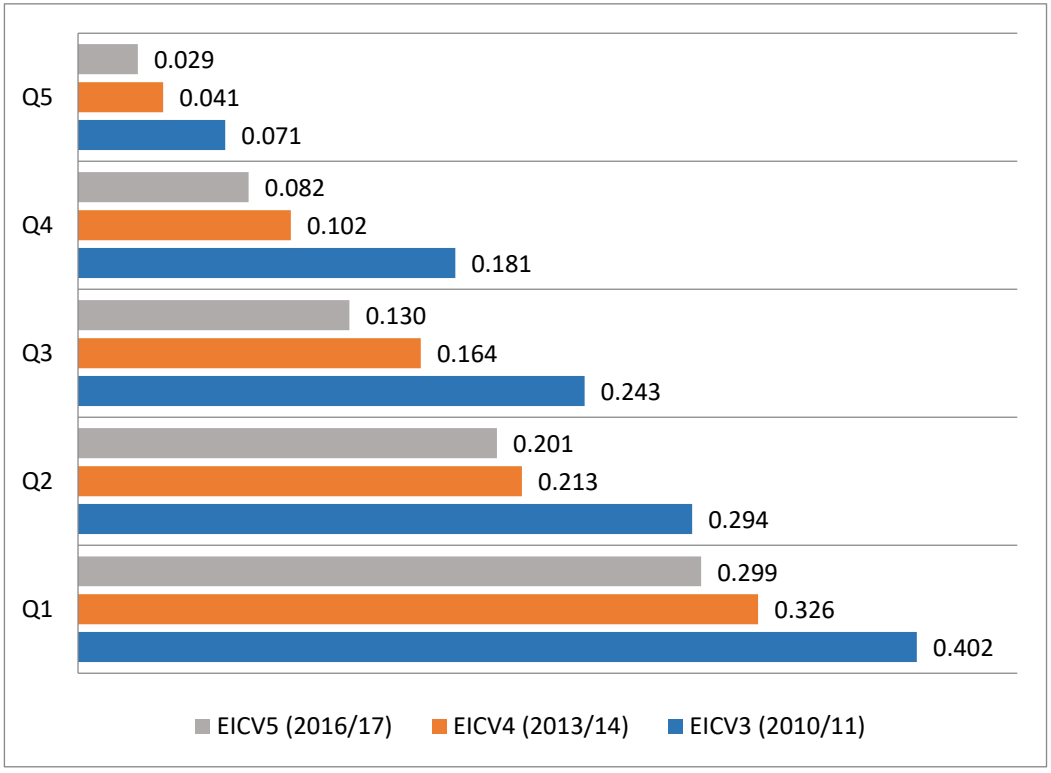
### 3.4.2. Multidimensional Poverty Index by quintile

The MPI decreases with the increase of the wealth quintile and this for all periods. The difference in MPI is remarkably high between the lowest wealth quintile and the second one for all three periods of analysis but it is also especially large between the fourth and the fifth wealth quintile in 2010/11. Between the lowest wealth quintile and the second wealth quintile, the difference in MPI is of 0.108 in 2010/11, 0.113 in 2013/14 and 0.098 in 2016/17. Between the fourth wealth quintile and the highest wealth quintile, the difference in MPI is of 0.110 in 2010/11, 0.061 in 2013/14 and 0.053 in 2016/17.

Considering each wealth quintile apart, we observe a decreasing of MPI over time: it is 0.420 in 2010/11, 0.326 in 2013/14 and 0.299 in 2016/17 for the lowest wealth quintile and 0.071 in 2010/11, 0.041 in 2013/14 and 0.029 in 2016/17 for the highest wealth quintile.

Figure 3.11 further clarifies that MPI reduces with increasing wealth quintiles. In 2016/17, the MPI is 10 times higher among the poorest population than in the richest, but what is interesting is that among the poorest population, the MPI has highly dropped by 10.3% points (from 0.402 in 2010/11 to 0.299 in 2016/17) and only 4.2% drop (from 0.071 in 2010/11 to 0.029 in 2016/17) was marked among the richest population. The decreasing trend is also observed among all wealth quintiles.

**Figure 3. 11: MPI by Quintile (*k* –value = 40%)/ Multi-dimensional Poverty Index by quintile**




Source: Data from EICV3, EICV4 and EICV5

### 3.4.3. Contribution of each indicator to the MPI at national, urban/rural and province

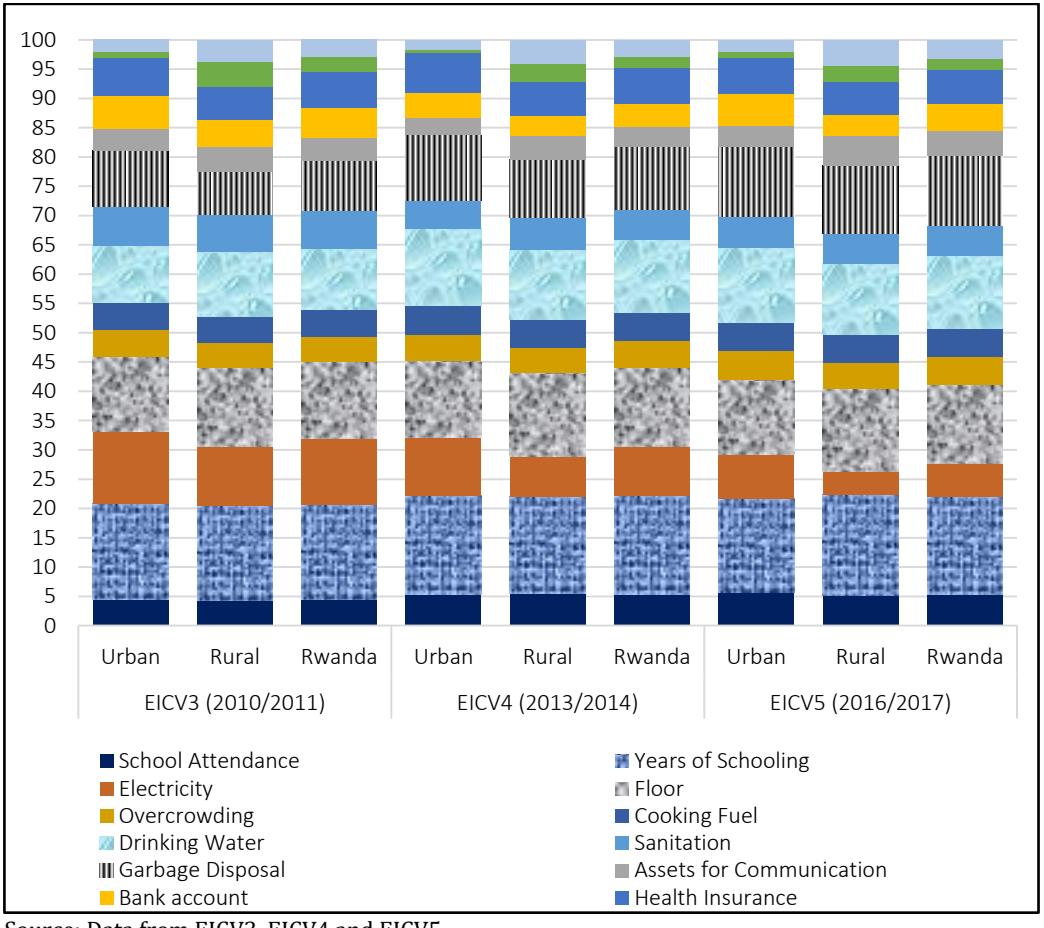
For a more in-depth view on multidimensional poverty, it is useful to see the percentage contribution of each of the 14 indicators to overall multidimensional poverty not only at national level but also at both rural and urban areas of Rwanda, as well as at province level.

In figure 3.12, the weighted percentage contribution of each indicator is depicted to show the composition of multidimensional poverty at the national level, for 2010/11, 2013/14 and 2016/17. The figure shows also that for any period considered, the years of schooling indicator within Education dimension, the floor within the housing dimension and the drinking water indicator and the garbage disposal both within Public services dimension contribute the most to poverty. It can be noticed that at national level, the proportion of contribution of these indicators increases over times, between 2010/11 and 2016/17; from 16.3% to 16.7% for the years of schooling indicator, 13.2% to 13.4% for the floor indicator and 10.3% to 12.5% for the drinking water indicator (table B.7, annex). Inversely, the electricity that contributed at 11.2% to the MPI in 2010/11, its contribution reduced to reach only 5.6% to MPI.

The garbage disposal contributes 11.8% to the MPI in 2016/17 while its contribution was only 8.4% in 2010/11. It can be also observed that those within Social Services & Economic Activity are the ones contributing the least to the MPI.

Since the Alkire Foster method allows for sub-group decomposability and dimensional breakdown, it is possible to explore the dimensional composition of the MPI not only at the national level but also at urban/rural areas. Figure 3.12 presents a depiction of the percentage contribution by rural/urban areas, for 2010/11, 2013/14 and 2016/17. In urban and rural areas, the indicators that most contribute to poverty are the same as at national level, but the proportion of deprivation in years of schooling, flooring materials and safe drinking water are to some extent higher in rural than in urban area. Years of schooling, floor, drinking water and garbage disposal are the indicators that contribute the most in Rwanda and urban-rural areas.

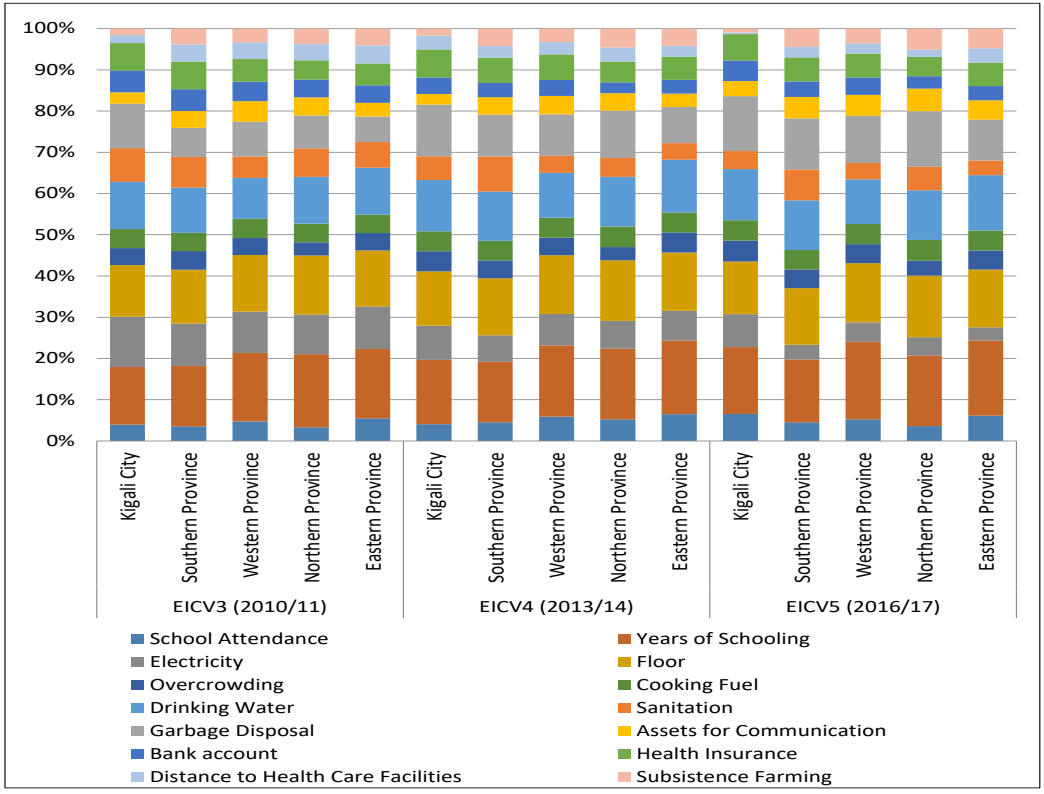
**Figure 3. 12: Percentage contribution of each indicator to the MPI at national and urban/rural**




Source: Data from EICV3, EICV4 and EICV5

At province level, in 2016/17, the years of schooling is also the indicator that contributes most to the MPI in all provinces where the proportion of contribution varies from 18.8% in Western Province to 15.3% in Southern Province (Figure 3.13) Therefore, years of schooling, floor, drinking water, and garbage disposal are the indicators that contribute the most in MPI at the national level, urban-rural and at province level (table B.8).

