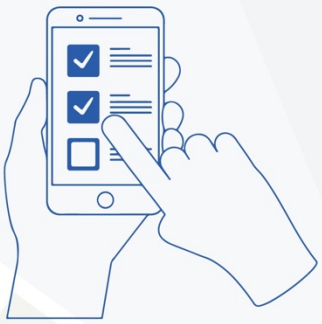
THE REPUBLIC OF RWANDA

RWANDA POPULATION AND HOUSING CENSUS
16-30 AUGUST 2022
BE COUNTED BECAUSE YOU COUNT

NISR
NATIONAL INSTITUTE OF STATISTICS OF RWANDA



5th

POPULATION AND HOUSING CENSUS

Rwanda, 2022

Thematic Report

DATA QUALITY ASSESSMENT

"Be counted because you count - Ibaruze kuko uri uw'agaciro"

THE REPUBLC OF RWANDA

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

Fifth Rwanda Population and Housing Census, 2022

Thematic Report

DATA QUALITY ASSESSMENT

July 2023

The National Institute of Statistics of Rwanda (NISR) implemented the Fifth Rwanda Population and Housing Census 2022 (RPHC 2022). Fieldwork was conducted from August 16th to 30th, 2022.

Additional information about the 2022 RPHC may be obtained from the NISR:
P.O. Box 6139, Kigali, Rwanda; Telephone: (+250) 788 383 103/Toll free: 4321
E-mail: info@statistics.gov.rw; Website: www.statistics.gov.rw.

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LIST OF ABBREVIATIONS

ASFR : **A**ge-Specific Fertility Rate
CRVSS : Civil Registration and Vital Statistics
CAPI : Computer Assisted Personal Interviews
CBR : Crude Birth Rate
DHS : Demographic and Health Survey
EA : Enumeration Area
EDPRS : Economic Development and Poverty Reduction Strategy
EICV : Integrated Household Living Conditions Survey/ Enquête Intégrale des Conditions de Vie des Ménages
EU : European Union
GFR : General Fertility Rate
GPS : Global Positioning System
MINEMA : Ministry in charge of Emergency Management
NISR : National Institute of Statistics of Rwanda
PAPI : Pen-and-Paper Personal Interview
PES : Post-Enumeration Survey
RCS : Rwanda Correctional Service
RDF : Rwanda Defence Force
RNP : Rwanda National Police
RPHC5 : Fifth Rwanda Population and Housing Census
TFR: : Total Fertility Rate
UKAID : United Kingdom Agency for International Development
UNFPA : United Nations Population Fund
UNICEF : United Nations Children's Fund
WB : World Bank

FOREWORD

The Government of Rwanda, through the National Institute of Statistics of Rwanda (NISR), conducted the Fifth Rwanda Population and Housing Census in August 2022. The Census results provide updated demographic, social and economic indicators for policy formulation and planning to support the national development agenda. Census results will also help in tracking the implementation of national, regional, continental and global development goals, such as the National Strategy for Transformation (NST), the AU Agenda 2063, and the Sustainable Development Goals (SDGs).

The Population and Housing Census in Rwanda dates back to the year 1978 when the first ever-modern census was implemented. The second, third, and fourth censuses were carried out in 1991, 2002, and 2012 respectively. The 2022 Rwanda Population and Housing Census marks therefore the fifth in the series following the United Nations Recommendations to conduct a census every ten years.

Considering census' crucial importance for the planning process, the Government of Rwanda has made the Population and Housing Census a priority to be undertaken every 10 years and adopted the use of technologies for timely delivery of census results for use.

Results of the 2022 Population and Housing Census provide population numbers from national to the lowest administrative level, as well as demographic and socio-economic indicators at both national and district levels. The census remains the only national data collection exercise that can provide the lowest levels of disaggregation to support decentralised decision making across the country.

I would like, therefore, to take this opportunity to thank all stakeholders that contributed to the success of the 2022 Rwanda Population and Housing Census. They include Ministries and other Government institutions, international organizations such as the World Bank (WB), the European Union (EU), the United Nations Population Fund (UNFPA), One-UN, UN Women, UNICEF, UNECA, the United Kingdom AID (UKAID), ONS, the African Development Bank (AfDB), the USAID, ENABEL, PARIS 21 and others for their support in diverse ways.

My special thanks go to the local government leaders from the province to the village levels who contributed a lot to the success of the 2022 Rwanda Population and Housing Census. Exceptional gratitude goes also to all enumerators and all field personnel, who collected the information and all respondents for their cooperation and dedication. The National Institute of Statistics of Rwanda (NISR) deserves special appreciation for the excellent operational and coordination of all census activities.

I finally recommend that the invaluable information contained in the different thematic reports of the 5th Rwanda Population and Housing Census be used as updated evidence for all decision and policy making for the national, regional and global development programs.

Dr. Uzziel NDAGIJIMANA
Minister of Finance and Economic Planning

ACKNOWLEDGEMENTS

The National Institute of Statistics of Rwanda (NISR) is pleased to release the results of the Fifth Rwanda Population and Housing Census (RPHC5). The execution of different Census phases: preparatory works, data collection, data processing, tabulation and data analysis; spans for a period of about four years between 2020 and 2023.

NISR has produced several thematic reports to be of direct help to policy makers, planners, local authorities and other census users. The reports provide key information, mainly population size and distribution, education, settlement, population of particular interest (children, youth, women, elderly, etc.), and population projections to mention but a few. NISR expects that results from these reports supplemented by the district profile reports will meet the demand of census data users across board.

On this occasion, I would like to extend my sincere gratitude to the Government of Rwanda and development partners for availing financial, logistical and technical support to the 2022 RPHC. The NISR would like to appreciate all stakeholders who worked tirelessly with us to ensure that the 2022 Rwanda Population and Housing Census operation was successful.

Special recognition also goes to the Ministry of Finance and Economic Planning, Ministry of Defence, Ministry of Local Government, Ministry of Education, Ministry of Foreign Affairs, Ministry of ICT and Innovation, Ministry of Interior, Ministry of Health, Ministry in Charge of Emergency Management, the Rwanda National Police, Rwanda Correctional Services, Rwanda Biomedical Center (RBC), Rwanda Information Society Authority (RISA), Rwanda Utilities Regulatory Authority (RURA), Rwanda Public Procurement Authority (RPPA), Office of Government Spokesperson (OGS), and Rwanda Broadcasting Agency (RBA) for their direct involvement in awareness campaign, logistical and 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, to the people of Rwanda, residents, and visitors, your cooperation was crucial towards the success of the census.

Thank you.

MURANGWA Yusuf
Director General,
National Institute of Statistics of Rwanda

EXECUTIVE SUMMARY

Provision of timely and good-quality data, such as census, is essential for socio-economic planning. The standard and global best practice in data production is to assess different phases of census enumeration with a view to ascertaining the quality of its final output. Thus, this report presents the quality review of the 2022 Population and Housing Census, which is the fifth to be conducted in Rwanda (RPHC5). An evaluation of different phases of the census (i.e., the pre-enumeration, enumeration and post-enumeration phases), as well as the assessment of selected key demographic and socio-economic variables are presented in the report. In summary, the quality assessment done shows that every phase of the census was well planned and meticulously implemented. Several quality assurance measures employed at different phases, including the pilot census, training of enumerators, use of CAPI for the enumeration amongst others, greatly enhanced the quality of the census database. Further, the use of modern technologies at different stages of the census greatly contributed to the overall quality of RPHC5. Despite the strong quality assurance measures put in place, a few data quality issues were identified. Notwithstanding, the overall conclusion of the assessment is that the RPHC5 was implemented with strong quality control and gives an excellent representation of the population of Rwanda with generally good measurement of its size, composition, structure, and distribution. Assessment of some selected key demographic and socio-economic characteristics also confirmed that these variables are of high quality.

Specifically, the Post-Enumeration Survey (PES) confirms that the RPHC5 has a good representation and high coverage, with a net-coverage rate of 98.7% nationally, and with little variation across provinces, rural-urban areas and by age and sex. Gross under-coverage rate was 1.51% while gross over-coverage rate (erroneous inclusions) was 0.19%. The PES data that indicates excellent representation is consistent with the plausible growth rate for the population over the inter-censual period implied by the census data.

Evaluation of some key demographic variables such as age, sex, migration flow, in the fertility, mortality, and migration data; as well as the assessment of some selected socio-economic indicators confirmed the high quality of the RPHC5. Importantly, triangulation of the selected variables with other data sources confirmed the good quality of the RPHC5 data in terms of representation of the population across provinces. However, some quality issues were identified on a few population characteristics. These include age heaping, particularly for ages with terminal digits zero and five. However, summary measures from Whipple's, and Myers' indices and the UN joint scores indicate comparatively some improvement and reduction in age heaping in the 2022 Census compared to the 2012 Census. Overall, age heaping disappeared in the population pyramid and line graph based on grouped age data, thus indicating that avoidance of age in preference for another largely occurred within the same five-year age group. In addition, there is strong evidence that the current births and lifetime fertility from the 2022 Census are of high quality. There is, however, some evidence of underreporting of births at the younger ages of mothers, particularly ages 10-19. Further, there is some evidence of under-reporting of infant deaths, and across other ages, hence, the indirect methods are recommended and utilized for estimating mortality rates. In addition, some key socio-economic variables such as marital status, migration, education and life expectancy are considered for evaluation. Evidence from the assessment shows plausible numbers and high quality of reporting for these characteristics.

In conclusion, there are no major quality issues identified in the 2022 Rwanda Population and Housing Census, except some economic activity variables with low quality reporting including the identification of unemployed people. The evaluation of key demographic and socio-economic variables as well as the triangulation of the data with other sources generally confirm the excellent quality of the RPHC5. Thus, the final database of the 2022 Rwanda Population and Housing Census is of high quality.

CHAPTER 1: OVERVIEW OF THE FIFTH RWANDA POPULATION AND HOUSING CENSUS

1.1. Context and justification

The history of the Population and Housing Census in Rwanda dates back in the 1970s. To date, five modern censuses have been successfully conducted in Rwanda: 1978, 1991, 2002, 2012 and 2022.
In line with the United Nations Decennial Census Programme, the 2022 Census is the Fifth Rwanda Population and Housing Census (RPHC5) in series.

Since 2000, and following the endorsement of recommendations from major international conferences held under the auspices of the United Nations, the Government of Rwanda (GoR) has been focusing on the long-term Vision 2020 that aims at transforming Rwanda into a middle-income country. Rwanda pursued the Millennium Development Goals (2000-2015) on the international scene and currently seeks to achieve the Sustainable Development Goals (SDGs) as well as Rwanda's Vision 2050. These goals have been implemented through the medium-term planning framework of the Economic Development and Poverty Reduction Strategy (EDPRS) and the National Strategy for Transformation (NST1). The measurement of progress in implementing national and international programmes in line with various AU and UN recommendations calls for availability of updated demographic and socio-economic statistical data to inform selected indicators at different levels.

The RPHC5 is a reliable and comprehensive source of such data. It was implemented in a way that allows the disaggregation of indicators at the lowest geographical level where it is applicable. The RPHC5 was undertaken to update the national mapping and demographic databases, to provide indicators for monitoring poverty reduction strategies and achievement of national, regional, and international development goals (NST1, Vision 2050, AU Agenda 2063, SDGs, etc.) and to strengthen the technical capacity of the National Institute of Statistics of Rwanda (NISR).

1.2. Legal and institutional frameworks

As an essential precondition for Census execution, the legislation of its operations was secured by the law No. 53bis/2013 of 28/06/2013 establishing the National Institute of Statistics of Rwanda and determining its mission, organization and functioning; and law No. 45/2013 of 16/06/2013 on the organization of statistical activities in Rwanda.
In order to ensure focused functioning during the whole period of Census execution, a Census Unit of NISR coordinated the overall implementation of the 2022 RPHC5 with support from other NISR units.

1.3. Objectives of the Census

The overall goal of the Fifth Rwanda Population and Housing Census (PHC5) is to contribute to the improvement of the quality of life of the Rwanda population by furnishing the Government and other stakeholders with relevant, reliable, and timely data and information for development planning, policy formulation and service delivery as well as for monitoring and evaluation of development programmes.

Specifically, the 2022 Rwanda Population and Housing Census has been implemented and is well placed to:

- Have increased availability and accessibility of accurate, timely and reliable data on demographic and socio-economic characteristics for evidence-based decisions, policy formulation and monitoring and evaluation of development frameworks at national, sub-national and sectoral levels;

- Have increased knowledge of stakeholders, at all levels, on population characteristics, patterns and trends;
- Have increased utilization, at all levels, of data and information for designing, monitoring and evaluating development programmes; and
- Have strengthened national capacities in data collection, processing, analysis, dissemination and utilization, including geographic information system (GIS).

1.4. Census phases and Methodology

1.4.1. Census phases

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

- Census mapping conducted between 18th October, 2020 to 15th July, 2021;
- A Pilot Census conducted between 16-30 September, 2021;
- Questionnaire and manual development;
- Census publicity and sensitization campaign;
- Recruitment and training of field staff;
- Census enumeration conducted between 16 -30 August, 2022;
- Post Enumeration Survey conducted between 16-30 September, 2022; and
- Post-census activities, including analysis and dissemination of census results.

The success of the RPHC5 is widely attributable 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, people of Rwanda and the generous technical and financial assistance from international development partners.

1.4.2. Census methodology

1. Census mapping

Census mapping was a crucial phase of the 2022 RPHC. 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 mapping used the latest versions of technology including satellite imagery and ArcGIS software to collect and document detailed information about the administrative units of the country, including boundaries, and locations of major social GPS coordinates of housing units and economic infrastructure (schools, health centres, hospitals, markets, administrative offices, etc.). These activities were carried out together with the estimation of the population and were used for delimitation of enumeration areas (EAs) in all villages (Imidugudu) of the country.

The Census mapping operation lasted for about 9 months (from 18th October, 2020 to 15th July, 2021), which enabled the NISR to better estimate the number of staff to be recruited (e.g., enumerators, team leaders, supervisors, etc.) and all logistics for the main field data collection. Details from the Census mapping also provided guidance for adequate planning of the other census infrastructures and facilities required for field activities.

The outcomes of the Census mapping included 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 24,339 enumeration areas within the current boundaries of administrative units, consisting of five provinces, 30 districts, 416 sectors and 2,148 cells and 14, 436 villages. This allows for easy compilation of census results in these administrative entities.

2. Pilot Census

Prior to the RPHC5, a pilot census was 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 of the census.

The pilot census was conducted from 16th to 30th September, 2021 on a sample of 600 EAs, including 416 randomly selected EAs across all sectors and 184 purposively selected EAs in the areas bordering neighbouring countries to Rwanda and in remote rural areas in order to test the internet connectivity, data transmission, and the availability of electricity. The pilot census was initially planned for 16th to 30th August, 2021 just to fall one year before the main census but was postponed for one month to ensure adequate preventive measures against the spread of Covid-19.
The pilot census was a rehearsal for the actual census enumeration during which the various methods and procedures for field organisation and operations as well as the census publicity/awareness campaign, census maps production, field remote monitoring, data transmission and storage, ICT infrastructure, and data analysis were tested.

The lessons learnt from the pilot census exercise were used to revise some census procedures and instruments to ensure a smooth/successful implementation of the actual census enumeration.

3. Questionnaires and manuals

The questionnaires' design for the 2022 RPHC consisted of updating the questionnaires used during the 2012 census coupled with consultations with stakeholders such as planners and policymakers from different sectors, ministries, other government institutions, private sector, and government's stakeholders,... in order to collect their needs in terms of statistical data. After the development of the questionnaires and the instruction manual, the team of analysts developed a questionnaire specifications to support and ensure a smooth translation of the paper based
questionnaire into the CAPI questionnaire by the IT and data processing team.

