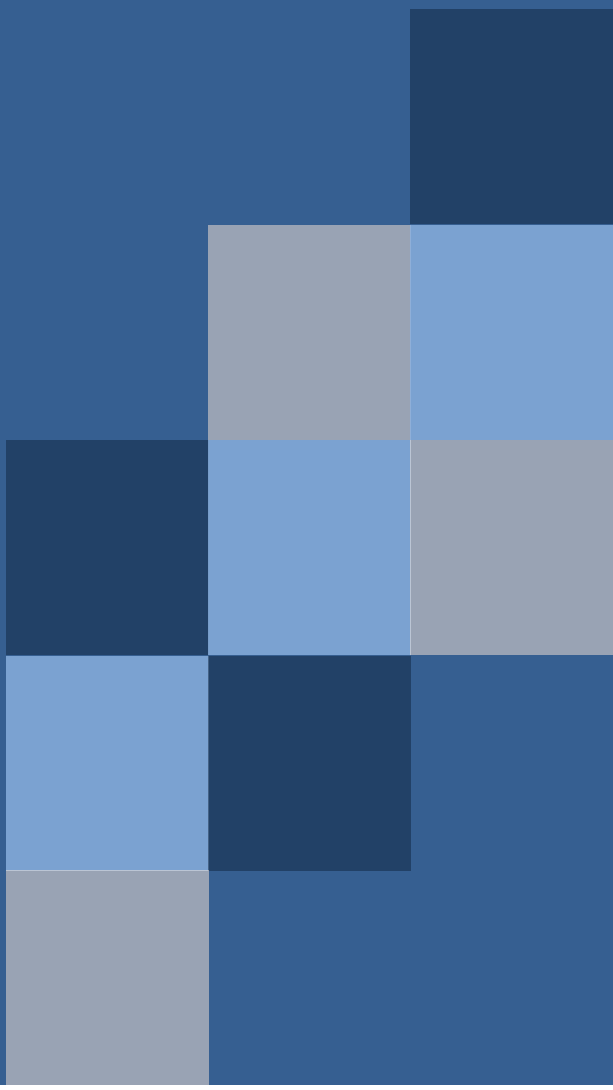
THE REPUBLIC OF RWANDA

NATIONAL INSTITUTE OF STATISTICS OF RWANDA

Fourth Population and Housing Census, Rwanda, 2012

Thematic Report

Mortality



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Ministry of Finance and Economic Planning
National Institute of Statistics of Rwanda

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January 2014

The Fourth Rwanda Population and Housing Census (2012 RPHC) was implemented by the National Institute of Statistics of Rwanda (NISR). Field work was conducted from August 16th to 30th, 2012. The funding for the RPHC was provided by the Government of Rwanda, World Bank (WB), the UKAID (Former DFID), European Union (EU), One UN, United Nations Population Fund (UNFPA), United Nations Development Programme (UNDP), United Nations Children's Fund (UNICEF) and UN Women.

Additional information about the 2012 RPHC may be obtained from the NISR:
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Thematic Report: **Mortality**

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List of Abbreviations

ASDR	Age-Specific Death Rate
CBHI	Community-Based Health Insurance
CTC	Census Technical Committee
CMR	Child Mortality Rate
CUG	Short User Group
CDR	Crude Death Rate
EA	Enumeration Area
EDPRS	Economic Development and Poverty Reduction Strategy
EICV	Integrated Household Living Conditions Survey
EU	European Union
GDP	Gross Domestic Production
GoR	Government of Rwanda
DHS	Demographic and Health Survey
HMIS	Health Management Information System
HDI	Human Development Index
HIV/AIDS	
IMR	Infant Mortality Rate
IDSR	Integrated Disease Surveillance in Rwanda
ICPD	International Conference on Population and Development
MMR	Maternal Mortality Ratio
MDGS	Millennium Development Goals
MINAGRI	Ministry of Agriculture
MINEDUC	Ministry of Education
MINECOFIN	Ministry of Finance and Economic Planning
MINAFEFET	Ministry of Foreign Affairs and Cooperation
MoH	Ministry of Health
NCC	National Census Commission

NISR	National Institute of Statistics of Rwanda
NEPAD	New Partnership for Africa's Development
PES	Post Enumeration Survey
PHC	Population and Housing Census
PRB	Population Reference Bureau
RPHC4	Fourth Rwandan Population and Housing Census
RDF	Rwanda Defence Force
SDR	Standardized Death Rate
SMS	Short message service
SNR	Service National du Recensement
TFR	Total Fertility Rate
U5MR	Under-5 Mortality Rate
UKAID	United Kingdom Agency for International Development (formerly DFID)
UNDP	United Nations Development Program
UNFPA	United Nations Population Fund
UNICEF	United Nations Children Fund
USD	United States Dollar
WB	World Bank
WHO	World Health Organization

FOREWORD

The undertaking of Population Censuses in Rwanda goes back to the year 1978 where the first ever Census was implemented. The second and third censuses were carried out in 1991 and 2002. The 2012 Census marks the Fourth in the series. It is undoubtedly that Census information, particularly if made available on a regular basis, is indispensible for planning, policy development, evaluation and for research purposes.

The final results of the 2012 Census are published in the form of statistical tables and analytical thematic reports. Generally, the results provide population counts down to the lowest administrative level, as well as demographic and socioeconomic indicators at both national and district levels. I recommend that such invaluable information contained in the census results be used as updated benchmarks for all development planning, and in monitoring and evaluation of Rwanda's development goals.

On this occasion, I would like to seize this opportunity to thank His Excellency the President of the Republic of Rwanda for his direct support to the census, the Government of Rwanda and development partners for providing the required resources for conducting the 2012 Census. Special gratitude goes to One UN, the European Union (EU), the United Nations Population Fund (UNFPA), the World Bank (WB), the United Kingdom AID (UKAID-formerly DFID), UN Women and UNICEF.

I would also like to thank all members of the National Census Commission and the Census Technical Committee for their able guidance of the entire Census operation. The National Institute of Statistics of Rwanda (NISR) deserves special appreciation for the successful implementation of this huge statistical undertaking and releasing the final results on time.

Special gratitude goes to all respondents, field staff from NISR and other government institutions and international experts for their sincere cooperation and dedication to successfully complete the mission.

Claver GATETE

Minister of Finance and Economic Planning, and
Chairperson of the National Census Commission

ACKNOWLEDGEMENTS

The National Institute of Statistics of Rwanda (NISR) is pleased to release the final results of the Fourth Population and Housing Census (PHC4). The execution of different Census phases: preparatory works, data collection, data processing, tabulation and data analysis continued for about four years -- between 2010 and 2013.

NISR has published several Census analytical reports to be of direct help to policy makers, planners, local authorities and other users. The reports have dealt with several issues from population size and distribution, education, settlement, labour, population projections to mention but a few. NISR hopes that the analytical reports would meet the demand of Census data users at central and local levels.

On this occasion, I would like to pay our sincere gratitude to the President of the Republic of Rwanda for the Presidential Decree No. 02/01 of 07/02/2011 organizing the 4th Population and Housing Census and the Minister of Finance and Economic Planning the Chairperson of the National Census Commission for the Ministerial Order No. 001/12/10/TC of 19/01/2012 determining the administrative structure and technical organization of the 2012 Population and Housing Census. These legal instruments laid a solid foundation for all activities that followed without which not much could be achieved.

I also take this opportunity to thank the National Census Commission, the Branches of the Commission at Province and District levels and the Census Technical Committee whose invaluable guidance and advice enabled carrying out Census operations in a highly professional and timely manner.

My greatest gratitude extends to the Government of Rwanda and development partners for availing logistical and technical support.

Special recognition goes to the Ministries of Defense, Local Government, Education, Internal Security, Foreign Affairs, the National Police and National Correctional Services for the direct involvement in field data collection operations.

I also wish to express my appreciation to the local government authorities and NISR staff for their excellent operational organization and to the tens of thousands of enumerators and supervisors for their painstaking efforts throughout the data collection phase.

Finally, the people of Rwanda, residents and visitors your cooperation was crucial for the success of the census. Thank you.

MURANGWA Yusuf

Director General,
National Institute of Statistics of Rwanda

Executive Summary

The objective of the present analysis was to analyse the level, trends and pattern of: (i) mortality among the general population; (ii) early childhood mortality; (iii) adult mortality; and (iv) mortality among the elderly. **The main findings is that mortality remains generally high in Rwanda but has decreased substantially over time, especially among children aged 0**. More detailed findings are presented below.

Mortality among the general population:

Overall 79,465 deaths occurred in the Rwandan population during the year preceding the 2012 census. Among them there were slightly more males (39,863) than females (39,607). In other words 218 persons die every day in Rwanda. This is equivalent to a Crude Death Rate (CDR) of 7.7‰ (8.0‰ among males and 7.4‰ among females).

The mortality pattern in Rwanda is similar to the one found in countries with high levels of mortality during childhood and at old ages. The mortality rate is around 50‰ during the first year of life and decreases quickly to 6‰ between ages 1 and 4 before varying a little bit up to 55 years when it surpasses again the 10‰. As age increases, the mortality increases very quickly and even reaches a value close to 180‰ at age 80 and above. The mortality pattern does not vary by sex though the level of mortality is systematically higher among males than among females for all age-group.

As for life expectancy at birth (e_0), it is 64.5 years in 2012 for both sexes. As is usually the case, it is higher among females (66.2 years) than males (62.5 years). It has increased a lot over the past decade. In 2002 it was 48.4 years for males and 53.8 years for females.

Childhood mortality:

Infant mortality is still high in Rwanda. The Infant Mortality Rate (IMR) in 2012 is 48.6 ‰ and is higher among boys (53‰) than girls (44%). However the IMR has decreased a lot and more quickly during the last decade: from 139‰ in 2002 to 48.6‰ in 2012. The decrease is more important among girls (67%) than among boys (63%).

The Child Mortality Rate (4q1) in 2012 is 25‰ with slight difference by sex: 26‰ for boys and 24‰ for girls. The Child Mortality Rate also decreased a lot between 2002 and 2012, more among boys (77%) than girls (74%).

Regarding Under-Five Mortality Rate (U5MR), it is also high with 72‰ of the new-born likely to die before their 5th anniversary. It is higher among boys (78.1‰) than among girls (66.1‰). As for the other childhood mortality rates (infant mortality rate and child mortality rate), it has decreased a lot between 2002 and 2012, with slight difference by sex: 67.4% among boys and 69% among girls.

The different findings presented above are consistent with the DHSs results that have already revealed an important decline in childhood mortality in Rwanda in the recent years.

Adult mortality:

Adult mortality in a population is better summarized by life expectancy at age 20. The 2012 census revealed that in Rwanda an adult people aged 20 may expect to live an additional 51.1-year period. This is greater among females (52.4 years) than among males (49.6 years). Compared to life expectancy at birth this means that a Rwandan who escapes from all mortality risks before age 20 would expect to live 6 years and a half more than at his/her birth. Six years and a half is therefore a measure of the cost in life expectancy of the risk the Rwandans are submitted to during their first 20 years of life. The gain is greater among males (7.1 years) than among females (6.2 years) reflecting the higher risk of mortality males run during the first 20 years of life.

Mortality among the elderly:

The official definition of elderly in Rwanda is people aged 60 years and above. Therefore in this analysis we captured mortality among the elderly through life expectancy at age 60 (e_{60}). Under the current level of mortality a person who reaches age 60 in Rwanda would expect to live around 18 more years (17 years for males and 18 for females). This corresponds to a gain in life expectancy of 13 years as compared to life expectancy at birth. The gain is even higher among males (14.5 years) than among females (12 years). This means that the cost in terms of life expectancy of the different risk a Rwandan has to go through between birth and age 60 is too high (13 years), especially among men (14.5), reflecting the greater death risk run by males.

Interpretation of the findings

The dramatic decline in all types of mortality presented above seems to reflect the direct impact of the vigorous and multidimensional interventions implemented over the past decade to fight against the leading causes of death in Rwanda (Malaria, Tuberculosis, HIV/AIDS, childhood diseases, etc.). It seems also to reflect the long-term impact of earlier interventions aimed at recovering from the 1994 genocide that had increased tremendously mortality. These actions resulted into a better access to health care and an improvement in living conditions of the population; for instance 1 million Rwandans escaped from poverty between 2006 and 2011 according to EICV 2010/2011[1].

More health facilities were built and evenly distributed throughout the territory, mosquito nets widely distributed to households, immunization campaigns conducted, universal access to medical insurance established, hygiene promoted, etc. According to the MoH annuals reports the number of non-private health facilities in Rwanda increased from 579 in 2010 to 720 at the end of 2011. There was 1 doctor per 17,200 inhabitants in 2011 compared to 1 doctor per 75,000 in 2000, and 1 nurse per 1,294 inhabitants compared to 1 nurse per 6250 inhabitants in 2000. Access to health facility has increased from 31% in 2003 to 95% in 2010. According to the 2010 DHS nearly all of the mothers (98 %) received antenatal care from trained personnel. The contraceptive prevalence rate was 45%in 2010.Over 90% of the children have received vaccination services in 2010. On average, 78% of households have health insurance, an increase from 68% in 2007–08.

[1]NISR .2012. The third Integrated household living conditions survey , main report

Chapter 1: Overview of the Fourth Rwanda Population and Housing Census

1.1 Context and justification

The history of the Population and Housing Census in Rwanda dates back to the 1970s. To date, four modern censuses have successfully been conducted in Rwanda, in 1978, 1991, 2002 and 2012.

The 2002 Census collected a number of demographic and socio-economic characteristics and indicated a total population of 8,128,553 people. Following the United Nations Decennial Census Program, the 2012 Census is the Fourth Rwanda Population and Housing Census (RPHC4). It indicates that the country now has a total population of 10,515,973 people.

Besides the endorsement of recommendations from major international conferences held under the auspices of the United Nations, the Government of Rwanda (GoR) has been focusing since 2000 on the long-term Vision 2020 that aims at transforming Rwanda into a middle-income country. This is being implemented through the medium-term planning framework of the Economic Development and Poverty Reduction Strategy (EDPRS) for successive five-year periods. The measurement of progress in implementing the EDPRS and the various UN recommendations calls for the availability of demographic and socio-economic statistical data to inform the selected indicators at different levels.

The RPHC4 is a reliable and comprehensive source of data, which compared to other official statistics data sources (administrative data, surveys, etc.) allows for disaggregation to the lowest geographical level.

The RPHC4 was undertaken to update the national mapping and demographic databases, to provide indicators for monitoring poverty reduction strategies and achievement of international development goals (MDGs, ICPD-PoA, NEPAD, etc.) and to strengthen the technical capacity of the National Institute of Statistics of Rwanda (NISR).

A more detailed discussion of the long- and short-term objectives of the Census is presented in Annex A of this report.

1.2 Legal and institutional frameworks

As an essential precondition for Census execution, the legalization of its operations was secured by a Presidential Decree officially establishing and determining the administrative organization of the Census. In addition, a Ministerial Order of the Minister of Finance and Economic Planning has set forth the official and statutory requirements for Census activities.

The institutional framework set up for implementing the RPHC4 consists of three main bodies: the National Census Commission (NCC), the Census Technical Committee (CTC) and the

decentralized branches of the NCC at province and district levels.

In order to ensure focused functioning during the whole period of Census execution, a Census Unit was created within the NISR, as an executing unit, and benefiting from other financial, logistical and technical support services from the NISR.

1.3 Census phases

Following the preparatory phase of the Census, which consisted of the production of the project documents, schedule and Census budget, the following technical activities were undertaken:

- Census mapping;
- A Pilot Census;
- Questionnaire and manual development;
- Census publicity and sensitization campaign;
- Recruitment and training of field staff;
- Census enumeration; and
- Post-enumeration activities.

Further details on all Census phases can be found in Annex A of this report.

The success of the RPHC4 is attributable largely to the rigorous pre-Census planning and robust Census enumeration monitoring undertaken by the NISR as well as the remarkable support received from the Government and people of Rwanda and the generous technical and financial assistance given by international development partners.

Chapter 2: Context and objectives of the analysis

2.1 Introduction

The analysis of mortality from census data is relevant for more than one reason. It provides many indicators needed for policy formulation, strategic planning, monitoring and evaluation of health and socioeconomic programs as well as for other demographic analysis. For instance it provides the levels and differentials of childhood mortality used to evaluate the effectiveness of health programs, to identify areas at risk and to better target health interventions. It measures life expectancy at birth which is an important indicator of the health and socioeconomic status of a population used in the calculation of the Human Development Index (HDI).

The outputs of the mortality analysis will also serve to monitor progress made towards the achievement of the Millennium Development Goals (MDGs) and the Action Plan of the International Conference on Population and Development held in Cairo in 1994 (ICPD).

Last but not least, the findings of the mortality analysis will be used as crucial inputs in the population projections and in the analysis of other themes.

Census data provide a unique opportunity to analyse various aspects of mortality. The present report uses the Rwandan 2012 Population and Housing Census data to conduct an analysis of mortality in Rwanda in the general population and in selected sub-populations.

The rest of the report will outline the objectives of the analysis, discuss the background and determinants of health in Rwanda, present the methodology, followed by the findings and the conclusion.

2.2 Objectives of the analysis

The overall objective of this report is to provide users with reliable and up-to-date information in mortality in Rwanda. More specifically the objectives are:

- Estimate the levels and trends in mortality among the general population and to describe its pattern;
- Estimate the level and trends of childhood mortality;
- Estimate the level of adult mortality;
- Estimate the level of adult mortality among the elderly; and
- Analyse the sex variations of the above mortality in the above listed groups.

2.3 Background and determinants of health in Rwanda

2.3.1 Geographic context

Rwanda is situated in central Africa, immediately south of the equator between latitude 1°4' and 2°51' S and longitude 28°63' and 30°54' E. The country is bordered by Uganda to the North, Tanzania to the East, the Democratic Republic of the Congo to the West, and Burundi to the South. Landlocked, Rwanda lies 1,200 kilometres from the Indian Ocean and 2,000 kilometres from the Atlantic Ocean.

Rwanda forms part of the highlands of Eastern and Central Africa, with mountainous relief and an average elevation of 1,700 meters. Because of its elevation, Rwanda enjoys a temperate, sub-equatorial climate with average yearly temperatures around 18.5°C. The average annual rainfall is 1,250 millimetres, which occurs over two rainy seasons of differing lengths that alternate with one long and one short dry season. The climate varies from region to region, depending on the altitude. Although Rwanda enjoys more or less constant temperatures, the climate is known to vary from year to year, with extreme variations in rainfall sometimes resulting in flooding or, more often, drought. These extremes have a profound impact on agricultural production and consequently on nutrition status and childhood mortality.

Rwanda has a dense network of rivers and streams, which drain into the Congo River on the western slope of the Congo-Nile Divide, and into the Nile River in the rest of the country through the Akagera River, which receives all the streams of this watershed. Other water resources also include several lakes surrounded by wetlands. Deforestation caused mainly by land clearing for agricultural expansion has resulted in mostly anthropic vegetation with only a few small areas of natural forestland (representing 7% of land area) remaining on the Congo-Nile Divide and the slopes of the volcanic range (NISR, MoH and ICF International, 2012).

People, society and economy

In the aftermath of the genocide, people felt the need to reproduce themselves to replace their killed family members; this translated into rapid population growth that the government has identified as contributing to poverty, malnutrition and poor health among the population as well as to environmental degradation[2]. Rwanda still has a high population growth and density. Between the 2002 and the 2012 censuses the population grew at an average annual rate of 2.3%. According to the 2012 census, the population density was 415 inhabitants per square kilometre. This was 321 inhabitants per square kilometre in 2002 whereas in sub-Saharan Africa the average population density is 23 inhabitants per square kilometre.

Rwanda is a poor rural country with about 90% of the population engaged in agriculture (mainly subsistence one) and some mineral and agro-processing. The country's limited resources, mainly agricultural, are not sufficient to ensure the strict dietary needs of its population. Subsistence crops are produced on family farms (less than one hectare on average in 1993),

[2]MINITERE 2004. Politique Nationale Fonciere

which are shrinking more and more because of population pressure and inheritance shares (all male children are entitled to a parcel of the farm of their father).

Other sectors of the economy are very modest, whether industrial crops (coffee, tea, and pyrethrum), crafts and small industry. The secondary sector employs 2.6% of the labour force, and the tertiary sector 10.0%. The country has few mineral resources. Minerals exports declined 40% in 2009-10 due to the global economic downturn. The shortness of the agricultural economy, therefore, produces no real possibility of using the surplus labour or industrial and commercial diversification.

The 1994 genocide decimated Rwanda's fragile economic base, severely impoverished the population, particularly women, and temporarily stalled the country's ability to attract private and external investments. However, Rwanda has made substantial progress in stabilizing and rehabilitating its economy. The country's macroeconomic framework was remarkably stable, given the difficult external post-crisis environment and Rwanda's position as a highly import-dependent land-locked country. GDP has rebounded with an average annual growth of 7%-8% since 2003 and inflation has been reduced to single digits. Rwanda has made impressive progress in rehabilitating and stabilizing its economy to exceed pre-1994 levels. The overall economy is growing at a significant rate. The GDP annual growth rate on an average of 8.2% between 2000 and 2012. Rwanda's GDP per capita has increased from less than USD 200 in 1994 to USD 644 in 2012.

Health indicators have improved, as has school enrolment, parity between girls and boys in school and access to clean water. Agricultural production has been continuously increasing and the country is reporting to have produced enough food to feed its entire people since 2008. However, surveys conducted to study issues related to food and nutrition in Rwanda have found that protein-energy malnutrition is a widespread problem. It primarily affects preschool children who still represent the most vulnerable group. The malnutrition rate in this group is around 35% with 2-3% suffering from severe malnutrition. In Rwanda the rate of acute malnutrition (wasting) measured by weight to height is relatively low at 3.6% and is within acceptable limits. Despite the success in reducing poverty, levels of chronic malnutrition among children aged 6-59 months remained very high over the last 20 years: 49% in 1992; 51% in 2005, 44% in 2010 and 43% in 2012,(NISR, MINAGRI, 2012)[3].

Mortality and Morbidity

Despite the progress made in the fight against diseases, notably elimination of maternal and neonatal tetanus, poliomyelitis, measles control and reduction of malaria-related mortality, the epidemiological profile of Rwanda is still dominated by communicable diseases, which constitute 90% of chief complaints in health facilities. Mortality and morbidity from these illnesses are aggravated by the high level of poverty, low level of education of the population as well as problems related to inadequate water, poor hygiene and lack of adequate sanitation systems.