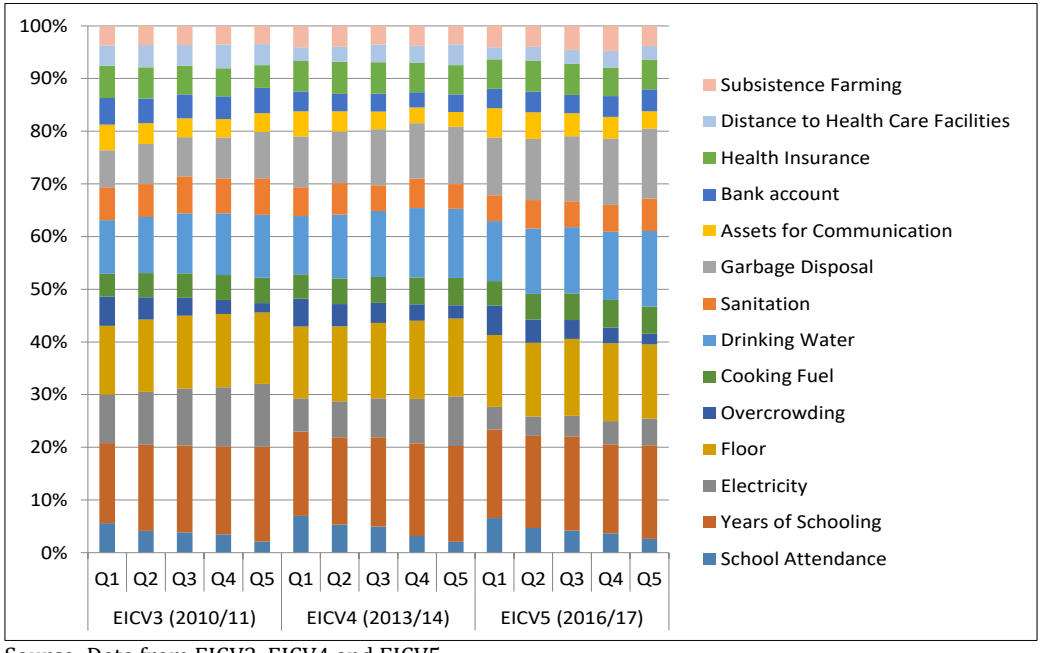
**Figure 3. 13: Percentage contribution of each indicator to the MPI at province level**




Source: Data from EICV3, EICV4 and EICV5

Figure 3.14 further indicates that years of schooling, the floor, the drinking water and the garbage disposal still are the most indicators that contribute to MPI for any wealth quintile considered.

**Figure 3. 14: Percentage contribution of each indicator to the MPI by quintile**




Source: Data from EICV3, EICV4 and EICV5

## 3.5. Incidence, intensity and multidimensional poverty index by different K-values

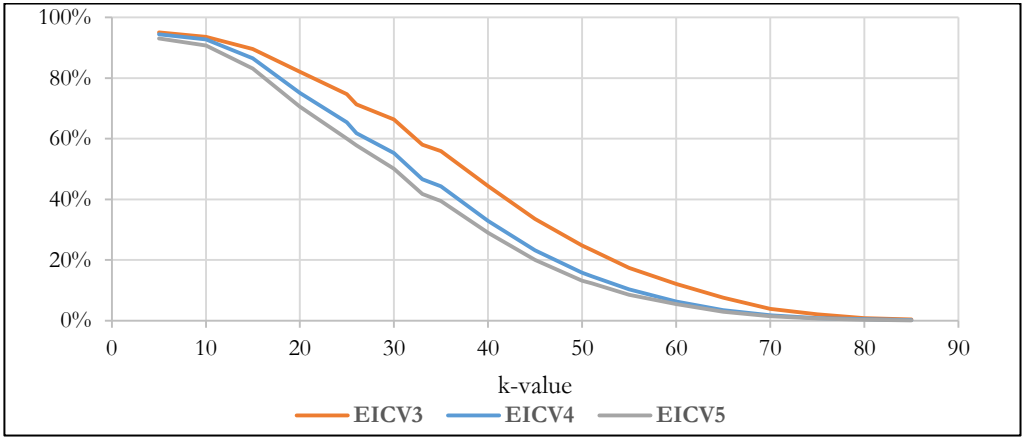
The results presented above are based on the K-value of 40%, meaning that people were considered as poor when they were deprived in 40% of indicators.

Figure 3.15 and Figure 3.16 illustrate the level of incidence, intensity and multidimensional poverty (H, A, and MPI) for various levels of the poverty cut-offs. This part of the report shows the proportion of people who are multidimensional poor at different K-values, from K-value 5 to K-value 100. Figure 3.15 shows

that k-value and the incidence of poverty are inversely proportional (i.e; the higher the k-value the less the incidence of poverty, and vice versa).

For Rwanda, in 2016/17, when the K-value is 5%, a very high proportion of the population (95%) is multidimensional poor in EICV3, EICV4 and EICV5; and as this cut-off (k-value) is raised to 20%, the proportion of multidimensional poor people in Rwanda reduces to 70.6%. At 33% of K-values, a cut-off used at international level, Rwanda incidence of poverty reduced to around 42% in EICV5 from 47% in EICV4 and 58% in EICV3. At 40% cut-off value, used in this MPI Rwanda report, the incidence of poverty is 29% in EICV5, from 44% in EICV3. When k is larger than 80%, poverty is practically zero, implying that, at this cut-off (80%), no one is multidimensional poor and none is deprived in more than 80% of the weighted indicators. Thus, between the interval of 20% and 55% k-values, a high improvement of the living condition is noted from EICV3 (2010/11) to EICV4 (2013/14), while in the same interval, there was slight improvement between EICV4 (2013/14) and EICV5 (2016/17).

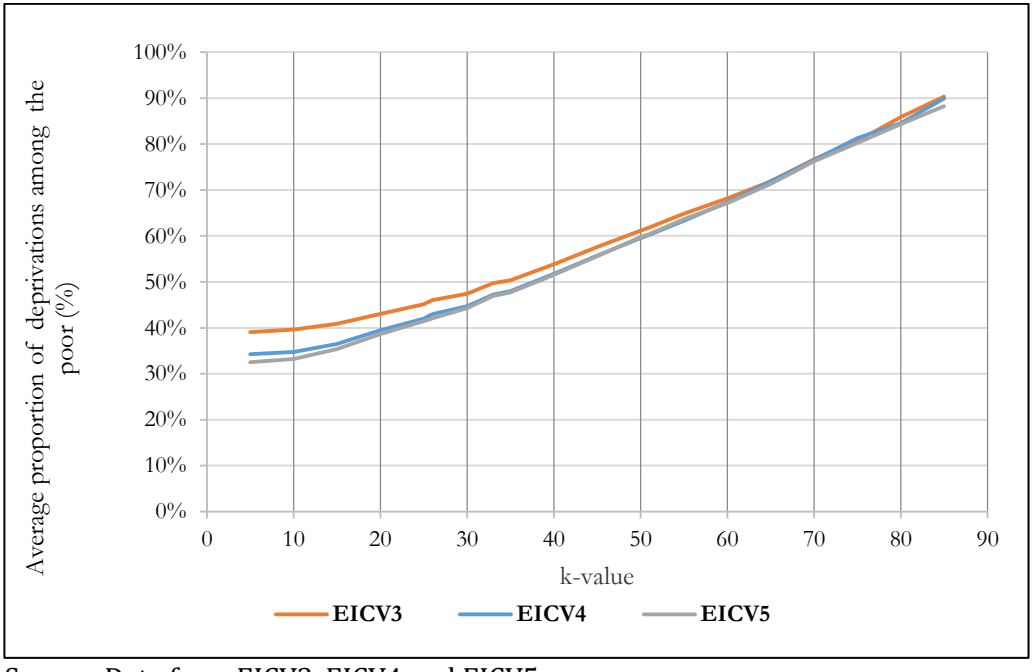
**Figure 3. 15: Percentage of multidimensional poor (H) people by different K-values**




Source: Data from EICV3, EICV4 and EICV5

Contrary to MPI and the Incidence of poverty, figure 3. 16 shows a different case. As the cut-off value (*k*) increases, the intensity of poverty increases as well. This means that, as the value of *k* increases, the share of deprivations each poor person experiences on average increases. At 5% cut-off value, the intensity seems to be at 39% in EICV3, 34% in EICV4, and 33% in EICV5. As this cut-off (k-value) is raised to 20%, the average proportion of deprivations among the poor is around 39% in both EICV4 & EICV5 from 43% in EICV3. As poverty cut-off is 33% (the international k-value), the intensity of poverty in Rwanda is around 47% in both EICV4 & EICV5 from 49.7% in EICV3. At 40% cut-off value used in this report, the average proportion of deprivations among the poor is 52% in both EICV4 and EICV5 from 54% in EICV3. When *k* is larger than 80%, the intensity seems to lie between 84% and 86% in three waves (EICV3, EICV4 and EICV5), implying that at this cut-off (80%), and multidimensional poor people experience more than 80% of the average deprivations. Between 5% and 55% k-values, a high drop of incidence is marked from EICV3 (2010/11) to EICV4 (2013/14), while in the same interval, there was slight decrease between EICV4 and EICV5. Also, between 60% and 80% cut-off, the intensity seems to be very high (around 67% to 85%) and shows no improvement in all three waves (EICV3, 4 and 5).