The lessons learnt during the pilot census were used by the NISR to improve and finalise the census
questionnaires, containing 131 variables, as well as to revise the manuals of instructions for all the census functionaries.

The questionnaires used for data collection are presented in Annex 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 with few questions.

4. Census publicity and sensitisation campaign

The success of the census is dependent upon the cooperation and participation of the entire populace. It therefore, becomes imperative to sensitize and educate the public on the importance of the census, an objective that was achieved through the implementation of the communication strategy developed for the census. A phased approach was assumed in implementing the communication strategy that includes awareness in different ways and dissemination mechanisms.
Some of the methods used for publicizing the 2022 RPHC are as below:

a. Digital Communication Programme through websites, social media, and mobile platforms;
b. Public Relations, events and mass communication;
c. Traditional Advertising through mass and outdoor media;
d. Community Mobilization (Umuganda).
e. Radios/TVs shows communication on the census calling for the public participation.

Prior to census enumeration, a national publicity and sensitisation campaign was implemented in order to inform the public about the importance and relevance of the census (RPHC5), as well as to seek the active participation, involvement and collaboration of administrative authorities during the census enumeration.

A subtle and targeted publicity and awareness campaign was conducted before the census, which was later intensified and expanded to cover all districts and villages across.

NISR was responsible for organizing and coordinating, as well as preparing and implementing appropriate communication strategies to all

communities at both national and district levels. The materials were appropriately packaged and delivered to the districts for the implementation of communication activities. In addition, the NISR coordinated and implemented communication interventions as guided by the communication strategy, and where necessary, by the prevailing conditions at the district level. Census's tasks force at Province and District levels played an important role in the census public awareness.

The census results published including the population projections 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 operation and processes.

5. Recruitment and training of field staff

The RPHC5 was conducted by personnel from various institutions: the NISR (the census executing agency), the Rwanda Defence Force through involvement of the Ministry of Defence, the Ministry of Emergency Management, the Rwanda National Police, the Rwanda Correctional Services and MINEDUC (Sector Inspectors of education and teachers).

The recruitment of Census functionaries was done by each institution according to the needs (i.e., number and categories of staff needed) of the NISR, except in the case of teachers whose recruitment was done by the NISR in collaboration with administrative authorities at the district and sector levels.

At each stage of census implementation, the necessary induction and mandatory training of NISR staff and census personnel 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 the training of enumerators, data quality monitors and their supervisors.

About twelve weeks prior to the commencement of actual Census enumeration, cascaded trainings were organised for all categories of census functionaries, namely:

a. Core training for 59 people (exclusively NISR staff);
b. Master training for 200 master trainers (NISR staff expanded to the Data quality monitors/team leaders and special institutions national coordinators;
c. Training of trainers for 1,748 trainers organised in 30 training centres, one centre per district; and
d. Training of 26,536 enumerators in 445 training centres spread across all sectors of the country.

The census training sessions focused on understanding of census questionnaire content, 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 trainings, the training content was recorded in audio-visual materials from the studio. The recorded materials were projected in each training centre and were registered in each trainee's telephone for use in case of electricity outage or at home.

Regarding the organization of the training in each centre, four trainers were in charge of the training centre. The training in each of the centres were coordinated at the central level by NISR trainers who moderated all training sessions using CISCO Webex to ensure that all contents were covered and timely management of the cessions.

6. Actual census enumeration

As planned, the actual census enumeration of the population in private and institutional households was conducted across the country from 16th to 30th August 2022, immediately after the Census reference night (the night of 15th to 16th August, 2022). Although data-collection activities were carried out by well-trained enumerators, quality assurance of the Census enumeration was ensured through close supervision at various levels.

The census personnel deployed for the RPHC5 comprised the following personnel:

a. Enumerators and support staff;
b. Sector supervisors;

c. Field monitors/data quality monitors and district team leaders;
d. Field analysts, data analysts; and
e. National coordinators.

In accordance with the instructions contained in the census manual, each personnel ensured the operations of daily census activities within their area of supervision. Enumerators were accountable for the work done on a daily basis to their sector supervisors, who monitored the progress using dashboards and field visits facilitated by two motorcycles hired to facilitate the transport of Sector Supervisors in their daily supervisory activities.

As the dashboard was accessible to all supervisors at different levels of supervision, each supervisor was expected to understand what was going on regarding the data collection and then provide explanations for any identified issues.

A team of 60 data monitors was working at NISR headquarters coordinated by 10 field analysts. They were responsible of the follow up on the progress of data collection through the dashboards in all enumeration areas. They interacted with sector supervisors on a daily basis by identifying the enumeration areas with low completion rates, and then suggesting possible solutions including redeployment of those who completed enumeration in EAs lagging behind. They were also reporting any issue that needed special attention of the coordination team.

The dashboards allowed coordination team to continually monitor the progress of census enumeration in all the 24,399 enumeration areas but also ensuring for quality of the census. The use of dashboards allowed the identification of the enumeration areas with risk of not completing the enumeration on time and where additional resources and support were needed (e.g. enumerators, means of transportation to ensure the completeness.

7. Post-enumeration activities

The post-enumeration activities include the Post-Enumeration Survey (PES), data processing, release of results, thematic analysis, and dissemination of census results. The use of technology at all stages of the census enabled the rapid and timely publication of the main indicators report, as well as the tabulations and summary results contained in the thematic reports and other census products.

The PES was conducted from 16th to 30th September 2022, just in one month after the main census enumeration. The aim of the PES was to assess the census coverage/completeness and quality of the census data.
A total of 180 enumeration areas were sampled from all districts of the country. To assess census coverage, PES and census records were matched, a task that was carried out using data science techniques and the Python programming language. Matching is the process of checking whether records from two different data sets relate to the same household and/or person match or not. In this work, both automatic and clerical matching methods were used.

The census dataset –stabilisation, data-processing, and data-editing processes were completed within two months, after which census data tables for all thematic reports were generated. The final results were subjected to an in-depth analysis across 18 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.

8. 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 the census enumeration to maximise the level of data quality. The assessment confirmed strong planning and quality assurance throughout the enumeration. Assessment of the key demographic and socio-economic variables also confirmed the good quality of the RPHC5 data in terms of representation of the population.

The overall conclusion of the assessment is that the RPHC5 was implemented with strong quality controls 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 high quality of the data with respect to coverage and representation is confirmed by the results of the Post-Enumeration Survey, which

measured the net coverage of the household population in the RPHC5 to be around 99% nationally with little variation across regions and by age and sex. Gross under-coverage was around 1.8% while gross over-coverage (erroneous inclusions) was around 0.2%.

The conclusion of excellent representation is also consistent with the plausible growth rate for the population over the intercensal period implied by the national results.

Some quality issues were identified on a few population characteristics. These include age heaping, particularly for ages with terminal digits 0 and 5. However, summary measures from Whipple's index, Myers' index and the UN joint score indicate comparatively some improvement and a reduction in age heaping in the 2022 Census compared to the 2012 Census. There is also some evidence of under-reporting of infant deaths, and across other ages - hence the use of indirect methods is recommended for estimating mortality indicators.

In conclusion, there were no major quality issues identified in the 2022 Rwanda Population and Housing Census, except for some economic activity variables with low-quality reporting. The evaluation of key demographic and socio-economic variables as well as the triangulation of the data with other sources generally confirm the excellent quality of the RPHC5. Thus, the final database of the 2022 Rwanda Population and Housing Census is of high quality.

CHAPTER 2: INTRODUCTION AND OBJECTIVES OF THE ANALYSIS

This report examines the quality of the Fifth Rwanda Population and Housing Census (RPHC5) conducted from 15th to 30th August 2022. The process involves a review of the processes and procedures for conducting the census, as well as the assessment of the coverage and contents of key variables in the census.

High-quality and reliable census data are important resource for social and economic planning. A country can make appropriate administrative planning if it has requisite and reliable information on different sectors of its economy. Hence, while the provision of timely census data is important, its quality assessment to ascertain data reliability is also very crucial. A thorough census quality assessment is a critical exercise that gives policymakers, programme implementers and other users of census data the desired confidence and assurances that their planning, policies and programmes are based on accurate data.

United Nations Statistical Division has developed relevant handbooks, technical notes and manuals to support and promote the management of the quality of census and other statistical data (UNSD, 2022). These initiatives are essentially to provide technical and methodological frameworks to ensure the quality of official statistics across countries. As shown in Figure 2. 1, a vast body of evidence in several publications (Mahanti, R.,2019; Shazia Sadiq et al.,2013; Yong Zung,2015) identifies six dimensions of data quality, including relevance, accuracy, timeliness, accessibility, interpretability, and consistency or coherence

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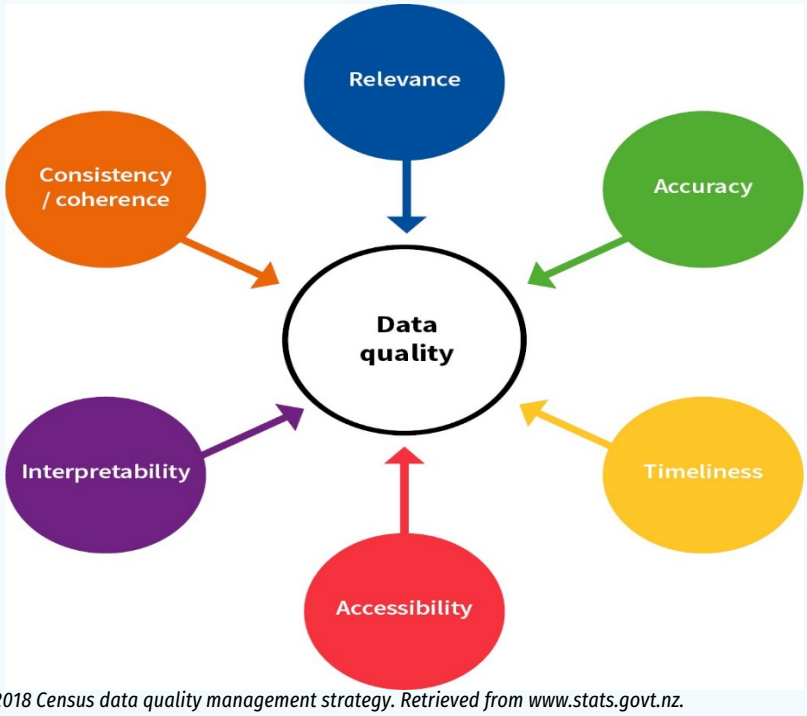
Figure 2. 1 Dimension of Data Quality



***Source**: Stats NZ (2017). 2018 Census data quality management strategy. Retrieved from www.stats.govt.nz.*

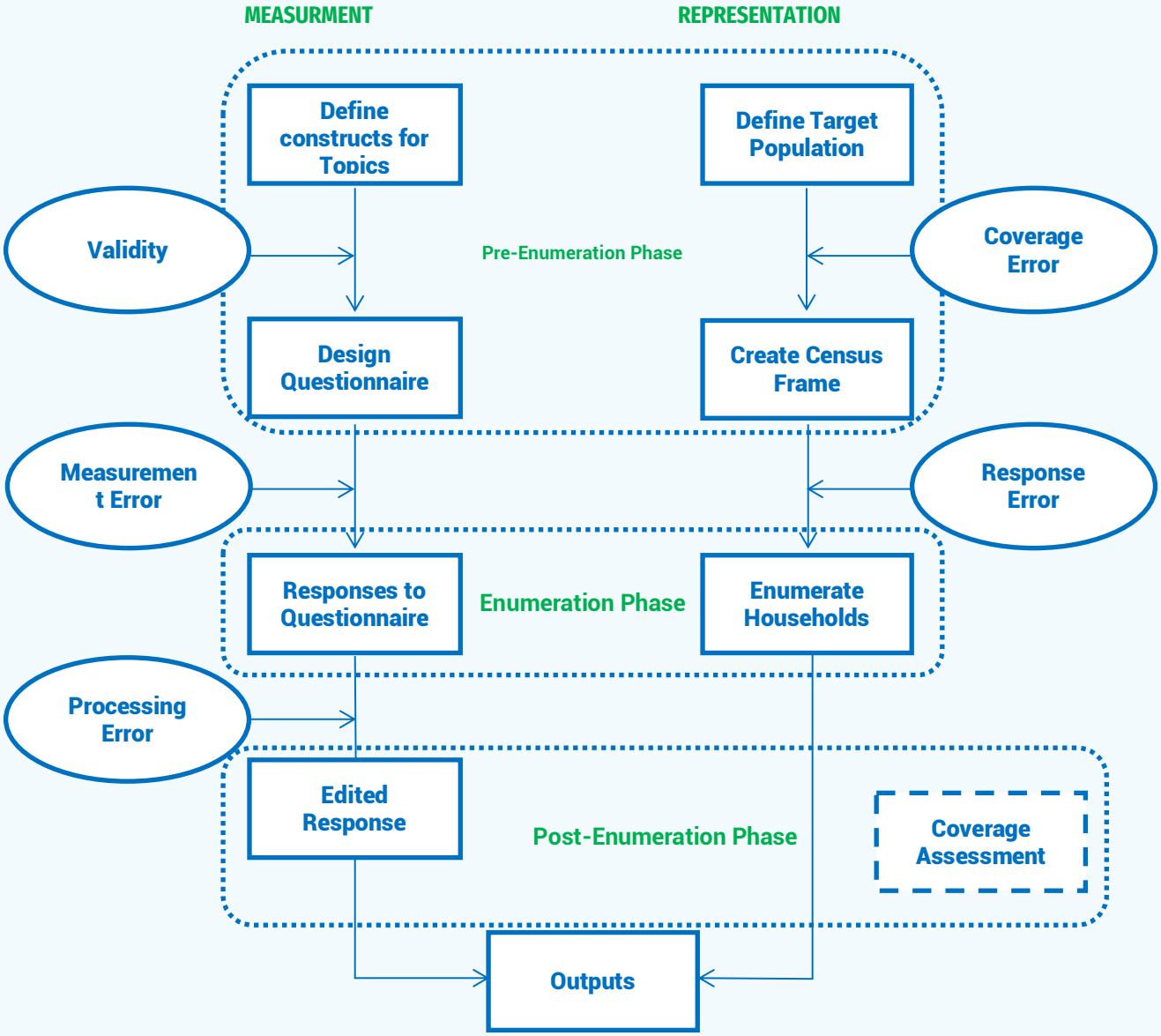
In this report, quality assessment will focus particularly on the accuracy and coherence dimensions. Where necessary, the report made references to other dimensions of quality such as relevance, and accessibility. For example, relevance comes to fore in the design of census questionnaire. To ensure adequate assessment of accuracy, the life-cycle framework developed by Groves *et al* (2009) is adapted for a census situation. The census life cycle from quality perspective is presented in Figure 2. 2.

The life-cycle framework in Figure 2. 2 presents different operations and processes of producing final census results in two components: measurement and representation. Within measurement there are several steps (boxes) to the creation of an output and at each step errors (ovals) can occur. For example, a well-designed questionnaire may well give valid measurement of the underlying construct but if poorly administered there will be measurement error as the

resulting response is the true response with error. Within representation segment, there are also several steps and again errors can occur at each step. For example, there may be a perfect listing of all housing units (census frame) but if the enumerator fails to get responses from all units there will be response error. With the Census, coverage assessment is a step that takes place to assess the representation in the census.