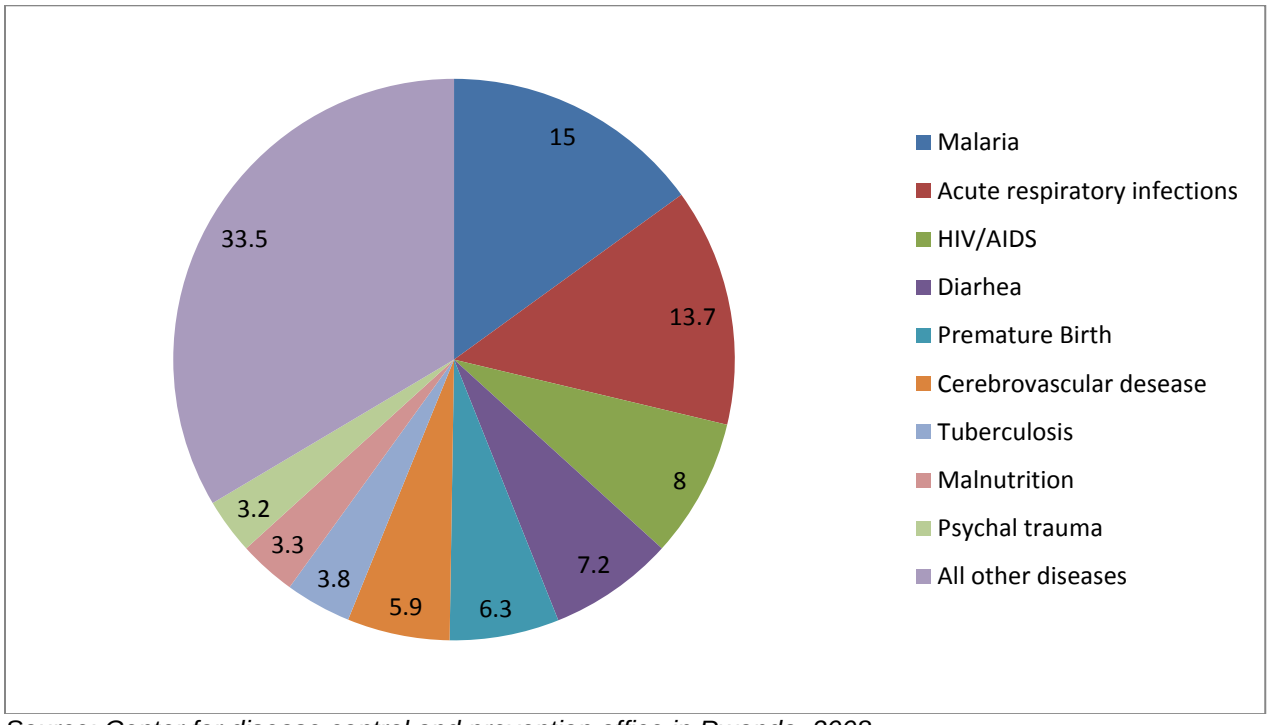
[3]NISR,MINAGRI .2012.Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey

Rwanda is also experiencing an emergence of non-communicable diseases associated with the development of high-risk behaviours and urbanization. As the other countries in the sub-region, it is threatened by natural or man-made disasters and emerging and re-emerging diseases such as avian flu and swine flu, etc..

National Malaria Control Program has shown that malaria incidence declined by 70% between 2005 and 2010. During this period, malaria cases reported in outpatient visits declined 60%, and mortality due to malaria inpatient admissions declined by 54%. Between 2001 and 2010, the test positivity rate declined 66% (Malaria Program Review, 2011). The number of malaria attributes deaths at health facilities declined from 670 in 2010 to 459 in 2012. The proportion of morbidity attributed to malaria at health facilities declined from 7.8% in 2010 to 5.7% in 2012. Mortality attributable to malaria also decreased from 12% in 2010 and halved to 6% in 2012[4]

Rwanda is also hit by the HIV/AIDS epidemic, with a national prevalence estimated at 3% in the general population aged 15-49 years (DHS 2010). This HIV prevalence reveals disparities between urban (7.3%) and rural (2.2%) areas, between women (3.6%) and men (2.3%). The graphs below show that in 2008, the first cause of death was Malaria (15.1%), followed by acute respiratory infections (13.7%) and HIV/AIDS (8%).

Figure 1: Causes of deaths in Rwanda (2008)



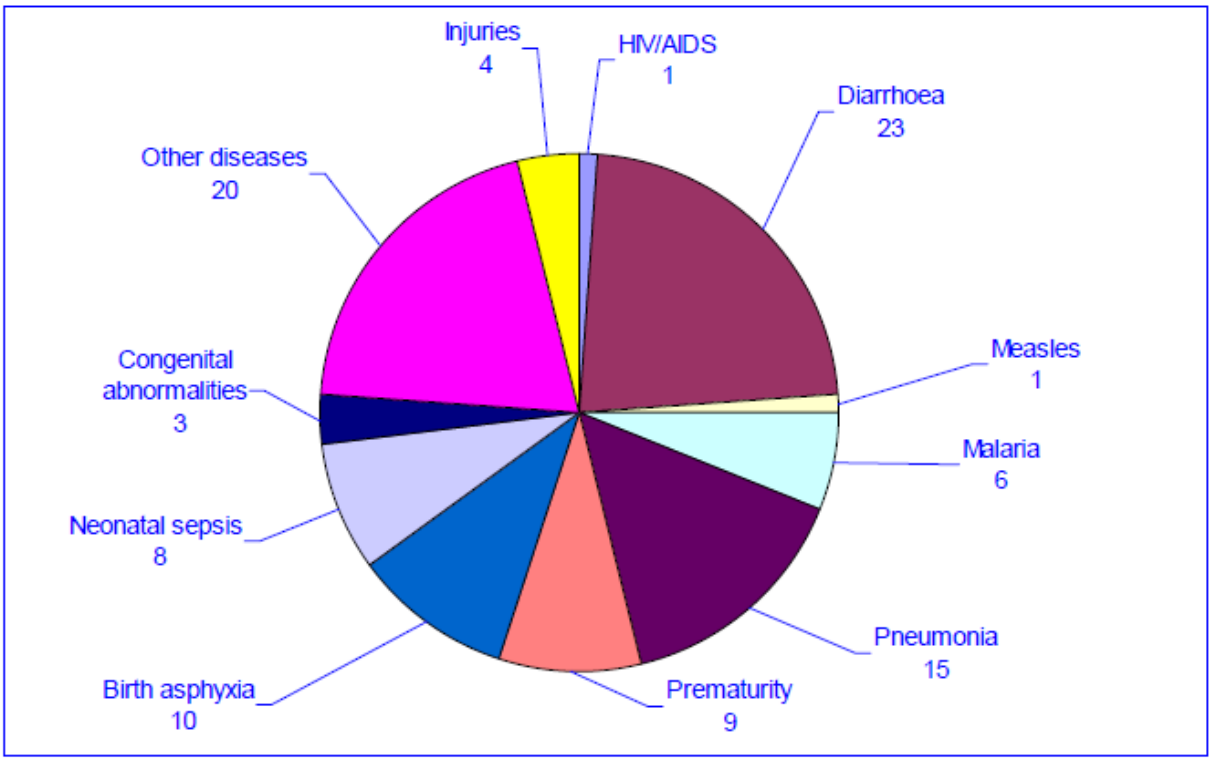
Source: Center for disease control and prevention office in Rwanda, 2008

Distribution of causes of death among children aged below five years

[4] www.newtimes.com.rw of April 25th ,2013

The 2010 factsheet of health statistics of Rwanda prepared by WHO provides the causes of death among under-five children (Figure 2). Diarrhoea was cited as the leading cause of death among this group (23% of all deaths). Pneumonia ranked as second cause of death among children with a non-negligible percentage of 15%. Although the 2010 DHS revealed that the national HIV/AIDS prevalence rate was 3%, 1% of all deaths among children under five are HIV/AIDS related.

Figure 2: Distribution of causes of death among children aged <5 years (%) in Rwanda, 2008



Source: Rwanda Factsheet of Health Statistics, WHO, 2010

Institutional and Policy factors

Over the last decade, the government of Rwanda has made tremendous progress in the health sector. Political commitment and leadership at different levels played a critical role in implementing a range of cost-effective health care interventions.

Since 2003, Rwanda has developed a comprehensive health financing framework building on global health care financing best practices. The health financing framework is still evolving as a result of profound transformation of key health financing functions of revenue collection, risk pooling and purchasing in the country. The new 2010 African health financing score-cards highlights percentage allocation of budgets and per capita investment on health against main indicators for MDGs on child mortality, maternal mortality, HIV, tuberculosis and malaria in Africa.

A summary of findings on 2009/2010 study of 2001 Abuja commitment of African Heads of State & governments to allocate at least 15% of domestic budgets to health towards achieving MDGs & African health priorities.. According to the score-card, Rwanda out-competed other countries by allocating 18.8% of its annual budget to the health sector, followed by Botswana with 17.8% while Burundi was second last with 2.4 percent[5]

The above financial policy had an implication on the number of non-private health facilities in Rwanda which was 720 at the end of 2011, 579 in the previous year. This increase was primarily due to the opening of 80 new health posts, 60 new dispensaries and 6 health centres[6].

Table 1: Number of health facilities, 2009-2011

No	Health facility	2009	2010	2011
1	National Referral Hospital	4	4	4
2	District Hospitals	40	40	40
3	Police/Military Hospital	1	1	1
4	Health Centers	428	436	442
5	Dispensaries	18	35	95
6	Prison dispensaries	16	18	13
7	Health Posts	34	45	125
	Total	541	579	720

Source: Health Facilities database, HMIS unit, 2009, 2010, 2011

Health infrastructures cannot be sufficient for providing health needs without appropriate human resources. In 2011 there were 625 doctors and 8,513 nurses/midwives working in Rwanda. This corresponds to a ratio of 1 doctor per 17,200 inhabitants, 1 midwife per 66,149 inhabitants and 1 nurse per 1,294 inhabitants. The ratio of health workers by population is declining over the recent ten years and there is hope that by 2017 Rwanda will reach WHO standards in terms of health workers.

Table 2: Ratio of health workers to population

Ratio of health workers by population	2000	2005	2008	2011	Target 2014 MDG	Target 2017	WHO Norms
Doctor/Population ratio	1/75000	1/50000	1/33000	1/17200	1/15000	1/10000	1/10000
Nurse/population ratio	Jan-50	Jan-00	1/1700	1/1294	1/1100	1/1000	1/1000
Midwives/population ratio	---	---	1/100000	1/66149	1/50000	1/25000	

Source: Ministry of Health (2012); Third health sector strategic plan July 2012-June 20187

Environmental factors

Maintaining a clean and safe physical environment is fundamental for social, economic and physical well-being of all sections of the population. It comprises a number of complementary activities including construction and maintenance of sanitary infrastructures, provision of safe

[5] www.who.int/pmnch/events/2010/autosummithealthfinancing score-card consulted on 06th august 2013
[6] Rwanda Ministry of Health Annual Health statistics Booklet,2011
[7] Ministry of Health. 2012. ; Third health sector strategic plan July 2012-June 2018

drinking water services, public education, community and individual actions, regulation and legislation.

The objective of Vision 2020 is to have a satisfactory state of health for both urban and rural population - without being exposed to pollution; to have all swamps cleaned up with a view to reducing the presence of malaria vectors in particular; for each town or development region to have a unit for the treatment and disposal of solid wastes; and for households to develop awareness and practice minimum hygiene and sanitation measures.

Urban areas are particularly under threat of environmental problems, land degradation and dual burden of communicable and non-communicable diseases. The DHS 2007 showed that 19% of urban households used spring water and 12% relied on water from uncovered public wells (NISR and ORC Macro, 2006). Such water resources could be easily contaminated once untreated wastes are indiscriminately discharged into the environment. Contaminated waters sources may put people in urban and peri-urban areas at risk of contracting infections and diseases. Water from open drains and streams within the urban or peri-urban perimeter are often used by farmers to grow vegetables for the urban market.

The use of untreated waste water for irrigation brings with it substantial occupational and consumer risks. Used domestic water mainly from septic tanks, latrines, animal waste and refuse-infested drinking water can cause diseases such as typhoid, cholera, gastro-intestinal infections and dysentery. Poor sanitation and contaminated water are responsible for about 80% of the disease burden of Rwandans.[8]

There are also other gradual and long-term chronic diseases that may affect general health and wellbeing. This does not only affect the social and economic conditions of people, but also puts greater burden on the Government health budget. Urban air pollution resulting from dust particles and vehicle emission has been constantly on the rise and a severe public health threat in Rwanda. Also, during the dry season, there is a marked increase in air borne diseases due to dust particles emission; this is particularly challenging since it calls for heavy investments in physical infrastructure.

Socioeconomic factors

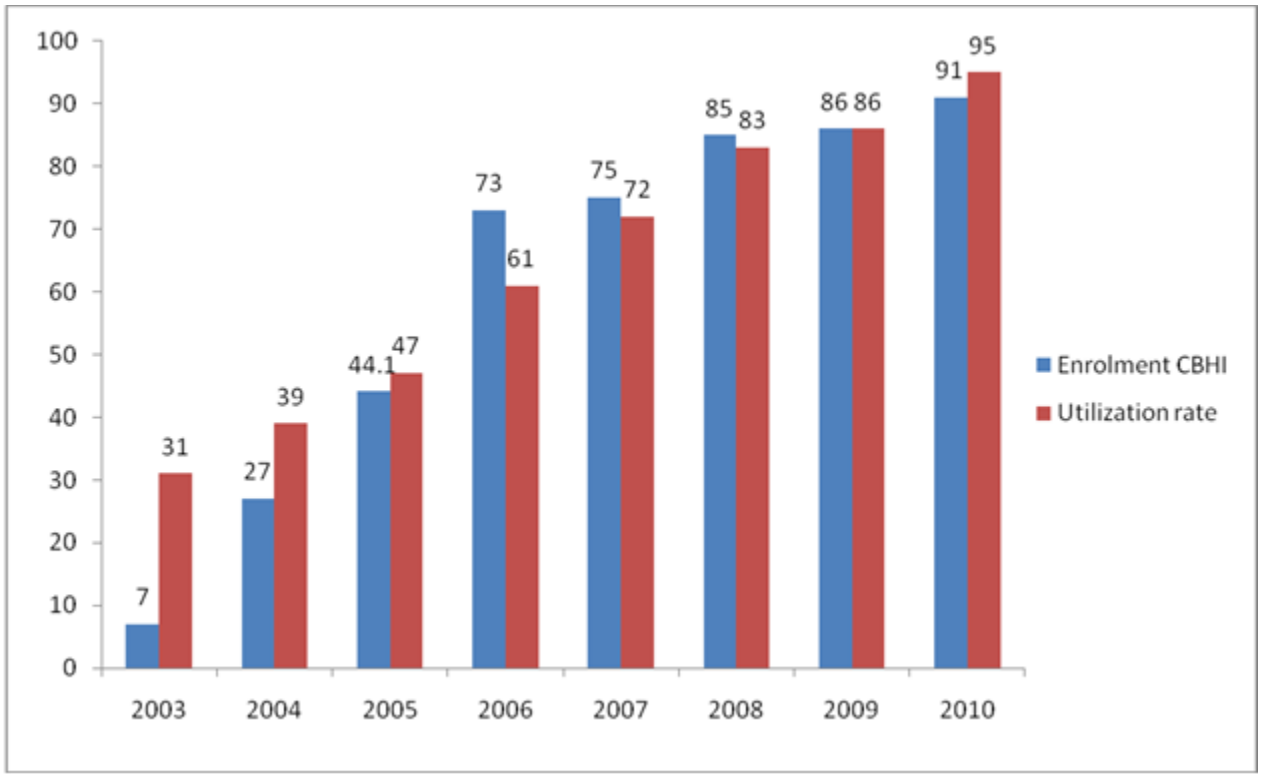
Health and poverty are closely intertwined and operate in both directions. This is particularly the case for long-term chronic conditions and other life threatening infections such as HIV/AIDS which has direct consequences on poverty and individual and family wellbeing. Improving access to affordable and quality health care can reduce health inequalities and reduce poverty.

This is reflected in the new mid-term strategy (EDPRS, 2008-2012) which has a stronger emphasis on poverty reduction through strengthening economic growth policy with components focusing on the most vulnerable segments of the population.[9]

[8]Ministry of Health (2008). Health Annual report 2007
[9]MOH.2010.Rwanda community based health insurance policy

There is overall increase in the access to health care. For example general health care utilization increased from 25% in 2001 to 30% in 2003, antenatal care increased from 67% in 2001 to 81% in 2003, and family planning use increased from 4% to 9.2% in the same period. Over 90% of the children have received vaccination services. Currently, all operational health centres of the country shelter a Community-Based Health Insurance (CBHI) section; which presumes 100 % geographic coverage. Population adhesion to CBHI[10] was progressive particularly since 2003. As demonstrated in the graph below, adhesion rates increased rapidly from 7% in 2003 to 91% in 2010.

Figure 3: Trends in community based health insurance (CBHI) coverage (%) in Rwanda 2003-2010



Source: Rwanda Ministry of Health, Mid-term review, 2011

The figure above shows that utilization rate (access to health facility) has increased progressively from 31% in 2003 to 95% in 2010.

It has been noted that only very few districts have an average membership rate lower than 75%, suggesting equity in CBHI access across districts in Rwanda .

However there remain serious challenges concerning access to quality health care in Rwanda. The lack of qualified health professional has been identified as a major problem in the sector. The government has acknowledged that the poorest people especially those living in rural areas

[10] CBHI is regulated under the law n°62 / 2007 of 30/12/2007 relating to the creation, organization, functioning and management of CBHI and published on March 20th, 2008 in the official gazette.

have the least access to health care services. The poor face limited resources constraints or low purchasing power to access quality health care services. The cost of health services was cited as the greatest barrier to accessing health care. The government has thus responded to the health care needs of the population through new financing mechanisms such as community based health insurance schemes (Mutuelle de santé)[11].

[11] MOH(2010) Rwanda Community based health insurance policy

Chapter 3: Methodology

In this chapter we will define the main concepts used in the analysis, present the data collection method and the information collected, evaluate the quality of the data and finally present the methodology used to adjust the data and to indirectly compute the mortality indicators.

3.1 Definition of concepts

The definitions presented in this section come from the 6th edition of the Population Reference Bureau (PRB)'s Population Handbook[12].

Death (Mortality): Mortality refers to the occurrence of deaths in a population. A death is a complete absence of any signs of life at any time after a live birth has occurred.

Infant Mortality Rate (IMR): Is the probability for a new-born to die before his/her first birthday. It is expressed per 1,000 live births occurring during a specified reference period. In this case of the present census it is the preceding year. It is usually denoted IMR or by the life table notation $({}_1q_0)$.

Child Mortality Rate (CMR): Is the probability for a child aged 1 year to die before reaching exact year 5. It is expressed per 1,000 and covers a specified reference period, in this case taken to be one year prior to the census. It is usually denoted by CMR or the life table notation $({}_4q_1)$.

Under-Five Mortality Rate (U5MR): Is the probability for a new-born to die before his/her fifth birth day It is expressed per 1,000 live births occurring during a specified reference period, in this case taken to be one year prior to the census. It is usually denoted U5MR or by the life table notation $({}_5q_0)$.

Crude Death Rate (CDR): The total number of deaths in a given year among a population divided by the mid-year population, expressed per 1,000 inhabitants.

Age-Specific Death Rate (ASDR): The number of deaths in a population of a given age (or age-group) in a given year divided by the estimated mid-year population in that age (age-group), expressed per 1,000 inhabitants.

Life Expectancy at Birth (e_0): Average number of years a hypothetical cohort of people born in a specific year could expect to live if they were subject to the current mortality level at each age throughout their life. Life expectancy at a specific age is the number of additional years a person could expect to live if he was subject to the current mortality at each age for the rest of his life.

[12] Haupt Arthur, Thomas T. Kane, and Carl Haub (2011) PRB's Population Handbook, 6th edition. Population Reference Bureau, Washington DC.

3.2 Data collection method and information collected

The objective of the census is to provide, among other indicators, the levels and patterns of mortality among the whole population and among the Children. Based on feasibility and assessment of the census data, the following indicators will be calculated:

- The total number of deaths that occur in the population per year;
- The Crude Death Rate;
- The Standardized Death Rate;
- The Age-specific Central Death Rates;
- The Age-specific Death Rates;
- The Life expectancy at each age.
- The Infant Mortality Rate;
- The Child Mortality Rate; and
- The Under-Five Mortality Rate.

In order to compute all these indicators, the 2012 PHC collected the needed data in the private households through two different sections of the questionnaire: the Deaths Record and the Fertility Sections.

The Deaths Record contains information on all deaths occurred in the household during the last 12 months preceding the census: sex of the deceased; age at death; cause of death; and in case of a female death, whether the death is maternal-related or not.

The Fertility Section collected data for each woman aged 12 years and above residing in the household, the number of her children ever-born and the number of children born in the last 12 months preceding the census by sex and the number of them still alive. For each sex, it is therefore possible to compute the number of children dead by subtracting the number still alive from the number of born children.

Questions on the survivorship of the biological parents (father, mother) of each resident of the household aged 0 to 17 were also collected to measure the prevalence of orphanhood. They were not designed to measure the mortality indicators presented above. We will, therefore, not use them in this analysis.

All mortality-related questions were asked to the household head or another member of the household if he or she was not available during the interview: The table below presents the mortality-related questions asked in the census and the variables that are available for the analysis.

Table 3: Summary of issues related to the questionnaire of mortality

Variables	Questions
Death of the last 12 months	Is there any household member who died during the last 12 months that is between 15/08/2011-15/08/2012? If yes, • What was the sex of the deceased? • What was the age of the deceased at death?
Child survivorship	For each female resident of 12 years and above • How many children in all were born alive? • Among all these living born, how many are still alive? • How many children were born alive in the past 12 months? • Among those children born alive in the last 12 months how many are still alive?
Deaths of women 12 to 49 years	If the deceased is a woman aged 12 to 49 years at time of his death: • Was she pregnant? • Was she in labour? • Was it within six weeks following the end of pregnancy or childbirth?
Survivorship of the biological parents (father and mother)	For each resident age 0-17 years • Is the natural mother alive? • Is the natural father alive?

3.3 Data Quality Evaluation

There are several reporting and measurement biases that affect the quality of mortality data. Mortality is a sensitive indicator and often people in the household might be reluctant to report the death of a household member; especially if the death occurred recently prior the census. The reporting bias varies according to the age of the deceased as well as other individual characteristics. The type of response depends on how the questions were asked and the probing of deaths in the reference period. The measurement and reporting biases are inherent in the mortality data collection in the census especially in resource poor settings, which makes it difficult to estimate mortality directly from the census. In such circumstances, the mortality indicators are estimated by applying indirect estimation techniques, adjusting the data for inconsistencies and errors. This is often the case in virtually all African censuses.

For these reasons, it is very important to first evaluate the quality of the data in order to: (i) identify the biases that affected the data; (ii) decide on whether or not some adjustments of the data are needed; and (iii) establish the feasibility of estimating relevant indicators using direct or indirect methods.