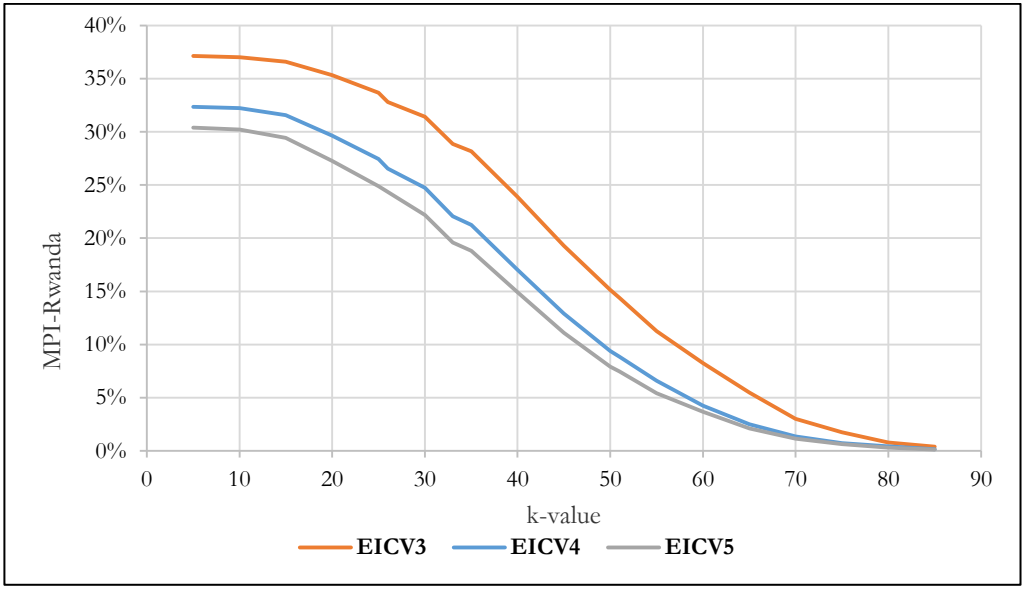
**Figure 3. 16: Intensity of Multidimensional poverty (A), by K- Values**




Source: Data from EICV3, EICV4 and EICV5

Figure 3.17 illustrates the level of multidimensional poverty Index (MPI) for various levels of the poverty cut-offs. As for the Incidence of poverty, the multidimensional poverty index decrease with the increase of k-value. When *k*=5%, the MPI is between 0.35 and 0.40 for EICV3, between 0.30 and 0.35 for EICV4, and 0.30 for EICV5. Between 5% and 55% cut-offs, the MPI shows very high improvement from EICV3 (2010/11) to EICV4 (2013/14), whereas from EICV4 to EICV5 there is gradual change as it was observed for 'H'. In other words, the living conditions improved significantly from EICV3 to EICV4 compared to improvement made between EICV4 and EICV5.

**Figure 3. 17: Multidimensional poverty index of Rwanda (M0) by K-Value**




Source: Data from EICV3, EICV4 and EICV5

## 3.6. Overlaps of multidimensional poverty and the monetary poverty

The results of the overlaps of multidimensional poverty with the monetary poverty show that in Rwanda, the multidimensionally poor population could also be at the same time income poor. However, income poor are not necssary multidimensional poor and also people can be multidimensionally poor but not income poor.

In fact, the overlap between the 2 types of poverty shows that in 2010/11, among 44.4% of population who were MPI poor, 16.6% of them were only multidimensional poor, whereas 27.8% were income poor and at the same time multidimensionally poor. This means that among the population that is

multidimensionally poor, the percentage of those who are deprived twice (expriencing income and social deprivations) is higher than that facing only social deprivations.

On the other hand, among 55.6% who are not multidimentionally poor, 17.3% are monetary poor, and only 38.3% were non-poor (neither multidimensional poor, nor monetary poor).

In 2013/14, among 32.9% of people who are MPI poor, 12.7% of them were only multidimensionally poor, while 20.2% were income poor and at the same time multidimensionally poor. Among 67.1% who are non-multidimentional poor, 19.3% are income poor, and only 47.8% were non-poor.

In 2016/17, among the 29% of multidimensional poor people, 18.4% are at the same time Income poor and 10.5% are only Multidimensional poor. On the other hand, among 71% people who are not multidimensional poor, 20% are income poor and 51.0% are non-poor. In this regard, the percentage of people who are Multidimensional and Income poor dropped by 9.4% from 27.8% in 2010/11 to 18.4% in 2016/17 (Table 3.2).

**Table 3.1: Overlaps of Multidimensional Poverty with Monetary Poverty in Rwanda (percentage)[8]**

| EICV3 National | | | | |
|---|---|---|---|---|
| | | Monetary Poor | | |
| | | No | Yes | Total |
| MPI Poor | No | 38.3 | 17.3 | 55.6 |
| | Yes | 16.6 | 27.8 | 44.4 |
| | Total | 54.8 | 45.2 | 100.0 |

| EICV4 National | | | | |
|---|---|---|---|---|
| | | Monetary Poor | | |
| | | No | Yes | Total |
| MPI Poor | No | 47.8 | 19.3 | 67.1 |
| | Yes | 12.7 | 20.2 | 32.9 |
| | Total | 60.5 | 39.5 | 100.0 |

| EICV5 National | | | | |
|---|---|---|---|---|
| | | Monetary Poor | | |
| | | No | Yes | Total |
| MPI Poor | No | 51.0 | 20.14 | 71.14 |
| | Yes | 10.47 | 18.4 | 28.86 |
| | Total | 61.46 | 38.54 | 100 |

Source: Data from EICV3, EICV4 and EICV

By area of residence, there is very high difference of people experiencing double deprivations (both income and MPI poverty) in urban and rural areas. In EICV3 (2010/11), the percentage of people who were multidimensional poor and income poor was 2 times higher in rural areas (30%) than in urban areas (14.7%). In EICV5 (2016/17), the multidimensional and monetary poor people was around 3 times higher in rural areas (20.7%) than in urban areas (7.5%). Despite these high urban-rural differences, the percentage of people who are multidimensional poor and monetary poor in urban areas decreased by a half (50%) from 14.7% in 2010/11 to 7.5% in 2016/17. However, in rural areas, the percent of people who are MPI poor and monetary poor reduced by 9.3% percentage points from 30.0% in EICV3 (2010/11) to 20.7% in EICV5 (2016/17). Thus, MPI and monetary poverty show a decreasing trend in both urban and rural areas and at the national level as illustrated in table 3.3.

**Table 3. 2: Overlaps of Multidimensional Poverty with Monetary Poverty by area of residence**

[8] There is a difference between the monetary poverty level in EICV5 poverty profile report (38.20) and in MPI report (38.54). This is due to the fact that when computing the overlaps between MPI and Monetary poverty, all persons not related to the head of households were omitted in MPI, whereas in EICV5 all members of household were considered.

**EICV3**

**Urban**

| | | Monetary Poor | | |
|---|---|---|---|---|
| | | No | Yes | Total |
| MPI Poor | No | 64.6 | 7.7 | 72.3 |
| | Yes | 13.0 | 14.7 | 27.7 |
| | | 77.6 | 22.4 | 100 |

**Rural**

| | | Monetary Poor | | |
|---|---|---|---|---|
| | | No | Yes | Total |
| MPI Poor | No | 34.0 | 18.9 | 52.9 |
| | Yes | 17.1 | 30.0 | 47.1 |
| | Total | 51.1 | 48.9 | 100 |

**EICV4**

**Urban**

| | | Monetary Poor | | |
|---|---|---|---|---|
| | | No | Yes | Total |
| MPI Poor | No | 77.1 | 9.2 | 86.3 |
| | Yes | 6.7 | 7.0 | 13.7 |
| | | 83.8 | 16.2 | 100 |

**Rural**

| | | Monetary Poor | | |
|---|---|---|---|---|
| | | No | Yes | Total |
| MPI Poor | No | 42.1 | 21.2 | 63.4 |
| | Yes | 13.9 | 22.7 | 36.6 |
| | Total | 56.0 | 44.0 | 100 |

**EICV5**

**Urban**

| | | Monetary Poor | | |
|---|---|---|---|---|
| | | No | Yes | Total |
| MPI Poor | No | 77.9 | 8.7 | 86.6 |
| | Yes | 6.0 | 7.4 | 13.4 |
| | | 83.9 | 16.1 | 100 |

**Rural**

| | | Monetary Poor | | |
|---|---|---|---|---|
| | | No | Yes | Total |
| MPI Poor | No | 45.3 | 22.6 | 67.9 |
| | Yes | 11.4 | 20.7 | 32.1 |
| | Total | 56.7 | 43.3 | 100 |

Source: Data from EICV3, EICV4 and EICV5

Table 3.4 further indicates a higher decreasing trend in both monetary and MPI poverty by province. In City of Kigali, the multidimensional and monetary poverty reduced from 11.3% in EICV3 (2010/11) to 7.0% in EICV5 (2016/17); from 37.7% to 22.6% in Southern province; from 29.7% to 21.3% in Western province, in Northern province from 19.3% to 14.6%; and from 29.3% to 20.0% in Eastern province.

In 2016/17, the proportion of multidimensional and monetary poor people is the lowest in City of Kigali (7.0%) followed by Northern province (14.6%), and the highest is Southern province (22.6%). However, in 2016/17, the MPI and monetary poverty does not differ in Southern province (22.6%), Western province (21.3%) and Eastern province (20.0%) except the City of Kigali (7.0%) and Northern Province (14.6%).

**Table 3. 3: Overlaps of Multidimensional Poverty with Monetary Poverty by Province**

| EICV3 | | | | |
|---|---|---|---|---|
| **Kigali City** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 72.0 | 5.9 | 77.8 |
| | Yes | 10.9 | 11.3 | 22.2 |
| | Total | 82.9 | 17.2 | 100 |
| **Southern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 27.6 | 19.0 | 46.6 |
| | Yes | 15.7 | 37.7 | 53.4 |
| | Total | 43.4 | 56.6 | 100 |
| **Western Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 34.8 | 19.0 | 53.7 |
| | Yes | 16.6 | 29.7 | 46.3 |
| | Total | 51.3 | 48.7 | 100 |
| **Northern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 41.0 | 23.7 | 64.7 |
| | Yes | 16.0 | 19.3 | 35.3 |
| | Total | 57.0 | 43.0 | 100 |
| **Eastern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 37.3 | 13.6 | 50.9 |
| | Yes | 19.8 | 29.3 | 49.1 |
| | Total | 57.1 | 42.9 | 100 |

| EICV4 | | | | |
|---|---|---|---|---|
| **Kigali City** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 74.8 | 12.3 | 87.2 |
| | Yes | 4.0 | 8.8 | 12.8 |
| | Total | 78.8 | 21.2 | 100 |
| **Southern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 44.3 | 15.9 | 60.1 |
| | Yes | 17.1 | 22.8 | 39.9 |
| | Total | 61.3 | 38.7 | 100 |
| **Western Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 41.4 | 22.1 | 63.5 |
| | Yes | 13.1 | 23.5 | 36.5 |
| | Total | 54.5 | 45.5 | 100 |
| **Northern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 44.8 | 26.3 | 71.1 |
| | Yes | 9.1 | 19.8 | 28.9 |
| | Total | 53.9 | 46.1 | 100 |
| **Eastern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 47.3 | 18.4 | 65.7 |
| | Yes | 14.4 | 19.9 | 34.3 |
| | Total | 61.7 | 38.3 | 100 |

| EICV5 | | | | |
|---|---|---|---|---|
| **Kigali City** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 79.4 | 7.3 | 86.7 |
| | Yes | 6.4 | 7.0 | 13.3 |
| | Total | 85.7 | 14.3 | 100 |
| **Southern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 44.9 | 19.07 | 64.0 |
| | Yes | 13.4 | 22.6 | 36.0 |
| | Total | 58.3 | 41.7 | 100 |
| **Western Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 43.3 | 26.0 | 69.2 |
| | Yes | 9.5 | 21.3 | 30.8 |
| | Total | 52.7 | 47.3 | 100 |
| **Northern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 49.3 | 27.9 | 77.1 |
| | Yes | 8.3 | 14.6 | 22.9 |
| | Total | 57.5 | 42.5 | 100 |
| **Eastern Province** | | | | |
| | | **Monetary Poor** | | |
| | | No | Yes | Total |
| **MPI Poor** | No | 50.2 | 17.6 | 67.8 |
| | Yes | 12.2 | 20.0 | 32.3 |
| | Total | 62.37 | 37.63 | 100 |

Source: Data from EICV3, EICV4 and EICV5

## Chapter 4: Conclusion and Recommendations

Comprehensive estimates using a multidimensional approach have been constructed for Rwanda using the 2010/11, 2013/14 and 2016/17 Integrated Household and Living Conditions Surveys (EICV3, EICV4 and EICV5). An innovative Multidimensional Poverty Index (MPI) was built using national thresholds, dimensions and indicators.