The steps in Figure 2. 2 have also been split into three phases to cover the implementation of the RPHC5. These include a pre-enumeration phase, an enumeration phase, and a post-enumeration phase. In the subsequent sections and chapters of this report, the three phases are presented where both measurement and representation of the census are assessed for possible errors. Chapter 3 of this report presents the assessment of pre-enumeration phase while Chapter 4 examines the enumeration phase. Chapter 5 and 6 present the assessment of post phase and evaluation of representation, respectively. Chapter 7 of the report presents the evaluation of measurement and representation with a focus on some key variables, including age, sex, fertility, mortality, and migration while Chapter 8 presents the conclusions and lessons for the future censuses

Figure 2. 2 : Census life cycle from a quality perspective



Source: adapted from Figure 2.5, p. 48, Groves et al (2009).

CHAPTER 3: PRE-ENUMERATION PHASE

The pre-enumeration or preparatory stage of a census is an important phase of the census enumeration. A careful planning and painstaking implementation of all the pre-enumeration activities is very critical to the successful conduct of a census and the quality of the census database. The pre-phase activities have significant impact on the overall quality of the final outputs. Hence, a vital part of the census quality assessment is the evaluation of different activities implemented during the pre-enumeration phase of the census.

Detailed planning for the RPHC5 Project started back in 2018 with the elaboration of the census project document detailing the plan, activities and indicative budget of the 2022 RPHC. Lessons learnt from the previous censuses conducted in 2002 and 2012 were very useful in planning for the 2022 census. The census team at NISR was able to build on the success of the previous censuses but also with the goal to improve timeliness of data release and therefore enhance its relevance for the use of policy-makers through timely release of the census results.

The United Nations recommends the use of technologies in census undertaking. This was reiterated in the United Nations Regional Workshop on the 2020 World Programme on Population and Housing Censuses held on May 29th to June 1st 2017 in Dar-es-Salaam, Tanzania. Rwanda was represented at the workshop by the Director of Census and the Director of ICT from NISR. The National Institute adopted the use of technologies in the 2022 RPHC in replacement of paper-based questionnaires and other manual processes. From 2017, NISR started testing different processes and aspects of the census operations, including the technology readiness (network coverage, data transmission, programming, census questionnaire on smartphone, and data archiving). To ensure a smooth and effective deployment of technologies in all aspects of the census operations, a national census ICT committee led by the Rwanda Information Society Authority (RISA) was established under the auspices of the Ministry of finance and Economic planning. Hence, NISR procured 30,000 smartphones locally from Maraphones ltd-Rwanda and a number of tests were performed to ensure that the brands are compatible and relevant for use in census enumeration.

The early commencement of planning for the census in 2018 was a conscious decision by the NISR to put the delivery of a high quality[1] output database at the centre of the RPHC5 Project. By June 2020, the project document, detailed activities and a clear road map of the 2022 RPHC were already available, and the process of fund mobilization had begun.

This chapter presents detailed information on the creation and testing of the questionnaire to assess the validity of the measurement of the desired[2] constructs. In addition, the chapter presents information on the representation stages up to the listing of housing units prior to the enumeration phase. The recruitment and training of enumerators is also covered in this chapter.

3.1 Development and testing of the questionnaire (validity and error measurement)

The development of census questionnaire for RPHC5 started with the first stage, which involved reviewing and building on the 2012 census questionnaire through engagement with relevant Ministries and other Government agencies to assess the relevance of the themes included in the questionnaire and also to identify possible gaps. After reaching a consensus on the themes or topics in the questionnaire, the design and layout of the 2012 questionnaire was the starting point for developing the questionnaires for 2022 Census.

As a default, most of the questions in 2012 census questionnaire were kept the same in 2022 census questionnaire. This not only increases the comparability of the data across time but made sense given the 2012 questionnaire was based on UN recommendations for census questions and content. However, there were some changes to the content such as New information collected on livestock type and agricultural activities (livestock type, type of crops and fruit trees) and ownership of mobile phones by the resident population.

[1] High quality refer to the relevance, the accuracy, the timeliness, the punctuality, the accessibility, the clarity, comparability and the coherence

[2] It is important that the constructs should be relevant to the policy-makers.

In the area of disability, there was the positive move towards utilising questions from the Washington Group Questions on Disabilities that were consistent with the International Classification of Functioning. Additional information was also collected such as those relating to the official identification documents of the resident population. Further, there was a substantial change on all questions relating to employment and this was done in line with the new framework to capture the economic characteristics of the population.

After the inclusion of additional questions and the design and layout of the 2022 Census questionnaire, the questionnaire was pre-loaded on the electronic devices for use in the Computer Assisted Personal Interview (CAPI). Prior to the actual census enumeration, the questionnaire was first reviewed by experts within the NISR. This was followed by a small-scale field-testing of the instrument to pilot the use of the questionnaire and the flow of the questions and controls. The testing of the questionnaire led to further refinement of enumerator instructions manual where it was discovered that enumerator–respondent interaction was potentially introducing measurement error with respect to the desired measurement. The result of the testing was used to further revise the questionnaire which was used in the pilot census. Through the pilot census, the general use of the questionnaire by enumerators through CAPI, flow of questions, as well as understanding and acceptability by respondents were then assessed on a larger scale

3.2. Creation and mapping of the enumeration areas (coverage errors)

Census is the most comprehensive source of demographic and socio-economic data at the smallest geographic level or administrative unit of a country. Therefore, a census must plan to maximise the coverage of the population. In the case of the 2022 Population and Housing Census, the process of maximisation started with the defining and mapping of enumeration areas (EAs). This was done both in terms of usual residents and via the inclusion of visitors in the enumeration of each household persons present.

There are different ways of measuring the success of a census enumeration, and the most important one is the census coverage. Prior to the main census enumeration, a census mapping was conducted from 18 October 2020 to 15 July 2021 to create a base map to be used for the whole process of census operation. The mapping was essential for planning and creating small manageable units – referred to as enumeration areas (EAs). The mapping was also done for other important purposes, including updating the existing administrative boundaries of the country, creating a georeferenced database of housing and household location that are linkable to the census results, creating a georeferenced database of basic social and economic infrastructures, and providing support structure for the monitoring of census enumeration through the use of GPS technology, dashboard and interactive maps.

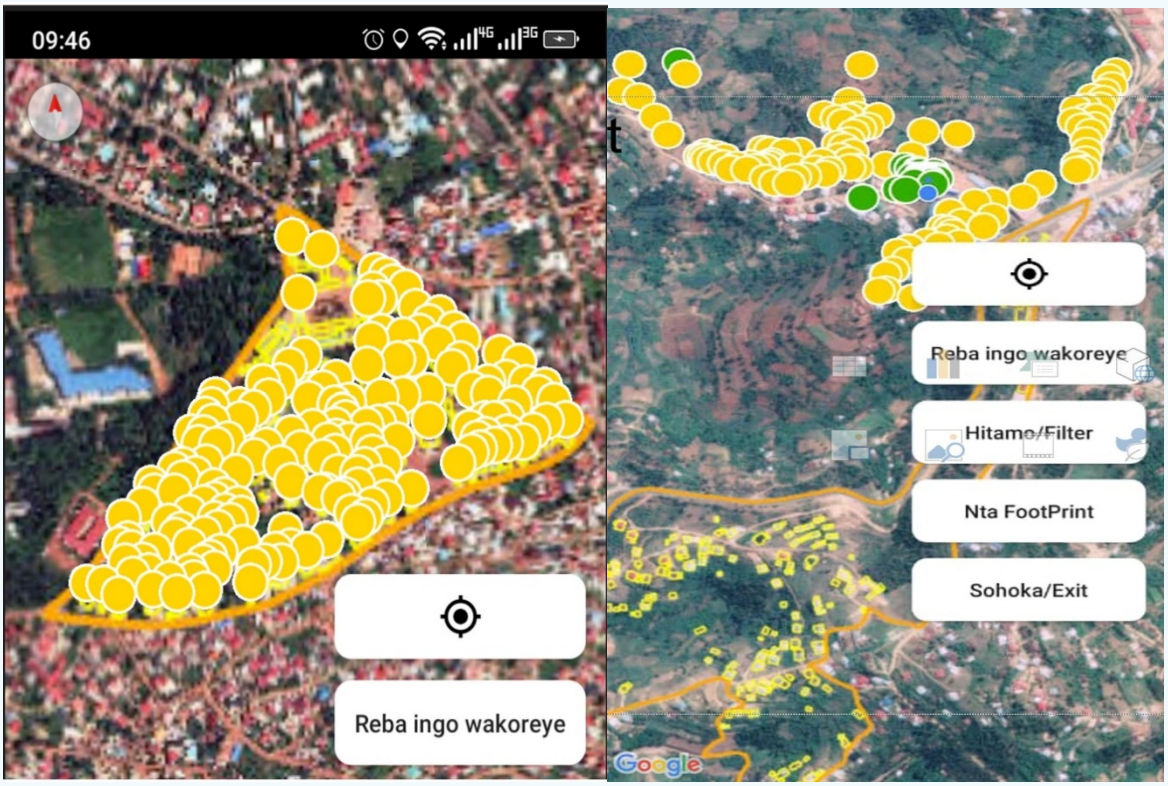
The census mapping was done first to ensure that the total land area of the country is divided into non-overlapping enumeration areas which were assigned to enumerators. To create enumeration areas, data with location and shape of buildings (building footprints) as well as high resolution satellite images were utilised. While in the field, every single building was tagged with information about the use of each building and details on the number of households in case of residential buildings. The lowest level of deployment during the field work was a village. After the village was completed, a total number and location (by GPS coordinates) could be available.

In the office, the boundaries of enumeration areas were created by staff on high resolution satellite images, a semi-automated process considering existing administrative boundary of villages, number of households with an average of 130 households at cell level. Even though the EAs boundary were created from the lowest administrative unit which is a village, the decision of considering the average of household at cell level was motivated by the fact that it is possible to organise support inside the cell without requiring a lot of logistics means. Sticking to a certain threshold of a number of households for each EA could have led to the creation of many and not optimised EA than considering a certain average at a slightly higher administrative unit which is a cell. The average of 130 households was chosen based on the early testing of the questionnaire during the pilot census. The pilot census showed that choice of 130 households is a reasonable decision considering the amount of time it will take to enumerate one household and the total period of fifteen days allocated to the census data collection.

The first phase of census mapping was about data collection from field (18th October 2020 to 15th July 2021). The second phase was about data processing and EAs boundary creation (July 2021-January 2022), then automated maps production took place in February 2022. The maps were produced in digital format loaded on smartphones and consumed directly with the census data collection application and used for the provisioning of devices used for the data collection (assigning each device to a specific EA).

Enumeration Area maps were provided for enumerators in digital format. The map included different layers, an image showing the boundary of enumeration area as well as reference buildings (from census mapping in yellow) (Figure 3.1). The reference buildings were used for reference location for data collection but also enumerators could add missing buildings. Internal controls were set to crosscheck the location of enumerators with the reference buildings and error message could pop up in the app in case of mistakes. As the enumeration continued, the enumerated buildings would turn green on the map..

Figure 3. 1 Enumeration Area map in Cs Entry app



Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

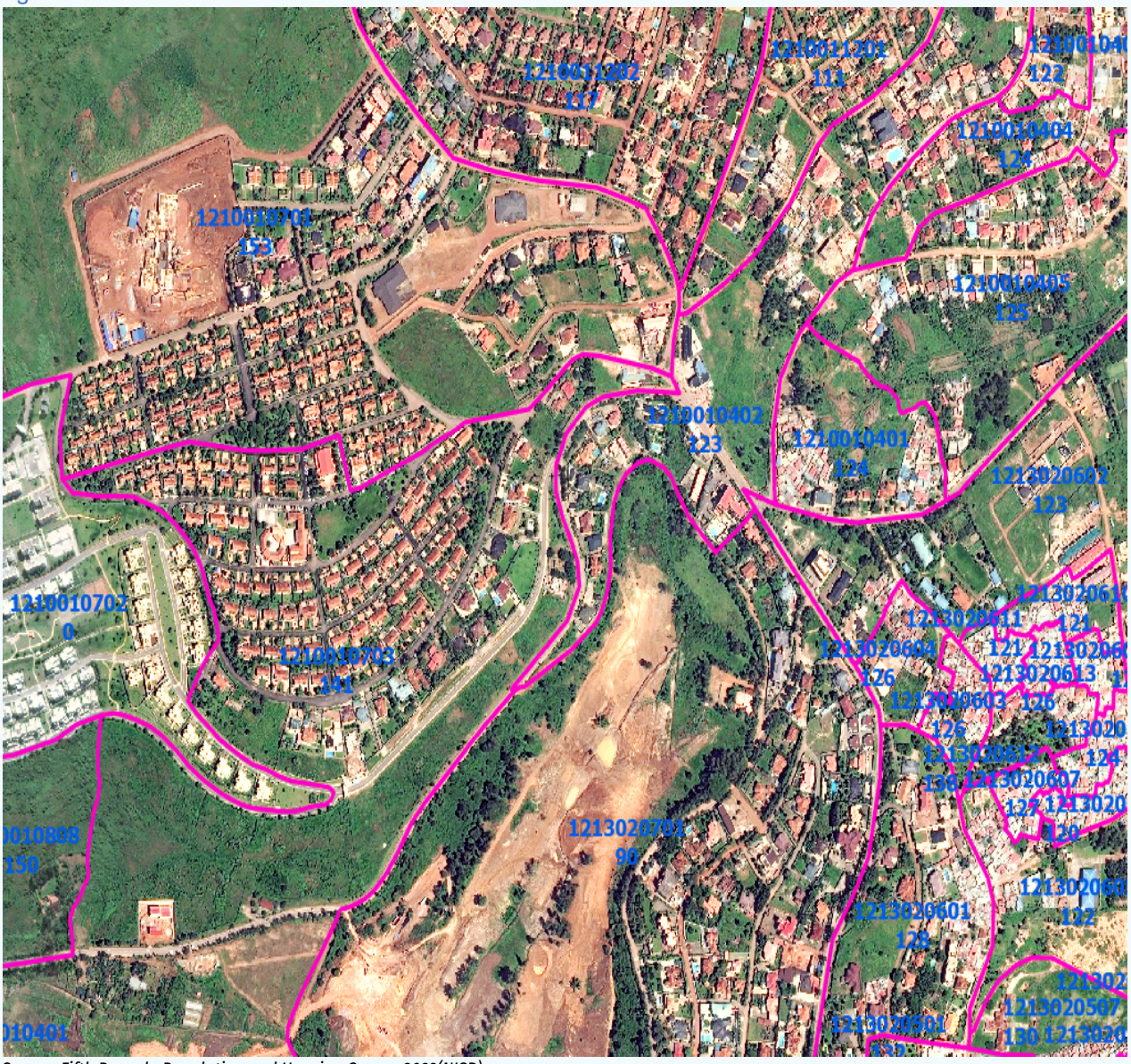
Generally, the use of technology greatly contributed to the successful implementation of different phases of the 2022 Rwanda Population and Housing Census. Overall, such steps including the deployment of technological devices for creating and mapping the enumeration area, as well as for fieldwork management using tools like location dashboard, progress dashboard, and key statistics dashboards, amongst others.

3.2.1 CENSUS MAPPING – DELINEATION OF EAS

Technological devices deployed in the census mapping included the satellite image which was used to capture base map and building footprint, ArcGis software – used for field mapping, and DBM (Microsoft SQL server) – used for data management. In total, 24,347 small and manageable geographic units (Enumeration Areas) were delineated. As shown in Figure 3.2, EAs were almost homogenous with similar geographic conditions and almost similar number of around 130

households in each EA.). The EAs also have clear boundaries and similar workload for enumeration. Over 4 million building footprints were counted during the 2022 PHC mapping.