3.3.1 Identification of the biases that affect the data

Three main types of bias affect the mortality data of the 2012 PHC: the under-reporting or over-reporting of deaths during the reference period, that is the 12 last months preceding the census night (Type 1), errors in the age declaration of the deceased (Type 2); and wrong identification of the causes of the death (Type 3).

These biases affect the level of mortality among the general population (Type 1), the mortality pattern in the general population (Type 2), the level of childhood mortality (Type 1 and Type 2)

and the level of maternal mortality (Type1, Type 2 and Type 3). The following sections elaborate more on the sources of each of these types of error.

Under and over-reporting of deaths: Data on mortality in the census were collected for a specific reference period of 12 months prior to the census night which was August 15th, 2012, except for survivorship of children ever-born that covers all born children irrespective of the period. However, this period of reference is not always well understood by the respondents. It is possible that respondents sometimes misclassify deaths within or outside the reference period which affects the reporting of the actual number of deaths. Moreover, respondents might be reluctant to report the death of a household member for cultural reasons which can lead to underestimation of the number of deaths. This is particularly the case for death of young children. The lack of judgment between a stillbirth and live birth and the tendency to ignore dead children born with genetic malformations can also affect the estimation of infant mortality.

Error in the declaration of age: Errors in classifying the deceased and the population by age may bias the observed age-structure of mortality (mortality pattern). Errors in age declaration seriously affect the childhood mortality indicators, especially the Infant Mortality Rate and the death rates among elderly. More generally, the misreporting of ages survivors at the time of census and significant variations by age of census coverage may substantially affect the levels of mortality indicators calculated from the deaths occurred in the last 12 months.

Error in reporting the causes of death: It is often difficult to ascertain the exact cause of death, especially if death occurs within the household. This is particularly a concern for sudden premature deaths. Also, in some cases, the respondents might be unwilling to disclose the cause of death especially those related to HIV or other related infections. Moreover it is possible that a person died due to multiple causes of death. In such circumstances, it is difficult to identify the primary cause of death in the absence of a medical expert. Finally the deaths within the health institutions are sometimes not properly recorded, disclosed or audited. These biases can influence the reporting of causes of death and the estimation of mortality.

In order to identify and measure the magnitude of such biases, an attempt is made to compute different indicators and compare them with other data collected by the census as well as with external sources to check for possible inconsistencies. Other irregularities in the data are examined by plotting the ASDRs curve and where appropriate comparing its shape with expected theoretical distributions confirmed in demographic research.

3.3.2 Evaluation of the completeness of the overall death reporting

The basic approach to evaluating the completeness of death reporting is to examine the total number of deaths occurred in the population by sex and to compute the Crude Death Rate and compare it with the previous census ones.

The crude death rate is calculated by dividing the total number of deaths to the average population in that year (mid-year population) and multiplying the ratio by 1,000. The mid-year population is the size of the population in February 2012; it is obtained by projecting the

population backward from the census count date by applying the average annual intercensal growth rate.

The Table 4 below gives the observed number of deaths by sex and for both sexes and the corresponding Crude Death Rate (CDR). Overall only 27,917 deaths were reported during the year preceding the 2012 census, corresponding to a CDR of 2.6‰.

This seems to be very low as compared to the 125,105 deaths and CDR of 15.4‰ calculated by the 2002 census. Though both values (total number of deaths and CDR from the 2012 PHC) are not directly comparable with the 2002 ones because of the decline in mortality and change in the age-sex structure of the population, the differences are rather unreasonably large. Moreover the level of the CDR is far lower than the one from the most developed countries. This gives a clear indication that there is an under-reporting of the deaths occurred in the households during the year preceding the census.

Table 4: Observed total number of deaths and Crude Death Rate (CDR) for both sexes

Indicators	Value of the indicators
Number of deaths for 12 preceding months	27,917
Mid-year population size	10,382,302
Crude Death Rate (CDR)	2.6‰

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

3.3.4 Evaluation of the completeness of the death reporting by sex

Table 5 below shows that the differences between the number of male and female deaths seem plausible. Mortality is known to be higher among males than females. Therefore it is possible to conclude that under-reporting is age-specific based only on this indicator.

Table 5: Observed total number of deaths and Crude Death Rate (CDR) by sex

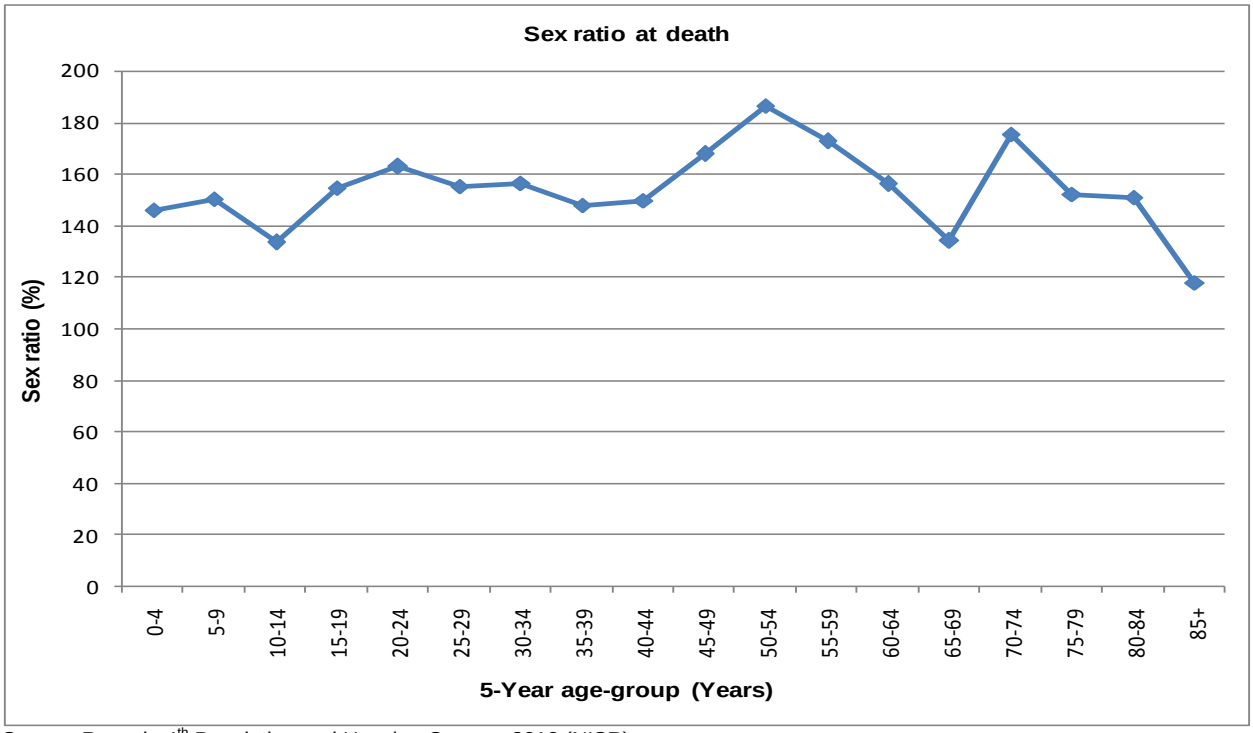
Indicators	Sex of the deceased	
	Male	Female
Number of deaths for 12 preceding months	16,714	11,203
Mid-year population size	4,998,237	5,384,047
Crude Death Rate (CDR)	3.3‰	2.1‰

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

The sex ratio at death by age is yet another indicator to examine potential sex-differences in mortality. It is expected that the sex ratios curve follow a classical well-known pattern that reflects the differences in mortality risk by sex and age-group. For instance mortality below age 1 is expected to be higher among boys than girls. Mortality risk is generally higher among females during childbearing age especially in countries where maternal mortality is very high.

The observed sex ratios at death plotted in Figure 4 below shows that female deaths are largely underreported as compared to male deaths. The number of male deaths is 40% higher than those of women at virtually all ages. More specifically the graph shows that underreporting of deaths is particularly marked in a very large age-group spanning from 0-4 years up to age 65-69 years.

Figure 4: Sex ratio at death of the Rwandan resident population in 2012



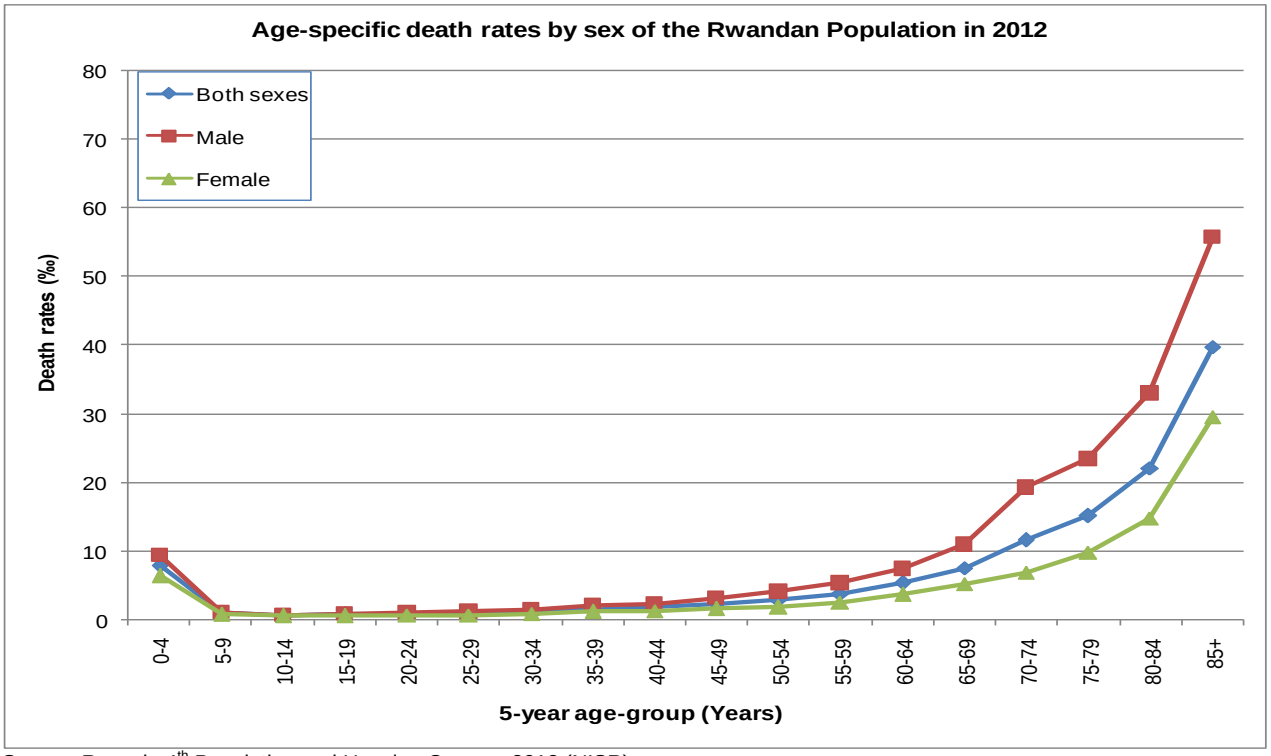
Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

3.3.5 Evaluation of the completeness and accuracy of the deaths reporting by age

The curve of the Age-Specific Death Rates (ASDRs) shows the mortality pattern of a population. In standard population, the ASDR curve follows a classical shape depending on the general level of mortality in the population. In high mortality populations, the curve follows approximately a “U” shape, meaning that mortality is high during childhood and old-age with similar levels and lower during the adult ages. In low mortality populations, the shape of the ASDR curve is similar to a “J”, shape meaning that mortality is low before age 5 and much higher in old-ages. Any discrepancy from this shape may reflect differences in the completeness of the deaths reporting by age.

Figure 5 below plots the observed ASDR by sex from the 2012 PHC. The curve looks more like a “J” than a “U” shape, irrespective of any difference between males and females. This suggests that the level of childhood mortality is lower than what is expected as compared to the level of mortality in other age-groups. The figure indicates evidence of severe underreporting of the child deaths as compared to adult deaths where underreporting is unevenly distributed by age. This may also reflect potential errors in the age distribution of the population.

Figure 5: Age-specific death rates by sex of the Rwandan resident population in 2012



Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

The severe under-reporting of infant mortality is classical in the African censuses and can be assessed in many ways with the census data along with external data. This exercise also gives an indication of the quality of the census mortality data. For all these reasons we will conduct an in-depth evaluation of the quality of the infant deaths data in the following section.

3.3.6 Evaluation of the completeness and accuracy of the infant death reporting

To assess the quality of data on infant deaths we will use two indicators: the number of infant deaths and the Infant Mortality Rate (IMR).

The number of infant deaths can be obtained from the Deaths Record by extracting the number of household members dead at age 0 and from the Fertility Section by subtracting the survivors from the children born in the last 12 months. Both calculations can be done by sex.

The IMR is obtained by converting the Central Death Rate at Age 0 that is the ASDR at age 0 ($_1t_0$) into a probability of death before age 1, that is into the IMR. The Central Death Rate at Age 0 is obtained through two ways. It is obtained from the Deaths Record by dividing the number of deaths at age 0 by the mid-year population aged 0. From the Fertility section, it is obtained by dividing the number of deaths among the children born in the last 12 months by the number of live births in the 12 months. Then we use the formula below to convert $_1t_0$ into $_0q_1$ (IMR).

$$ {}_0q_1 = \frac{{}_1t_0}{1+\alpha\,{}_0t_1} $$

where α is the percentage of the infant deaths that occur during the first 6 months after birth. In countries with high level of infant mortality similar to the one recorded in Rwanda, α=2/3. Therefore the formula becomes:

$$ {}_0q_1 = \frac{{}_1t_0}{1+0.67\,{}_0t_1} $$

Table 6 below contains the number of infant deaths by sex obtained through the Deaths Record and the Fertility Section. There is substantial difference in the reported number of deaths at age 0 between the two sources. The total number of deaths from the Deaths Record is 8,922 vs. 22,131 from the Fertility Section. In both sources, the number of deaths is higher among boys than among girls. However, the sex difference in reported number of deaths is found much larger when computed from the Deaths Record than from the Fertility Section.

Table 6: Number of infant deaths during the last 12 months by sex from the Deaths Record and from the Fertility Section

Number deaths at age 0	Sex		
	Both sexes	Male	Female
From the Deaths Record	8,922	5,361	3,561
From the Fertility Section	22,131	11,543	10,588

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

The Table 7 below compares the IMRs calculated from the Deaths Record and the one from the Fertility Section. Clearly the IMR estimated from the Death Record of 28.6‰ seem to underestimate the true values whereas those estimated from the Fertility Section of 70.5‰ appear to overestimate the reality. These estimates are inconsistent with findings from other sources including the 2010 DHS which estimated IMR at 50‰ for the five years preceding the survey.

Table 7: Infant mortality rates by sex from the Deaths Record and from the Fertility Section

Mortality indicators	Sex		
	Both sexes	Male	Female
From the Deaths Record			
Mid-year population aged 0	305,622	152,765	152,857
Number of deaths at age 0 year	8,922	5,361	3,561
Central Death Rate: ${}_1t_0$ (‰)	29.2	35.1	23.3
Infant Mortality Rate, IMR: ${}_1Q_0$ (‰)	28.6	34.3	22.9
From the Fertility Section			
Number of births during the last 12 months	299,320	149,663	149,657
Number of deaths at age 0 year	22,131	11,543	10,588
Central Death Rate: ${}_1t_0$ (‰)	73.9	77.1	70.7
Infant Mortality Rate, IMR: ${}_1Q_0$ (‰)	70.5	73.4	67.6

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

In conclusion, there is evidence to suggest that the quality of data on mortality is generally poor to allow any direct estimation of mortality indicators.

3.3.7 Evaluation of the declaration of the causes of deaths

According to the Death Record 204 maternal deaths occurred in the previous 12 months, equivalent to a Maternal Mortality Ratio (MMR) of 68.2 maternal deaths per 100,000 live births. This seems too low compared to the findings from other sources including the 2010 DHS that gives an MMR of 476 deaths per 100,000 live births (NISR, 2012). The estimates from raw data show evidence of underestimation of maternal deaths in the previous 12 months. This means that there is an important underestimation of maternal deaths in the previous 12 months.

Table 8: Reported maternal deaths by period of death

Period of death	Number of deaths
During pregnancy	57
During childbirth	76
During the 6 weeks period following the termination of pregnancy	71
Total	204
Maternal Mortality Ratio (per 100,000 live births)	68.2

Source: Rwanda 4th Population and Housing Census, 2012 (NISR

A closer evaluation of the raw data on reported deaths suggests that direct estimation of mortality indicators is inappropriate and will lead to biased estimates. The alternative approach of indirect estimation is considered for subsequent analysis.

However for maternal mortality even indirect estimates will not be made owing to the too poor quality of the data. Therefore maternal mortality estimates are not included in this report

3.4 Adjustment of the data and description of the indirect methods

The main limitation of the data on observed number of deaths is high levels of underreporting. Therefore the data are first adjusted for completeness before generating the life tables using indirect method of estimation. More specifically, the number of reported deaths is corrected by applying the Brass Growth Balance Method and the estimated ASDRs were used to calculate the sex-specific and both sexes abridged life tables. The procedures followed include:

- Correction of the number of deaths in order to calculate a corrected CDR using the Brass Growth Balance Method application of Pasex[13] (GRBAL) that computes the coverage rate of the deaths reporting. The observed deaths are simply divided by this rate to obtain the corrected number of deaths.

- Computation of the Male and Female Abridged Life tables along with related demographic indicators for Male, Female and Both sexes (Life expectancy at birth, Infant mortality rate, Crude death rate). This is done using the LTNRTH application of Pasex by choosing the North family of model life tables which seems the most appropriate one for current mortality patterns in Rwanda.

- Computation of the Abridged Life Table for both sexes using the LTPOPDTH application of Pasex. To do this we used the following inputs: the 5-year age distribution of the population and the corrected deaths for both sex. The latter is obtained by adding up the corrected male and female deaths calculated using the ASDRs from the abridged life tables and the mid-year population of each sex.

The table below gives more details on each step, the input data required and the outputs.

For the detailed descriptions of the GRBAL, LTNRTH and LTPOPDTH method (rationale of the method, mathematical demonstration, assumptions and limitations) see Moultrie et al. (2013).

[13] Pasex is a series of spreadsheet developed by the US Bureau of Census for the analysis of the census data, including method of data quality evaluation and indirect estimations methods of many demographic indicators.

Chapter 4: Findings

This section computes and interprets the levels, trends and pattern of three types of mortality:

- Mortality among the general population, through the number and frequency of deaths in the population, the distribution of deaths by sex and age (mortality pattern) and the life tables (life expectancy at each age by sex);
- Early childhood mortality through the Infant Mortality Rate (IMR), the Child Mortality Rate (CMR) and the Under-Five Mortality Rate (U5MR); and
- Adult mortality and late-age mortality through respectively the life expectancy at age 20 and at ages 60 and 65.

4.1 Mortality among the general population

In countries where the civil registration system is not fully functional, like Rwanda, Population and Housing Censuses are the unique source of data that provides an accurate overview of the level and pattern of mortality among the general population. The objective of this section is to provide the level and structure of mortality in Rwanda by calculating, interpreting and analysing the variations by sex and over time of the following indicators: Total number of deaths that occur in the population per year, the Crude Death Rate, the Standardized Death Rate, the Age-specific Central Death Rates, the Age-specific Death Rates and the Life expectancy at each age.

All the above-listed indicators are derived from the male, female and both sexes' life tables. As explained in the chapter Methodology, we resorted to indirect estimation techniques to compute the three life tables due to the poor quality of the mortality data.

4.1.1 Number and frequency of deaths among the population and their evolution since 1978

The most basic indicators to measure the level of mortality in a given population are the total number of deaths that occur per year in that population and the corresponding Crude Death Rate (CDR) and standardized Death rate (SDR). The SDR eliminates the bias introduced in the CDR by the age structure. In that sense the SDR is more appropriate than the CDR for trend analysis and geographical comparisons.

The number of deaths that occurred in the Rwandan population the year preceding the census is estimated indirectly using the Age-Specific Death Rates (ASDRs) from the male and female life tables. For each age-group of each sex, the number of deaths is obtained by simply multiplying the corresponding ASDR and the mid-year population of the age-group. The mid-year population (as of February 2012) is obtained by retro-projection of the August 2012 Population using the 2002-2012 intercensal average annual growth rate.

The numbers of deaths of the different age-groups are added to obtain the total number of male and female deaths in the year preceding the census. Then male and female deaths are added to obtain both sexes deaths. Table 9 below contains the findings.

Overall 79,465 deaths occurred in the population during the year preceding the census including 39,863 males and 39,607 females. This equates to a number of about 218 deaths every day in Rwanda.

Table 9: Number of deaths occurred during the year preceding the census

Age-group (years)	Both sexes			Male			Female		
	ASDR (a)	Mid-year Population (b)	Expected Deaths (c=f + i)	ASDR (d)	Mid-year Population (e)	Expected Deaths (f=d x e)	ASDR (g)	Mid-year Population (h)	Expected Deaths (i=g x h)
0	0.0506	305,622	15,454	0.0558	152,765	8,522	0.0454	152,857	6,942
1-4	0.0063	1,214,829	7,686	0.0067	605,521	4,045	0.0060	609,308	3,641
5-9	0.0023	1,503,627	3,474	0.0026	747,793	1,910	0.0021	755,834	1,564
10-14	0.0015	1,248,989	1,817	0.0016	615,515	962	0.0013	633,474	855
15-19	0.0021	1,098,926	2,293	0.0024	539,912	1,319	0.0017	559,015	974
20-24	0.0029	1,015,313	2,931	0.0035	493,068	1,747	0.0023	522,245	1,184
25-29	0.0031	916,297	2,872	0.0037	450,838	1,648	0.0026	465,459	1,223
30-34	0.0034	751,212	2,580	0.0039	363,240	1,432	0.0030	387,972	1,148
35-39	0.0039	503,188	1,954	0.0044	229,863	1,016	0.0034	273,325	937
40-44	0.0049	410,278	2,004	0.0054	188,450	1,023	0.0044	221,828	980
45-49	0.0060	336,523	2,031	0.0069	153,580	1,059	0.0053	182,944	972
50-54	0.0087	334,009	2,900	0.0101	149,867	1,508	0.0076	184,141	1,392
55-59	0.0116	238,255	2,774	0.0134	105,471	1,418	0.0102	132,784	1,356
60-64	0.0180	174,107	3,137	0.0206	75,517	1,558	0.0160	98,591	1,579
65-69	0.0285	101,240	2,887	0.0321	39,665	1,272	0.0262	61,574	1,616
70-74	0.0462	91,112	4,213	0.0506	34,902	1,767	0.0435	56,210	2,446
75-79	0.0753	59,462	4,477	0.0812	23,172	1,881	0.0715	36,291	2,596
80+	0.1762	79,312	13,975	0.1842	31,349	5,775	0.1710	47,962	8,200
Total		**10,382,302**	**79,465**		**5,000,487**	**39,863**		**5,381,815**	**39,607**

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

Table 10 below presents the Crude Death Rate (CDR) by sex corresponding to the above-estimated number of deaths. It shows that 7.7 deaths occur in Rwanda per year per thousand inhabitants. As expected, the CDR is greater among males (8.0‰) than among females (7.4‰).