The analysis outlined in this report provides a picture of multidimensional poverty in Rwanda, in order to inform national policies and programs makers, and to provide a baseline for measuring the SDG Indicator 1.2.2 (Proportion of men, women and children of all ages living in poverty in all its dimensions) according to national definitions. This study will be repeated over the next 3 years using forthcoming EICV datasets to monitor progress.

This MPI report helps Rwanda to have a different approach of measuring poverty in addition to conventional monetary poverty measures. It is intended to complement monetary poverty measures. Both measures provide an important source of information for public policy. Rwanda's National MPI, in particular, can help to monitor progress in meeting the social and infrastructure goals in the National Plan.

The cooking fuel, the years of schooling, the floor, and the garbage disposal are the indicators in which Rwandan population is mostly deprived, whereas the school attendance, Distance to health care facilities, assets for communication, sanitation, electricity, and Health insurance are the least indicators in which the population is deprived in.

The proportion of people identified as multidimensional poor in Rwanda (incidence of poverty, H) is still high but is decreasing over time. However, the share of deprivations each poor person experiences on average (the intensity of poverty) has been slightly reducing over time, but it is still high (over 50%), and a considerable decrease in the national MPI is observed

The incidence, intensity and Multidimensional Poverty Index (MPI) is higher in rural areas, but a significant improvement is observed in both rural and urban areas. Similarly, the multidimensional poverty seems to be the least in the City of Kigali and highest in Southern province, but the decreasing trend from EICV3 to EICV5 is noted across all provinces.

Twelve out of fourteen indicators have registered improvements over time. A reduction in the proportion of people deprived in electricity, floor, cooking fuel, sanitation, health insurance and distance to health care facilities being the indicators that have registered the highest reduction.

As asserted by the findings, distance to health care facilities, bank account, assets for communication, sanitation, and subsistence farming were identified as the indicators that contribute the least to overall poverty in Rwanda, while those that contribute the most are years of schooling, floor, cooking fuel, drinking water and garbage disposal.

The proportion of people who are multidimensional poor and income poor marks a significant improvement at the National level, urban and rural and across all provinces from 2010/11-2013/14.

Finally, this section presents some recommendations based on the outcome of the analysis of this report:

1. The proportion of people who are multidimensional poor (incidence of poverty) is more than 2 times higher in rural areas (32.1%) than in urban areas (13.4%). Therefore, much effort regarding poverty eradication programs need to be strengthen in rural areas

2. The number of deprived population has increased for garbage disposal and for cooking fuel from 2010/11 to 2016/17, which is contrary to the expectation. Therefore, policy intervention is needed to curb with this problem and further research is needed to examine the cause. In addition, alternative source of cooking other than wood and charcoal should be promoted.

3. The share of deprivations each poor person experiences on average (intensity of poverty) is over 50%. Immediate intervention is needed to handle this situation by targeting remote areas that seem to be more deprived and allocating resources that reflect the needs of people.

4. About 55.3% of people living in the least wealthy households are multidimensional poor compared to only 5.9% living in the highest wealth quintiles. Special poverty eradication policies need to be put in place focusing on this group of people.
5. Although Multidimensional poverty, Incidence and Intensity of poverty has improved across all Provinces, Southern Province, Eastern Province and Western seem to be lagging behind in the three periods, 2010/11, 2013/14 and 2016/17. Therefore, special programs need to be allocated focusing on poor people in these provinces.

6. For strict comparability between different time periods, and to gauge the progress over the years, it is recommended that all MPI variables definition are not changed in future surveys. Doing so will enable the MPI to be updated periodically.

7. Include MPI variables in the next census. The next Census should include as many MPI variables as is feasible, so as to map poverty at the sub-district level. This will help in policy intervention at the grassroots, and provide a razor-sharp picture of MPI in Rwanda.

8. Make the MPI transparent to academic and policy makers. It is highly recommended that the programmes required computing the MPI – such as the do files – be posted online and open access at the same time that the measure is released. This should be done by the Government to stimulate research by academic bodies into poverty reduction.

9. Promote further research and to understand what really caused the reductions in poverty observed in this report, it is recommended that further research is undertaken, particularly by the very strong and engage community of scholars, economists and statisticians in Rwanda and outside.

## References


1. Suppa, N. (2016). "Comparing monetary and multidimensional poverty in Germany." OPHI Working Paper 103, University of Oxford. Available at: http://www.ophi.org.uk/wp-content/uploads/OPHIWP103_1.pdf (accessed on 30/6/2018)
2. Alkire, S. & Foster, J. (2011). 'Counting and Multidimensional Poverty Measurements.' Journal of Public Economics (95): 476-487.
3. Alkire, S. & Santos, M. E. (2010). Acute Multidimensional Poverty: A New Index for Developing Countries. OPHI Working Paper No. 38. University of Oxford.
4. National Institute of Statistical of Rwanda (NISR). (2015) Integrated Household Living Conditions Survey 2013-2014. NISR, Kigali.
5. Nkurunziza, J., Broekhuis, A. & Hooimeijer, P. (2012). 'Free education in Rwanda: Just one step towards reducing gender and sibling inequalities.' Education Research International 2012.
6. Pickering, A. J. & Davis, J. (2012). 'Freshwater availability and water fetching distance affect child health in sub-Saharan Africa.' Environmental Science & Technology 46(4): 2391-2397.
7. Plavgo, I. (Forthcoming). Child Monetary and Multidimensional Poverty Analysis in Madagascar. Working Paper 2014-X, UNICEF Office of Research, Florence.
8. UNICEF. (2007). Global Study on Child Poverty and Disparities 2007-2008. Guide, Division of Policy and Planning, New York.
9. UNICEF Senegal. (Forthcoming). Actualisation de l'étude sur la pauvreté et les disparités chez les enfants au Sénégal 2013. UNICEF Senegal Country Office, Dakar.
10. United Nations. (1989). Convention on the Rights of the Child, the General Assembly resolution 44/25.