Figure 3. 2 Delineation of Enumeration Areas

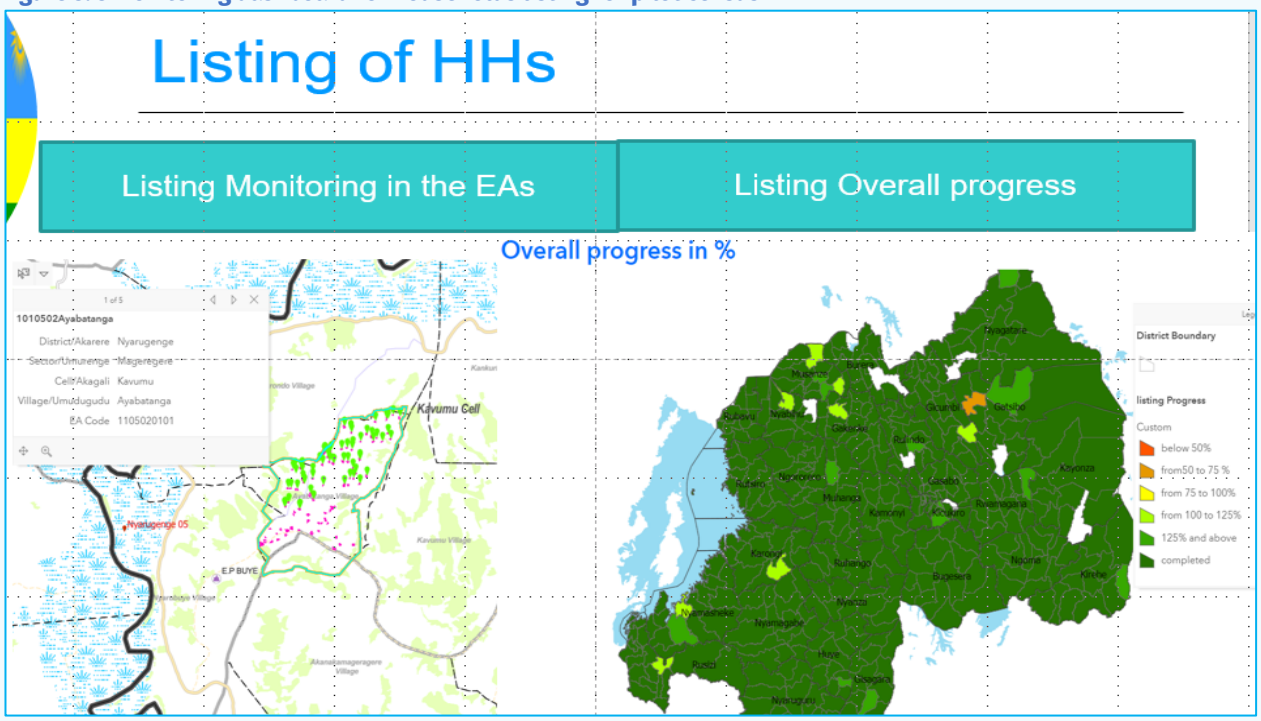


Source: Fifth Rwanda Population and Housing Census,2022(NISR)

3.3 Pilot census

After the census mapping, the next activity implemented was the pilot census. The pilot started with the household listings which took place on September 11th-15th, 2021. Listing of all the private households was done in all the sampled 600 EAs across the country. Also listed were institutional households, including 2 refugees' camps, 2 correctional centres (prisons), 5 military barracks, and 2 police stations just to mimique what will be done in the real census. Figure 3.3 presents the dashboard used for monitoring the progress of households listing across the country.

Figure 3. 3 Monitoring dashboard for households listing for pilot census



Source: Fifth Rwanda Population and Housing Census, 2022,(NISR)

3.3.1. PILOT CENSUS ENUMERATION

After the listing of households for the pilot census, the enumeration for the pilot was conducted in a total of 65,586 occupied households from 16th to 30th September 2021. The pilot census was meant to be conducted exactly one year before the planned census so as to conform to the exact period of the main census. Hence, the pilot census took place in September 2021 – exactly 12 months before the actual census enumeration to ensure that the field conditions are identical. Unfortunately, the pilot was disrupted by Covid-19 pandemic as the country was in lock-down during the period.

The pilot census is a comprehensive process that involves testing of all census procedures such as the adequacy of the census plan and of the census organization. The pilot mainly tests the operational feasibility of conducting the main census rather than make population estimates. Pilot census was also conducted to test the equipment, recruitment process and field materials such as smart phones. In the context of using hand-held devices, testing included daily data transmission, network connection, battery life of the device, and field monitoring using dashboards. It was critically important to undertake a set of tests of technologies related to the fieldwork, data capture, transmission, processing, analysis, and the efficiency of editing and tabulation applications. It was also useful for evaluating different field techniques to increase response and participation.

The Pilot Census took place in 600 EAs randomly selected from across Rwanda. The Pilot undertook a comprehensive and large-scale test of the processes and activities in the pre- and enumeration phases 'on-the-ground', thus covering several aspects of the census enumeration, including recruitment and training of enumerators, EA and house listing, use of the questionnaire, as well as responses to the census questions. Hence, one of the objectives of the Census Pilot was to ensure that measurement errors are minimised in the actual census data collection. The pilot census was also undertaken to test the use of technological devices in data collection with a view to address any technical glitches that may arise and other challenges that may affect the smooth conduct of the census. During the pilot census, the skipping pattern of the question was also tested and necessary changes were made thereafter. Fieldwork management was also tested during the Pilot Census to put necessary measures in place to ensure effective management of field operation and also to minimize response errors. Data from the Pilot Census was also analysed to address any issues with respect to response and measurement

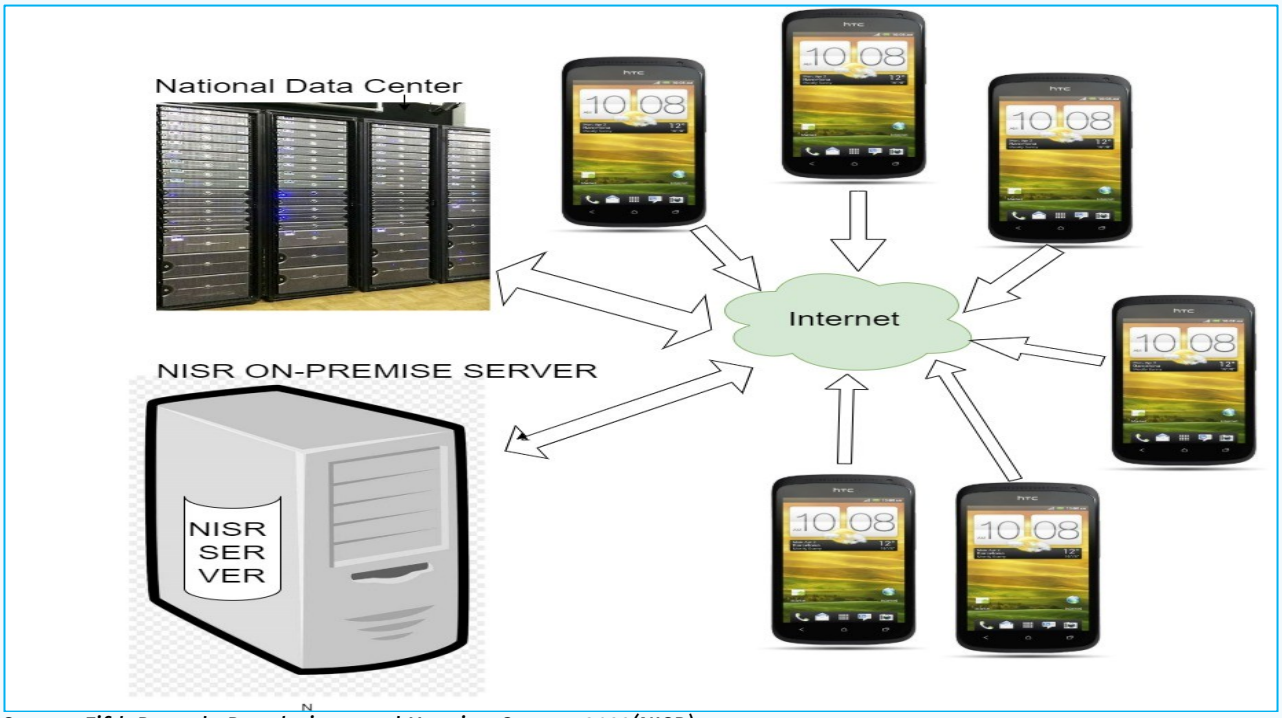
errors prior to the actual census enumeration. Analysis of the pilot census was done to (i) assess if the questions were well understood by the respondents and to confirm the appropriateness of their responses, (ii) determine if skips worked well as intended, and (iii) assess if the CAPI applications function well. Findings from the pilot census were used to facilitate a more desirable allocation of available census resources. Also, the pilot data provided understanding on respondents' interpretation and reaction to census questions and instructions, and this was used to revise the questionnaires for better and clearer understanding.

With respect to response error, several lessons were learnt. First it was clear that more flexible hours would be required for the enumeration phase, especially in urban areas. A call-back card was added to allow the household members to call the enumerator to arrange a suitable time for enumeration. Second, the size of the EA had been based on the mapping exercise and in some cases, this had seriously under-estimated the number of dwellings. This was especially the case in the City of Kigali where there has been rapid population growth due to the rural-urban migration. In some cases, EA boundaries were revisited, and the team split the EAs that were too large into more than one EA and assigned support staff to complete the enumeration. More enumerators were assigned from the list of additional ones to boost the enumeration capacity. To ensure a smooth process, a live management information system was put in place to first track the listing of each EA and then to track the progress of enumeration. The RPHC5 was CAPI-based and it benefitted from technological innovation with the use of a number of IT-based monitoring tools (dashboard, Mobile Device Management) for a rapid and better monitoring of field activities.

3.3.2. DATA TRANSMISSION AND HOSTING REPORT FOR THE PILOT CENSUS

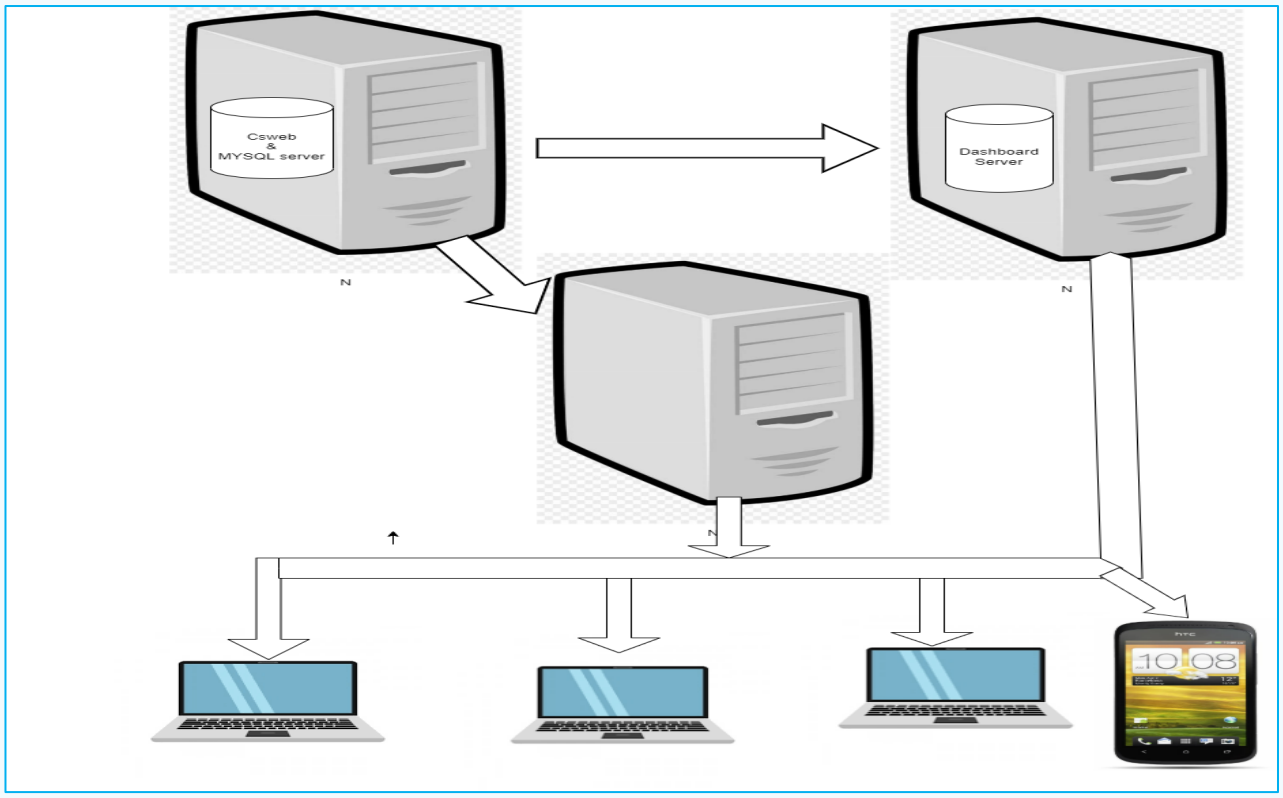
The data collection during pilot census was done using CsPro application. The application was developed in such a way that allowed transmission of data to the central server (Figure 3. 4 and Figure 3.5) immediately after completing household enumeration. This made a positive impact on the overall quality of the pilot census data as it enabled the supervisors and the management team at the NISR to get data in real time for proper monitoring of the data collection exercise Figure 3. 6 shows the dashboard used for monitoring data collection during the pilot census.

Figure 3. 4 Transmission and Hosting System



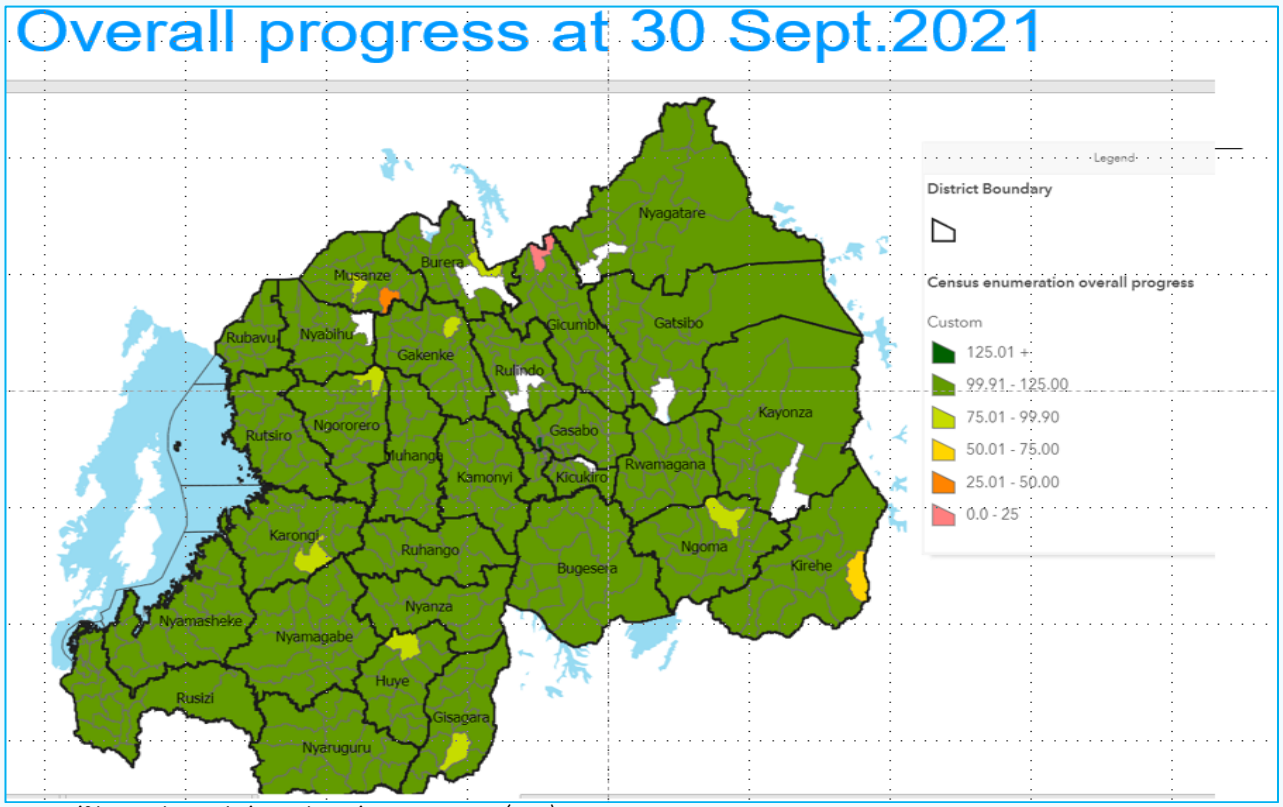
Source: Fifth Rwanda Populationa nad Housing Census, 2022(NISR)

Figure 3. 5 Csdb data download flow



Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

Figure 3. 6 Overall progress data collection 30 September 2021



Source: Fifth Rwanda Population and Housing Census, 2022, (NISR)

3.3.3. FIELD MONITORING FOR DATA QUALITY

Dashboards were used for monitoring data collection during pilot census in order to manage the information/data, as well as track, analyse, and display key performance indicators, metrics, and data points real time as data collection progressed. Dashboards were also used to assess key variables such as age, sex, fertility and mortality.