Table 10: Crude Death Rate by sex

Age-group (years)	Sex		
	Both sexes	Male	Female
Expected Deaths	79,465	39,863	39,607
Mid-year Population	10,382,302	5,000,487	5,381,815
CDR (‰)	**7.7**	**8.0**	**7.4**

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

In fact, the CDRs of different population or groups are not directly comparable, nor is the CDR of the same population at different points of time. This is attributed to the differences in the age-

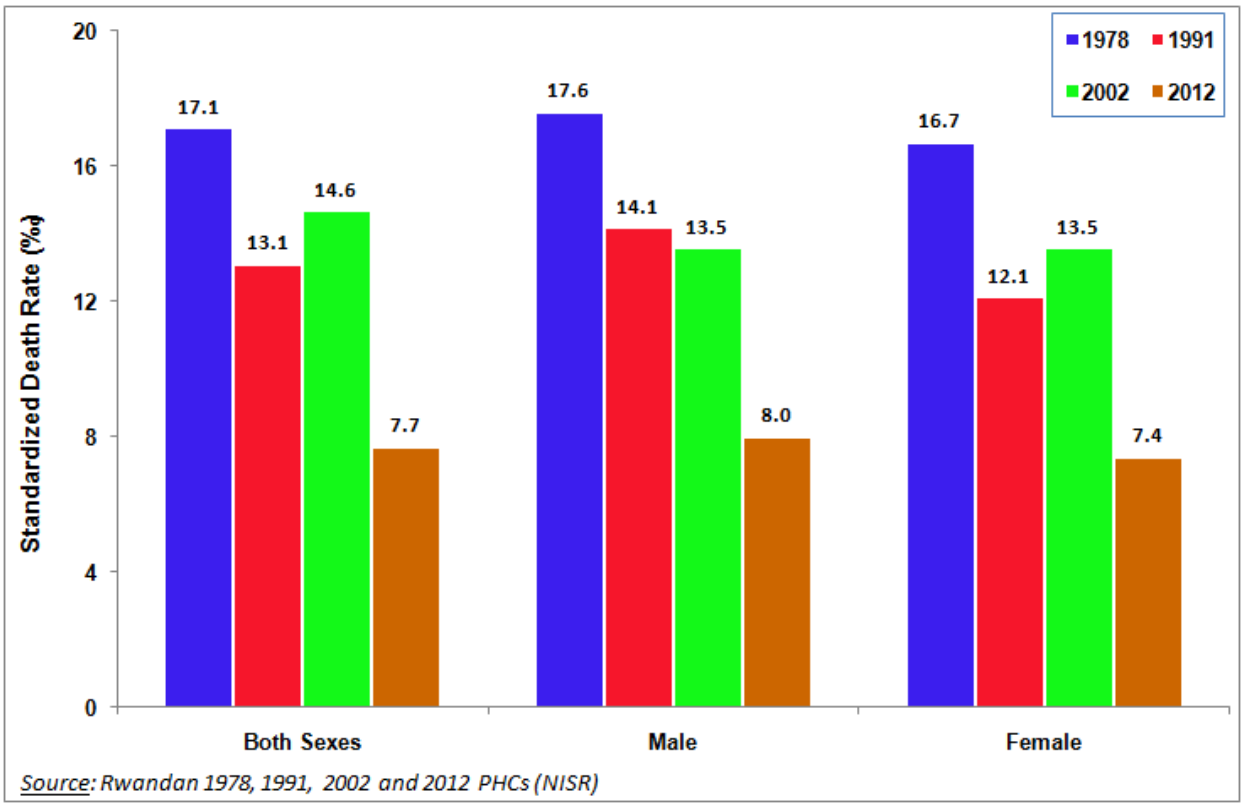
sex structure of the population that has a great impact on the CDR. A simple way to eliminate this influence of the age-sex structure on the CDR is to apply a procedure known as standardization. The standardization procedure is implemented in two steps: (i) multiply the estimates ASDR by the population in each age-group of a standard population and (ii) then divide the sum of the product obtain in step 1 by the total size of the standard population. The obtained deaths rates are called standardized deaths rates (SDRs and are directly comparable. Thus in order to analyse the trends of mortality among the general population between 1978 and 2012 we will use the SDR obtained by using the 2012 PHC mid-year population as the standard population. The findings are presented in the figure 6 below.

The results show that mortality has dramatically declined between 1978 and 2012. The SDR has decrease from 17.1‰ to 7.7‰, equivalent to a relative reduction by 55.0% over a period of 34 years.

The decrease however was not uniform over time. Actually mortality has declined between 1978 and 1991 (SDR dropped from 17‰ to 13‰) before increasing during the following decade (the SDR reached 15‰ in 2002) and decreases again but more substantially in the decade 2002-2012 (the SDR was divided by 2 to fall below 8‰).

This trend is consistent with the evolution of the health and socioeconomic status of Rwanda. The period 1978-1991 was characterized by improvement in the access to health services, mass immunization campaigns and improvements in the living conditions of the population (better housing, better access to clean water and modern toilets, etc.). This in turn translated into decline in mortality, especially among children, explaining the decrease observed in the SDR between 1978 and 1991. The period 1991 to 2002 was characterized by the 1994 genocide that claimed the lives of more than a million people. The direct consequences of the 1994 genocide on mortality and its indirect impact well afterward made all improvement in the preceding decade vanish, explaining why the SDR increased between 1991 and 2002. In contrary, the decade 2002-2012 was characterized by important improvements in the health sector and in the living conditions of the population as a consequence of many vigorous programs and interventions aimed at fighting against the leading causes of death in the country. The important decrease of the death rate is a reflection of the positive impact of these efforts on mortality.

Figure 6: Evolution of the CDR between 1978 and 2012



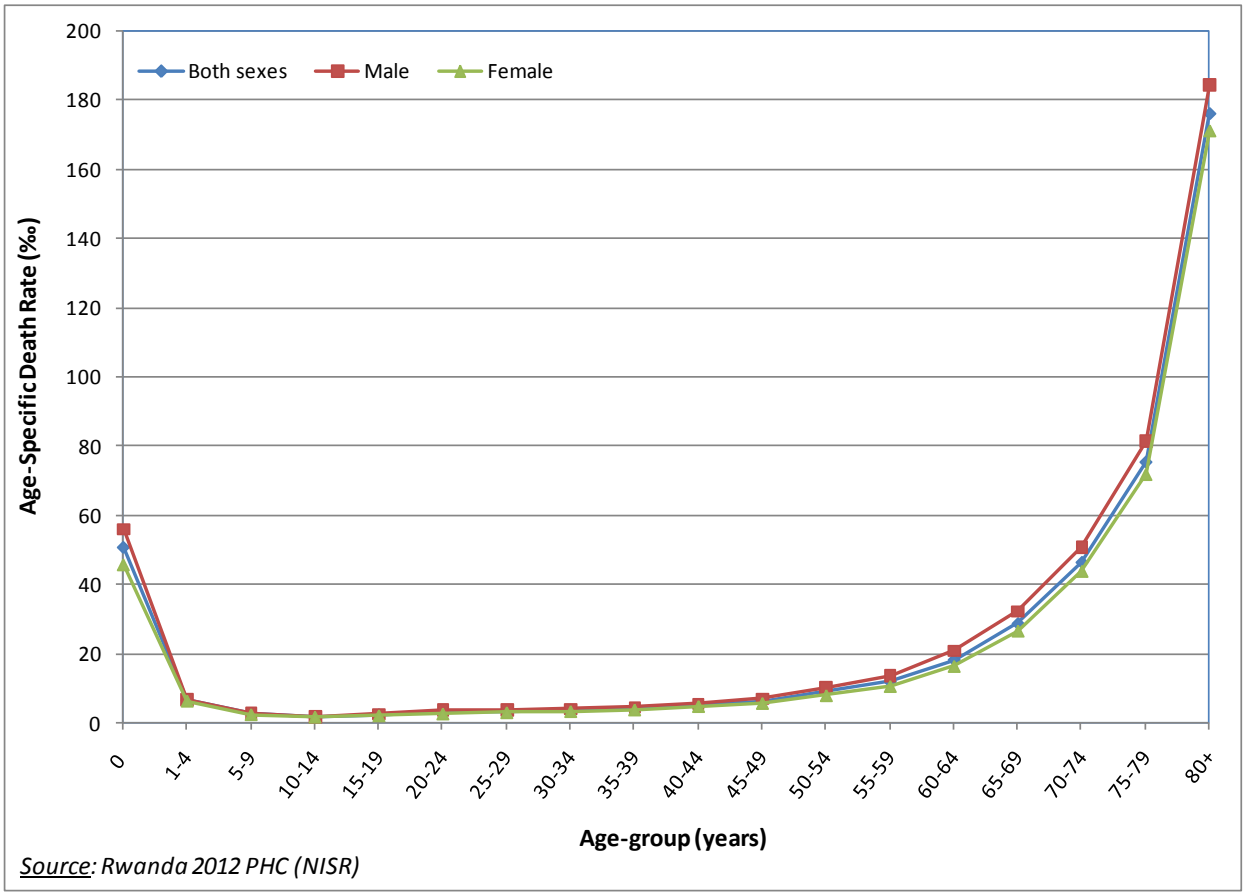
4.1.2 The mortality pattern in Rwanda

The risk of mortality varies substantially by age and these variations are not reflected in the CDR, nor in the SDR. Two populations may have exactly the same CDR or SDR but quite different patterns of mortality. Therefore to analyse the morality pattern of a population one should compute and examine the mortality rates by age also known as Age-Specific Death Rates (ASDRs). The figure 7 below shows the ASDRs for both sexes and for each sex separately.

It shows that Rwanda has a mortality pattern similar to the one prevailing in countries with high levels of mortality during childhood and at old ages. The mortality rate is around 50‰ during the first year of life and decreases quickly to 6‰ between ages 1 and 4 before varying a little bit up to 55 years when it surpasses again the 10‰. As age increases, the mortality rates increases very quickly and even reach a value close to 180‰ at age 80 and above.

The mortality pattern does not vary by sex though the level of mortality is systematically higher among males than among females for all age groups.

Figure 7: ASDR by sex in 2012

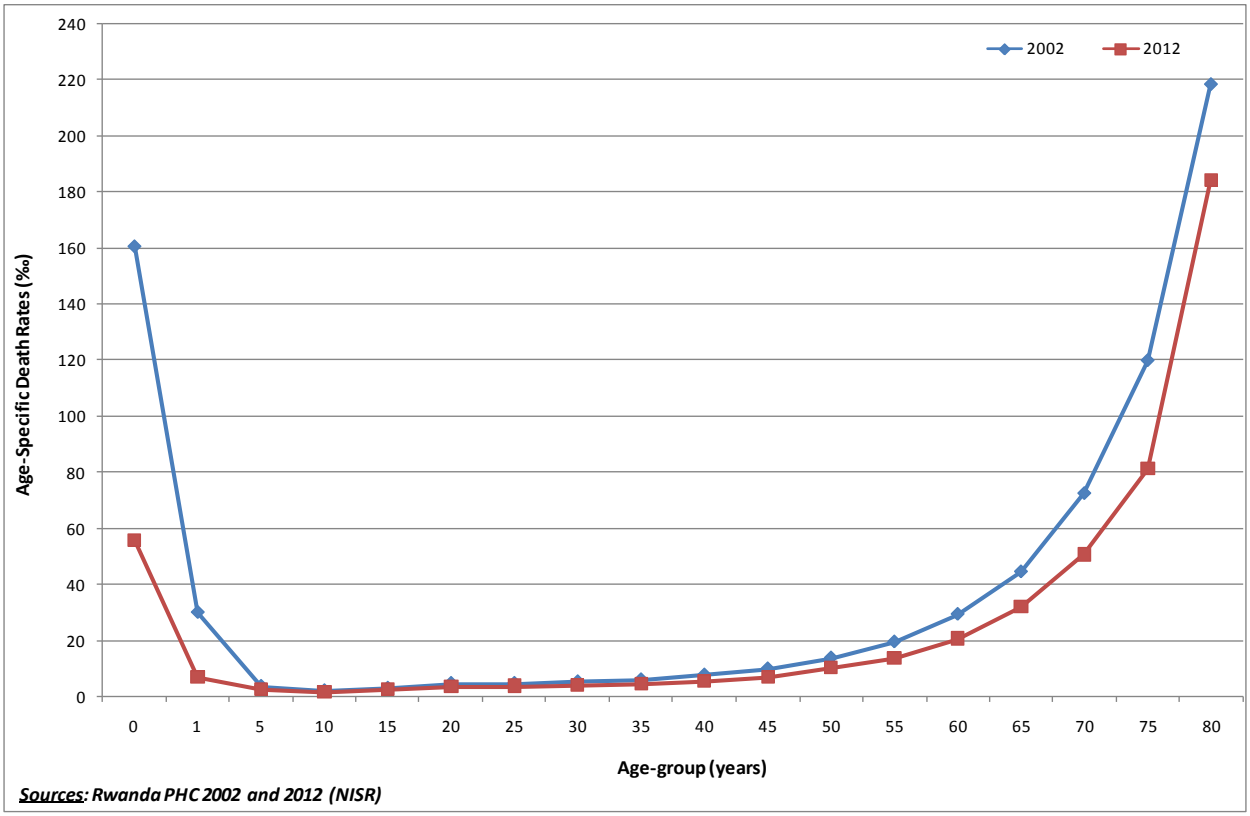


Source: Rwanda 2012 PHC (NISR)

The Table 8 below compares the mortality pattern for both sexes in 2012 described above with the one from the 2002 census. It reveals that the mortality pattern has not changed over the past decade. However, it shows a dramatic decline of infant and child mortality during the intercensal period. It also reveals that the mortality level has not changed between age 5 and 55 and decreased only slightly for ages 55 and above.

This is consistent with the decrease of mortality in Rwanda shown by the DHSs and past Censuses and the fact that adult mortality varies slightly over time in a normal population except when maternal mortality was high and significantly reduced.

Figure 8: Evolution of the ASDR between 2002 and 2012



4.1.3 The life tables and the life expectancy: current level and past evolution

Presentation of the life tables and the current life expectancy at birth

The main output of mortality analysis using census data is the life tables by sex. These tables contain among other indicators, the life expectancy, the mortality rates and the central death rates for each age (complete life table) and for each age-group (abridged life table),.

Table 11 through Table 13 show the abridged life tables respectively for both sexes, for males and for females.

Life expectancies at the different ages are the indicators that best summarize the life table, and among them life expectancy at birth is the one that summarizes the table as a whole. For that reason, we will focus here on the interpretation of the life expectancy at birth.

According to the life tables, the life expectancy at birth in Rwanda is 64.5 years. This means that someone born in Rwanda now and subjected during his/her entire life to the current levels of mortality at the different ages would expect to live 64.5 years. As is usually the case, life expectancy at birth is greater among females (66.2 years) than among males (62.5 years), meaning that females live longer than males.

According to the literature, females live longer than males for both biological and behavioural reasons. In terms of biological reasons, it seems that women possess genes that expose them to a longer life than men. In terms of behaviours, women's pay more attention than men to their health, seek care when they are sick more frequently than men, are less prone to risky behaviours such as smoking, alcohol drinking, drug consumption and are less at risk of injuries and violent deaths such as traffic accidents and exposure to occupational risks, etc.

The table shows that life expectancy at age 1 is around 3 years greater than at age 0 for all sexes, meaning that a child who survives the first year would have better chance to live longer than at his/her birth.

Table 11: Both sexes Abridged Life Table, Rwanda 2012

Age, x	${}_nM_x$	${}_na_x$	${}_nq_x$	l_x	${}_nd_x$	${}_nL_x$	${}_5P_x$	T_x	e_x
0	0.05058	0.196	0.04861	100,000	4,861	96,091	0.94217	6,446,113	64.5
1	0.00633	1.654	0.02494	95,139	2,372	374,992	0.97896	6,350,022	66.7
5	0.00231	2.500	0.01149	92,767	1,066	461,171	0.99062	5,975,031	64.4
10	0.00145	2.500	0.00725	91,701	664	456,846	0.99119	5,513,860	60.1
15	0.00209	2.500	0.01038	91,037	945	452,823	0.98766	5,057,014	55.5
20	0.00289	2.500	0.01433	90,092	1,291	447,233	0.98506	4,604,191	51.1
25	0.00313	2.500	0.01555	88,801	1,381	440,553	0.98372	4,156,959	46.8
30	0.00343	2.500	0.01702	87,420	1,488	433,381	0.98188	3,716,406	42.5
35	0.00388	2.500	0.01923	85,932	1,652	425,529	0.97835	3,283,025	38.2
40	0.00488	2.500	0.02412	84,280	2,033	416,316	0.97311	2,857,496	33.9
45	0.00604	2.500	0.02973	82,247	2,445	405,120	0.96399	2,441,180	29.7
50	0.00868	2.500	0.04249	79,802	3,391	390,530	0.95062	2,036,060	25.5
55	0.01164	2.500	0.05657	76,411	4,323	371,246	0.92904	1,645,529	21.5
60	0.01802	2.500	0.08622	72,088	6,215	344,901	0.89139	1,274,283	17.7
65	0.02852	2.500	0.13311	65,872	8,768	307,442	0.83247	929,383	14.1
70	0.04624	2.500	0.20724	57,104	11,834	255,936	0.74430	621,941	10.9
75	0.07530	2.500	0.31684	45,270	14,343	190,492	0.47954	366,005	8.1
80+	0.17621	5.675	1.00000	30,927	30,927	175,512		175,512	5.7

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

Table 12: Male Abridged Life Table, Rwanda 2012

Age, x	${}_nM_x$	${}_na_x$	${}_nq_x$	l_x	${}_nd_x$	${}_nL_x$	${}_5P_x$	T_x	e_x
0	0.05578	0.196	0.05339	100,000	5,339	95,708	0.93724	6,254,617	62.5
1	0.00668	1.698	0.02632	94,661	2,491	372,910	0.97718	6,158,909	65.1
5	0.00255	2.500	0.01269	92,170	1,170	457,925	0.98975	5,785,999	62.8
10	0.00156	2.500	0.00778	91,000	708	453,231	0.99005	5,328,074	58.6
15	0.00244	2.500	0.01214	90,292	1,096	448,720	0.98517	4,874,844	54.0
20	0.00354	2.500	0.01756	89,196	1,566	442,064	0.98216	4,426,123	49.6
25	0.00366	2.500	0.01812	87,630	1,587	434,180	0.98119	3,984,059	45.5
30	0.00394	2.500	0.01951	86,042	1,679	426,014	0.97932	3,549,879	41.3
35	0.00442	2.500	0.02187	84,363	1,845	417,204	0.97570	3,123,865	37.0
40	0.00543	2.500	0.02679	82,518	2,211	407,065	0.96971	2,706,662	32.8
45	0.00690	2.500	0.03390	80,308	2,722	394,734	0.95864	2,299,596	28.6
50	0.01006	2.500	0.04909	77,586	3,809	378,407	0.94313	1,904,863	24.6
55	0.01345	2.500	0.06505	73,777	4,799	356,888	0.91898	1,526,456	20.7
60	0.02063	2.500	0.09811	68,978	6,768	327,971	0.87804	1,169,568	17.0
65	0.03206	2.500	0.14840	62,211	9,232	287,973	0.81653	841,597	13.5
70	0.05062	2.500	0.22465	52,979	11,902	235,138	0.72612	553,624	10.4
75	0.08117	2.500	0.33738	41,077	13,859	170,738	0.46391	318,486	7.8
80+	0.18422	5.428	1.00000	27,218	27,218	147,748	0.00000	147,748	5.4

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

Table 13: Female Abridged Life Table, Rwanda 2012

Age, x	${}_nM_x$	${}_na_x$	${}_nq_x$	l_x	${}_nd_x$	${}_nL_x$	${}_5P_x$	T_x	e_x
0	0.04541	0.181	0.04379	100,000	4,379	96,415	0.94726	6,619,839	66.2
1	0.00597	1.662	0.02357	95,621	2,254	377,215	0.98058	6,523,424	68.2
5	0.00207	2.500	0.01029	93,367	961	464,435	0.99148	6,146,208	65.8
10	0.00135	2.500	0.00673	92,406	622	460,479	0.99230	5,681,773	61.5
15	0.00174	2.500	0.00867	91,785	796	456,934	0.99003	5,221,295	56.9
20	0.00227	2.500	0.01127	90,989	1,026	452,379	0.98784	4,764,361	52.4
25	0.00263	2.500	0.01306	89,963	1,174	446,878	0.98614	4,311,981	47.9
30	0.00296	2.500	0.01469	88,788	1,304	440,682	0.98417	3,865,103	43.5
35	0.00343	2.500	0.01700	87,484	1,487	433,704	0.98059	3,424,421	39.1
40	0.00442	2.500	0.02186	85,997	1,880	425,287	0.97599	2,990,717	34.8
45	0.00531	2.500	0.02621	84,118	2,205	415,075	0.96842	2,565,430	30.5
50	0.00756	2.500	0.03709	81,913	3,038	401,967	0.95668	2,150,355	26.3
55	0.01021	2.500	0.04979	78,874	3,927	384,554	0.93695	1,748,388	22.2
60	0.01602	2.500	0.07701	74,947	5,771	360,307	0.90086	1,363,834	18.2
65	0.02624	2.500	0.12312	69,176	8,517	324,586	0.84271	1,003,527	14.5
70	0.04352	2.500	0.19625	60,659	11,904	273,532	0.75598	678,941	11.2
75	0.07155	2.500	0.30345	48,754	14,794	206,784	0.48994	405,410	8.3
80+	0.17097	5.849	1.00000	33,960	33,960	198,626	0.00000	198,626	5.8

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

Evolution of life expectancy at birth

Rwanda experienced a significant socioeconomic and health transformation over the past 35 years, as clearly illustrated in the trends of the life expectancy at birth. Life expectancy at birth is the best summary health indicator of a population, which can be used to track improvements of the socioeconomic and health status of the population.

Figure 9 below shows the trends in life expectancy at birth over time. It increases between 1978 and 1991 (from 46 to 54 years), then decreased between 1991 and 2002 (from 54 to 51 years) before increasing again and very quickly up to 64 in 2012.