# Annex A: Multidimensional poverty maps

## A.1: Incidence of multidimensional poverty (H)

**Figure A. 1: Incidence of multidimensional poverty ( H) by province, 2010/11**

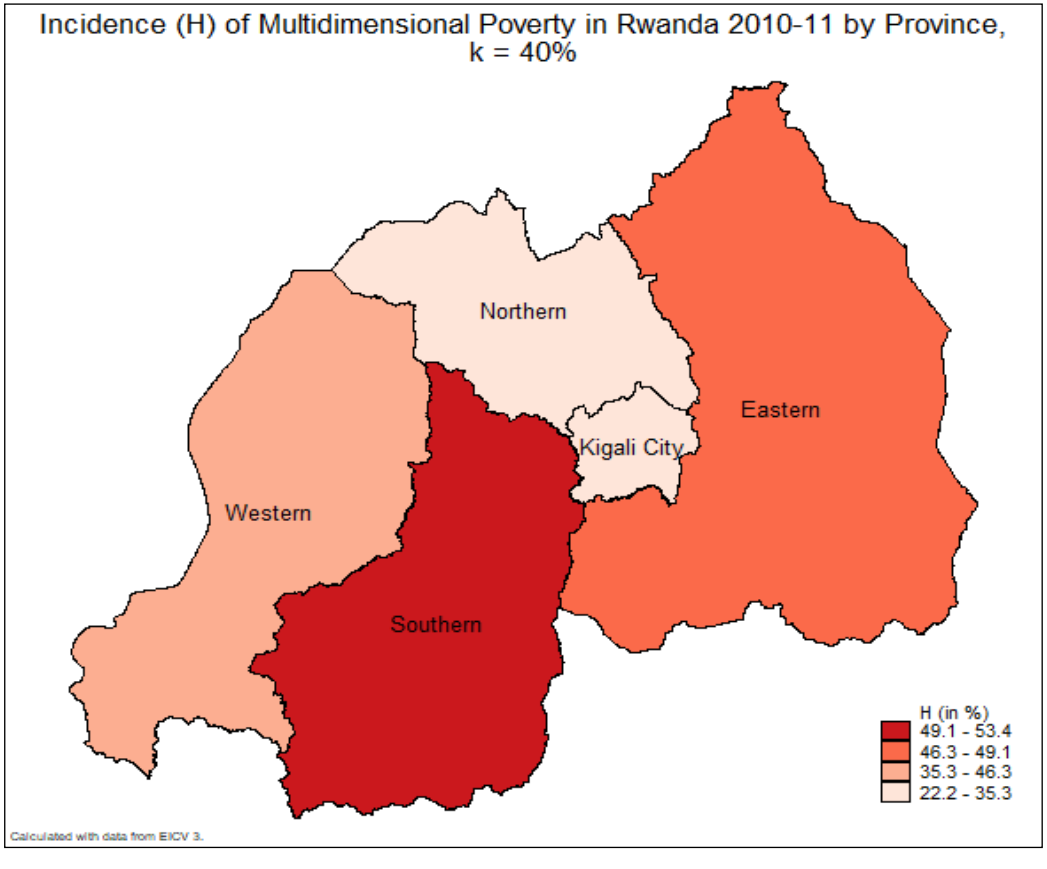


**Figure A. 2: Incidence of Multidimensional poverty (H) by province, 2013/14**

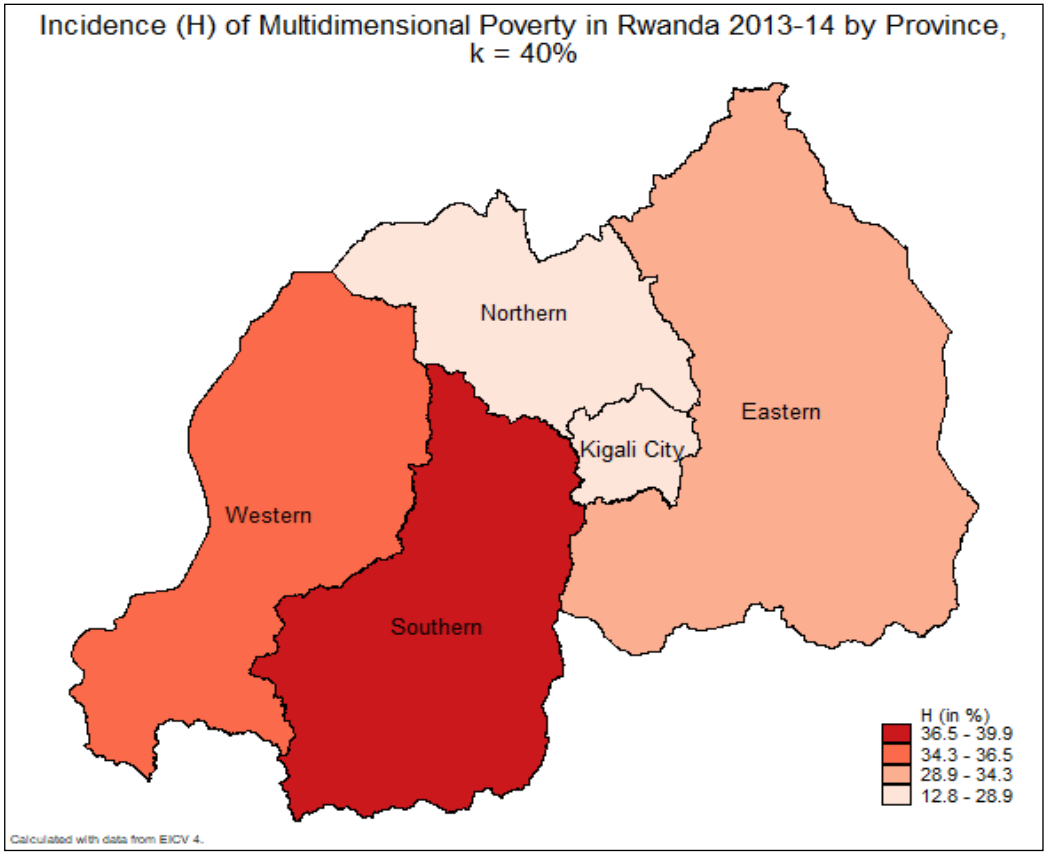
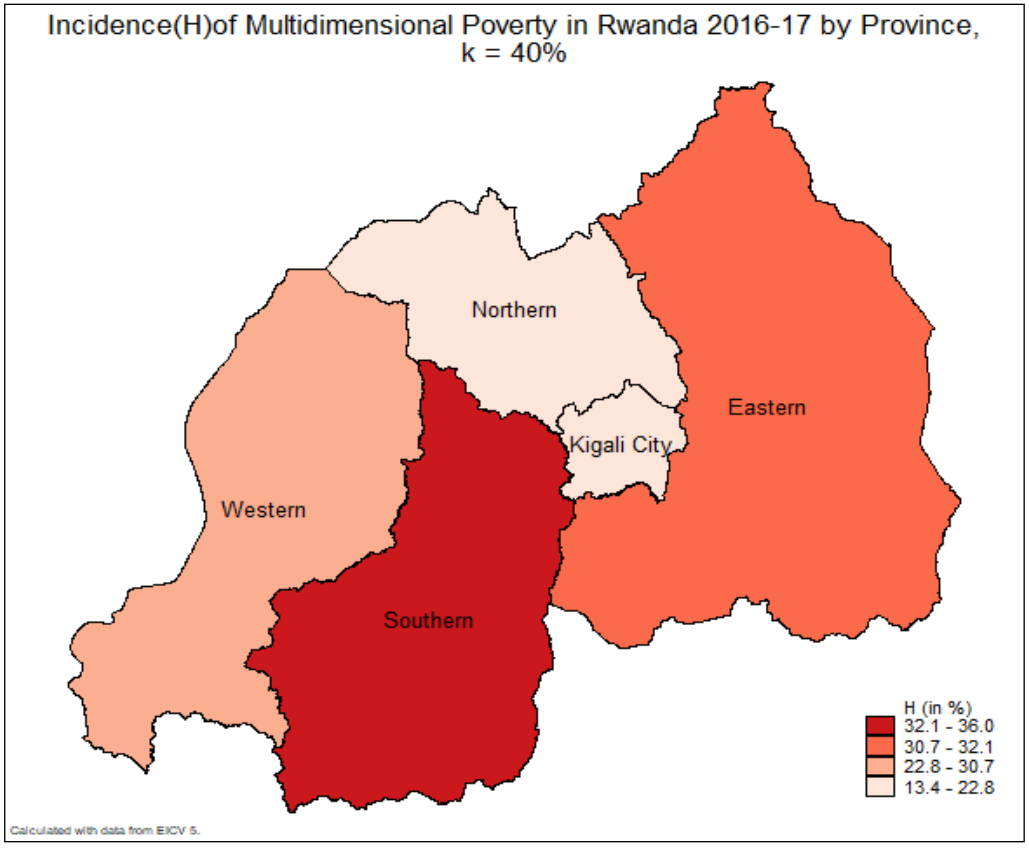


**Figure A. 3: Incidence of multidimensional poverty by province, 2016/17**



## A. 2: Intensity of multidimensional poverty

**Figure A. 4: Intensity of multidimensional poverty (A) by province, 2010/11**

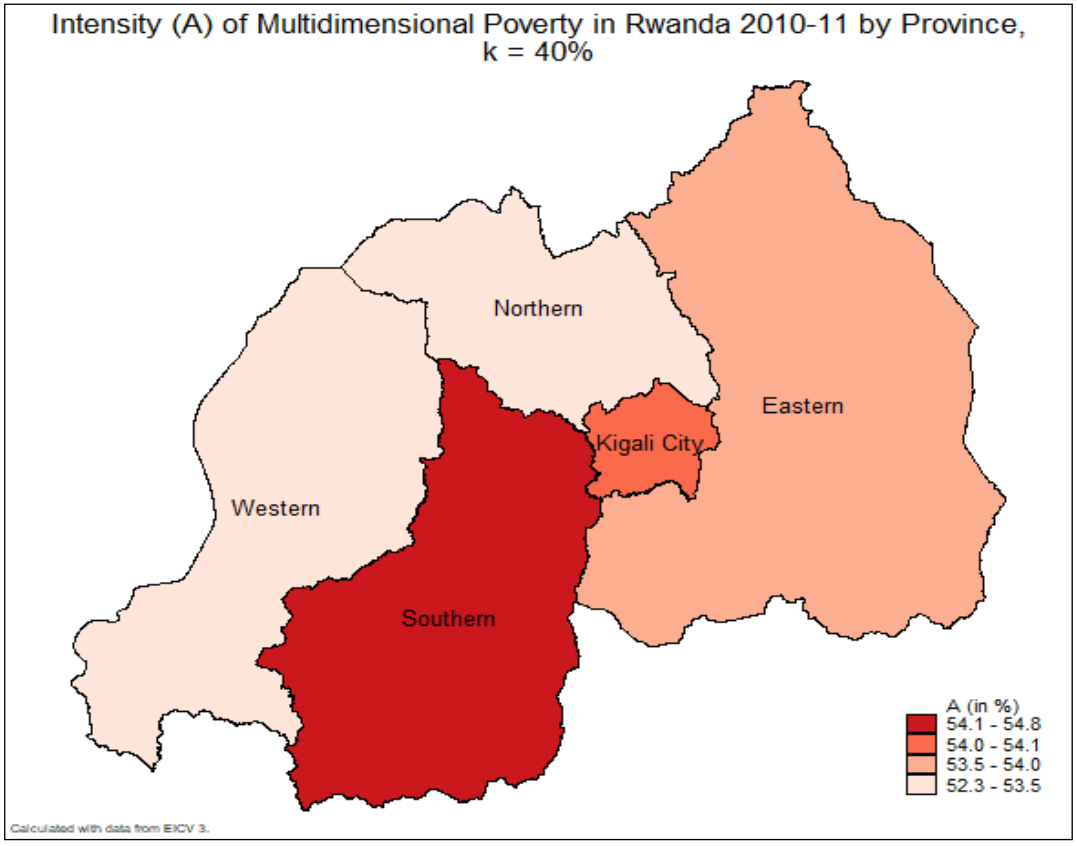


**Figure A. 5: Intensity of multidimensional poverty (A) by province, 2013/14**

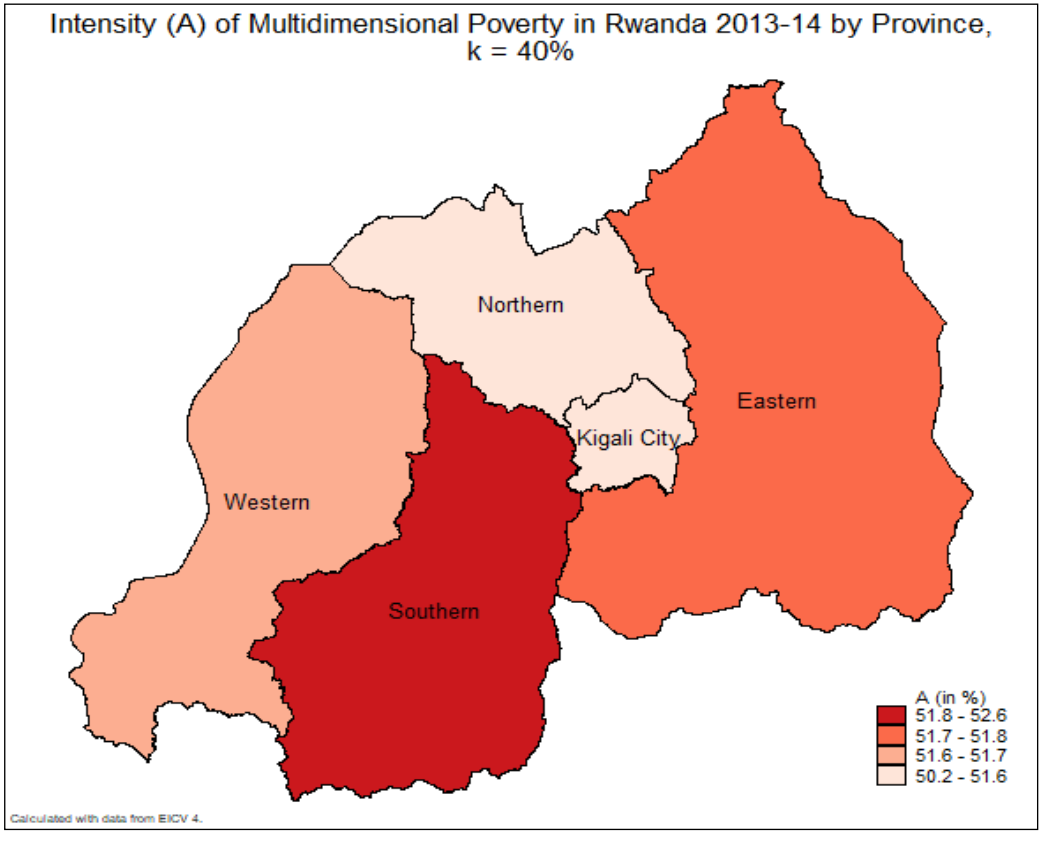
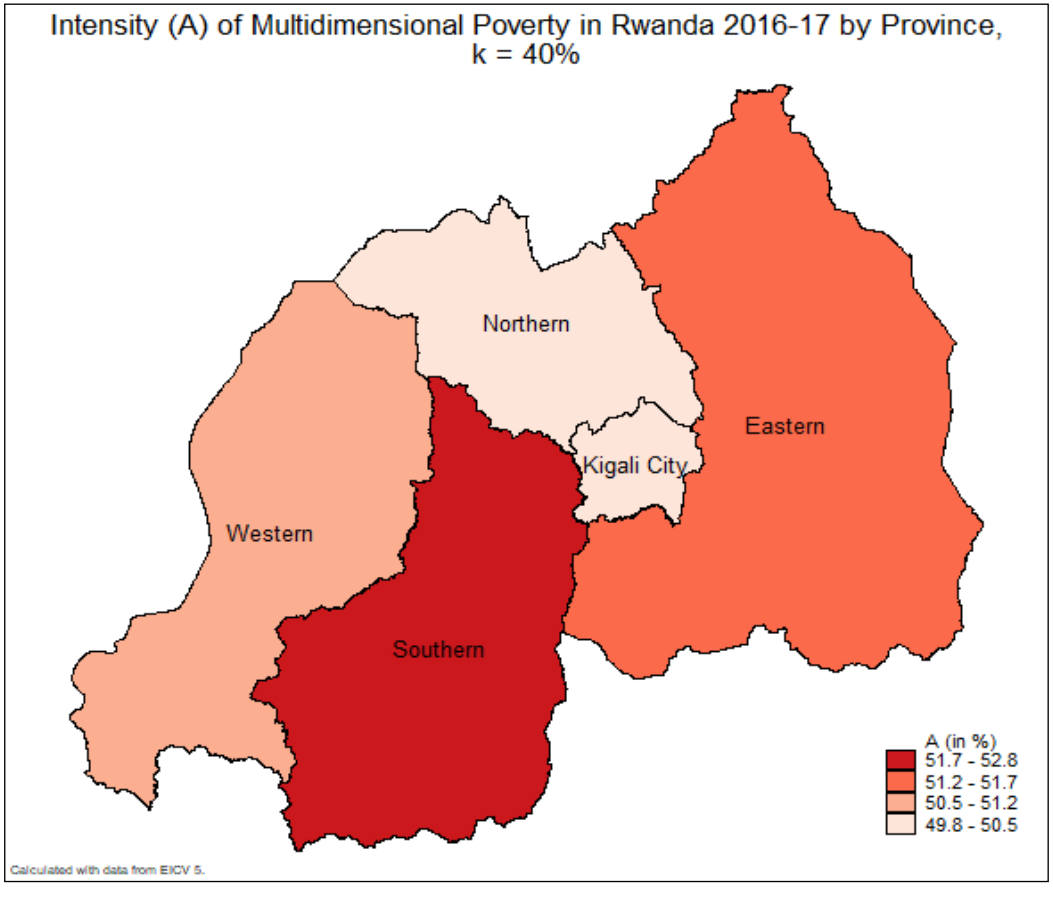