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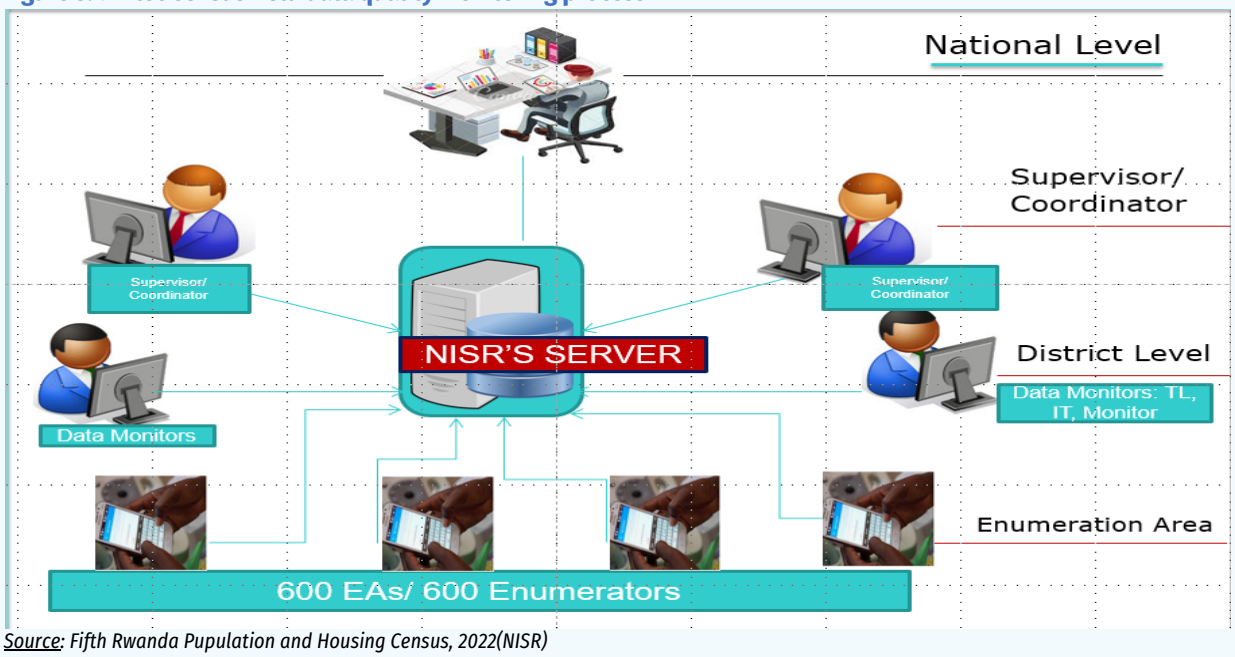
Through this process, supervisors and the NISR team were able to track the quality of data being collected real time (Figure 3.7). Also, dashboards were used for field management to track enumerators' daily performance, cumulative progress and assessment of the completeness of the census enumeration at different levels from national to EA level.

Figure 3. 7 Pilot Census field data quality monitoring process



Source: Fifth Rwanda Pupulation and Housing Census, 2022(NISR)

Several lessons were learnt from the pilot census with respect to the general organisation and management of the enumeration phase. Lessons learnt from the pilot census contributed to the appropriate planning of different aspects of the census operations, including the questionnaire design, deployment of CAPI application and controls, tabulation and analysis plans, EAs boundaries delineation, internet connectivity and data transmission, recruitment and training of enumerators, as well as communication campaign and field deployment. The pilot census also allowed for development of the listing and enumeration to help minimise coverage and response errors. Lessons from the analysed pilot data were used to revise the census questionnaire. As a last phase, the final questionnaire was reviewed by the Census Technical Committee. Notwithstanding the analysis done on the pilot census, some quality issues were identified in the responses to the questions on economic activity. Details on the issues identified are provided in Chapter 7 of this report.

3.4Enumerator's training (measurement errors; coverage errors; response errors)

In preparation for the actual enumeration for the 2022 Rwanda Population and Housing Census, 26,987 enumerators and 2,148 reserve staff were recruited for training and deployment for the enumeration within privates Households, while 308 enumerators were appointed to do enumeration within institutional households. One enumerator was deployed to cover an EA during the census enumeration. In addition, one reserve enumerator per cell was recruited to serve as backup and cover for issues such as illness or unavailability of some enumerators or to provide support during enumeration in one of the neighbouring

EAs. The reserve enumerators covered the excess households in EAs with more than the target maximum of 130 households. Local primary teachers and youth were recruited as enumerators. This was to ensure that enumerators would have sufficient level of education needed to understand the nitty gritty of census enumeration taught during the training and also to ensure that enumerators have sufficient capacity to properly use smart phones for data collection. Besides, primary school teachers were recruited to serve in their locality to ensure commitment to their various local areas and reduce commuting time between EAs and their homes. Other important considerations for engaging local teachers include having knowledge of local areas which is needed in house listing and being a respected member of the local village to aid cooperation during the enumeration.

Detailed training materials in form of audios and videos were prepared covering the use of Cs entry application for the identification of an EA's boundary (*coverage error*), the listing of households within the EA (*coverage error*), and then the enumeration of the households both in terms of getting a response with the identification of all individuals to be enumerated (*response error*), as well as the correct completion of the questionnaire for the identified individuals (*measurement error*). The training leveraged the use of technologies by developing pre-recorded materials. The materials included audios and videos of examples of interviews demonstrating how an enumeration should be done in different scenarios.

To ensure proper training of the enumerators, the hierarchical structure of census management was used to cascade the standardised training from the national level down to the local level. The first two levels of training (core, and master training) were face-to-face sessions while the last two were hybrid (online and face to face) trainings. The virtual trainings were facilitated using the Webex application. The core training was held from the 9th to the 13th May 2022, then followed by the training of master trainers which took place from the 15th to the 28th May 2022. The training of trainers was done in two phases from the 4th June to the 10th July 2022, and it was done during weekends because some trainers were teachers and sector inspectors of education who were busy with their teaching responsibilities in their schools and sectors during the weekdays. The training of enumerators was done between July 21st and August 9th, 2022. The training was done very close to the listing, and enumeration period purposely to ensure that enumerators do not forget what they learnt during the training.

As shown in

, the cascading trainings were organized at different levels starting with core training organized generally for the NISR technical staff involved in the technical implementation of the census. In the master training, the core team was expanded to include special institutions, special team and contractual staff who later served as team leaders and office data quality monitors.

The training of trainers involved the sector data quality monitors who were meant to facilitate the main training and supervision at sector level. Activities in the training sessions include practical exercises, mock interviews, field data collection and data transmission, and testing of all aspects of the training.

Table 3. 1 Cascading trainings and numbers of participants

Training name	Date	Number of participants
Core training (NISR Staff only)	09/5 – 14/5/2022	59
Master training	15/5 – 28/5/2022	200
Training of trainers (Phase1)	04/6 – 10/7/2022	1,748
Training of trainers (Phase 2)	04/7 – 08/7/2022	445
Training of enumerators	21/7 – 09/8/2022	26,536
Refresher training PES	04/9 – 09/9/2022	210

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

3.5 Creation of the enumeration lists within each EA (coverage errors)

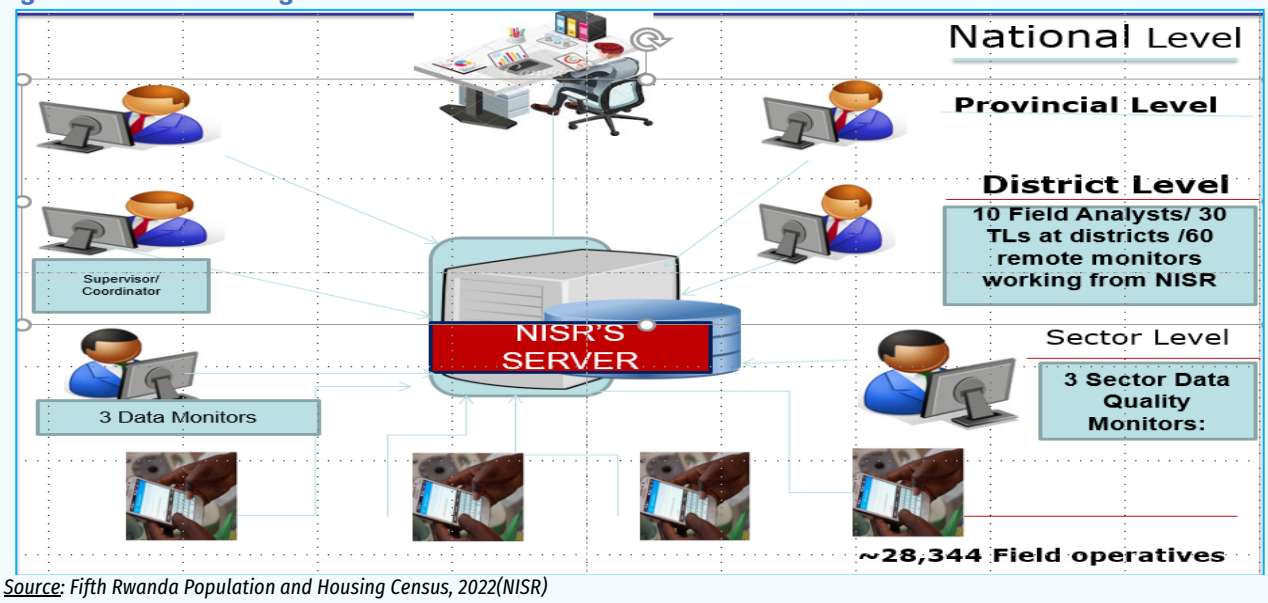
Census is the most comprehensive demographic data source and therefore must have a total coverage of all the persons resident in the country. To ensure 100% coverage, an important step in census planning is the identification and listing of all housing units within all EAs across the country. A suitable timing was chosen (10th to 14th of August, 2022) for the identification and listing of housing units for the RPHC5. The dates were carefully chosen to ensure sufficient time for planning and listing of all housing units and to ensure that this all-important exercise takes place close to the actual census enumeration as much as possible. To ensure easy movement, motorcycles were provided for the sector data quality monitors (Sector education Inspectors, and selected youths or teachers) who were in charge of monitoring fieldwork at sector level.

The first stage of the house listing was the identification 'on the ground' of each EA boundary. Prior to the listing, enumerators were trained[3] on how to use the map uploaded in Cs entry application to identify an EA's boundary on the ground. The identification by each enumerator was done in consultation with sector data quality monitor and the enumerators assigned to the neighbouring EAs and the relevant Village Heads. This process ensured that all housing units close to a boundary were assigned to just *one* EA before the listing took place.

The second stage involved actual listing of housing units which took place over a period of 5 days between 10th and 14th of August, 2022. The exercise was closely supervised by the sector supervisors via the dashboard to ascertain the quality and progress of work done each day. The result of the house listing was of a high quality[4] in all EAs as full coverage was achieved within the planned time-frame with the feedback reported back to the central NISR census team. Report from the post-enumeration survey presented in Chapter 5 confirmed the high quality of the house listing exercise for the RPHC5.

As it was done during the pilot census, data from listing of housing units for the census were sent directly to the server. This aided a robust monitoring of fieldwork at all levels – the national (using coordination team, field analysts, office data quality monitors, and data analysts), district (using district team leaders and district data quality monitors), and sector levels (using three sector data quality monitors per sector). Sector data quality monitors comprised one Sector Inspector of Education and two monitors drawn from among the Youth. There were also representations from the army, police, and correctional services. Figure 3.8 and Figure 3.9 present the field monitoring and field interaction mechanism dashboards used in the 2022 PHC.

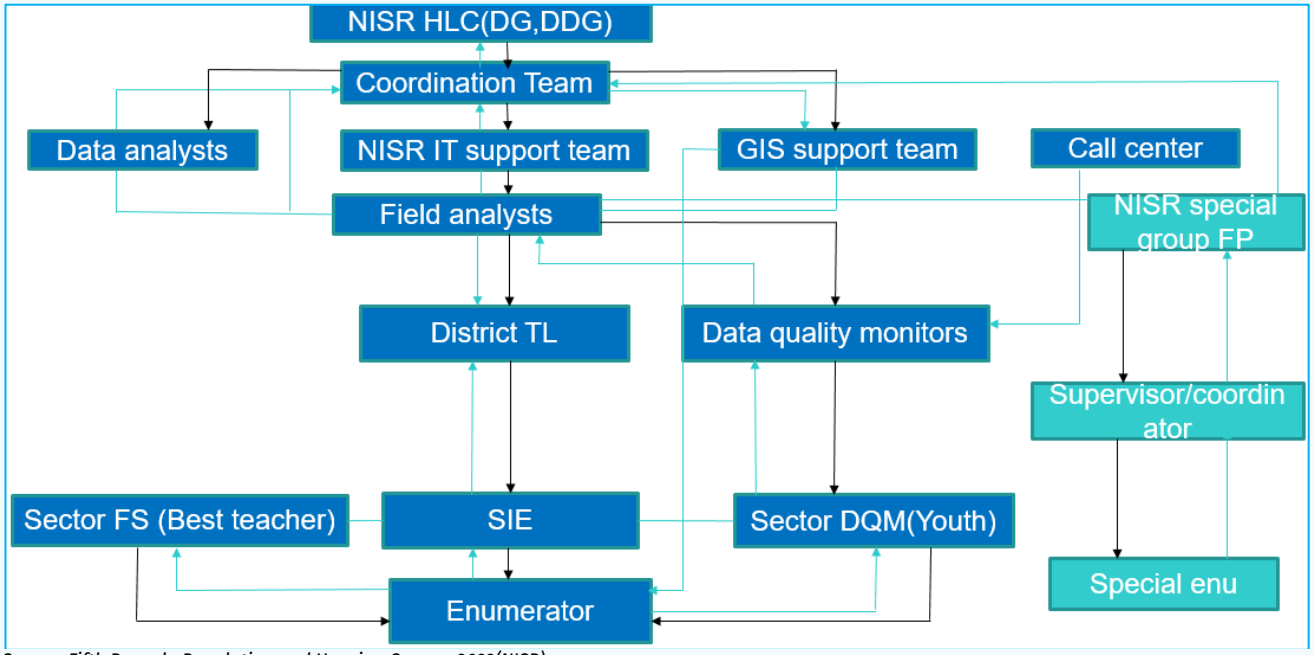
Figure 3. 8 Field monitoring dashboard



Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

[3] The delivery of enumerator training is covered in Section 2.4.
[4] The final quality of the listing can be assessed using the Post-Enumeration Survey but the planning, management, and implementation of the listing was a success getting as close as possible to 100% coverage.