The increase between 1978 and 1991 corresponds to a period where population access to health services as well as their living conditions was improved by different interventions: more heaths facilities built and evenly distributed across the country, improvement of immunization coverage (82% in 1991), more access to safe drinking water, improved housing units[14].

The decrease of life expectancy at birth between 1991 and 2002 is explained by the 1994 genocide with its direct impacts (a death toll exceeding one million) and indirect impact (impoverishment of the population, social disruption, and disruption of the health system...).

The post 1994 genocide era marked by substantial investments in social restructuring and health infrastructure was in the right direction although it was difficult to maintain environmental

[14] SNR (1994) Recensement General de la Population et de l'Habitat au 15 aout 1991, Resultats définitifs. Republique du Rwanda. Ministère du Plan, Service National de Recensement : Kigali

and personal hygiene and provide clean potable drinking water to such large number of people. This led to an increase in food and water borne diseases like cholera, typhoid, worm infestation, amoebiasis, etc.

Many people suffered from malaria as there is no adequate protection from mosquitoes, especially those living without proper shelters including in the refugee camps. A large number of people were displaced, lived and slept in closed space leading to overcrowding. This facilitated the spread of diseases like pneumonia and tuberculosis[15].

The increase of life expectancy at birth over the last decade (2002-2012) reflects both the impact of social welfare and health intervention as well as the long term impact of past interventions to mitigate the consequences of the genocide and more generally to improve the quality of life of the Rwandan population. In fact, after 2002 many programs were implemented to fight against the leading causes of death in Rwanda (Malaria, Tuberculosis, HIV/AIDS, water-borne diseases) through mass immunization campaigns, distribution of mosquito nets, early diagnosis, adequate case management, universal access to medical insurance, etc.[16]. Between 1994 and 2002 different interventions were already being implemented to recover from the genocide, in particular in terms of health care[17]. More generally the country engaged itself in a vigorous fight against poverty, one of the most important driven factors of poor health, which resulted in getting 1 million Rwandan from poverty between 2006 and 2011[18].

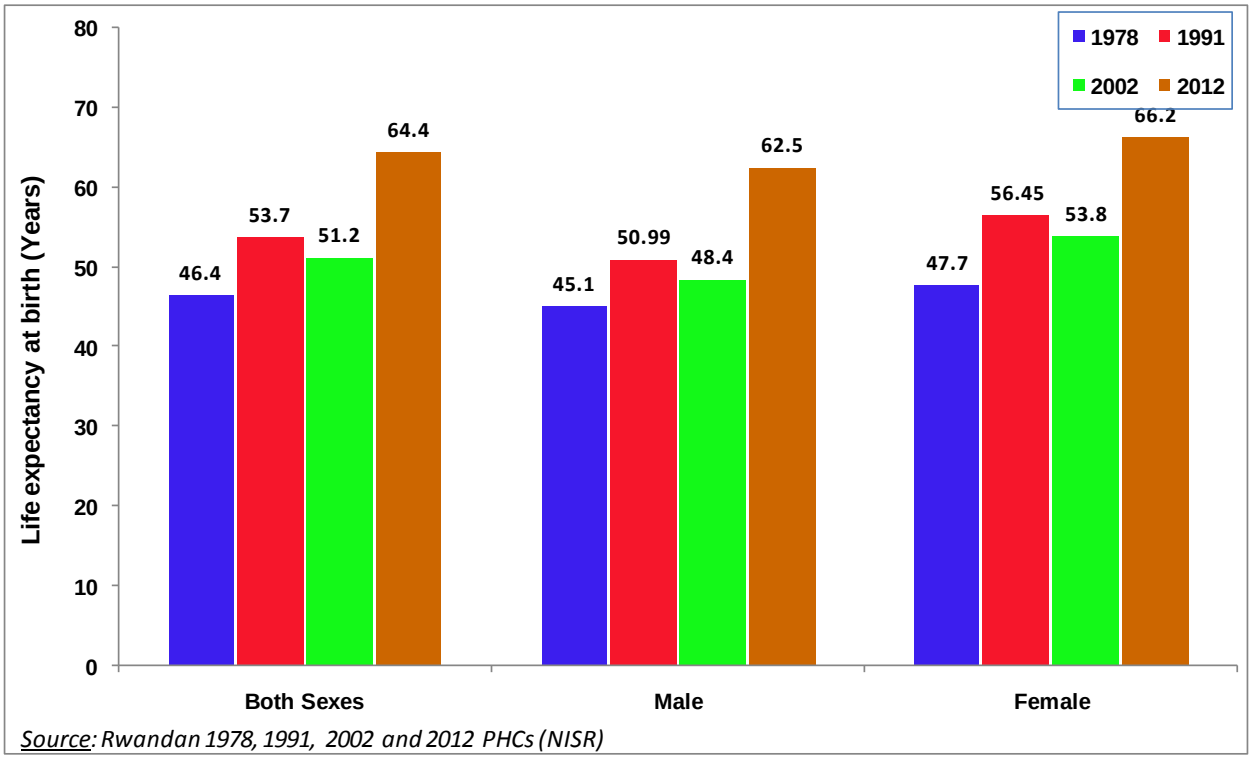
[15]www.newtimes.co.rw/news/views/article_print.php?i=14227&a=6628&icon=Print 2/2

[16] Ministry of Health (2011), Mid-term review, 2011.Republic of Rwanda: Kigali

[17]Louis Rusa, Miriam Schneidman, Gyuri Fritsche and Laurent Masengo (2009) Rwanda Individual performance based financing in the public sector. American National Standard for Information Sciences –Permanence of paper printed library Materials: ANSI Z39.48-1992. Center for Global development / www.cgdev.org.

[18]NISR (2012). The Evolution of Poverty in Rwanda from 2000 to 2011: Results from the Households Surveys (EICV) – Social Protection. National Institute of Statistics of Rwanda: Kigali.

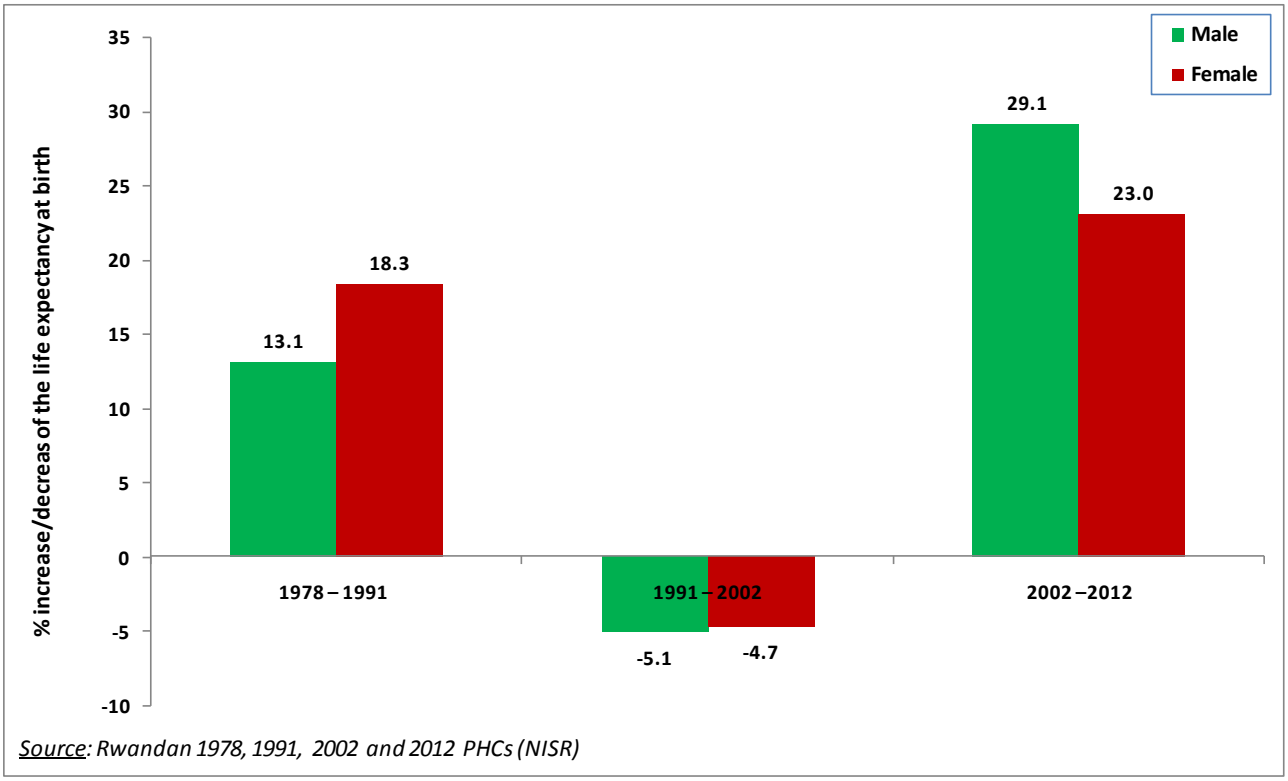
Figure 9: Evolution of life expectancy at birth between 1978 and 2012by sex



Sex differentials in the evolution of life expectancy at birth

The trends of life expectancy at birth show marked difference by sex. As expected female life expectancy at birth is greater than male life expectancy at birth throughout the period. However the difference in magnitude varies over time by sex as shown in Figure 10 below. Female generally benefited more than men in terms of increase of life expectancy. For example during1978-1991, female life expectancy increased by 18% whereas male life expectancy increased by only 13%. The reverse trend was observed between 2002 and 2012 in favour of males for whom the life expectancy at birth increased by 29% against 23% only for females. The decrease in life expectancy between 1991 and 2002 did not show any marked difference by sex.

Figure 10: Percentage change in life expectancy at birth in intecensal period 1978-1991,1991-2002 and 2002-2012



Source: Rwandan 1978, 1991, 2002 and 2012 PHCs (NISR)

4.2 Early childhood mortality

The childhood mortality will be analysed through three main indicators: infant mortality rate (mortality during the first year of life), child mortality rate (mortality between age 1 and 4) and under-five mortality rate (mortality between ages 0 and 5). The analysis will focus on the levels and the trends disaggregated by sex. These indicators are very sensitive to health interventions thus very useful in terms of monitoring and evaluating the health programs. Moreover the level of infant mortality has the largest single year contribution to life expectancy at birth and therefore gives an indication of the health status of a population.

The factors that influence childhood mortality vary by age. For example, the survival of infants is primarily determined by both biological and behavioural factors such as breastfeeding status at birth, mother's health status and her health care whereas child survival between age 1 and 4 (child mortality) is determined by a combination of social, health care, family and environmental factors including lack of hygiene, exposure to infections, malnutrition and access to safe drinking water, etc.

4.2.1 Level of childhood Mortality

Table 14 below presents the levels of the three childhood mortality disaggregated by sex. The findings show that the levels of childhood mortality are high in Rwanda as in the developing

countries: The probability of dying before the first birthday is 49 per 1,000 live births. It is greater for boys (53‰) than for girls (44‰) as is generally the case

Mortality between age 1 and 4 is twice lower than at age 0 (25‰ vs. 49‰) and the gender gap narrower, 26‰ among boys and 24‰ among girls. This means that in Rwanda there is no sign of gender-based discrimination in child care that may have a greater impact on mortality of one sex than another.

Under-five mortality is also high in Rwanda (72‰) reflecting the important contribution of mortality at age 0 to the total mortality between 0 and 5. As expected it is higher among boys than girls; mainly due to the boys' higher risk of death before age 1.

Table 14: Infant Mortality Rate, Child Mortality Rate and Under Five Mortality Rate by Sex

Childhood mortality	Sex		
	Both sexes	Male	Female
Infant Mortality Rate: $_1Q_0$ (‰)	48.6	53.3	43.7
Child Mortality Rate: $_4Q_1$ (‰)	24.9	26.3	23.5
Under Five Mortality Rate: $_5Q_0$ (‰)	72.2	78.1	66.1

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

4.2.2 Evolution of childhood Mortality

Childhood mortality has generally declined substantially between 1978 and 2012 (Table 15 below). All three indicators are three times lower in 2012 than in 1978. For instance for both sexes IMR felt from 144‰ to 49‰, CMR from 89‰ to 25‰ and U5MR from 221‰ to72‰.

Table 15: Evolution between 1978 and 2012 of Infant Mortality Rate, Child Mortality Rate and Under Five Mortality Rate by sex

Childhood mortality by census year	Sex		
	Both sexes	Male	Female
Infant Mortality Rate: $_1q_0$ (‰)			
1978	144	155	134
1991	118	126	114
2002	139	145	133
2012	49	53	44
Child Mortality Rate: $_4q_1$ (‰)			
1978	89	90	89
1991	73	83	67
2002	102	111	93
2012	25	26.3	24
Under Five Mortality Rate: $_5q_0$ (‰)			
1978	221	231	210
1991	182	199	173
2002	227	240	214
2012	72	78	66

Sources: Rwandan 1978, 1991, 2002 and 2012 Censuses (NISR)

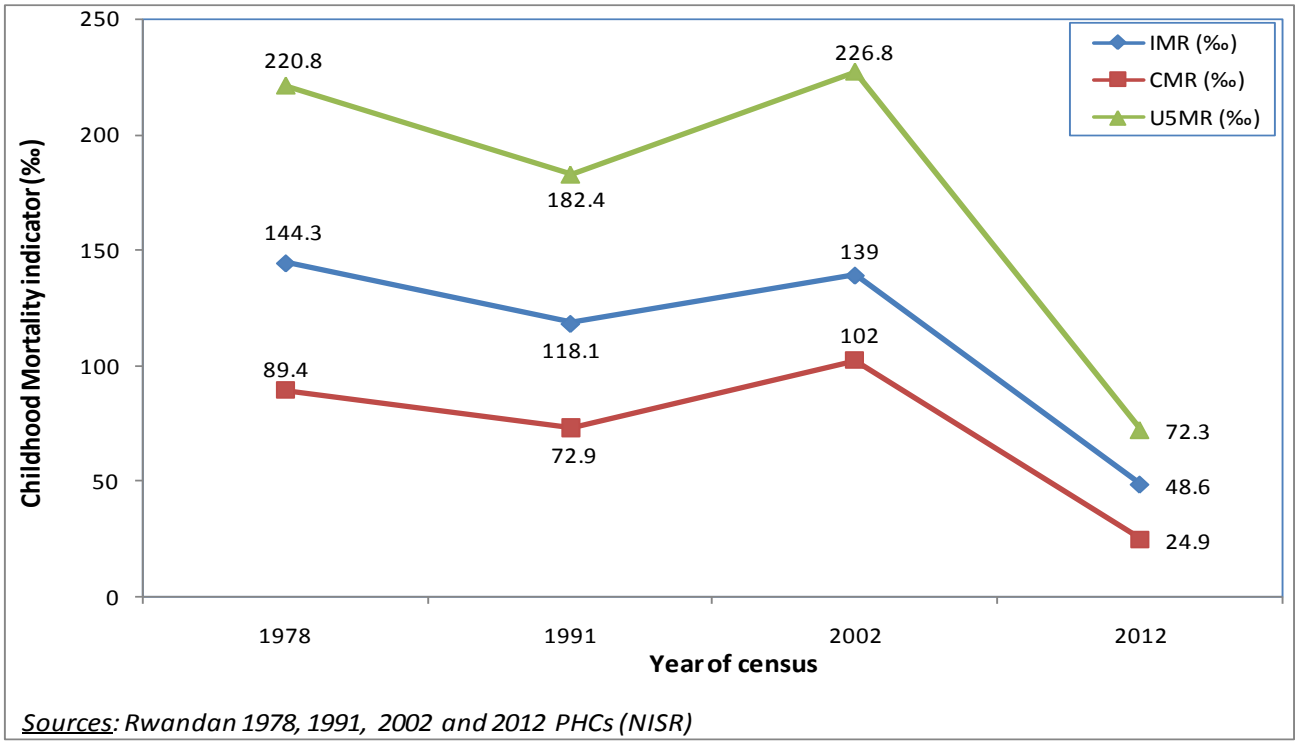
However the decline was not linear since an increase in childhood mortality was observed between 1991 and 2002. For instance for both sexes IMR increased from 118‰ to 139‰, CMR from 73‰ to 102‰ and U5MR from 182‰ to 227‰ (Figure 11 below). This is part of the

consequences of the 1994 genocide which were still perceptible in the health indicators, among others, till early 2000.

The decline in childhood mortality between 1978 and 1991 reflects interventions at that time aimed at improving the population's health and living conditions, as discussed earlier. However these levels remained high (for instance IMR of 120‰ in 1991). This was explained partly by a long period of drought in the former prefectures of Butare, Gikongoro and Kibuye that caused food shortage and severe malnutrition among children and their mothers[19].

The steady decline in childhood mortality between 2002 and 2012 is associated with several healthcare interventions implemented to improve the health status of the population. This decline is consistent with findings from the DHSs.

Figure 11: Evolution of the childhood mortality indicators for both sexes between 1978 and 2012



Sources: Rwandan 1978, 1991, 2002 and 2012 PHCs (NISR)

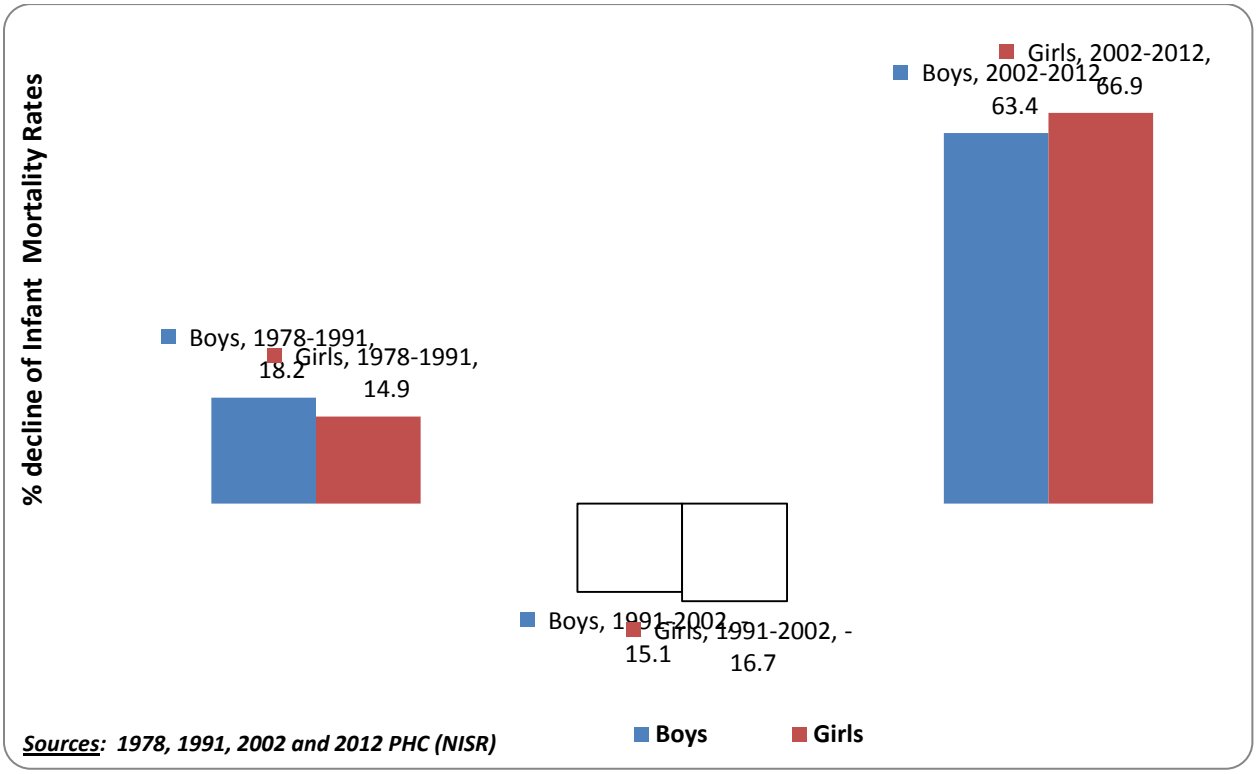
4.2.3 Sex differentials in childhood mortality evolution

The general pattern of the evolution of childhood mortality does not vary by sex: decrease between 1978 and 1991 followed by an increase between 1991 and 2002 and finally a steady decrease between 2002 and 2012 (Table 15 above). However this general pattern hides marked sex differences for infant, child and under-five mortality as will be shown below.

[19] SNR (1994) Recensement General de la Population et de l'Habitat au 15 aout 1991, Résultats définitifs. République du Rwanda. Ministère du Plan, Service National de Recensement : Kigali

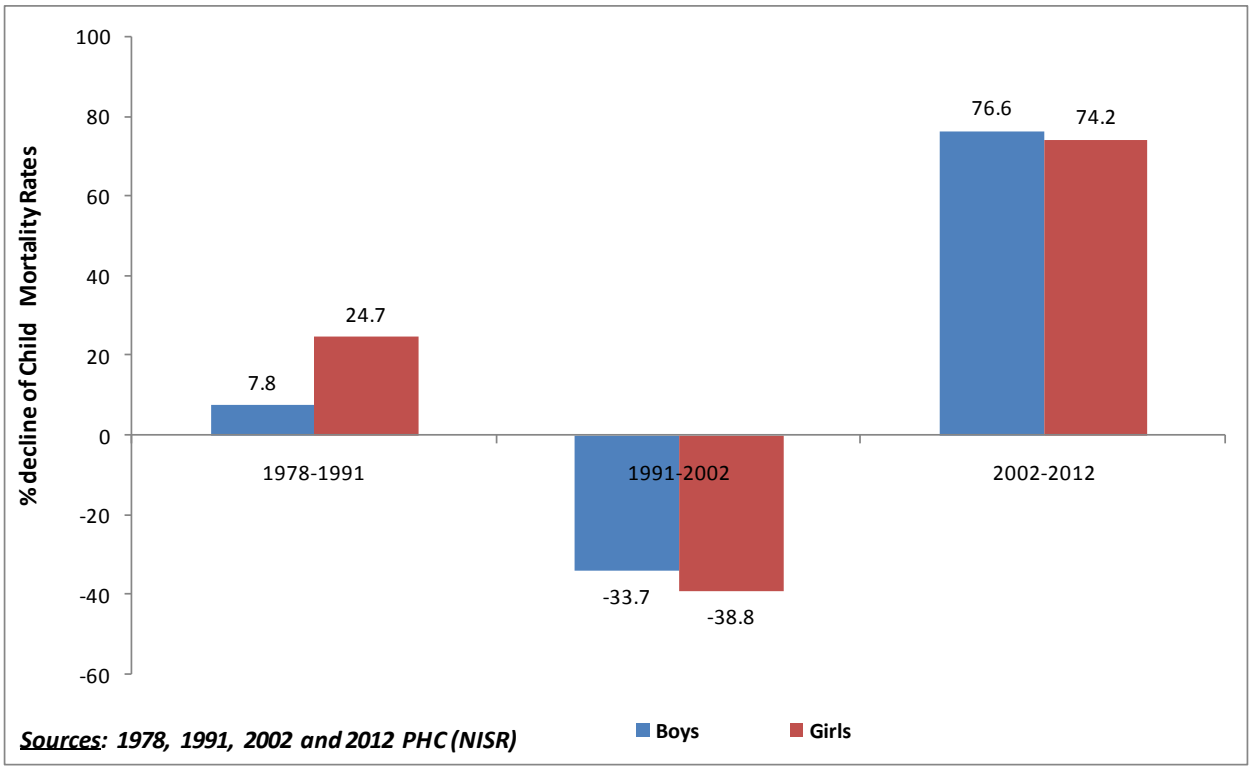
For infant mortality, girls were disadvantaged as compared to boys between 1978 and 1991 with a more important decrease of IMR among boys (18%) than among girls (15%). Girls were also disadvantaged between 1991 and 2002 with a greater increase of IMR among them (17%) than among boys (15%). However the reverse was observed during the most recent intercensal period, 2002-2012 with girls being more advantaged than boys. In fact IMR has decreased more among girls (67%) than among boys (63%).