**Figure A. 6: Intensity of multidimensional poverty (A) by province, 2016/17**



# ANNEX B: Tables

## B.1: Uncensored Headcount Ratios

**Table B 1: Uncensored Headcount Ratios (k=40)**

### Proportion of poor people deprived in each indicator

| Dimension | Indicator | EICV3 | EICV4 | EICV5 |
|---|---|---|---|---|
| Education | School Attendance | 9.6 | 9.3 | 8.0 |
| | Years of Schooling | 38.3 | 32.8 | 31.4 |
| Housing | Electricity | 59.3 | 33.5 | 14.7 |
| | Floor | 80.4 | 77.3 | 72.4 |
| | Overcrowding | 19.4 | 17.7 | 17.0 |
| | Cooking Fuel | 97.8 | 99.8 | 99.1 |
| Public Services | Drinking Water | 54.6 | 54.2 | 54.2 |
| | Sanitation | 23.4 | 15.1 | 12.8 |
| | Garbage Disposal | 30.8 | 38.5 | 45.6 |
| Social Services & Economic Activity | Assets for Communication | 24.2 | 18.8 | 21.9 |
| | Bank account | 31.6 | 18.2 | 18.6 |
| | Health Insurance | 42.9 | 40.1 | 33.2 |
| | Distance to Health Care Facilities | 31.2 | 19.5 | 16.6 |
| | Subsistence Farming | 26.9 | 25.6 | 27.2 |

Source: Computations done by NISR based on EICV 3 and EICV 4 and EICV5

## B.2: Censored Headcount Ratios (K=40%)

### Table B 2: Censored Headcount Ratios (k = 40%)

**Proportion of people who are MPI poor and deprived in each indicator at national level and urban/rural**

| Dimension | Indicator | EICV3 | | | EICV4 | | | EICV5 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Urban | Rural | National | Urban | Rural | National | Urban | Rural | National |
| **Education** | School Attendance | 3.1 | 9.2 | 8.3 | 3.0 | 8.3 | 7.5 | 3.2 | 6.8 | 6.1 |
| | Years of Schooling | 11.2 | 34.3 | 30.9 | 9.6 | 25.2 | 22.6 | 9.1 | 22.9 | 20.5 |
| **Housing** | Electricity | 14.0 | 35.7 | 32.5 | 9.2 | 17.3 | 16.0 | 7.1 | 8.4 | 8.2 |
| | Floor | 14.5 | 48.0 | 43.1 | 12.3 | 35.8 | 32.0 | 12.0 | 31.2 | 27.9 |
| | Overcrowding | 5.1 | 14.6 | 13.2 | 4.3 | 11.0 | 9.9 | 4.8 | 9.8 | 8.9 |
| | Cooking Fuel | 16.2 | 47.9 | 43.3 | 13.7 | 36.6 | 32.9 | 13.4 | 32.1 | 28.9 |
| **Public Services** | Drinking Water | 9.9 | 34.9 | 31.2 | 11.2 | 27.0 | 24.4 | 10.9 | 24.0 | 21.7 |
| | Sanitation | 6.9 | 20.6 | 18.6 | 4.1 | 12.5 | 11.2 | 4.5 | 10.1 | 9.1 |
| | Garbage Disposal | 9.7 | 23.4 | 21.4 | 9.4 | 22.7 | 20.5 | 10.2 | 23.0 | 20.8 |
| **Social Services & Economic Activity** | Assets for Communication | 6.3 | 21.8 | 19.5 | 4.3 | 15.2 | 13.4 | 5.0 | 16.9 | 14.8 |
| | Bank account | 9.5 | 24.9 | 22.7 | 6.0 | 12.9 | 11.7 | 7.7 | 11.9 | 11.2 |
| | Health Insurance | 11.3 | 30.0 | 27.2 | 9.5 | 22.0 | 20.0 | 8.8 | 18.7 | 17.0 |
| | Distance to Health Care Facilities | 1.5 | 22.5 | 19.4 | 0.8 | 11.8 | 10.0 | 1.5 | 8.9 | 7.6 |
| | Subsistence Farming | 3.5 | 19.9 | 17.5 | 2.4 | 15.4 | 13.3 | 2.8 | 14.5 | 12.5 |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

**Table B 3:** Censored Headcount Ratios, by province (k = 40%)
**Proportion of people who are MPI poor and deprived in each indicator by province**

| Dimension | Indicator EICV | EICV3 | | | | | EICV4 | | | | | EICV5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Kigali City | Southern Province | Western Province | Northen Province | Eastern Province | Kigali City | Southern Province | Western Province | Northen Province | Eastern Province | Kigali City | Southern Province | Western Province | Northen Province | Eastern Province |
| Education | School Attendance | 3.8 | 8.3 | 9.4 | 4.8 | 11.6 | 2.1 | 7.5 | 8.9 | 6.0 | 9.3 | 3.5 | 6.9 | 6.6 | 3.3 | 8.2 |
| | Years of Schooling | 13.4 | 34.3 | 32.9 | 26.3 | 35.6 | 8.3 | 24.7 | 26.1 | 19.9 | 25.4 | 8.8 | 23.2 | 23.7 | 15.6 | 24.3 |
| Housing | Electricity | 19.5 | 40.0 | 33.0 | 23.7 | 36.4 | 7.3 | 18.0 | 19.1 | 13.0 | 17.0 | 7.2 | 9.0 | 10.0 | 6.7 | 7.1 |
| | Floor | 20.0 | 50.9 | 45.4 | 35.2 | 48.0 | 11.6 | 38.6 | 35.8 | 28.4 | 33.5 | 11.5 | 34.8 | 30.1 | 22.6 | 31.1 |
| | Overcrowding | 6.6 | 17.8 | 13.5 | 7.9 | 14.9 | 4.3 | 12.1 | 10.8 | 6.3 | 11.6 | 4.6 | 11.5 | 9.7 | 5.5 | 10.3 |
| | Cooking Fuel | 22.1 | 51.6 | 46.3 | 33.6 | 47.5 | 12.8 | 39.8 | 36.5 | 28.9 | 34.3 | 13.3 | 36.0 | 30.8 | 22.9 | 32.2 |
| Public Services | Drinking Water | 16.5 | 38.5 | 29.5 | 25.0 | 36.2 | 9.9 | 30.2 | 24.6 | 20.9 | 27.3 | 10.1 | 27.4 | 20.5 | 16.5 | 26.8 |
| | Sanitation | 11.7 | 26.0 | 15.4 | 15.4 | 19.7 | 4.5 | 21.3 | 9.4 | 8.0 | 8.5 | 3.6 | 17.1 | 7.5 | 7.8 | 7.1 |
| | Garbage Disposal | 15.5 | 24.7 | 25.1 | 17.6 | 19.7 | 10.0 | 25.6 | 22.8 | 20.0 | 18.7 | 10.8 | 28.2 | 21.6 | 18.3 | 19.8 |
| Social Services & Economic Activity | Assets for Communication | 6.6 | 24.0 | 24.6 | 16.2 | 17.7 | 3.4 | 17.7 | 16.8 | 12.2 | 11.7 | 4.9 | 19.8 | 16.2 | 12.6 | 15.5 |
| | Bank account | 12.7 | 30.9 | 23.5 | 16.0 | 22.7 | 5.3 | 14.6 | 14.6 | 7.7 | 11.9 | 6.7 | 14.2 | 13.3 | 6.8 | 11.5 |
| | Health Insurance | 15.9 | 39.0 | 27.0 | 17.3 | 27.8 | 9.1 | 25.7 | 23.4 | 14.6 | 19.8 | 8.7 | 22.3 | 18.3 | 10.6 | 19.1 |
| | Distance to Health Care Facilities | 4.6 | 24.3 | 20.1 | 14.5 | 23.2 | 4.4 | 11.9 | 11.4 | 9.9 | 9.5 | 0.6 | 9.6 | 7.9 | 4.0 | 11.4 |
| | Subsistence Farming | 3.8 | 22.6 | 16.4 | 13.8 | 21.6 | 2.2 | 17.7 | 12.3 | 13.3 | 14.8 | 1.2 | 16.9 | 11.2 | 11.5 | 16.0 |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

**Table B 4: Censored Headcount Ratios, by quintile (k = 40%)**

## Proportion of people who are MPI poor and deprived in each indicator by quintile

| Dimension | Indicator EICV | EICV3 | | | | | EICV4 | | | | | EICV5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 | Q5 | Q1 | Q2 | Q3 | Q4 | Q5 | Q1 | Q2 | Q3 | Q4 | Q5 |
| Education | School Attendance | 17.9 | 9.7 | 7.5 | 5.1 | 1.2 | 18.2 | 9.1 | 6.5 | 2.6 | 0.7 | 15.7 | 7.5 | 4.4 | 2.4 | 0.6 |
| | Years of Schooling | 48.9 | 38.5 | 32.0 | 24.2 | 10.2 | 41.7 | 28.2 | 22.3 | 14.4 | 6.0 | 40.1 | 28.1 | 18.6 | 11.1 | 4.1 |
| Housing | Electricity | 49.5 | 39.3 | 35.0 | 27.0 | 11.2 | 27.5 | 19.4 | 16.2 | 11.4 | 5.1 | 17.2 | 9.8 | 6.8 | 4.8 | 1.9 |
| | Floor | 69.8 | 53.9 | 44.7 | 33.5 | 12.8 | 59.2 | 40.3 | 31.3 | 20.2 | 8.0 | 54.2 | 37.5 | 25.4 | 16.1 | 5.4 |
| | Overcrowding | 29.9 | 16.5 | 11.1 | 6.4 | 1.7 | 23.0 | 12.0 | 8.3 | 4.2 | 1.4 | 22.4 | 11.8 | 6.2 | 3.3 | 0.8 |
| | Cooking Fuel | 68.9 | 53.9 | 44.7 | 34.4 | 13.6 | 60.3 | 41.5 | 32.4 | 20.8 | 8.4 | 55.3 | 39.0 | 26.3 | 17.1 | 5.9 |
| Public Services | Drinking Water | 49.3 | 37.6 | 33.3 | 25.3 | 10.1 | 43.1 | 30.9 | 24.7 | 16.1 | 6.4 | 40.8 | 29.9 | 19.7 | 12.7 | 4.9 |
| | Sanitation | 30.0 | 22.1 | 20.3 | 14.4 | 5.9 | 21.5 | 15.2 | 9.5 | 6.9 | 2.3 | 17.7 | 13.0 | 7.6 | 5.0 | 2.1 |
| | Garbage Disposal | 33.9 | 26.8 | 21.7 | 16.9 | 7.5 | 37.7 | 25.0 | 21.0 | 12.9 | 5.3 | 39.2 | 28.0 | 19.3 | 12.4 | 4.6 |
| Social Services & Economic Activity | Assets for Communication | 39.2 | 23.2 | 17.4 | 12.6 | 5.0 | 31.2 | 16.3 | 10.9 | 6.1 | 2.3 | 33.4 | 20.3 | 11.4 | 6.7 | 1.9 |
| | Bank account | 40.6 | 27.7 | 22.2 | 15.7 | 6.8 | 24.3 | 14.2 | 11.2 | 5.9 | 2.7 | 21.9 | 15.7 | 9.0 | 6.4 | 2.4 |
| | Health Insurance | 49.3 | 34.7 | 26.4 | 19.2 | 6.1 | 37.7 | 26.0 | 19.7 | 11.5 | 4.5 | 33.3 | 23.6 | 15.3 | 8.9 | 3.2 |
| | Distance to Health Care Facilities | 30.8 | 24.9 | 18.9 | 16.2 | 5.7 | 17.0 | 12.0 | 11.0 | 6.5 | 3.2 | 13.7 | 10.5 | 6.9 | 5.2 | 1.5 |
| | Subsistence Farming | 30.0 | 21.5 | 17.8 | 12.9 | 4.9 | 26.6 | 17.0 | 11.7 | 7.7 | 2.9 | 24.3 | 16.0 | 11.9 | 7.8 | 2.2 |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