Figure 3. 9 2022 Census interaction mechanisms



Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

3.6 Listing institutional households (coverage errors)

The vast majority of the Rwandan population reside in residential households. However, there are important sub-groups of the population that reside within institutional households and homes. These include army barracks, police barracks, prisons, and other institutional homes such as religious centres and hotels and refugees' camps. These require special treatment in the census to ensure they are enumerated. At the District level, a list was created covering all army barracks, police barracks, correctional services and other institutional homes. The enumeration of these institutional households was then managed separately with their own National Coordinators (RDF, RCS, RNP, and MINEMA in charge of refugees' camps management). Other institutional households such as religious centres were identified by the standard enumerators as part of their listing and were recorded at the end of the listing to be enumerated by the standard enumerators during the enumeration phase. Another important sub-group not within residential households are the homeless. With the help of the Village Heads, the enumerators identified the locations of homeless individuals within their EAs during the listing stage to ensure they are enumerated as members of an 'institutional household' for that EA.

CHAPTER 4: ENUMERATION PHASE

After several months of careful and painstaking planning, the census enumeration for the Fifth Rwanda Population and Housing Census took place on the designated Census Night. The actual enumeration took place from 16th to 30th August 2022. The careful planning by the NISR ensured that necessary processes and logistics were put in place to ensure a smooth implementation of the census enumeration. Important parts of the preparation included the central reporting of final house listings to the NISR census team, and procurement of 30,000 smart phones and their configuration with relevant applications such as CS Entry application and Mobile Device Management application. The early purchase of the electronic devices was done prior to data collection to ensure sufficient time for their configuration and other necessary planning and steps required for a successful digital census. Other important measures put in place during the planning included the design of dashboards for management of field operation and for monitoring daily progress as well as the quality of key statistics collected during enumeration.

Where EAs were larger than expected, as in a particular case in the City of Kigali additional resource from the pool of reserve enumerators and youth was made available to ensure that the enumeration phase could run smoothly and be completed during the enumeration period as planned. This was important as the testing had given an indication of the average time taken to enumerate a household, and therefore it was known that above a certain threshold of households it would not have been possible to complete the workload in thirteen days. Prior to the enumeration phase, the enumerators identified the EA boundaries and then did the households listing. Where necessary, additional staff were brought to cover the listed households in the large EAs. Needless to say, the use of CAPI contributed to a seamless enumeration phase of the census.

4.1 fieldwork management

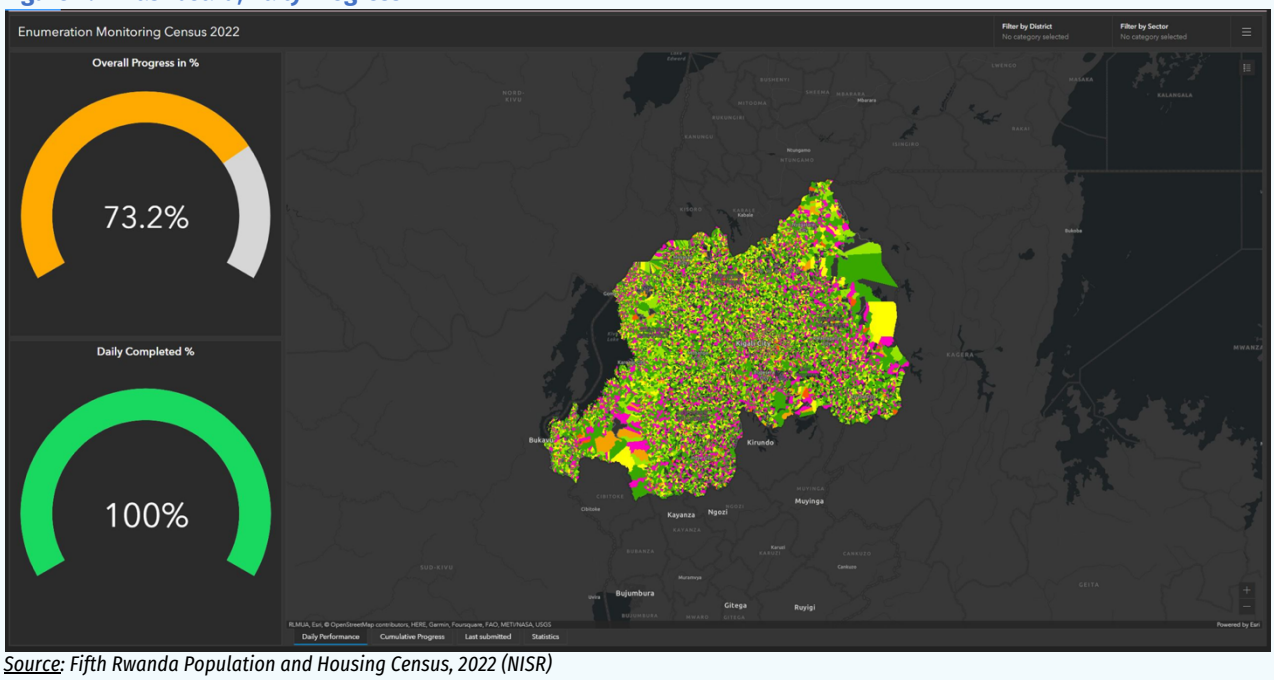
The 2022 PHC was a digital census. By digital census, it means that the data collection was not done on paper questionnaire but through the use of electronic devices such as smartphones and tablets. The use of technology was not limited to data collection but also was extended to other aspects of the census, including the fieldwork management.

The fieldwork management was divided into two main pillars – the progress and the location. The progress means the work progresses in line with a certain target on live and on daily basis. The location pillar focused on coverage (i.e., the whole enumeration area buildings are covered) and the attendance (i.e., enumerators are collecting data in the right location and at the right time).

A fieldwork-monitoring dashboard was the main tool built to support different levels of fieldwork monitors. It was accessed online by different level of users including the national coordinators, and district and sector data monitors. The monitoring dashboard was functioning based on data collection flow, where enumerators could automatically send the data once a case is completed.

On a daily basis, the data collection assumption was that every enumerator could achieve a target of 13 households per day. Different colour codes were designed to show the progress, from red which indicates a poor progress, to green, indicating good progress, while purple signifies a case of out of range. The field monitoring task was to focus on poor progress and abnormal cases. The map of daily progress (Figure 4.1) shows EA changing colours throughout the day as enumeration progressed.

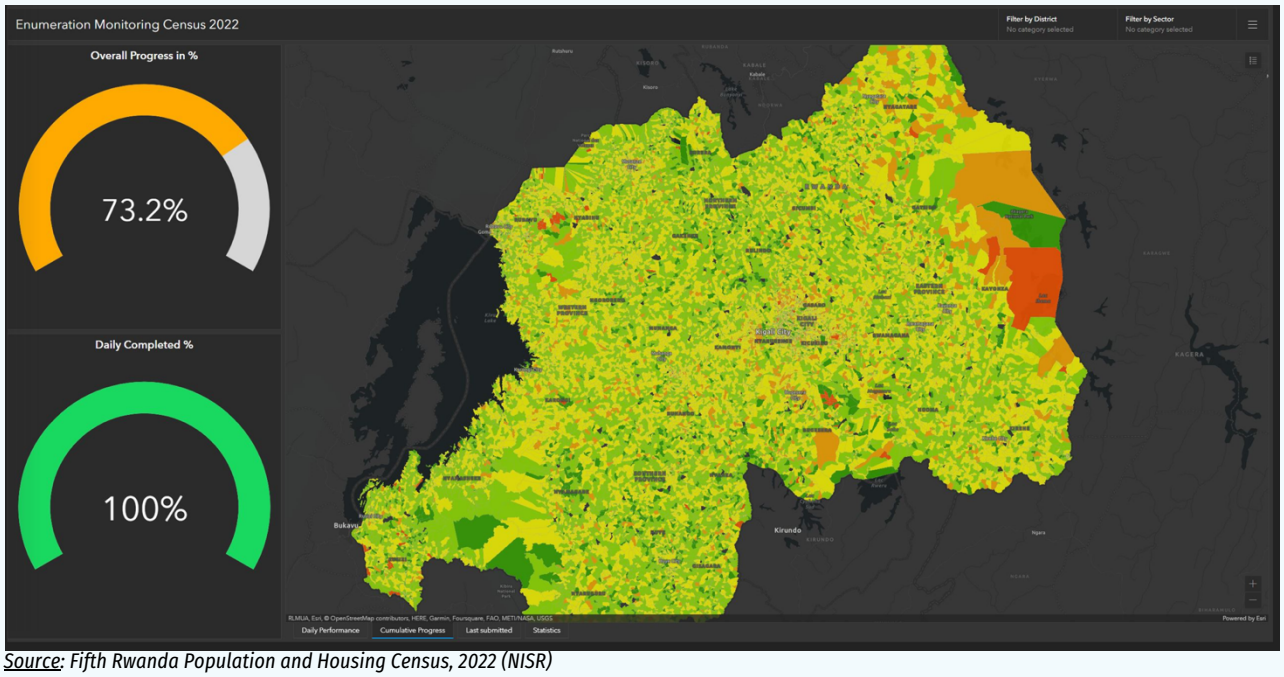
Figure 4. 1 Dashboard, Daily Progress



Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The cumulative target was set based on the total number of households assigned in the EAs and the total number of days for the census data collection. The same colour codes (red to green) were assigned to monitor different levels of progress. As shown in Figure 4.2, the map of daily progress shows EA changing colours as data collection progressed each day.

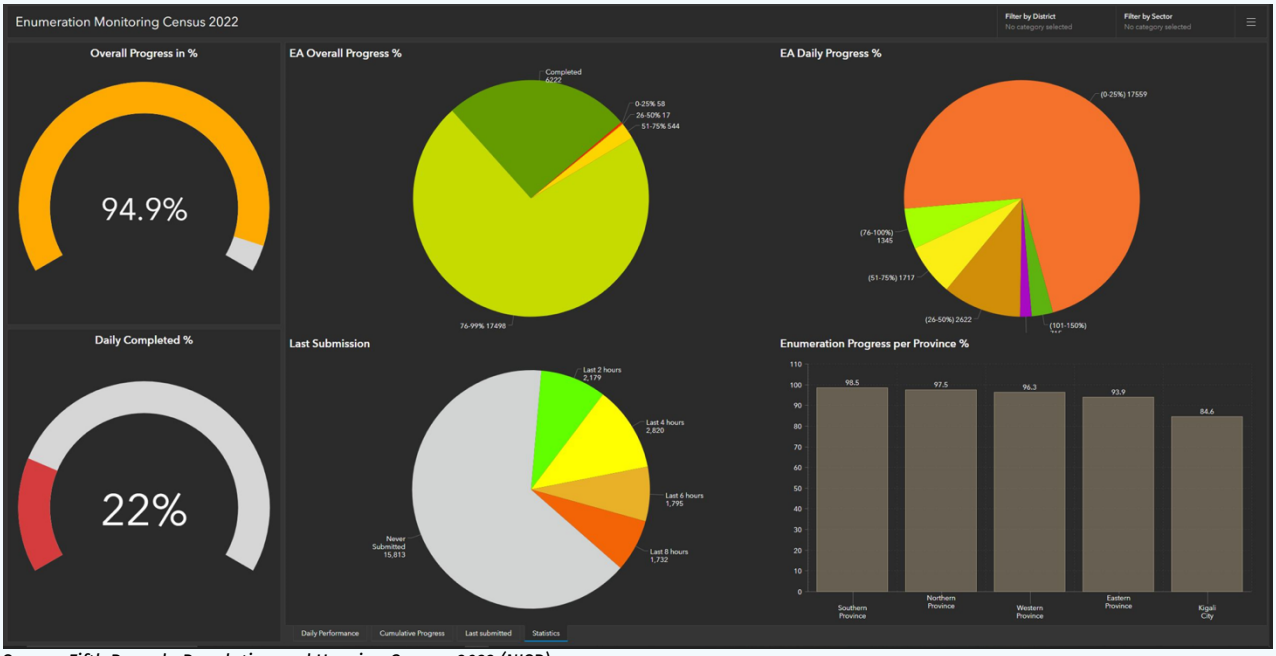
Figure 4. 2 Dashboard, Cumulative progress



Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

Apart from monitoring progress, managers at higher levels could get summary about the progress made on data collection regarding key statistics like the number of completed EAs, as well as aggregates to different geographic units like province (Figure 4.3).

Figure 4. 3 Dashboard, Key statistics



Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

As part of data collection management, enumerators used reference buildings provided for them for data collection. They could also add on the maps missing building locations. In the background the data collection app could capture the real location of the enumerator. As indicated in Figure 4.4, real location compared with reference building could provide information about the place where the enumerator is collecting data from and computer programs to decide if it is a wrong or right location.

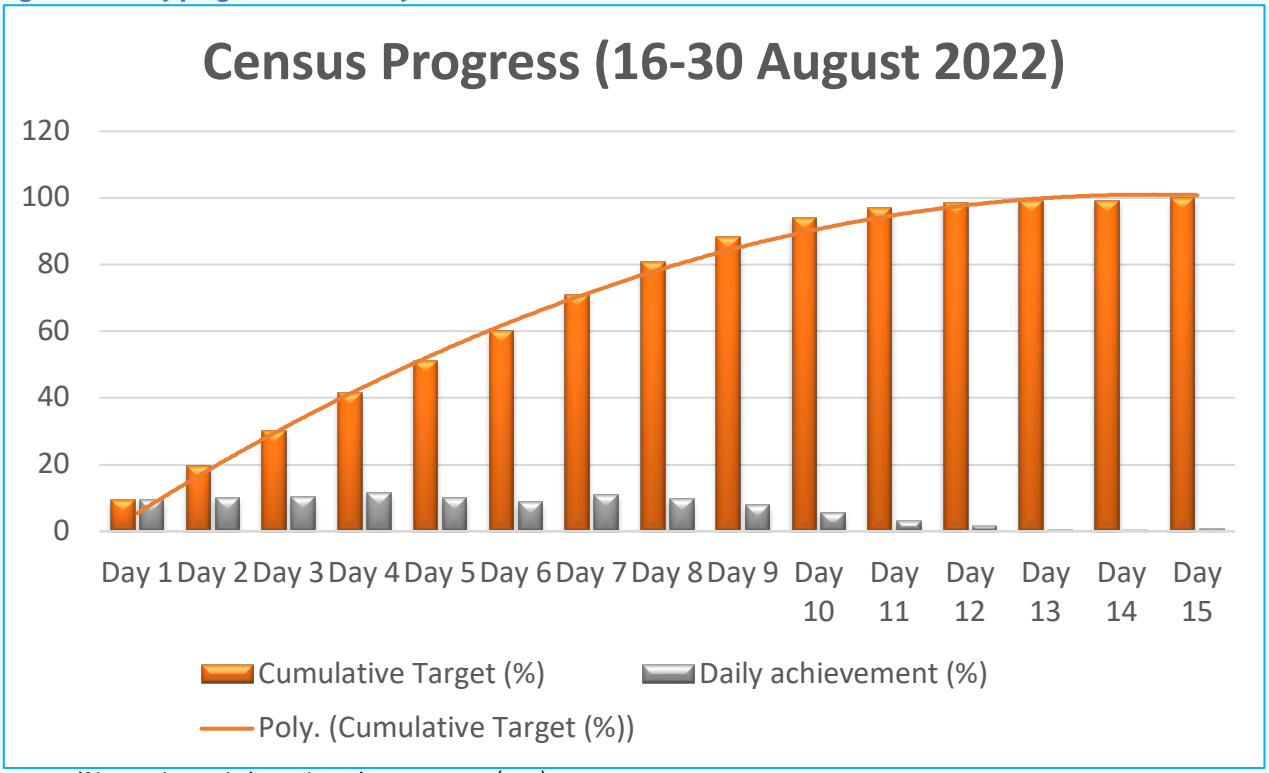
Figure 4. 4 Dashboard, locations

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

A key component of the fieldwork management was the daily feedback of number of individuals enumerated in each EA through the dashboard, so that progress with respect to response error as measured by the listing could be monitored at all levels. For each EA, expected progress in the dashboard was spread evenly across 13 days allowing for two days at the end to mop up where needed. Figure 4. 5 presents daily progress over the period of the census data collection (16th -30th