Figure 12: Percentage decline of Infant Mortality Rate in the Intercensal periods between 1978 and 2012



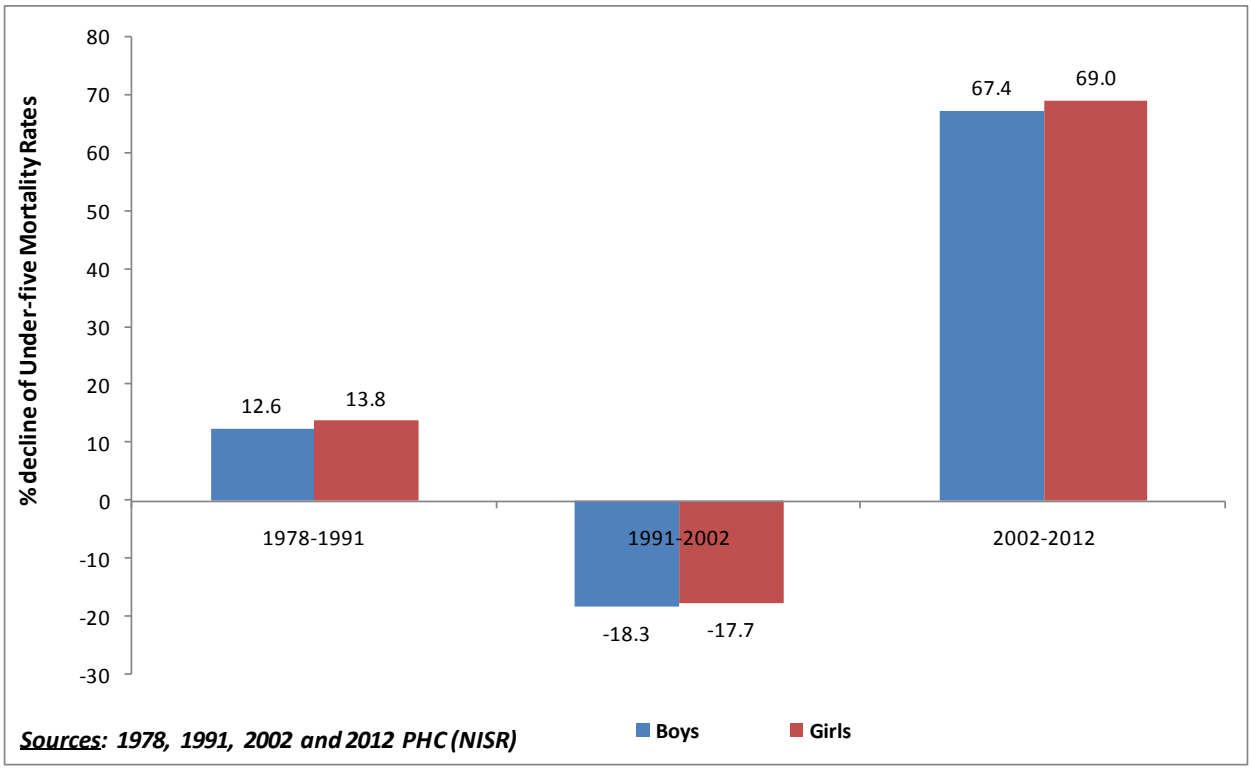
As for child mortality, the reverse was observed as compared to infant mortality: boys were disadvantaged as compared to girls between 1978 and 1991 (increase of the CMR by 8% among boys vs. 25% among girls) and between 1991 and 2002. In contrary, between 2002 and 2012 CMR decreased more among boys (77%) than among girls (74%).

Figure 13: Percentage decline of Child Mortality Rate in the intercensal periods between 1978 and 2012



The sex differentials in the trend of mortality are less visible in the under-five mortality rate due to the compensation between IMR and CMR differentials.

Figure 14: Percentage decline of Under-five Mortality Rate in the Intercensal period between 1978 and 2012



The fact that IMR and CMR decrease or increase is more important for one sex for a given period while the reverse is observed the following period is also revealed by the DHSs findings. Though this is not common and has no known or obvious explanation, this seems to reflect a reality specific to Rwanda. Therefore there is a need for further investigations on the delayed evolution of childhood mortality of one sex as compared to the other.

4.3 Mortality among the Adult and the Elderly

The census allows us to analyse the level and trends of adult mortality and mortality among the elderly through two indicators respectively: life expectancy at age 20 (e_{20}) that provides a good summary of adult mortality in a population and life expectancy at age 60 (e_{60}), the official lower boundary age for the elderly in Rwanda.

4.3.1 Adult mortality: current level

Table 16 shows the life expectancy at age 20 (e_{20}) by sex compared to life expectancy at birth. It shows that in Rwanda an adult people aged 20 may expect to live an additional 51.1-year period. This is greater among females (52.4 years) than among males (49.6 years).

Table 16 also reveals that a Rwandan who escapes from all mortality risks before age 20 would expect to live 6 years and a half more than at his/her birth. Six years and a half is therefore a measure of the cost in life expectancy of the risk the Rwandans are submitted to during their

first 20 years of life. The gain is greater among males (7.1 years) than among females (6.2 years) reflecting the higher risk of mortality males run during the first 20 years of life.

Table 16: Life expectancy at age 20 (e_{20}) by sex and Number of years in life expectancy gained at age 20 as compared to age 0

Indicator (Years)	Sex		
	Both sexes	Male	Female
Life expectancy at age 0 (e_0)	64.5	62.5	66.2
Life expectancy at age 20 (e_{20})	51.1	49.6	52.4
Number of years in life expectancy gained at age 20 as compared to age 0	6.6	7.1	6.2

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

4.3.2 Mortality at late age: Current level

The official definition of elderly in Rwanda is people aged 60 years and above. Therefore in this analysis we will capture mortality among the elderly through life expectancy at age 60 (e_{60}). The trends of e_{60} by sex are displayed in Table 18 below.

Under the current level of mortality a person who reaches age 60 in Rwanda would expect to live around 18 more years. This would be 17 years for males and 18 for females. This corresponds to an additional 13 years as compared to life expectancy at birth. The gain in life expectancy is even higher among males (14.5 years) than among females (12 years). This means that the cost in terms of life expectancy of the different risks a Rwandan has to go through between birth and age 60 is too high (13 years), especially among men (14.5), reflecting the greater death risk run by males.

Table 17: Life expectancy at age 60 (e_{60}) by sex and Number of years in life expectancy gained at age 60 as compared to age 0

Indicator (Years)	Sex		
	Both sexes	Male	Female
Life expectancy at age 0 (e_0)	64.5	62.5	66.2
Life expectancy at age 60 (e_{60})	17.7	17.0	18.2
Number of years in life expectancy gained at age 60 as compared to age 0	13.2	14.5	12.0

Source: Rwanda 4th Population and Housing Census, 2012 (NISR)

Conclusion

The results of the PHC of August 2012 fill in a gap in the knowledge of the demographic situation in Rwanda. Regarding mortality in particular, the analysis of the PHC data allowed to estimate the levels, trends and pattern of mortality among the general population, the children, the adult population and elderly.

To do this, it was first necessary to evaluate the quality of the mortality data. The evaluation reveals that it was necessary to adjust the data and to use indirect methods to estimates the mortality indicators.

Main findings

Based on the above methodology, the main findings is that mortality remains generally high in Rwanda but has decreased substantially over time, especially among children aged 0. More detailed findings are presented below.

Mortality among the general population:

Overall 79,465 deaths occurred in the Rwandan population during the year preceding the 2012 census. Among them there were slightly more males (39,863) than females (39,607). In other words 218 persons die every day in Rwanda. This is equivalent to a Crude Death Rate (CDR) of 7.7‰ (8.0‰ among males and 7.4‰ among females).

The mortality pattern in Rwanda is similar to the one found in countries with high levels of mortality during childhood and at old ages. The mortality pattern does not vary by sex though the level of mortality is systematically higher among males than among females for all age-group.

As for the life expectancy at birth (e_0), it is 64.5 years in 2012 for both sexes. As expected, it is higher among females (66.2 years) than males (62.5 years). It has increased a lot over the past decade. In 2002 it was 48.4 years for males and 53.8 years for females.

Childhood mortality:

Infant mortality is still high in Rwanda. The Infant Mortality Rate (IMR) in 2012 is 48.6 ‰ and is higher among boys (53‰) than girls (44%). However the IMR has decreased a lot and more quickly during the last decade: from 139‰ in 2002 to 48.6‰ in 2012. The decrease is more important among girls (67%) than among boys (63%).

The Child Mortality Rate (4q1) in 2012 is 25‰ with slight difference by sex: 26‰ for boys and 24‰ for girls. The Child Mortality Rate also decreased a lot between 2002 and 2012, more among boys (77%) than girls (74%).

Regarding Under-Five Mortality Rate (U5MR), it is also high with 72‰ of the new-born likely to die before their 5th anniversary. It is higher among boys (78.1‰) than among girls (66.1‰). As

for the other childhood mortality rates, it has decreased a lot between 2002 and 2012, with slight difference by sex: 67.4% among boys and 69% among girls.

The different findings presented above are consistent with the DHSs results that have already revealed an important decline in childhood mortality in Rwanda in the recent years.

Adult mortality:

Adult mortality in a population is better summarized by life expectancy at age 20. The 2012 census revealed that in Rwanda an adult person aged 20 may expect to live an additional 51.1-year period.. This is greater among females (52.4 years) than among males (49.6 years). Compared to life expectancy at birth this means that a Rwandan who escapes from all mortality risks before age 20 would expect to live 6 years and a half more than at his/her birth. Six years and a half is therefore a measure of the cost in life expectancy of the risk the Rwandans are submitted to during their first 20 years of life. The gain is greater among males (7.1 years) than among females (6.2 years) reflecting the higher risk of mortality males run during the first 20 years of life.

Mortality among the elderly:

The official definition of elderly in Rwanda is people aged 60 years and above. Therefore in this analysis we captured mortality among the elderly through life expectancy at age 60 (e_{60}). Under the current level of mortality a person who reaches age 60 in Rwanda would expect to live around 18 more years (17 years for males and 18 for females). This corresponds to a gain in life expectancy of 13 years as compared to life expectancy at birth. The gain is even higher among males (14.5 years) than among females (12 years). This means that the cost in terms of life expectancy of the different risk a Rwandan has to go through between birth and age 60 is too high (13 years), especially among men (14.5), reflecting the greater death risk run by males.

Interpretation of the findings

The dramatic decline in all types of mortality presented above seems to reflect the direct impact of the vigorous and multidimensional interventions implemented over the past decade to fight against the leading causes of death in Rwanda (Malaria, Tuberculosis, HIV/AIDS, childhood diseases, etc.). It seems also to reflect the long-term impact of earlier interventions aimed at recovering from the 1994 genocide that had increased tremendously mortality. These actions resulted into a better access to health care and an improvement in living conditions of the population. For instance 1 million Rwandans escaped from poverty between 2006 and 2011 according to EICV 2010/2011[20].

[20]NISR .2012. The third Integrated household living conditions survey, main report

More health facilities were built and evenly distributed throughout the territory, mosquito nets widely distributed to households, immunization campaigns conducted, universal access to medical insurance established, hygiene promoted, etc. According to the MoH annuals reports the number of non-private health facilities in Rwanda increased from 579 in 2010 to 720 at the end of 2011. There was 1 doctor per 17,200 inhabitants in 2011 compared to 1 doctor per 75,000 in 2000, and 1 nurse per 1,294 inhabitants compared to 1 nurse per 6250 inhabitants in 2000. Access to health facility has increased from 31% in 2003 to 95% in 2010. According to the 2010 DHS nearly all of the mothers (98 %) received antenatal care from trained personnel. The contraceptive prevalence rate was 45% in 2010. Over 90% of the children have received vaccination services in 2010. On average, 78% of households have health insurance, an increase from 68% in 2007–08.

Way forward

Mortality indicators disaggregated by regions is one of the exclusive contribution of PHC to mortality analysis as compared to other existing sources of mortality data like DHS. However, there was limitation of computing all mortality indicators disaggregated by area of residence due to the questionable quality of death data in the census disaggregated by province. Therefore a better attention should be paid to mortality data collection during the next censuses.

Further analysis is needed to investigate some unexpected and uncommon findings of the present analysis. For instance, the trend analysis has shown that childhood mortality declines substantially for a sex and not the other one for a given period while the reverse is observed during the following period. A secondary analysis of the DHS data we conducted also reveals such findings.

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Annex A: Census objectives, methodology and data quality assessment

A.1 Objectives of the Census

The long-term objective of the Fourth Rwanda Population and Housing Census (RPHC4) is to contribute to:

i. Improving the level of knowledge on the social, demographic and economic characteristics of the population of Rwanda;
ii. Enabling a better understanding of population and development interrelationships; and
iii. Reinforcing the National Institute of Statistics of Rwanda's (NISR) human and technical capacity.

In the short term, the objectives of the Census are to:

i. Determine the current size of the population of Rwanda and its spatial distribution among provinces, districts, sectors, cells and villages and among rural and urban areas;
ii. Determine the present demographic, social, economic and cultural characteristics of the population of Rwanda;
iii. Determine the level, structure and trends in regard to fertility, mortality and migration among the population in order to come up with the natural and overall growth rates of the population of Rwanda;
iv. Provide indicators to enable advocacy for particular groups of the population such as women, children, youth, the elderly and disabled persons;
v. Determine the characteristics of households, housing conditions and household welfare in Rwanda to further use this information for a more elaborate poverty mapping of the country;
vi. Produce national population projections using updated demographic data and other information on population dynamics to enhance future planning;
vii. Update the relevant databases, providing information right down to the smallest administrative unit in order to enhance the current government policy on 'village clusters';
viii. Provide clear details of the current statutory boundaries of all administrative units of the country to which appropriate geographical codes can then be assigned;
ix. Constitute an updated sampling frame for Rwanda and produce maps for each enumeration area for future sample surveys; and
x. Promote the use of Census data at national and local level in formulating, monitoring and evaluation of development programmes.

A.2 Methodology and Census phases

As mentioned in Chapter 1 of this report, following the preparatory phase of the Census which consisted of the production of the project documents, schedule and Census budget, the following technical activities were undertaken.

A.2.1 Census mapping

The purpose of the Census mapping is to divide the whole country into well-delineated enumeration areas that constitute the smallest operational Census units to be assigned to each enumerator during the enumeration period.

The Census mapping operation lasted for about a year (from February 2011 to March 2012), which enabled the NISR to better estimate the number of staff to be recruited (e.g. enumerators, team leaders, supervisors, etc.) and the other Census infrastructure and facilities necessary for planning robust field activities. The outcomes of the Census mapping include the production of a new sampling frame for future surveys and an updated administrative area boundary map for Rwanda. In total, the country was delineated into 16,728 enumeration areas within the current boundaries of administrative units, consisting of five provinces, 30 districts and 416 sectors. This allows for the easy compilation of Census results in these administrative entities.

A.2.2 Pilot Census

Prior to the conducting of the RPHC4, a Pilot Census designed for testing the Census questionnaires, other Census data-collection tools, enumeration time requirements and the state-of-preparedness of the entire field work organisation was carried out. This test was conducted on a sample of 75 enumeration areas throughout all the districts of the country, from 16 to 30 August 2011, exactly one year before the actual Census.

The Pilot Census was a dress rehearsal for the actual Census during which the various methods and procedures for field organisation were tested as well as the Census publicity/awareness campaign, Census map products and data-coding and data-entry equipment.

The lessons learnt from the Pilot Census exercise were used to revise some Census procedures and instruments necessary for a smooth/successful implementation of the actual Census enumeration work.

A.2.3 Questionnaires and manuals

The first draft of Census questionnaires prepared by the NISR was submitted to the Census Technical Committee (CTC) for review before its approval by the National Census Commission (NCC). The CTC-reviewed Census questionnaires and related manuals were tested during the Pilot Census.

The lessons learnt during the Pilot Census were used by the NISR to improve and finalise the Census questionnaires, containing 77 variables, as well as to revise the manuals of instructions for all Census functionaries accordingly. The revised Census questionnaires and manuals were again reviewed and approved by the CTC before final approval was granted by the NCC to use the Census questionnaire for the RPHC4.

The questionnaires used to collect data are presented in Annex B of this report. Two different types of questionnaires were administered – one for private households and one for institutional households. The questionnaire for private households contained a person record, a household record and a mortality record. The questionnaire for institutional households contained only a person record.

A.2.4 Census publicity and sensitisation campaign

Prior to the conducting of Census enumeration a national publicity and sensitisation campaign was implemented in order to inform the public about the importance and relevance of the fourth Rwanda RPHC4, as well as to seek their active participation and the involvement and collaboration of administrative authorities during the Census enumeration period. A subtle and targeted publicity and awareness campaign was conducted before the Pilot Census, which was later intensified and diversified to cover all of the country as the actual Census enumeration period approached.

The active collaboration and participation of Census commissions at both provincial and district levels in campaign activities contributed significantly to the success of the Census enumeration.

The innovative mass-communication mix that was used to inform the public about the Census and, at the same time, to ask for their full participation in the RPHC4, included the following:

(i) Census Commission meetings;
(ii) Articles in local newspapers;
(iii) Radio and television programmes;
(iv) Outdoor billboards, banners, publicity spots and press releases; and
(v) Monthly village community development meetings (*Umuganda*).

The Census results published in this report attest to the high level of cooperation of the political and administrative authorities and the effective participation of the general public in the entire Census enumeration process.

A.2.5 Recruitment and training of field staff

The RPHC4 was conducted by personnel from various institutions: the NISR (the Census executing agency), MINECOFIN, MINALOC (districts and sectors), MINAFFET, the Rwanda Defence Force, the Rwanda National Police, the Rwanda Correctional Services and MINEDUC (heads of secondary schools and teachers). The recruitment of Census functionaries was done by each institution according to the needs (i.e. number and categories of staff) of the NISR,

except in the case of teachers whose recruitment was done by the NISR in collaboration with administrative authorities at the district, sector and cell levels.

At each stage of Census implementation, the necessary induction and mandatory training for NISR staff and Census functionaries took place. For example, the Census mapping phase was preceded by the training of cartographers, while the Pilot Census and the actual Census enumeration were preceded by training of enumerators and their supervisors.

About eight weeks prior to the commencement of actual Census enumeration cascading training was organised for all categories of Census functionaries, namely:

(i) Core master trainers' dialogue;
(ii) Training for 275 master trainers;
(iii) Training for 1,004 trainers organised in five training centres, one centre per province; and
(iv) Training for 24,426 enumerators in 68 training centres spread across all districts of the country.

The Census training sessions focused on the understanding of Census enumeration processes and the correct completion of Census questionnaires, reading and interpretation of Census maps, practical role plays, and field practice. All the trainers and trainees were subjected to mandatory qualifying tests which they had to pass before being appointed.

In order to mitigate the risk of declining quality of training at the various cascading training levels, the comprehensive enumerator training was voice-over simulated by core master trainers at a recording studio. The audio recorded training session was mass-recorded on CDs and distributed to all the training classes as a reference source for the trainers.

A.2.6 Actual Census enumeration

As initially planned, the actual Census enumeration of the population in private and institutional households was conducted across the country from 16 to 30 August to 2012, immediately after the Census reference night.

Although data-collection activities were carried out by well-trained enumerators, quality assurance of the Census enumeration was ensured through close supervision by line managers at various levels. The Census functionaries deployed for the RPHC4 comprised the following personnel:

(i) Enumerators and support staff;
(ii) Team supervisors, covering an average of five enumeration areas each;
(iii) Sector controllers;
(iv) Zonal supervisors, covering between two and five administrative sectors;
(v) District coordinators;
(vi) Province coordinators; and
(vii) National coordinators.

In accordance with the instructions contained in the Census Manual, each manager oversaw and ensured the operations of daily Census activities within his/her area of supervision. Enumerators were accountable for the work done on a daily basis to their team leaders, who carried out the verification of completed questionnaires and also resolved to the best of their ability challenges and/or problems encountered.

The team leaders communicated their daily progress achieved to the innovative Census Command and Control Centre (CC&CC) established at the NISR using a SMS (i.e. Short Message Service) system. The CC&CC system was an open source and web-based system that allowed NISR senior management and authorised staff to continually monitor the progress of Census enumeration in all the 16,728 enumeration areas via the internet. These officials were also able to contact each other through a MTN Closed User Group.

Prior to the conducting of Census enumeration, a robust field operations plan with worst case scenarios and risk analyses was established to facilitate hitch-free data collection and supervision of the work. Appropriate logistical support was made available to field staff, such as bicycles, motorcycles, vehicles and other necessary equipment. The mechanism utilised for the distribution of Census material for data collection as well as the repatriation of questionnaires and other materials to NISR headquarters was mainly facilitated by Rwanda Defence Force trucks.

A.2.7 Post-enumeration activities

The logistical arrangement employed for the repatriation, inventory of Census questionnaires and collating of Census counts was swift and seamless, which enabled the rapid publishing of the Provisional Census Report within 90 days of Census enumeration being concluded. The other post-enumeration activities included: the Post-Enumeration Survey (PES); data coding; data processing; the release of final results; thematic analysis; and the dissemination of Census results.

The PES was conducted from 19 September to 3 October 2012. The aim of the PES was to assess the coverage and quality of Census data gathered during the actual Census. A total of 120 enumeration areas was sampled from across all districts of the country.

The data-coding and data-processing activities were done concurrently and completed within six months. The Census data-cleaning, data-editing and data-stabilisation processes were completed in two months, after which approximately 1,000 basic Census data tables were generated. The final results were subjected to an in-depth analysis across 17 generic themes (one of which is presented in this report) in accordance with the analysis plan developed for each theme. Census monographs for each of the 30 districts will also be produced.