## B. 3: Incidence, Intensity and Multidimensional Poverty Index

### Table B 5: Incidence, Intensity and MPI, by area and province (k = 40%)

| Province | EICV3 | | | | EICV4 | | | | EICV5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pop. Share | Incidence (H) | Intensity (A) | MPI (M0) | Pop. Share | Incidence (H) | Intensity (A) | MPI (MO) | Pop. Share | Incidence (H) | Intensity (A) | MPI (M0) |
| Kigali City | *8.8%* | 22.2% | 54.1% | 0.120 | *8.8%* | 12.8% | 51.6% | 0.066 | *9.4%* | 13.3% | 50.8% | 0.068 |
| Southern Province | *26.1%* | 53.4% | 54.8% | 0.293 | *26.1%* | 39.8% | 52.6% | 0.210 | *23.1%* | 36.0% | 52.7% | 0.190 |
| Western Province | *24.3%* | 46.3% | 53.5% | 0.248 | *24.4%* | 36.5% | 51.7% | 0.189 | *16.5%* | 30.8% | 51.2% | 0.158 |
| Northern Province | *16.9%* | 35.3% | **52.3%** | 0.185 | *17.0%* | 28.8% | 50.2% | 0.145 | *26.3%* | 22.9% | 49.7% | 0.114 |
| Eastern Province | *23.8%* | 49.1% | 54.0% | 0.265 | *23.7%* | 34.2% | 51.8% | 0.178 | *24.7%* | 32.2% | 51.7% | 0.167 |
| Urban | *14.1%* | 16.3% | 52.1% | 0.085 | *15.1%* | 13.6% | 51.6% | 0.070 | *15.7%* | 13.4% | 52.8% | 0.071 |
| Rural | *85.9%* | 49.2% | 53.9% | 0.265 | *84.9%* | 36.6% | 51.8% | 0.190 | *84.3%* | 32.1% | 51.5% | 0.165 |
| **Rwanda(National)** | ***100.0%*** | **44.4%** | **53.8%** | **0.239** | ***100.0%*** | **32.9%** | **51.7%** | **0.170** | ***100.0%*** | **28.7%** | **51.5%** | **0.148** |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

### Table B 6: Incidence, Intensity and MPI, by Quintile (k = 40%)

| Quintile | EICV3 | | | | EICV4 | | | | EICV5 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pop. Share | Incidence (H) | Intensity (A) | MPI (M0) | Pop. Share | Incidence (H) | Intensity (A) | MPI (M0) | Pop. Share | Incidence (H) | Intensity (A) | MPI (M0) |
| Q1 | *20.2%* | 70.9% | 56.7% | 0.402 | *20.4%* | 60.3% | 54.1% | 0.326 | *20.84* | 55.3% | 54.0% | 0.299 |
| Q2 | *20.6%* | 55.4% | 53.1% | 0.294 | *20.5%* | 41.5% | 51.3% | 0.213 | *20.44* | 39.0% | 51.5% | 0.201 |
| Q3 | *20.2%* | 46.0% | 52.7% | 0.243 | *20.3%* | 32.5% | 50.6% | 0.164 | *20.33* | 26.3% | 49.5% | 0.130 |
| Q4 | *20.1%* | 35.0% | 51.6% | 0.181 | *20.0%* | 20.8% | 49.0% | 0.102 | *19.82* | 17.1% | 47.9% | 0.082 |
| Q5 | *19.0%* | 13.8% | 51.1% | 0.071 | *18.9%* | 8.4% | 48.4% | 0.041 | *18.57* | 5.9% | 48.5% | 0.029 |
| **Rwanda** | ***100.0%*** | **44.4%** | **53.8%** | **0.239** | ***100.0%*** | **32.9%** | **51.7%** | **0.170** | ***100.0%*** | **28.7%** | **51.5%** | **0.148** |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

## B.4: Contribution of each indicator to the MPI

### Table B 7: Percentage contribution of each indicator to the MPI at national level, and urban/rural (k = 40%)

| Dimension | Indicator | EICV3 (2010/2011) | | | EICV4 (2013/2014) | | | EICV5 (2016/2017) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Urban | Rural | Rwanda | Urban | Rural | Rwanda | Urban | Rural | Rwanda |
| **Education** | School Attendance | 4.5 | 4.3 | 4.4 | 5.3 | 5.5 | 5.4 | 5.6 | 5.1 | 5.4 |
| | Years of Schooling | 16.4 | 16.1 | 16.3 | 16.9 | 16.6 | 16.8 | 16.1 | 17.3 | 16.7 |
| **Housing** | Electricity | 12.3 | 10.1 | 11.2 | 9.8 | 6.9 | 8.3 | 7.5 | 3.8 | 5.6 |
| | Floor | 12.7 | 13.6 | 13.2 | 13.1 | 14.2 | 13.6 | 12.7 | 14.2 | 13.4 |
| | Overcrowding | 4.5 | 4.1 | 4.3 | 4.6 | 4.3 | 4.5 | 5.1 | 4.5 | 4.8 |
| | Cooking Fuel | 4.8 | 4.5 | 4.6 | 4.8 | 4.8 | 4.8 | 4.7 | 4.9 | 4.8 |
| **Public Services** | Drinking Water | 9.7 | 11.0 | 10.3 | 13.2 | 11.9 | 12.5 | 12.8 | 12.1 | 12.5 |
| | Sanitation | 6.7 | 6.5 | 6.6 | 4.8 | 5.5 | 5.2 | 5.3 | 5.1 | 5.2 |
| | Garbage Disposal | 9.5 | 7.4 | 8.4 | 11.1 | 10.0 | 10.6 | 12.0 | 11.6 | 11.8 |
| **Social Services & Economic Activity** | Assets for Communication | 3.7 | 4.1 | 3.9 | 3.0 | 4.0 | 3.5 | 3.5 | 5.1 | 4.3 |
| | Bank account | 5.6 | 4.7 | 5.1 | 4.3 | 3.4 | 3.8 | 5.4 | 3.6 | 4.5 |
| | Health Insurance | 6.6 | 5.6 | 6.1 | 6.7 | 5.8 | 6.3 | 6.2 | 5.7 | 5.9 |
| | Distance to Health Care Facilities | 0.9 | 4.2 | 2.6 | 0.5 | 3.1 | 1.8 | 1.1 | 2.7 | 1.9 |
| | Subsistence Farming | 2.1 | 3.7 | 2.9 | 1.7 | 4.1 | 2.9 | 2.0 | 4.4 | 3.2 |
| **Total** | | **100.0** | **100.0** | 100.0 | **100.0** | **100.0** | 100.0 | **100.0** | **100.0** | **100.0** |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

**Table B 8: Percentage contribution of each indicator to the MPI, by province**

**(k = 40%)**

| Dimension | Indicator | EICV3 (2010/11) | | | | | EICV4 (2013/14) | | | | | EICV5 (2016/17) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Kigali City | Southern Province | Western Province | Northern Province | Eastern Province | Kigali City | Southern Province | Western Province | Northern Province | Eastern Province | Kigali City | Southern Province | Western Province | Northern Province | Eastern Province |
| Education | School Attendance | 4.0 | 3.5 | 4.7 | 3.3 | 5.5 | 4.0 | 4.5 | 5.9 | 5.2 | 6.5 | 6.5 | 4.5 | 5.3 | 3.6 | 6.2 |
| | Years of Schooling | 14.0 | 14.7 | 16.6 | 17.8 | 16.8 | 15.6 | 14.7 | 17.3 | 17.2 | 17.8 | 16.2 | 15.3 | 18.8 | 17.1 | 18.2 |
| Housing | Electricity | 12.2 | 10.3 | 10.0 | 9.6 | 10.3 | 8.3 | 6.4 | 7.6 | 6.7 | 7.2 | 7.9 | 3.6 | 4.8 | 4.4 | 3.2 |
| | Floor | 12.5 | 13.1 | 13.8 | 14.3 | 13.6 | 13.2 | 13.8 | 14.2 | 14.7 | 14.1 | 12.8 | 13.7 | 14.3 | 14.9 | 14.0 |
| | Overcrowding | 4.1 | 4.6 | 4.1 | 3.2 | 4.2 | 4.9 | 4.3 | 4.3 | 3.2 | 4.9 | 5.1 | 4.5 | 4.6 | 3.6 | 4.6 |
| | Cooking Fuel | 4.6 | 4.4 | 4.7 | 4.6 | 4.5 | 4.8 | 4.7 | 4.8 | 5.0 | 4.8 | 4.9 | 4.7 | 4.9 | 5.0 | 4.8 |
| Public Services | Drinking Water | 11.5 | 11.0 | 9.9 | 11.3 | 11.4 | 12.5 | 12.0 | 10.9 | 12.0 | 12.8 | 12.4 | 12.0 | 10.8 | 12.1 | 13.4 |
| | Sanitation | 8.2 | 7.4 | 5.2 | 7.0 | 6.2 | 5.7 | 8.4 | 4.1 | 4.6 | 4.0 | 4.4 | 7.5 | 4.0 | 5.7 | 3.5 |
| | Garbage Disposal | 10.8 | 7.0 | 8.4 | 7.9 | 6.2 | 12.6 | 10.2 | 10.1 | 11.5 | 8.8 | 13.3 | 12.4 | 11.4 | 13.4 | 9.9 |
| Social Services & Economic Activity | Assets for Communication | 2.7 | 4.1 | 5.0 | 4.4 | 3.3 | 2.5 | 4.2 | 4.5 | 4.2 | 3.3 | 3.6 | 5.2 | 5.1 | 5.5 | 4.7 |
| | Bank account | 5.3 | 5.3 | 4.7 | 4.3 | 4.3 | 4.0 | 3.5 | 3.9 | 2.7 | 3.3 | 5.0 | 3.7 | 4.2 | 3.0 | 3.4 |
| | Health Insurance | 6.7 | 6.7 | 5.5 | 4.7 | 5.3 | 6.8 | 6.1 | 6.2 | 5.0 | 5.6 | 6.4 | 5.9 | 5.8 | 4.7 | 5.7 |
| | Distance to Health Care Facilities | 1.9 | 4.1 | 4.1 | 3.9 | 4.4 | 3.4 | 2.8 | 3.0 | 3.4 | 2.7 | 0.4 | 2.5 | 2.5 | 1.8 | 3.4 |
| | Subsistence Farming | 1.6 | 3.9 | 3.3 | 3.7 | 4.1 | 1.7 | 4.2 | 3.3 | 4.6 | 4.2 | 0.9 | 4.4 | 3.6 | 5.1 | 4.8 |
| Total | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