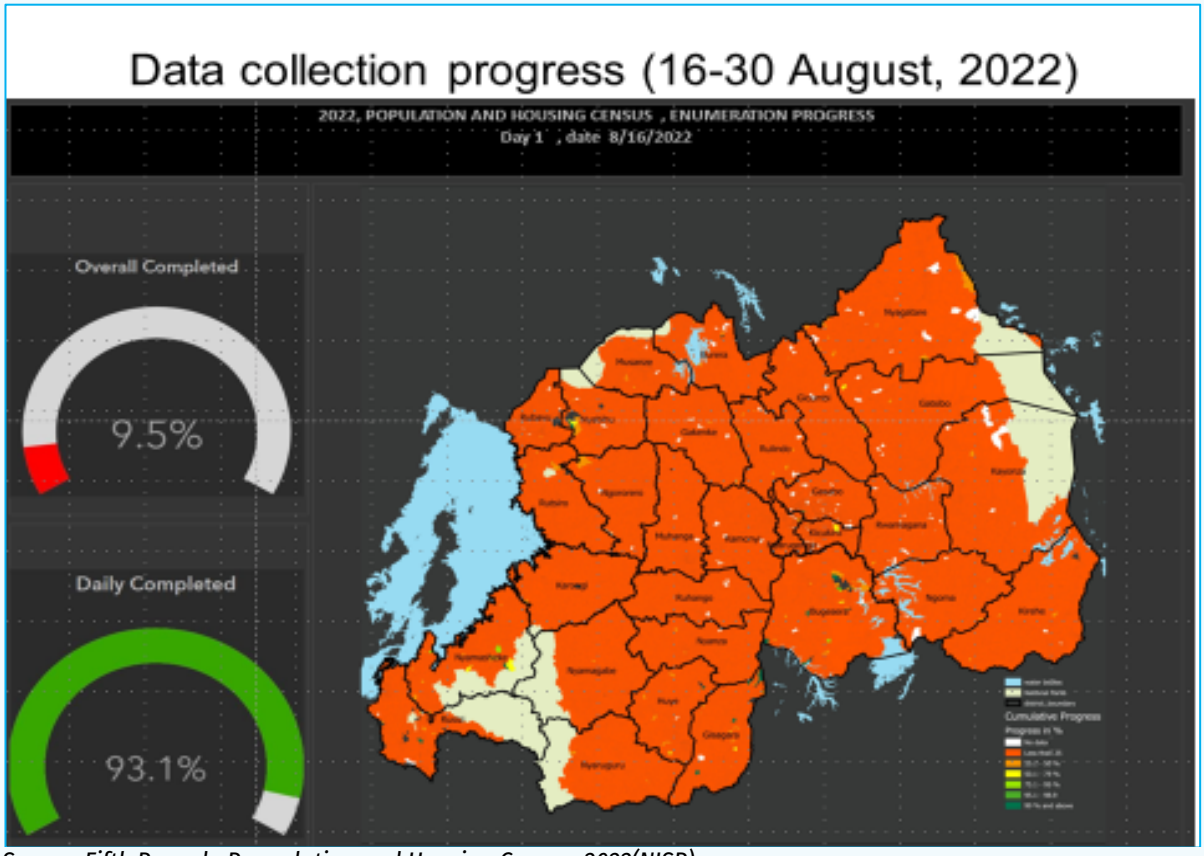
August 2022). By the end of this initial period, some additional resource was targeted at City of Kigali in a final push towards complete enumeration. As it was done in the pilot census, deployment of technologies facilitated the use of dashboards for monitoring the census completeness (Figure 4.6, Figure 4.7, Figure 4.8)
coverage and quality of some key indicators.

Figure 4. 5 Daily progress over the days of the census fieldwork



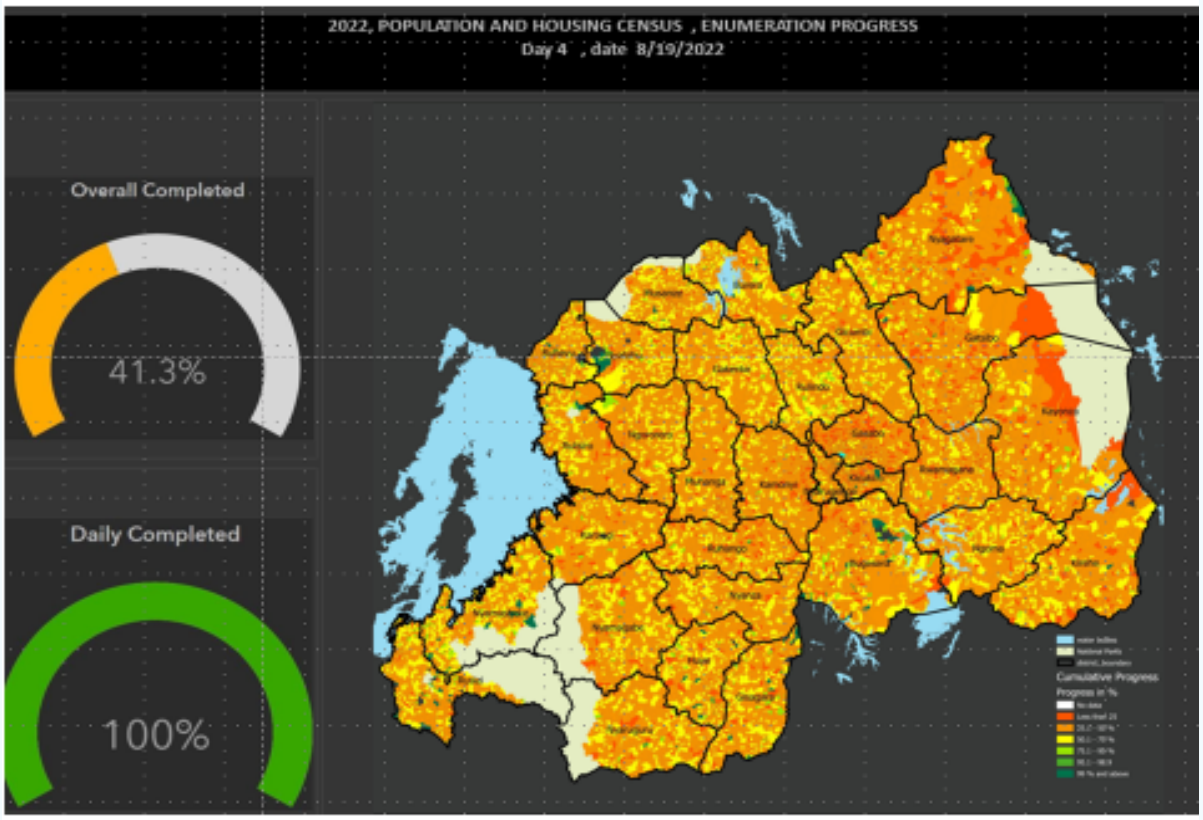
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

Figure 4. 6 Dashboard showing daily completion and overall completion (day 1)



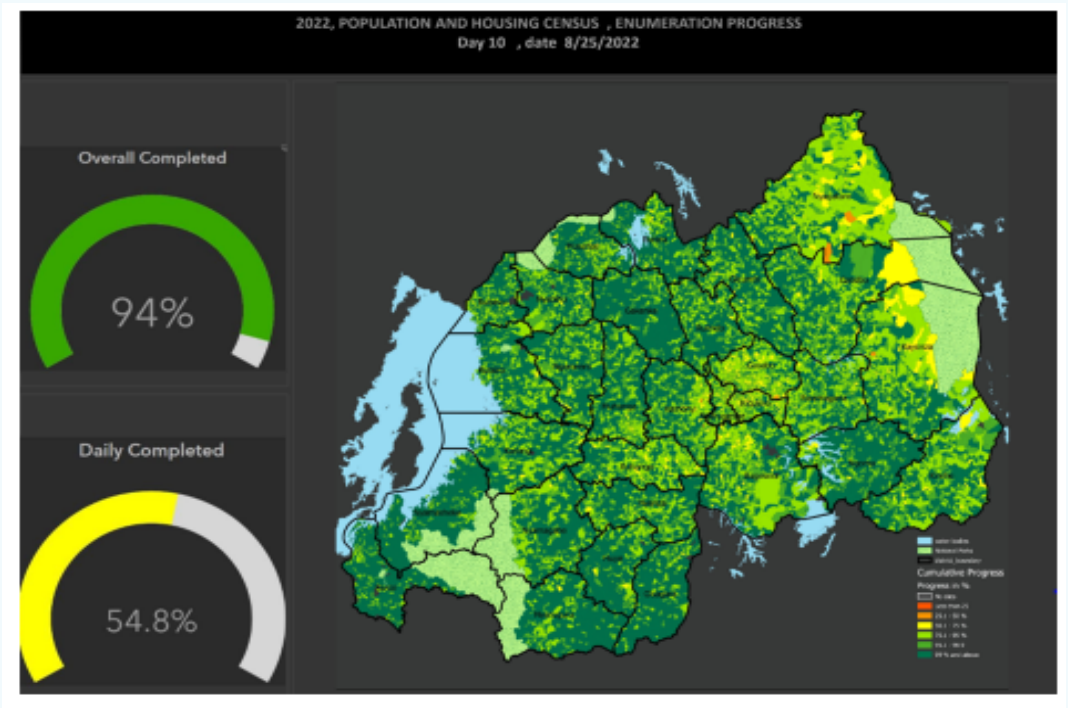
Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

Figure 4. 7 Dashboard showing daily completion and overall completion (day 4)



Source: *Fifth Rwanda Population and Housing Census, 2022(NISR)*

Figure 4. 8 Dashboard showing daily completion and overall completion(day 10)



Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

Table 4. 1: Progress at the provincial level across selected days of the fieldwork

	20/08/2022(Day Five)			24/08/2022(Day Nine)			28/08/2022(Day Thirteen)		
Province	Listed	Enumerated	%	Listed	Enumerated	%	Listed	Enumerated	%
City of Kigali	496,898	226,281	46%	496,898	405244	82%	496898	493071	99%
Southern province	765,329	404,611	53%	765,329	696496	91%	765329	764778	100%
Western province	676,714	362,587	54%	676,714	620844	92%	676714	676349	100%
Northen Province	511,094	282,947	55%	511,094	470927	92%	511094	510834	100%
Eastern province	896,486	448,222	50%	896,486	786576	88%	896486	894915	100%
Grand Total	3,346,521	1,724,648	52%	3,346,521	2980087	89%	3346521	3339947	100%

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

4.2 Enumerating Institutional Households (Response Errors; Measurement Errors)

The questionnaire for institutional households was smaller and simpler than the main household questionnaire and did not include the employment section, the household section and the mortality section. It was administered on an individual-by-individual basis to the members of the institution. As already discussed, the large institutional households including correctional services and army barracks were enumerated by staff recruited from the relevant organisations to aid cooperation 'on the ground'. For hotels, these were dealt with by the standard enumerators towards the end of the enumeration phase; while the homeless individuals identified within an EA during the listing phase were dealt with at the very start to ensure those actually present in the EA on Census Night were enumerated.

CHAPTER 5 : POST ENUMERATION PHASE

With the details of assessment done on the pre-enumeration and enumeration phases of the 2022 Rwanda Population and Housing Census presented in Chapters 2 and 3, this chapter presents information on the assessment done on the post enumeration phase of the census. Evidence outlined in Chapters 2 and 3 points to a well-planned, well-managed and well-implemented enumeration phase that maximised the coverage of the RPHC5. More importantly, using CAPI application on the smart phones greatly improved data quality by eliminating potential weak point and errors associated with data entry in the pen-and-paper personal interview (PAPI) as was done in the 2002 and 2012 censuses. In addition, the use of restriction and skip patterns in the electronic devices contributed to minimise measurement and response errors.

The post-enumeration phase of the 2022 census includes data cleaning, data editing and imputation for non-responses. Also, other tasks implemented in the post-enumeration phase are data analysis and tabulation, assessment of data quality and thematic reports writing for the use of policymakers, government ministries, development partners and non-governmental organizations. Given that the use of electronic devices eliminated some stages of census enumeration, including storing of paper forms, data coding and data entry, this chapter presents assessment done on data editing and imputation for the non-response cases.

5.1 Data Editing And Imputation For Item Non-Response

The use of the Computer Assisted Personal Interview (CAPI) has significantly reduced the number of internal inconsistencies that are usually found in the census data. Notwithstanding, as a standard practice in a census enumeration, it is necessary to apply edit rules to identify possible internal inconsistencies in the data, and then to make a minimum change to the data so that a record can pass the edit rules. To guide against errors and to reduce the enumerators' work and avoid a lot of back and forth during the interviews using CAPI, the census data collection application was designed with limited internal consistency checks. The census team also designed the error detection and editing specification rules as presented below:

5.2 Error Detection Rules

The error detection program was looking for three types of issues:

1) Some complex checks that required checking several variables were intentionally left during the data collection. These checks also include internal consistency checks;
2) Some issues that the field supervision teams identified and documented; and
3) Checking of the universe of each variable to identify a wrong skip or data entry error.

5.3 Editing Specification Rules

The subject matters specialist of each topic provided an editing specification. When the error was detected, there was a rule to fix the issue. Generally, the rule of correction consists of making a minimal change to the data so that a record can pass the edit rules. For example, if the census data has record of a 24-year-old man, married to the male head-of-household aged 28, and with a report of full current fertility history, such record lacks internal consistent. The minimum rule is to change the gender of such individual to female. In this case the edit rules that only females ages 15 to 49 that can have children and only a female of marriageable age can get married to a male not only highlight the inconsistency but define the imputation required to correct the inconsistency. A full list of the edit specification rules was created by the census team and is recorded in Annex B of this report.

After editing, the data contains item non-response, either because the respondent failed to provide a required answer or because of the editing process. The NISR has used standard (hot-deck and cold-deck)

donor-based methods to impute for the item non-response on a variable-by-variable basis. Such an approach preserves the marginal distribution of a variable, conditional on the variables used to identify the donor. Still, it can damage multivariate relationships as different donors can provide imputations for the item non-response of related questions within a single individual.

Note that for some variables where it was not obvious to identify a correction rule, we decided to record a "missing" value. These "missing" values end by 9s (in a two digits variable, 99=Missing) and are identified in the data dictionary as "Missing."

5.4 Data Editing Report

From the internal consistency check, a minimal number of issues were edited, and imputation rates for individual questions are generally a fraction of one percent. The corrections with many cases edited came from the issues identified during the field supervision. For instance, considering the question, "How many years has [NAME] been living continuously in [District]?" some enumerators recorded the person's age if the person's residence had not changed since birth. However, the instruction in the questionnaire was to write 888 if the person never moved. Therefore, 8.0% of the resident individuals for this issue have been fixed.