A.3 Data quality assessment

An independent quality review (available as an internal report to NISR) was conducted in parallel with the thematic analysis. This investigated the work done prior, during, and after enumeration to maximise the data quality. The assessment confirmed the strong planning and quality assurance throughout the enumeration to maximise representation of the population; but also found potentially weaker direct quality assurance during the data processing phase. The overall conclusion of the assessment is that the RPHC4 was implemented with strong quality control and gives an excellent representation of the population of Rwanda with generally good measurement of its structure both in terms of spread and demographic and socio-economic characteristics.

The claim of high quality with respect to representation is confirmed by the Post-Enumeration Survey (PES), which measured the net-coverage of the household population in the RPHC4 to be over 99% nationally with little variation across regions and by age and sex. Gross under-coverage was around 1.5% while gross over-coverage (erroneous inclusions) was around 0.6%. The conclusion of excellent representation is also consistent with the plausible growth rate for the population over the inter-censal period implied by the national results.

Analysis of the demographic and socio-economic information contained in the final RPHC4 database and triangulation with other data sources also confirm that for most areas, the RPHC4 gives a reliable and comprehensive representation of the population. However, some issues were found with respect to measurement of population characteristics: some possible under-reporting of males (especially at young ages), some age-heaping around the digits 0 and 2 as well as particular irregularities around the ages 2 and 12. Moreover, despite careful testing of the questionnaire with explicit enumerator instructions regarding these sections, there is also evidence of under-reporting of mortality, and to a lesser extent fertility. Indirect estimation may be appropriate in these two thematic areas. However, apart from these issues the analysis of the RPHC4 database supports the assertion of good quality with respect to measurement.

Annex B Census questionnaire

This annex provides the key pages of the Census questionnaires. The full questionnaires including all cover sheets can be obtained from the NISR.

As mentioned above, two different types of questionnaires were administered, one for private households and one for institutional households. The questionnaire for private households contained a person record, a household record and a mortality record. The questionnaire for institutional households contained only a person record.

B.1 Private households: person record

FORM: 001

REPUBLIC OF RWANDA

S/N: 0000000

MINISTRY OF FINANCE AND ECONOMIC PLANNING

NATIONAL CENSUS COMMISSION

NATIONAL INSTITUTE OF STATISTICS OF RWANDA
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GENERAL POPULATION AND HOUSING CENSUS
16 – 30 AUGUST 2012

***Legal Basis**: Presidential decree No, 02/01 of 28/02/2011*

CENSUS QUESTIONNAIRE *(PRIVATE HOUSEHOLD)*

I. SECTION L - LOCALIZATION AND IDENTIFICATION OF HOUSEHOLD

L01. PROVINCE / KIGALI CITY: ..... |__|
L02. DISTRICT: ..... |__|
L03. SECTOR: ..... |__|__|
L04. CELL: ..... |__|__|
L05. VILLAGE: ..... |__|__|
L06. ENUMERATION AREA (N° EA): ..... |__|__|
L07. AREA OF RESIDENCE: (Urban = 1, Rural = 2): ..... |__|
L08. BUILDING NUMBER: ..... |__|__|__|
L09. HOUSEHOLD NUMBER: ..... |__|__|__|
L10. TYPE OF HOUSEHOLD: ..... |1|0|0|

L11. NUMBER OF QUESTIONNAIRES FILLED IN THIS HOUSEHOLD: |__| / |__|

II. SECTION S - HOUSEHOLD SUMMARY TABLE TO BE FILLED IN AFTER

	MALE	FEMALE	TOTAL
PRESENT RESIDENTS (PR)			
ABSENT RESIDENTS (AR)			
TOTAL RESIDENTS (PR + AR)			
VISITORS (VIS)			
TOTAL ENUMERATED			
RESIDENTS ABOVE 18 YEARS OLD			

CONTROL SHEET

ENUMERATOR	TEAM SUPERVISOR
Enumeration Date:	Date of Verification: .....
Observations:	Observations:
Name of Enumerator:	Name of Team Supervisor: .....
Signature:	Signature:

CODER	VERIFIER	DATA ENTRY CLERK
Name :.....	Name :.....	Name:.....
Date:	Date:	Date: .....
Signature:	Signature:	Signature: Code: |__|__|

N°	Name and First Name (P01)	Relationship to the Head of Household (P02)	Sex (P03)	Age at last birthday (P05)
	1. Resident household members Write the names of all resident members who were present or absent during the census night: (15-16/08/2012) according to the following order : - The Head of the Household ; - Unmarried resident children of the head of the household whose mothers /fathers are not resident in the same household beginning with the eldest ; -The first Spouse, followed by her unmarried children resident in the household beginning with the eldest ; -The second, third, … .Spouses, followed by their unmarried children resident in the household beginning with the eldest; - Married resident children of the head of the household followed by their resident spouses and children; - Children unrelated to the head being brought up within the household; - Other resident persons who are related either to the head of the household or to his spouse or spouses; - Other resident persons who are unrelated either to the head of the household or to his spouse or spouses; - Names of all other residents who did not spend the census night within the household; **2. Visitors** Record the names of all visitors who spent the census night within the household (if any).	**What is [NAME]'s Relationship to the head of the household?** *Circle the code corresponding to the response options found at the bottom of the page, depending on the declaration of the respondent.*	**What is [NAME]'s Sex?** *Circle the number which matches the response given.*	**How old was [NAME] at his/ her Last Birthday?** *If respondent do not know the exact age; Use the historical calendar provided to estimate his/her age.*
1		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
2		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
3		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
4		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
5		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
6		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
7		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
8		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
9		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
10		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
11		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|
12		1. HH 3. SD 5. FM 7. GC 9. NR 2. SP 4. UC 6. BS 8. OR	1. Male 2. Female	|__|__|__|

Relationship to the head

1. HH: Head of Household
2. SP: Spouse
3. SD: Son/Daughter
4. UC: Unrelated child
5. FM: Father/ Mother
6. BS: Brother/ Sister
7. GC: Grand child
8. OR: Non Relative
9. NR: Other relative

SECTION P – CHARACTERISTICS OF POPULATION

FOR ALL MEMBERS OF HOUSEHOLD

P01 – Serial Number of the person ☐☐

NAME: _____

P02 – What is [NAME]'s relationship to the Head of Household?

1. Head of Household

P03 – Is [NAME] male or female?

1. Male 2. Female

P04 – In what month and year was [NAME] born?

Month:_____ ☐☐ Year: ☐☐☐☐

P05 – How old was [NAME] at his/her last birthday?

Record age in completed years ☐☐☐

P06 – What is residence status of [NAME]?

1. Present Resident – PR
2. Absent Resident - AR
3. Visitor – VIS

FOR USUAL RESIDENTS

P07 – Where [NAME] was born?

Province: _____

District: _____

Foreign Country: _____ ☐☐☐

P08 – What is [NAME]'s Nationality?

1st Nationality: _____

2nd Nationality: _____

Foreigner:_____ ☐☐☐

(Record the name of the country)

P09 – Where was [NAME] residing previously?

Province: _____

District: _____

Foreign Country: _____ ☐☐☐

P10 – How long has [NAME] been living continuously in this District?

Record 000 if less than 1 year;
Record 999 if the residence has not changed since birth ☐☐☐

P11 – What is [NAME]'s Religion?

1. Catholic 4. Muslim 7. No Religion
2. Protestant 5. Jehovah Witness 8. Other……..
3. Adventist 6. Tradit/Animist

P12 – Does [NAME] have any difficulty or problem as listed below? If yes, what were the causes?

Type of disability (D)	Causes (C)
1. Seeing	1. Congenital
2. Hearing	2. Disease/Illness
3. Speaking	3. Injury/Accident
4. Walking/Climbing	4. War/Mines
5. Learning/Concentrating	5. Genocide
6. Other……	6. Not Known
	7. Other……

If None *(Write 0 in first D* → *Go to P13)*

D	C	D	C	D	C	D	C	D	C	D	C

P13 – What is [NAME]'s Medical insurance?

1. Mutuelle 2. RAMA 3. MMI 4. FARG
5. Insurance Cie 6. School 7. NGO 8. Employer
9. None 10. Other……

FOR RESIDENTS LESS THAN 18 YEARS OLD

P14 – Parental survivorship and residence

P14a - Is [NAME]'s natural mother alive?	1. Yes 2. No 3. Don't know
P14b - If yes, does [NAME]'s natural mother live in this household?	1. Yes 2. No
P14c - Is [NAME]'s natural father alive?	1. Yes 2. No 3. Don't know
P14d - If yes, does [NAME]'s natural father live in this household?	1. Yes 2. No

P15 – Was [NAME]'s birth registered?

1. Yes 2. No 3. Don't know

FOR RESIDENTS AGED 3 YEARS or OLDER

P16 – Can [NAME] read and write with understanding in the following languages?

Kinyarwanda	1	Record the SUM of the codes circled
French	2	
English	4	
Other	8	☐☐
None	0	

P17 – Has [NAME] ever attended school?

1. Has never attended → *Go to P20*
2. Has ever attended
3. Is currently attending school

P18a – What is the highest level of education [NAME] attended?

Level		Level	
Preschool	0	Secondary	3
Primary	1	University	4
Post Primary	2		

P18b – How many years of school did [NAME] complete successfully at that level?

Level	Years Completed
Preschool	0 1 2 3
Primary	0 1 2 3 4 5 6
Post primary	0 1 2 3
Secondary	0 1 2 3 4 5 6 7
University	0 1 2 3 4 5 6 7+

P19 – What is the highest certificate/degree [NAME] obtained?

0. None
1. CE/FM
2. EMA/ENTA
3. A3/D4/D5
4. A2/D6/D7
5. A1: Bacc/Diploma
6. A0: Bachelor
7. MA: Master
8. PhD: Doctorate

FOR RESIDENTS AGED 5 YEARS or OLDER

P20 – Aside from his/her own housework, did [NAME] work at least 1 hour during the last 7 days preceding the census night (8-14/08/2012)?

1. Yes → *Go to P25*
2. No

P21 – Why [NAME] did not work during the last 7 days (8-14/8/12)?

0. Home worker
1. Non-worker (Never worked)
2. Non-worker (Ever worked)
3. On leave, but has job → *Go to P25*
4. Retired
5. Old age
6. Student
7. Other: ……

4–6 → *Go to P23*

P22 – Did [NAME] do one of the following activities during the last 7 days (8-14/08/2012)?

1. Farming/Rearing animals/Fishing
2. Production
3. Services/Selling
4. House worker at someone's house
5. Home worker at own house
6. None

1–5 → *Go to P25*

P23 – Is [NAME] available to work?

1. Yes 2. No → *Go to P29*

P24 – Has [NAME] been seeking for work during the last 7 days (08-14/08/2012)?

0. No
1. Yes, 1st job
2. Yes, new job

0–2 → *Go to P29*

FOR RESIDENTS WHO ARE CURRENTLY WORKING or HAVE EVER WORKED

P25 – What was [NAME]'s main occupation (type of work) during the last 7 days preceding the census night or during the last time he/she worked?

_____ ☐☐☐☐

_____

P26 – What is [NAME]'s status in employment?

1. Employee
2. Employer
3. Self-employed
4. Contributing family worker
5. Producers' cooperative member
6. Other

P27 – What is the main product, service or activity of [NAME]'s place of work?

_____ ☐☐☐☐

_____

P28 – What is [NAME]'s institutional sector of employment?

1. Public
2. Private
3. Non-profit institution
4. Household

FOR RESIDENTS AGED 12 YEARS or OLDER

P29 – What is [NAME]'s marital status?

1. Never married 3. Separated 5. Divorced
2. Married 4. Widowed

If never married and FEMALE → *P33*

If Widowed or Divorced → *P32*

If never married and MALE → *Next Person*

P30 – How many spouses [NAME] have? *(For men only)*

Current number of spouses: ☐

P31 – What is the rank of [NAME] to the spouse? *(For women only)*

Current rank as spouse: ☐

P32 – How old was [NAME] when he/she first got married or lived together with partner?

Age at first marriage : ☐☐

FOR RESIDENT WOMEN AGED 12 YEARS or OLDER

P33 – How many live births [NAME] has ever had?

If none, write 00 for each sex and proceed to the next person

Male ☐☐ Female ☐☐

P34 – Among those children, how many are still alive?

Male ☐☐ Female ☐☐

P35 – How many live births has [NAME] had during the last 12 months (from 15/08/2011 to 15/08/2012)?

Male ☐ Female ☐

P36 – Among those children, how many are still alive?

Male ☐ Female ☐

SECTION P – CHARACTERISTICS OF POPULATION

FOR ALL MEMBERS OF HOUSEHOLD

P01 – Serial Number of the person ☐☐

NAME: _____

P02 – What is [NAME]'s relationship to the Head of Household?

2. Spouse
3. Son/Daughter
4. Unrelated Child
5. Father/Mother
6. Brother/Sister
7. Grandchild
8. Other Relative
9. Non Relative

P03 – Is [NAME] male or female?

1. Male 2. Female

P04 – In what month and year was [NAME] born?

Month:_____ ☐☐ Year: ☐☐☐☐

P05 – How old was [NAME] at his/her last birthday?

Record age in completed years ☐☐☐

P06 – What is residence status of [NAME]?

1. Present Resident – PR
2. Absent Resident - AR
3. Visitor – VIS

FOR USUAL RESIDENTS

P07 – Where [NAME] was born?

Province: _____
District: _____
Foreign Country: _____ ☐☐☐

P08 – What is [NAME]'s Nationality?

1st Nationality: _____
2nd Nationality: _____
Foreigner:_____
(Record the name of the country) ☐☐☐

P09 – Where was [NAME] residing previously?

Province: _____
District: _____
Foreign Country: _____ ☐☐☐

P10 – How long has [NAME] been living continuously in this District?

Record 000 if less than 1 year;
Record 999 if the residence has not changed since birth ☐☐☐

P11 – What is [NAME]'s Religion?

1. Catholic 4. Muslim 7. No Religion
2. Protestant 5. Jehovah Witness 8. Other……..…..
3. Adventist 6. Tradit/Animist

P12 – Does [NAME] have any difficulty or problem as listed below? If yes, what were the causes?

Type of disability (D)	Causes (C)
1. Seeing	1. Congenital
2. Hearing	2. Disease/Illness
3. Speaking	3. Injury/Accident
4. Walking/Climbing	4. War/Mines
5. Learning/Concentrating	5. Genocide
6. Other……	6. Not Known
	7. Other……

If None *(Write 0 in first D → P13)*

D	C	D	C	D	C	D	C	D	C	D	C

P13 – What is [NAME]'s Medical insurance?

1. Mutuelle 2. RAMA 3. MMI 4. FARG
5. Insurance Cie 6. School 7. NGO 8. Employer
9. None 10. Other……

FOR RESIDENTS LESS THAN 18 YEARS OLD

P14 – Parental survivorship and residence

P14a - Is [NAME]'s natural mother alive?	1. Yes 2. No 3. Don't know
P14b - If yes, does [NAME]'s natural mother live in this household?	1. Yes 2. No
P14c - Is [NAME]'s natural father alive?	1. Yes 2. No 3. Don't know
P14d - If yes, does [NAME]'s natural father live in this household?	1. Yes 2. No

P15 – Was [NAME]'s birth registered?

1. Yes 2. No 3. Don't know

FOR RESIDENTS AGED 3 YEARS or OLDER

P16 – Can [NAME] read and write with understanding in the following languages?

Kinyarwanda	1	Record the SUM of the codes circled
French	2	
English	4	
Other	8	☐☐
None	0	

P17 – Has [NAME] ever attended school?

1. Has never attended → *Go to P20*
2. Has ever attended
3. Is currently attending school

P18a – What is the highest level of education [NAME] attended?

	Level		Level
Preschool	0	Secondary	3
Primary	1	University	4
Post Primary	2		

P18b – How many years of school did [NAME] complete at that level?

Level	Years Completed
Preschool	0 1 2 3
Primary	0 1 2 3 4 5 6
Post primary	0 1 2 3
Secondary	0 1 2 3 4 5 6 7
University	0 1 2 3 4 5 6 7+

P19 – What is the highest certificate/degree [NAME] obtained?

0. None
1. CE/FM
2. EMA/ENTA
3. A3/D4/D5
4. A2/D6/D7
5. A1: Bacc/Diploma
6. A0: Bachelor
7. MA: Master
8. PhD: Doctorate

FOR RESIDENTS AGED 5 YEARS or OLDER

P20 – Aside from his/her own housework, did [NAME] work at least 1 hour during the last 7 days preceding the census night (8-14/08/2012)?

1. Yes → *Go to P25*
2. No

P21 – Why [NAME] did not work during the last 7 days (8-14/08/2012)?

0. Home worker
1. Non-worker (Never worked)
2. Non-worker (Ever worked)
3. On leave, but has job → *P25*
4. Retired
5. Oldness
6. Student
7. Other: ……..

Go to P23

P22 – Did [NAME] do one of the following activities during the last 7 days (8-14/08/2012)?

1. Farming/Rearing animals/Fishing
2. Production
3. Services/Selling
4. House worker at someone's house
5. Home worker at own house
6. None

Go to P25

P23 – Is [NAME] available to work?

1. Yes 2. No → *Go to P29*

P24 – Has [NAME] been seeking for work during the last 7 days (8-14/08/2012)?

0. No
1. Yes, 1st job
2. Yes, new job

Go to P29

FOR RESIDENTS WHO ARE CURRENTLY WORKING or HAVE EVER WORKED

P25 – What was [NAME]'s main occupation (type of work) during the last 7 days preceding the census night or during the last time he/she worked?

_____ ☐☐☐☐
_____

P26 – What is [NAME]'s status in employment?

1. Employee
2. Employer
3. Self-employed
4. Contributing family worker
5. Producers' cooperative member
6. Other

P27 – What is the main product, service or activity of [NAME]'s place of work?

_____ ☐☐☐☐
_____

P28 – What is [NAME]'s institutional sector of employment?

1. Public
2. Private
3. Non-profit institution
4. Household

FOR RESIDENTS AGED 12 YEARS or OLDER

P29 – What is [NAME]'s marital status?

1. Never married 3. Separated 5. Divorced
2. Married 4. Widowed

If never married and FEMALE → P33
If Widowed or Divorced → P32
If never married and MALE → Next Person

P30 – How many spouses [NAME] have? *(For men only)*

Current number of spouses: ☐

P31 – What is the rank of [NAME] to the spouse? *(For women only)*

Current rank as spouse: ☐

P32 – How old was [NAME] when he/she first got married or lived together with partner?

Age at first marriage : ☐☐

FOR RESIDENT WOMEN AGED 12 YEARS or OLDER

P33 – How many live births [NAME] has ever had?

If none, write 00 for each sex and proceed to the next person

Male ☐☐ Female ☐☐

P34 – Among those children, how many are still alive?

Male ☐☐ Female ☐☐

P35 – How many live births has [NAME] had during the last 12 months (from 15 August 2011 to 15 August 2012)?

Male ☐ Female ☐

P36 – Among those children, how many are still alive?

Male ☐ Female ☐

B.2 Private households: household record and mortality record

SECTION H: HOUSING UNITS CHARACTERISTICS

H01 – TYPE OF HABITAT

1. Umudugudu (clustered rural settlement)
2. Old settlement
3. Dispersed/Isolated housing
4. Planned urban housing
5. Spontaneous/Squatter housing
6. Other type of housing

H02 – TYPE OF BUILDING

1. House occupied by one household
2. House occupied by several households
3. Storey building occupied by one or more households
4. Several buildings in a compound occupied by several households
5. Other type of building

H03 – TENURE OF THE HOUSING UNIT

1. Owner
2. Tenant
3. Hire purchase
4. Free lodging
5. Staff housing
6. Refuge/Temporary camp settlement
7. Other.....

H04 – MAIN MATERIAL OF THE ROOF

What is the main material used for the roof?
(In case of a storey building, consider the roof of the last floor)

1. Iron Sheets
2. Local Tiles
3. Industrial Tiles
4. Asbestos
5. Concrete
6. Cartoons/Sheathing
7. Grass
8. Other material

H05 – MAIN MATERIAL OF THE WALLS

What is the main material used for the walls?

1. Wood/Mud
2. Wood/Cemented mud
3. Sundried bricks
4. Plastic Sheathing/Cardboard
5. Cement blocks/Concrete
6. Stone
7. Timber
8. Burnt bricks
9. Other

H06 – MAIN MATERIAL OF THE FLOOR

What is the main material used for the floor?

1. Earth/Sand
2. Concrete
3. Stone
4. Burn bricks
5. Timber
6. Other

H07 – NUMBER OF ROOMS

How many rooms do the housing units have, including bathrooms, toilets, kitchen, store rooms?

☐☐

H08 – NUMBER OF BED ROOMS

How many of these rooms are used for sleeping?

☐☐

H09 – NUMBER OF OCCUPANTS

How many persons usually sleep in the housing unit?

☐☐

H10 – MAIN SOURCE OF WATER

What is the main source of water supply for members of the household?

1. Internal pipe-born water
2. Pipe-born water in the compound
3. Public tap out of the compound
4. Protected Spring/Well
5. Unprotected Spring/Well
6. Rain water
7. River
8. Lake/Stream/Pond/Surface water
9. Other

H11 – TYPE OF TOILET FACILITY

What is the main type of toilet facility used by the members of the household?

1. Flush toilet/Water Closet (WC) system
2. Private pit latrine
3. Public pit latrine
4. Bush
5. Other

H12 – MAIN SOURCE OF ENERGY FOR LIGHTING

What is the main source of energy the household uses for lighting?

1. Electricity by EWSA
2. Hydro-electric or other private source
3. Solar power
4. Generator
5. Kerosene lamp
6. Paraffin
7. Biogas
8. Candle
9. Firewood
10. Other

H13 – MAIN SOURCE OF ENERGY FOR COOKING

What is the main source of energy the household uses for cooking?

1. Electricity
2. Gas
3. Biogas
4. Kerosene
5. Firewood
6. Charcoal
7. Grass/Leaves
8. Other

H14 – ENERGY SAVING STOVE

Do you have an energy saving stove in this house?

1. Yes, and it is used
2. Yes, but it is not used
3. No

H15 – MODE OF WASTE DISPOSAL

What is the main mode of household waste disposal used?

1. Compost dumping
2. Private dust bins
3. Public refuse dumps
4. In the bush
5. On the farms
6. In a River/Stream/Drain/Gutter
7. Other

H16 – MODE OF SEWAGE DISPOSAL

What is the main mode of sewage disposal used by the household?

1. Sump
2. In the courtyard
3. Rivulet/Trench/Channels
4. In the street
5. Main sewer
6. Cesspool
7. Bush
8. Other

H17-H25 – HOUSEHOLD ASSETS

How many does the household have of the following assets in functioning condition?