**Table B 9: Percentage contribution of each indicator to the MPI**

**(k = 40%) by quintile**

| Dimension | Indicator | EICV3 (2010/11) | | | | | EICV4 (2013/14) | | | | | EICV5 (2016/17) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Q1 | Q2 | Q3 | Q4 | Q5 | Q1 | Q2 | Q3 | Q4 | Q5 | Q1 | Q2 | Q3 | Q4 | Q5 |
| Education | School Attendance | 5.6 | 4.1 | 3.9 | 3.5 | 2.1 | 7.0 | 5.3 | 5.0 | 3.2 | 2.0 | 6.6 | 4.7 | 4.2 | 3.7 | 2.6 |
| | Years of Schooling | 15.2 | 16.4 | 16.5 | 16.7 | 18.0 | 16.0 | 16.6 | 16.9 | 17.6 | 18.2 | 16.8 | 17.5 | 17.9 | 16.9 | 17.8 |
| Housing | Electricity | 9.2 | 10.0 | 10.8 | 11.2 | 11.9 | 6.3 | 6.8 | 7.4 | 8.4 | 9.4 | 4.3 | 3.7 | 3.9 | 4.4 | 5.1 |
| | Floor | 13.0 | 13.7 | 13.8 | 13.9 | 13.6 | 13.6 | 14.2 | 14.3 | 14.8 | 14.8 | 13.6 | 14.0 | 14.6 | 14.8 | 14.1 |
| | Overcrowding | 5.6 | 4.2 | 3.4 | 2.6 | 1.8 | 5.3 | 4.2 | 3.8 | 3.1 | 2.5 | 5.6 | 4.4 | 3.6 | 3.0 | 2.0 |
| | Cooking Fuel | 4.3 | 4.6 | 4.6 | 4.8 | 4.8 | 4.6 | 4.9 | 4.9 | 5.1 | 5.2 | 4.6 | 4.9 | 5.0 | 5.2 | 5.2 |
| Public Services | Drinking Water | 10.2 | 10.7 | 11.4 | 11.7 | 11.9 | 11.0 | 12.1 | 12.5 | 13.2 | 13.1 | 11.4 | 12.4 | 12.6 | 12.9 | 14.4 |
| | Sanitation | 6.2 | 6.3 | 7.0 | 6.7 | 6.9 | 5.5 | 6.0 | 4.8 | 5.6 | 4.7 | 4.9 | 5.4 | 4.9 | 5.1 | 6.1 |
| | Garbage Disposal | 7.0 | 7.6 | 7.4 | 7.8 | 8.8 | 9.6 | 9.8 | 10.7 | 10.5 | 10.9 | 10.9 | 11.6 | 12.4 | 12.6 | 13.3 |
| Social Services & Economic Activity | Assets for Communication | 4.9 | 3.9 | 3.6 | 3.5 | 3.5 | 4.8 | 3.8 | 3.3 | 3.0 | 2.8 | 5.6 | 5.1 | 4.4 | 4.1 | 3.3 |
| | Bank account | 5.0 | 4.7 | 4.6 | 4.3 | 4.8 | 3.7 | 3.3 | 3.4 | 2.9 | 3.3 | 3.7 | 3.9 | 3.5 | 3.9 | 4.2 |
| | Health Insurance | 6.1 | 5.9 | 5.4 | 5.3 | 4.3 | 5.8 | 6.1 | 6.0 | 5.6 | 5.5 | 5.6 | 5.9 | 5.9 | 5.4 | 5.6 |
| | Distance to Health Care Facilities | 3.8 | 4.2 | 3.9 | 4.5 | 4.0 | 2.6 | 2.8 | 3.4 | 3.2 | 4.0 | 2.3 | 2.6 | 2.7 | 3.2 | 2.6 |
| | Subsistence Farming | 3.7 | 3.7 | 3.7 | 3.6 | 3.4 | 4.1 | 4.0 | 3.5 | 3.8 | 3.5 | 4.1 | 4.0 | 4.6 | 4.7 | 3.8 |
| Total | | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

**Table B 10: Incidence, intensity and multidimensional poverty index by different K-values**

| EICV3 | | | | EICV4 | | | | EICV5 | | | | CHANGES (from 2010/11 to 2016/17) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| k-value | H | A | MPI | k-value | H | A | MPI | k-value | H | A | MPI | H | A | MPI |
| 5 | 95.0% | 39.1% | 0.371 | 5 | 94.5% | 34.3% | 0.324 | 5 | 93.1% | 32.5% | 0.304 | -0.9 | -0.3 | -0.3 |
| 10 | 93.6% | 39.6% | 0.370 | 10 | 92.7% | 34.8% | 0.322 | 10 | 90.7% | 33.2% | 0.302 | -0.9 | -0.3 | -0.3 |
| 15 | 89.6% | 40.9% | 0.366 | 15 | 86.5% | 36.5% | 0.316 | 15 | 83.2% | 35.3% | 0.294 | -0.8 | -0.3 | -0.2 |
| 20 | 82.1% | 43.1% | 0.354 | 20 | 75.1% | 39.5% | 0.296 | 20 | 70.6% | 38.7% | 0.273 | -0.6 | -0.4 | -0.2 |
| 25 | 74.7% | 45.1% | 0.337 | 25 | 65.4% | 42.0% | 0.275 | 25 | 60.1% | 41.5% | 0.249 | -0.5 | -0.4 | -0.2 |
| 26 | 71.3% | 46.0% | 0.328 | 26 | 61.8% | 42.9% | 0.265 | 26 | 57.9% | 42.0% | 0.243 | -0.5 | -0.4 | -0.2 |
| 30 | 66.3% | 47.4% | 0.314 | 30 | 55.3% | 44.7% | 0.247 | 30 | 50.1% | 44.3% | 0.222 | -0.4 | -0.4 | -0.2 |
| 33 | 58.1% | 49.7% | 0.289 | 33 | 46.7% | 47.2% | 0.220 | 33 | 41.8% | 46.9% | 0.196 | -0.3 | -0.4 | -0.1 |
| 35 | 56.0% | 50.3% | 0.282 | 35 | 44.3% | 48.0% | 0.212 | 35 | 39.5% | 47.7% | 0.188 | -0.3 | -0.5 | -0.1 |
| 40 | 44.4% | 53.8% | 0.239 | 40 | 32.9% | 51.7% | 0.170 | 40 | 29.0% | 51.5% | 0.149 | -0.2 | -0.5 | -0.1 |
| 45 | 33.5% | 57.6% | 0.193 | 45 | 23.2% | 55.7% | 0.129 | 45 | 20.0% | 55.6% | 0.111 | -0.1 | -0.5 | 0.0 |
| 50 | 24.8% | 61.1% | 0.151 | 50 | 15.8% | 59.6% | 0.094 | 50 | 13.2% | 59.8% | 0.079 | 0.0 | -0.6 | 0.0 |
| 51 | 23.3% | 61.8% | 0.144 | 51 | 14.7% | 60.3% | 0.088 | 51 | 12.4% | 60.4% | 0.075 | 0.0 | -0.6 | 0.0 |
| 55 | 17.4% | 64.8% | 0.113 | 55 | 10.4% | 63.3% | 0.066 | 55 | 8.5% | 63.6% | 0.054 | 0.0 | -0.6 | 0.0 |
| 60 | 12.1% | 68.2% | 0.083 | 60 | 6.3% | 67.4% | 0.042 | 60 | 5.5% | 67.1% | 0.037 | 0.0 | -0.7 | 0.0 |
| 65 | 7.6% | 71.9% | 0.055 | 65 | 3.5% | 71.8% | 0.025 | 65 | 2.9% | 71.3% | 0.021 | 0.0 | -0.7 | 0.0 |
| 70 | 3.9% | 76.6% | 0.030 | 70 | 1.8% | 76.5% | 0.013 | 70 | 1.5% | 76.3% | 0.011 | 0.0 | -0.8 | 0.0 |
| 75 | 2.1% | 80.7% | 0.017 | 75 | 0.9% | 81.3% | 0.007 | 75 | 0.8% | 80.2% | 0.006 | 0.0 | -0.8 | 0.0 |
| 80 | 0.9% | 85.9% | 0.008 | 80 | 0.5% | 84.5% | 0.004 | 80 | 0.4% | 84.4% | 0.003 | 0.0 | -0.8 | 0.0 |
| 85 | 0.4% | 90.3% | 0.004 | 85 | 0.2% | 89.9% | 0.001 | 85 | 0.1% | 88.2% | 0.001 | 0.0 | -0.9 | 0.0 |
| 90 | 0.2% | 94.5% | 0.001 | 90 | 0.0% | 95.0% | 0.000 | 90 | 0.0% | 94.2% | 0.000 | 0.0 | -0.9 | 0.0 |
| 95 | 0.0% | 100.0% | 0.000 | 95 | 0.0% | 100.0% | 0.000 | 95 | 0.0% | 100.0% | 0.000 | 0.0 | -1.0 | 0.0 |
| 100 | 0.0% | 100.0% | 0.000 | 100 | 0.0% | 100.0% | 0.000 | 100 | 0.0% | 100.0% | 0.000 | 0.0 | -1.0 | 0.0 |

Source: Produced by NISR based on data from EICV3, EICV4 and EICV5

## Rwanda MPI team

**National Coordinators**

- Yusuf MURANGWA, Director General of NISR
- Ivan MURENZI, Deputy Director General of NISR

**National technical Coordinator**

- Dominique Habimana, Director of SMRP
- Roger KAMANA, Team Leader

**Sampling Experts**

- David Megill
- Roger KAMANA,

**National fieldwork Coordinator**

- Juvenal MUNYARUGERERO

**Regional data collection Supervisors**

- Jean Baptiste Serugendo
- Astrid SEGAHWEGE
- Jean Claude Nzabonimpa
- Serge Mugabo
- Alice Uwimana
- Ali Baba Mwango

**Data collection IT supervisors**

- Jimmy Mukasa
- Massud HARERIMANA
- Donat Nkundimana
- Jean Jacques Faustin Sharangabo
- Jean Marie Vianney NKURUNZIZA

**EICV5 Data Analysis and report writing**
Dominique HABIMANA
Apolline MUKANYONGA
Bonus NTAGENGERWA
François ABARIKUMWE
Roger KAMANA
Baba Ali MWANGO
Jean Claude NZABONIMPA
Serge MUGABO

**International Experts**
Christian OLDIGES, Oxford Poverty and Human Development Initiative (OPHI)
Monica PINILLA, Oxford Poverty and Human Development Initiative (OPHI)
Adriana CONCONI, Oxford Poverty and Human Development Initiative (OPHI)

**Proof reading**
DR Joseph NKURUNZIZA
Jean Claude NYIRIMNZI
Ruben MUHAYITETO
**Design and Layout**
Jean Claude Nyirimanzi