H17 – Radio	☐
H18 – Television	☐
H19 – Telephone (fixed line)	☐
H20 – Cell phone	☐☐
H21 – Refrigerator/ Freezer	☐
H22 – Computer	☐
H23 – Vehicles	☐☐
H24 – Motorcycles	☐☐
H25 – Bicycles	☐☐

H26 – INTERNET ACCESS: Does any member of this household have access to Internet?

1. Yes
2. No → *Go to H28-H34*

H27 – Where do you access Internet?

From Home	1	Record the SUM of the codes circled
From Office / School	2	
From Cyber Cafe	4	
Other	8	

☐☐

H28-H34 – How many cattle, goats, sheep, pigs, poultry/fowl and rabbits do you have in this household?

H28a – Local breed cow	☐☐☐☐
H28b – Cross breed cow	☐☐☐☐
H28c – Exotic breed cow	☐☐☐☐
H29 – Goats	☐☐☐☐
H30 – Sheep	☐☐☐☐
H31 – Pigs	☐☐☐☐
H32 – Rabbits	☐☐☐☐
H33 – Poultry	☐☐☐☐
H34 – Other poultry	☐☐☐☐

H35 – During the last 12 months (15/08/2011 – 15/08/2012), has any member of this household done agriculture activity or rented his land?

1. Yes, in his own land
2. Yes, in land he rented
3. No, he/she has rented it out
4. No, he/she has not rented it
5. No, without land

SECTION M: MORTALITY

Please record information on deaths that occurred in the household during the last 12 months.
Do not forget the children.

M1 – Is there any member of the household who died during the last 12 months (15/08/2011-15/08/2012)?

1. Yes
2. No → End of the interview

M2 – Specify the sex, age and cause of death.

Death No.	Sex (1. Male 2. Female)	Age at death (Record 000 if less than 1 year)	Cause (1. Accident 2. Murder 3. Violence 4. Suicide 5. Injury 6. Illness)	If death of Woman aged 12-49, ... Did the death occur while pregnant?	Did the death occur during childbirth?	Did the death occur during the 6 weeks period following the termination of pregnancy, irrespective of the way the pregnancy was terminated?
			If 1-5 and → Next Person	1. Yes 2. No	1. Yes 2. No	1. Yes 2. No
	☐	☐☐☐	☐	☐	☐	☐
	☐	☐☐☐	☐	☐	☐	☐
	☐	☐☐☐	☐	☐	☐	☐
	☐	☐☐☐	☐	☐	☐	☐
	☐	☐☐☐	☐	☐	☐	☐
	☐	☐☐☐	☐	☐	☐	☐

B.3 Institutional households: person record

FORM: 002

REPUBLIC OF RWANDA

S/N: 0000000

MINISTRY OF FINANCE AND ECONOMIC PLANNING

NATIONAL CENSUS COMMISSION

NATIONAL INSTITUTE OF STATISTICS OF RWANDA
P.O. Box 6139 Kigali. Tel.: (+250)252571035
Fax: (+250)252570705 *E-mail :info@statistics.gov.rw*

GENERAL POPULATION AND HOUSING CENSUS
16 – 30 AUGUST 2012

***Legal Basis**: Presidential decree No, 02/01 of 28/02/2011*

CENSUS QUESTIONNAIRE *(INSTITUTIONAL HOUSEHOLD)*

I. SECTION L - LOCALIZATION AND IDENTIFICATION OF HOUSEHOLD

L01. PROVINCE / KIGALI CITY: ..... |__|
L02. DISTRICT: ..... |__|
L03. SECTOR: ..... |__|__|
L04. CELL: ..... |__|__|
L05. VILLAGE: ..... |__|__|
L06. ENUMERATION AREA (N° EA): ..... |__|__|
L07. AREA OF RESIDENCE: (Urban = 1, Rural = 2): ..... |__|
L08. BUILDING NUMBER: ..... |__|__|__|
L09. HOUSEHOLD NUMBER: ..... |__|__|__|
L10.TYPE OF HOUSEHOLD:..... |_2_|__|__|

L11. NUMBER OF QUESTIONNAIRES FILLED IN THIS HOUSEHOLD: |__| / |__|

II. SECTION S - HOUSEHOLD SUMMARY TABLE TO BE FILLED IN AFTER

	MALE	FEMALE	TOTAL
PRESENT RESIDENTS (PR)			
ABSENT RESIDENTS (AR)			
TOTAL RESIDENTS (PR + AR)			
VISITORS (VIS)			
TOTAL ENUMERATED			
RESIDENTS ABOVE 18 YEARS OLD			

CONTROL SHEET

ENUMERATOR	TEAM SUPERVISOR
Enumeration Date:	Date of Verification: .....
Observations:	Observations:
Name of Enumerator: ..... Signature:	Name of Team Supervisor: ..... Signature:

CODER	VERIFIER	DATA ENTRY CLERK
Name :..... Date: ..... Signature:	Name :..... Date: ..... Signature:	Name:..... Date: ..... Signature: Code: |__|__|

N°	SECTION P - CHARACTERISTICS OF POPULATION						
	Name and First Name	Is [NAME] male or female?	In what month and year was [NAME] born?	How old was [NAME] at his/her last birthday?	What is residence status of [NAME]?	Where [NAME] was born? (Province and District or Country)	What is [NAME]'s Nationality?
	P01	P03	P04	P05	P06	P07	P08
1		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
2		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
3		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
4		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
5		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
6		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
7		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
8		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
9		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
10		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
11		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
12		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
13		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
14		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___
15		1. Male 2. Female	___/___/ ____	___	1. Present Resident 2. Absent Resident 3. Visitor	.... ___	.... ___

	SECTION P - CHARACTERISTICS OF POPULATION (cont'd)					
	QUESTIONS ADDRESSED TO ALL HOUSEHOLD MEMBERS		FOR MEMBERS AGED 3 YEARS or ABOVE			MEMBERS AGED 12 YEARS or ABOVE
	Where was [NAME] Residing previously? (District and Province or Country)	Does [NAME] have any disability? If yes, what were the causes? If None *(Write 0 in D and Go to P17)*	Has [NAME] ever attended preschool, school or literacy program? *If P17 = 1 Go to P29*	What is highest level of school or literacy program [NAME] attended ?	How many years of school did [NAME] complete at that level?	What is [NAME]'s marital status?
	P09	P12	P17	P18a	P18b	P29
1	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
2	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
3	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
4	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
5	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
6	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
7	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
8	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
9	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
10	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
11	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
12	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
13	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
14	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has ever attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced
15	.... |___|___|___|	D C D C D C D C D C |_|_|_|_|_|_|_|_|_|_|	1. Has never attended 2. Has never attended 3. Is currently attended	|___|	|___|	1. Never married 2. Married 3. Separated 4. Widowed 5. Divorced

P12: Type of disability (D)

1. Seeing
2. Hearing
3. Speaking
4. Walking/Climbing
5. Learning/Concentrating
6. Other

Causes (C)

1. Congenital
2. Disease/Illness
3. Injury/Accidents
4. War/Mines
5. Genocide
6. Not known
7. Other

P18a: Level

0. Preschool
1. Primary
2. Post-primary
3. Secondary
4. University

P18b Year completed

0 1 2 3
0 1 2 3 4 5 6
0 1 2 3
0 1 2 3 4 5 6 7
0 1 2 3 4 5 6 7+

Annex C Glossary of key terms and definitions

This Glossary provides definitions of key concepts and indicators used in the thematic reports of the Fourth Rwanda Population and Housing Census (RPHC4). Readers are referred to the methodological sections of the respective reports for a more detailed technical explanation of indicators.

C.1 Population and demographic characteristics

Residents: persons who have lived for more than six months in the place where they were enumerated or who intended to live for more than six months in that place. They represent the population usually living in a place. Residents could be:

- **Present residents:** present in their place of usual residence on the reference night; or
- **Absent residents:** not present in their place of usual residence on the reference night. The person must be absent for a period shorter than or equal to six months.

Visitors: persons who were not usual residents of the household. They might be residents in another place in Rwanda, and thus absent residents in that place, or non-residents of the country, for example tourists present at the moment of the Census.

De facto population (present residents + visitors): includes all persons physically present in the country or area at the reference date.

De jure population (present residents + absent residents): includes all usual residents of the given country or area, whether or not they were physically present in the area at the reference date. The de jure population is also referred to as the (usual) resident population. Most of the analysis presented in these thematic reports is based on the de jure population.

Age-dependency ratio: is measured as the ratio between those typically not in the labour force and the age group typically in the labour force. Using the national definition of working age, it is defined as the sum of persons aged 0 to 15 and elderly people aged 60 and above, divided by the population in the 16 to 59 age group, multiplied by 100. For international comparisons, age groups 0 to 14 and 65 and above are used to identify dependents.

Population pyramid: graphically displays a population's age and sex composition. Horizontal bars present the numbers (or percentages) of males and females in each age group or at each individual age. The sum of all the age/sex groups in the population pyramid equals the total population.

Sex: refers to the classification of people as male or female, based on biological and physiological characteristics such as chromosomes, hormones, and reproductive organs.

Sex ratio: the number of males per 100 females in the population. A sex ratio of 100 would imply that there are as many males as females.

Disability status: characterises the population into those with and without a disability. The 'International Classification of Functioning, Disability and Health' defines disability as 'an umbrella term for impairments, activity limitations and participation restrictions. It denotes the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors).' The following limitations in activity functioning are considered in the RPHC4: seeing, hearing, speaking, walking/climbing, learning/concentrating and another type of difficulty/disability.

Total fertility rate (TFR): refers to the average number of children a hypothetical cohort of women would have at the end of their reproductive period during their lifetime if they were subject to experiencing the ASFRs of a given period. It is calculated by summing the ASFRs and multiplying the sum by the width of the age interval. The indirect estimate of TFR for Rwanda is obtained by applying the Arriaga (ARFE2) method after adjusting the ASFRs using the El Badry correction procedure.

Age-specific fertility rate (ASFR): refers to the number of births to women in a specific age group, divided by the number of women in that age group. The ASFR is expressed as number of births per 1,000 women.

Mean age at childbearing: the mean age of mothers at the time of the birth of their children if women were subject throughout their lives to the ASFRs observed in a given year.

Parity: the number of children born alive to a woman. Zero parity women are those with no live births and single parity refers to those women who have one child and so on.

Nuptiality: refers to marriage as a population phenomenon, including the rate at which it occurs, the characteristics of people united in marriage, and the dissolution of such unions (through divorce, separation, widowhood, and annulment). The question on marital status was formulated as follows: 'what is [name]'s marital status?' Men in marital union were further asked the type of union, whether it is a monogamous or a polygamous union, and the age at first union. Women in union were asked about their rank as spouse and their age at first union.

Marital status: personal status of each individual in relation to the marriage laws or customs of the country and defined in the Census in five categories: *Never married*: an individual who has never been in a union; *Married*: an individual who was in marital union at the moment of the Census, legally or not; *Divorced*: an individual who has been separated from his or her spouse through a court decision, according to legislation; *Separated*: an individual who has separated temporarily from his/her spouse and is awaiting the court decision; *Widowed*: a man or a woman who has lost his or her spouse by death, not yet remarried. The marital status of all usual residents aged 12 and above is enquired about in the Census questionnaire.

Monogamous: is defined as having one spouse. This indicator is only calculated for currently married or separated males aged 12 and above living in private households.

Polygamous: is defined as having more than one spouse. This indicator is only calculated for currently married or separated males aged 12 and above living in private households.

C.2 Housing and household characteristics

Housing unit: a separate and independent place of abode intended for habitation by a single household or one not intended for habitation but occupied by a household at the time of the Census. The essential features of housing units are separateness and independence.

Household: the concept of the household is based on the arrangements in regard to food or other essentials for living. One household occupies a single housing unit.

Private household: consists of one or more persons living together and sharing at least one daily meal. Persons in a private household may or may not be related, or may constitute a combination of persons both related and unrelated. In order to facilitate analysis of the de jure population (usual residents) across thematic reports, private households were further categorised as follows:

a) Households where there is at least one usual resident in the household (present or absent resident); and
b) Households consisting only of visitors (e.g. households found during the Census in their holiday homes, etc.)

Subsequently, and across all thematic reports, any analysis of the characteristics of 'private households' will refer to the definition in (a) above, whereas analysis of 'private housing units' will refer to households under both (a) and (b).

Institutional household: comprises a group of persons who are being provided with institutionalised care, and includes educational institutions, health care institutions, military institutions, religious institutions, or institutions for the elderly or persons with disabilities. In the RPHC4, persons who were homeless on the night of the Census were also classified as belonging to an institutional household.

Head of household*:* refers to a person recognised as such by the respondent. Every private household has one and only one household head.

Sources of drinking water*:* have been split into improved and unimproved sources. Improved sources include internal pipe-borne water, pipe-borne water in the compound, public tap outside the compound, protected spring/well, and rain water. These categorisations are based on the definition developed by the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) Joint Monitoring Programme (NISR, n.d.) in 2010. Unimproved sources include unprotected springs/wells, rivers and lakes/streams/ponds/surface water.

Housing tenure: refers to legal occupation of the dwelling. Usually, occupancy here is defined as owner, tenant, hire purchase, free lodging, staff housing or refugee/temporary camp settlement.

C.3 Education

Education system (Rwanda) and degrees/certificates: the education system in Rwanda is organised in four levels:

- **Pre-primary education:** is organised in nursery schools for a period of three years for children between the ages of three and six.
- **Primary education:** lasts for six years and the official age at this level is seven to 12.
- **Secondary education:** lasts for six years and the official age for this level is 13 to 18. It is composed of lower secondary (the first three years – often referred to as Tronc Commun) and upper secondary (the second three years). The following certificates and/or diplomas were or are currently awarded at this level of education:
    i) **ENTA:** (*Ecole Normale Technique Auxiliaire)* – a certificate awarded upon successful completion of five years of secondary school. This type of certificate is no longer available.
    ii) **A3/D4/D5**: certificates awarded upon successful completion of three, four or five years of secondary school. This type of certificate is no longer available.
    iii) **A2/D6/D7**: certificates awarded upon successful completion of six or seven years of secondary school.

  Previously, **post-primary education** constituted an alternative to lower secondary school that targeted specialised fields of study and allowed students, after successfully completing three years of study, to either: i) enter upper secondary level or ii) enter the labour market. Some disaggregations by highest level attended may group post-primary and secondary education. The following certificates and/or diplomas were awarded at this level of education:
    i) **EMA** (*Ecole des Moniteurs Auxiliaire*): a certificate awarded upon successful completion of two years of post-primary education, when this level existed in the education system.
    ii) **CE/FM** (*Centre d'Enseignement Rural Artisanal Integré/Certificat d'Etude Familiale*)*:* a certificate awarded upon successful completion of three years of post-primary education.
- **Tertiary education:** the duration of tertiary education varies between three and six years according to the institution and the field of study. The following certificates and/or diplomas were or are currently awarded at this level of education:
    i) **Bacc/diploma**: a degree previously awarded upon successful completion of two years of university. It is no longer available.
    ii) **Bachelor's**: a degree awarded upon successful completion of four years of university.
    iii) **Master's**: a degree awarded to a university graduate upon his/her successful completion of at least one year of post-graduate studies.
    iv) **PhD**: a degree awarded to a university graduate upon his/her successful completion of a doctoral programme, usually lasting between three and four years.

Highest level of education attended: current or previous attendance at any regular accredited educational institution or programme, public or private, for organised learning at pre-school, primary, post-primary, secondary, university level – or none.

Net Attendance Ratio (NAR): attendance of the official age group for a given level of education expressed as a percentage of the corresponding school-age population.

Literacy: the ability to both read and write with understanding (self-reported). A literate person is one who can both read and write a short, simple statement on his or her everyday life. An illiterate person is one who cannot, with understanding, both read and write such a statement. Hence, a person capable of reading and writing only figures and his or her own name should be considered illiterate, as should a person who can read but not write as well as one who can read and write only a ritual phrase that has been memorised. Literacy is recorded in the following languages: Kinyarwanda, English, French and Other.

C.4 Employment/economic activity

Working age: even though the minimum working age specified in the labour law of Rwanda is 16, the 2012 RPHC collected data on the economic activities of persons aged five and above. The official retirement age is 60, but there is no upper limit to the working age in the Rwandan context. Employment indicators are computed for the resident population aged 16 and above, except for the analysis of children in employment.

Employed population: refers to persons who worked at least one hour in the seven-day period before the Census night, or who were temporarily absent from a job, or who were engaged in productive activities during the reference period, including: farming/rearing animals/fishing; production; services/selling; and domestic work at someone else's house.

Unemployed population: refers to persons who, during the seven-day period before the Census night, were without work but available for work. This constitutes the 'relaxed' definition of unemployment, as the condition of *seeking* work during the reference period is not taken into consideration.

Economically active population/labour force: refers to the sum of the employed and unemployed populations.

Inactive population: refers to persons who during the seven-day period before the Census night were without work and not available for work. These include persons looking after the house/family, students, people who have retired and persons who consider themselves too old to work.

Labour force participation rate (LFPR): defined as the ratio of the active population to the sum of the active and inactive population, expressed in percentage terms. Persons whose economic activity status has not been stated are excluded from the calculation of the LFPR.

Unemployment rate: defined as the ratio of unemployed to the labour force, expressed in percentage terms.

Status in employment: the International Standard Classification of status in employment identifies the following statuses: *employees* are persons working in paid (wage/salary, in-kind) employment; *employers* are persons on own account or with one or a number of partners in a self-employed job who engage one or more employees on a continuous basis; the *self-employed* are persons on own account or with one or a number of partners in a self-employed job not engaging any employee on a continuous basis; *contributing family workers* are persons working for an establishment operated by a household member who cannot be regarded as a partner; and *members of producers' cooperatives* are persons working in a cooperative producing goods and services, in a self-employed job, not engaging any employee on a continuous basis.

Main industry and main occupation: the classifications of the main branch of economic activity are based on the International Standard Industrial Classification (ISIC), version 4 and the classifications of the main occupation are based on the International Standard Classification of Occupations (ISCO), version 4.

Economic dependency ratio: is measured as the ratio between economically dependent persons (sum of unemployed, inactive, and children aged five and under) and employed persons, multiplied by 100. An economic dependency ratio of 100 would imply that one employed person has to support one economically dependent person.

C.5 Socio-cultural characteristics

Religion: the following nine response options were offered to measure religious affiliation in Rwanda: Catholic, Protestant, Adventist, Jehovah's Witness, other Christian religion, Muslim, traditionalist/animist, other religion and no religious affiliation

Nationality: nationality means the state of being legally a citizen of a particular country or the legal right of belonging to a particular nation whether by birth or naturalisation. Types of nationality are identified as single and dual nationality, which refers to the state of being a citizen of two countries. Article 7 of the Constitution of Rwanda specifies that persons of Rwandan origin, along with their descendants, have the right to acquire Rwandan nationality on demand. The same article provides allowance for dual nationality.

PERSONS AND INSTITUTIONS THAT CONTRIBUTED TO THE FOURTH RWANDA POPULATION AND HOUSING CENSUS, 2012

National Census Commission

Chairperson:	
Claver GATETE	Minister of Finance and Economic Planning
John RWANGOMBWA	Former Minister of Finance and Economic Planning
Vice Chairperson:	
James MUSONI	Minister of Local Government
Secretary:	
Yusuf MURANGWA	Director General of NISR
Dr. Diane KARUSISI	Former Acting Director General of NISR

Members of the National Census Commission

Venantia TUGIREYEZU	Minister in the Office of the President
Stella Ford MUGABO	Minister of Cabinet Affairs
James KABAREBE	Minister of Defense
Sheikh Mussa HARERIMANA	Minister of Internal Security
Louise MUSHIKIWABO	Minister of Foreign Affairs and Cooperation
Dr. Vincent BIRUTA	Minister of Education
Dr. Mathias HAREBAMUNGU	Minister of State in charge of Primary and Secondary Education
Dr. Agnes BINAGWAHO	Minister of Health
Odda GASINZIGWA	Minister in Prime Minister's Office in charge of Gender and Family Promotion
Jean Philbert NSENGIMANA	Minister of Youth and ICT
Prof. Silas LWAKABAMBA	Minister of Infrastructure
Albert NSENGIYUMVA	Former Minister of Infrastructure
Anastase MUREKEZI	Minister of Public Service and Labour
Stanislas KAMANZI	Minister of Natural Resources
Willy RUKUNDO	Former Acting Director General of ORINFOR
Arthur ASIIMWE	Director General of RBA
Hannington NAMARA	CEO of the Private Sector Federation
Robert BAYIGAMBA	Former CEO of the Private Sector Federation

National Technical Committee

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Vice Chairperson:	Director General of Planning in MINALOC
Egide RUGAMBA	
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Prosper NKAKA MUTIJIMA	

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Anna MUGABO	Director General of Labour and Employment
Dr. Erasme RWANAMIZA	Director General of Education
Innocent MUSABYIMANA	Director of Planning in MINIRENA
Jeanne d'Arc UMULISA	Director of Planning and M&E in MIGEPROF
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Antonio MUTORO	Former Executive Director of IPAR-Rwanda

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Kigali City:
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Sothern Province:
Alphonse MUNYENTWARI, Governor

Western Province:
Celestin KABAHIZI, Former Governor
Caritas MUKANDASIRA, Governor

Northern Province:
Aime BOSENIBAMWE, Governor

Eastern Province:
Odette UWAMARIYA, Governor

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Abdallah MURENZI	Nyanza District	Justus KANGWAGYE	Rulindo District
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Francois HABITEGEKO	Nyaruguru District	Winifrida MPEBYEMUNGU	Musanze District
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Francois Xavier MBABAZI	Ruhango District	Nehemie UWIMANA	Rwamagana District
Yvonne MTAKWASUKU	Muhanga District	Fred SABITI ATUHE	Nyagatare District
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Bernard KAYUMBA	Karongi District	John MUGABO	Kayonza District
Gaspard BYUKUSENGE	Rutsiro District	Protais MURAYIRE	Kirehe District
Sheikh Hassan BAHAME	Rubavu District	Aphrodice NAMBAJE	Ngoma District
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Census National Coordinator

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Olivier MBANGUTSE	Ngororero District	Florence UWIMBABAZI	Bugesera District
Wellars MUDASHIMA	Rusizi District		

Zone and Sector Controllers and Enumerators

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Sector Controllers:
451 (mostly Sector Education Officers)

Enumerators:
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Prof. Emmanuel TWARABAMENYE	Characteristics of Housing and Households
James BYIRINGIRO	Labour Force
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Jules RUBYUTSA	Socio-Economic Status of Children
Venant HABARUGIRA	Socio-Economic Status of Youth
Michel NDAKIZE	Socio-Economic Status of Elderly
Prosper NKAKA MUTIJIMA	Population Projections

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