5.5 Concluding Remarks On The Post Enumeration Phase

A close examination of the entire enumeration phases and processes from the initial planning through the enumeration phase and the final phase indicates that use of CAPI greatly improved data quality by eliminating potential weak point and errors associated with data entry in the pen-and-paper personal interview (PAPI) as was done in the previous censuses. As a result, far less editing and imputation was done for the RPHC5 compared to the previous censuses of 2012, 2002 and others. The best approach in data collection is to eliminate sources of error before the actual enumeration rather than taking measures to later correct them. This approach was adopted for the 2022 Population and Housing Census and thus contributed to quality of the data. For the few identified cases, the census team has successfully used edit and imputation rules to fix the internal consistencies. The full imputation report is presented in Annex B of this report.

CHAPTER 6: EVALUATION OF REPRESENTATION

The expectation in a census enumeration is to have 100% coverage of the entire population of a given country or delineated areas. To ascertain the extent of completeness and coverage of the enumeration, the standard practice is to undertake an independent evaluation of the representation of the census. As per the recommendation of the UNSD[5], an independent evaluation was undertaken to evaluate the census coverage, and the contents of some key variables to identify possible errors and implementation issues that may require adjustment in the data. These processes are also important to document lessons for future censuses. The Dual System Estimation (DSE) was used for the evaluation. NISR has implemented this approach for the fourth time in the 1991, 2002, 2012 and now 2022 rounds of Population and Housing Censuses.

6.1. Design And Conduct Of The Pes

To ensure the representativeness of PES results, a stratified single-stage sample design was used. The sampling frame was based on the cartographic data from the census mapping done in 2020 with a total number of 24,347 enumeration areas, where 180 EAs were drawn for the PES, stratified by district, sector and urban/rural areas. Within each district, 6 EAs were selected using systematic random sampling technique.

Institutional homes, floating and homeless populations were not included in the PES sample. This is the common practice in most countries. The PES only covered the private household population and not the individual residents in institutional households. In the field, the PES enumerators went through a process similar to the census enumerators to identify their EAs 'on-the-ground' using the EA map loaded on electronic devices, and then carried-out a comprehensive listing of the whole EA completely independently of the listing done for the census. The PES enumerators then obtained responses from all listed households. They first collected the basic demographic characteristics of all the usual residents of all households as per the stated PES day, that is around one month after Census Night. Thereafter, they established who amongst those individuals were also usual residents (present or absent) on Census Night so that in-movers to the household since the census could be excluded. Second, they collected the same data on all individuals that were usual residents (present or absent) on Census Night that were no longer usual residents to ensure that out-movers were included. The very short time between Census and PES (around one month) was adopted to minimize issues regarding in movers and out movers.

For the PES analysis, a comparison of census and PES records by matching was done at the individual level. It was done based on variables that are most likely to facilitate an optimal identification of people in both census and PES datasets. These are household identification (HHID), names, age, sex, marital status and relationship to the head of household. A computer-based algorithm was developed in Python programming language to perform the matching process. Field visits and telephone calls were done during reconciliation to find additional matching records and understand the reasons behind the unmatched data.

[5] **Post Enumeration Surveys – Operational guidelines, New York,2010, UNSD.**

6.2 Approach To The Estimation Of Coverage

The estimation of the census coverage used the Dual-System Estimation (Table 6. 1:) as recommended by the United Nations.

Table 6. 1: **Dual-System estimation technique**

	In Census	Out of Census	Total
In PES	$\widehat{N}_{11}$	$\widehat{N}_{12}$	$\widehat{N}_{1+}$
Out of PES	$\widehat{N}_{21}$	$\widehat{N}_{22}$	$\widehat{N}_{2+}$
Total	$\widehat{N}_{+1}$	$\widehat{N}_{+2}$	$\widehat{N}_{++}$

Where;

$\widehat{N}_{11}$ is an estimate of the number of people counted in both the census and the PES

$\widehat{N}_{12}$ is an estimate of the number of people counted only in PES

$\widehat{N}_{21}$ is an estimate of the number of people counted only in the census

$\widehat{N}_{22}$ is an estimate of the number of people missed by both the census and the PES

$\widehat{N}_{+1}$ is an estimate of the number of people counted correctly in the census

$\widehat{N}_{1+}$ is an estimate of the number of people counted correctly in the PES

$\widehat{N}_{++}$ is an estimate of the total number of people reported in both the census and the PES

The following are key concepts of Dual-System Estimation (DSE):

1. **Matching Rate:** This is the matched population between the census and PES relative to the PES population.

$$Matching\ rate = \frac{PESpop}{Matched_{pop}}$$

2. **DSE:** This is the population estimated from the PES multiplied by the population from the census after correcting for erroneous inclusions and divided by matched population between the census and the PES. For each enumeration area A, we use dual-system estimation to calculate the estimate of the true population, post-stratified by age-sex group and urban/rural geography type.

$$DSE_{AHE} = \frac{(PES_{AHE})\ x\ (CEN_{AHE} - ErronInclusion_{AHE})}{MatchedNonMovers_{AHE} + MatchedOutMovers_{AHE}}$$

Where,

- DSE_{AHE} is the estimate of the total population in enumeration area A, with age-sex group H and urban/rural E
- PES_{AHE} is the PES count of persons in enumeration area A, with age-sex group H and urban/rural E
- CEN_{AHE} is the Census count of persons in enumeration area A, with age-sex group H and urban/rural E
- $ErronInclusion_{AHE}$ are persons erroneously included in enumeration area A, with age-sex group H and urban/rural E
- $ErronInclusion_{AHE}$ are persons erroneously included in enumeration area A, with age-sex group H and urban/rural E
- $MatchedNonMovers_{AHE}$ are matched non-movers in enumeration area A, with age-sex group H and urban/rural E
- $MatchedOutMovers_{AHE}$ are matched out-movers in enumeration area A, with age-sex group H and urban/rural E

3. **Net coverage error rate** is the total net error relative to the dual-system estimate of the true population; that is, divided by DSE.

$$Net\ coverage\ error\ rate = \frac{Net\ Coverage\ Error}{TruePop}$$

4. **The Net coverage rate** is the complement of the Net Coverage Error Rate. It is equal to 100-Net Coverage Error Rate.

6.3 Summary Results Of Coverage Assessment

As shown in Table 6. 2, the net coverage rate at the national level is 98.7%. The highest net coverage rate is observed in Northern and Western Provinces with 99%, while the lowest Matching rate is observed in the City of Kigali with 96.9%. Rural areas have a greater net coverage rate compared to urban areas, with 99.0% and 97.7% respectively. In age groups, the highest matching rate is observed in the age group 45-59 years with 99.1%, while the lowest matching rate is observed in the group 15-29 years with 97.9%. Females have a greater net coverage rate compared to males with 98.9% and 98.4% respectively.

Table 6. 2:Net Coverage Rate (%) by Province, age group, Sex and area of residence

Rwanda	Male	Female	Urban	Rural	Total
	98.4	98.9	97.7	99.0	98.7
Age groups					
0-4	98.5	98.8	97.7	99.0	98.6
5-14	98.8	98.8	98.1	99.1	98.8
15-29	97.5	98.3	96.7	98.3	97.9
30-44	98.4	98.9	97.9	99.0	98.7
45-59	98.8	99.5	98.4	99.4	99.1
60+	98.7	99.3	97.6	99.5	99.0
Province					
City of Kigali	95.9	97.8	96.8	97.6	96.9
Southern Province	98.2	98.9	98.2	98.6	98.5
Western Province	98.8	99.2	98.5	99.2	99.0
Northern Province	98.9	99.1	97.1	99.2	99.0
Eastern Province	99.2	99.1	98.2	99.3	99.1

***Source**: Post Enumeration Survey, 2022(NISR)*

The net coverage error rate at the national level is 1.3%. A less coverage error rate is observed in rural areas (0.97%) compared to urban areas (2.26%). Provincial patterns indicate that City of Kigali has the highest coverage error rate (3.1%) while Eastern Province has the least rate (0.9%) (Table 6. 2). The difference in net coverage error rates between females (1.07%) and males (1.56%) is 0.5 percentage points (Table 6. 3). The evaluation shows that under-coverage rate for the RPHC5 is minimal, thereby affirming the 2022 Census to be of high quality in terms of coverage. This result explains the great effort made towards the smooth implementation of the 2022 Population and Housing Census.

Table 6. 3: Type of Census Coverage Errors (%) by main population Sub–groups

Type of Census Coverage Errors	Rwanda	Urban	Rural	Male	Female
Census Net Coverage error rate	1.31	2.26	0.97	1.56	1.07
Under Coverage rates	1.51	2.45	1.17	1.8	1.22
Over Coverage rates	0.19	0.19	0.19	0.23	0.14
Gross Coverage error rates	1.78	2.79	1.41	2.15	1.41

***Source**: Post Enumeration Survey, 2022(NISR)*

CHAPTER 7: EVALUATION OF MEASUREMENT AND REPRESENTATION

Information obtained in a census in terms of its contents and representation should be of high quality. The effectiveness of government policies and programmes, to a very large extent, depends on the quality of data used for planning. To ensure the quality of official statistics, the UN recommends the evaluation of measurement and representation of census data. The preparation for the RPHC5 outlined in Chapter 3, the enumeration phase outlined in Chapter 4, the post-enumeration phase outlined in Chapter 5, and the independent coverage check in Chapter 6 all point to a final census database with both excellent representation and good coverage. However, the final check on quality of key variables is important. It is necessary to confirm whether the obtained numbers are plausible in line with the theoretical expectation, and whether they are consistent with the patterns and information available from other sources; and whether there are any internal inconsistencies in the numbers such as obvious age heaping or peculiar sex ratios. In this section we first consider the basic structure of the population and then look at the data collected on fertility, mortality, migration, as well as selected socio-economic variables, such as education, economic activity, marital status, and life expectancy.

7.1 Population Size And Structure

As presented in Chapter 6, the RPHC5 has a high overall coverage. It is expected that the total population figures and distributions are also of high quality. This is confirmed by the total population figures in Table 7.1 showing sensible levels of growth between 2012 and 2022 for the total population and populations by sex and urban-rural distribution. The overall growth rate of 2.3% per annum is consistent with a population that has a declining fertility and declining mortality positively contributing to growth, while the impact of fertility decline is being offset by a young age structure.

Table7. 1:Evolution of the size of the population between 1978 and 2022

Year of census and Intercensal growth rate	Rwanda			Urban			Rural		
	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
	Year of the Census								
1978	2,363,177	2,468,350	4,831,527	122,784	99,943	222,727	2,240,393	2,368,407	4,608,800
1991	3,488,612	3,668,939	7,157,551	207,490	183,704	391,194	3,281,122	3,485,235	6,766,357
2002	3,879,448	4,249,105	8,128,553	727,172	645,432	1,372,604	3,152,276	3,603,673	6,755,949
2012	5,064,868	5,451,105	10,515,973	891,806	845,878	1,737,684	4,173,062	4,605,227	8,778,289
2022	6,429,326	6,817,068	13,246,394	1,851,588	1,837,412	3,689,000	4,577,738	4,979,656	9,557,394
	Intercensal growth rate								
1978-1991	3.0	3.1	3,07	4,12	4,79	4,43	3,02	3,00	3,00
1991-2002	1.0	1.3	1.2	12,08	12,10	12,09	-0,36	0,30	-0,01
2002-2012	2.7	2.5	2.6	2,1	2,7	2,4	2,8	2,5	2,7
1978-2012	2.3	2.4	2.3	6,0	6,5	6,2	1,8	2,0	1,9
2012-2022	2.41	2.26	2.34	7.58	8.07	7.82	0.93	0.78	0.85
1978-2022	10.5	10.7	10.6	31.2	33.8	32.4	7.4	7.7	7.6

Source: Rwanda Population and Housing Census 1978, 1991, 2002, 2012, 2022.

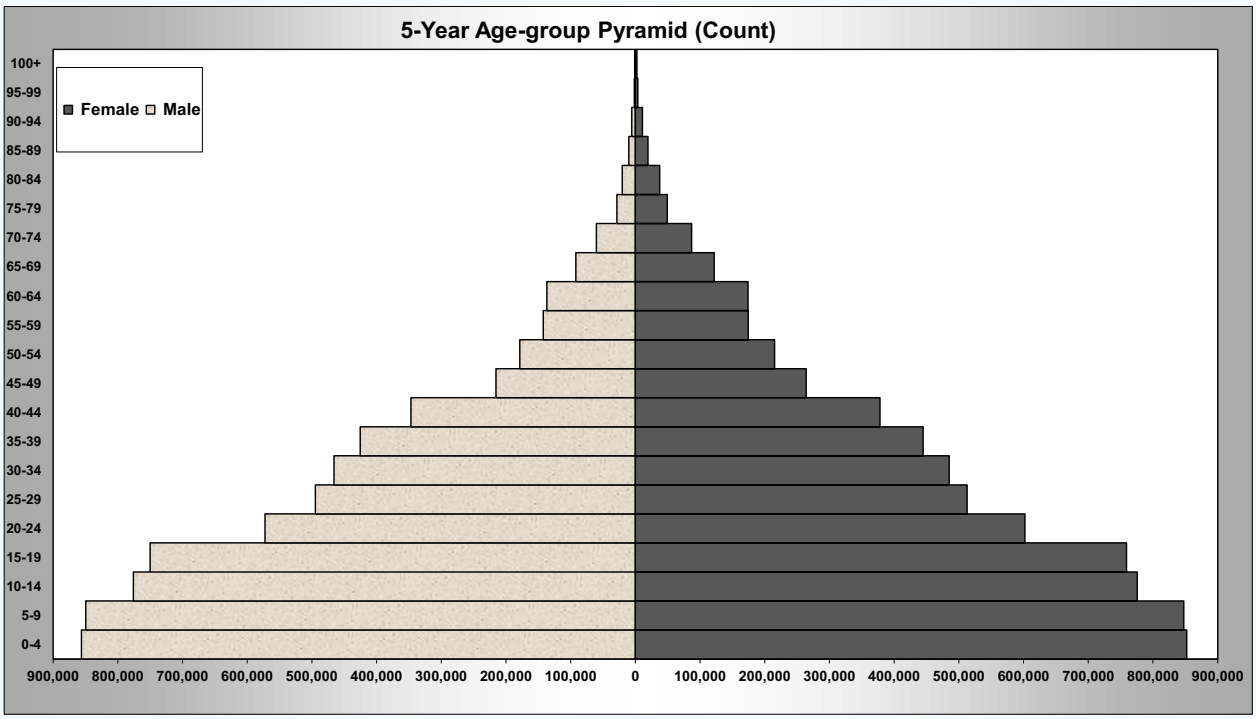
The census coverage by age and sex is high so we expect the basic age-sex structure of the population to be of high quality. This is confirmed by the population pyramid in
Figure 7. 1 and the line graph in Figure 7. 3, representing the overall population in standard five-year age-groups. It displays the overall shape we would expect. However, looking at the data by age-groups can hide other data quality issues such as heaping of ages on single digits. Therefore, single year pyramid and single-year graphical presentation are presented in Figure 7. 2 and Figure 7.4, respectively. The two figures

indicate some evidence of age heaping, possibly due to the rounding of ages, particularly on terminal digits 0, 5 and a few even numbers like 2. Heaping on the terminal digit 2 for age would be consistent with heaping on the year-of-birth at 0 and the census being in a year ending in 2.Figure 7. 2 and Figure 7.4 show a zig-zag pattern which deviates from the theoretical expectation of a population distribution that gradually declines due to effect of mortality in successive older ages. On the other hand, a closer look at

Figure 7. 1 and Figure 7. 3 indicates a smoother age distribution that gradually declines according to the expected pattern. Juxtaposing evidence from the pictorial presentations in single-year and 5-year age group suggests a situation of rounding of ages mainly within the same age groups. The 5-year age groups seem more appropriate for use as they appear to correct the systematic measurement errors arising from rounding of ages.

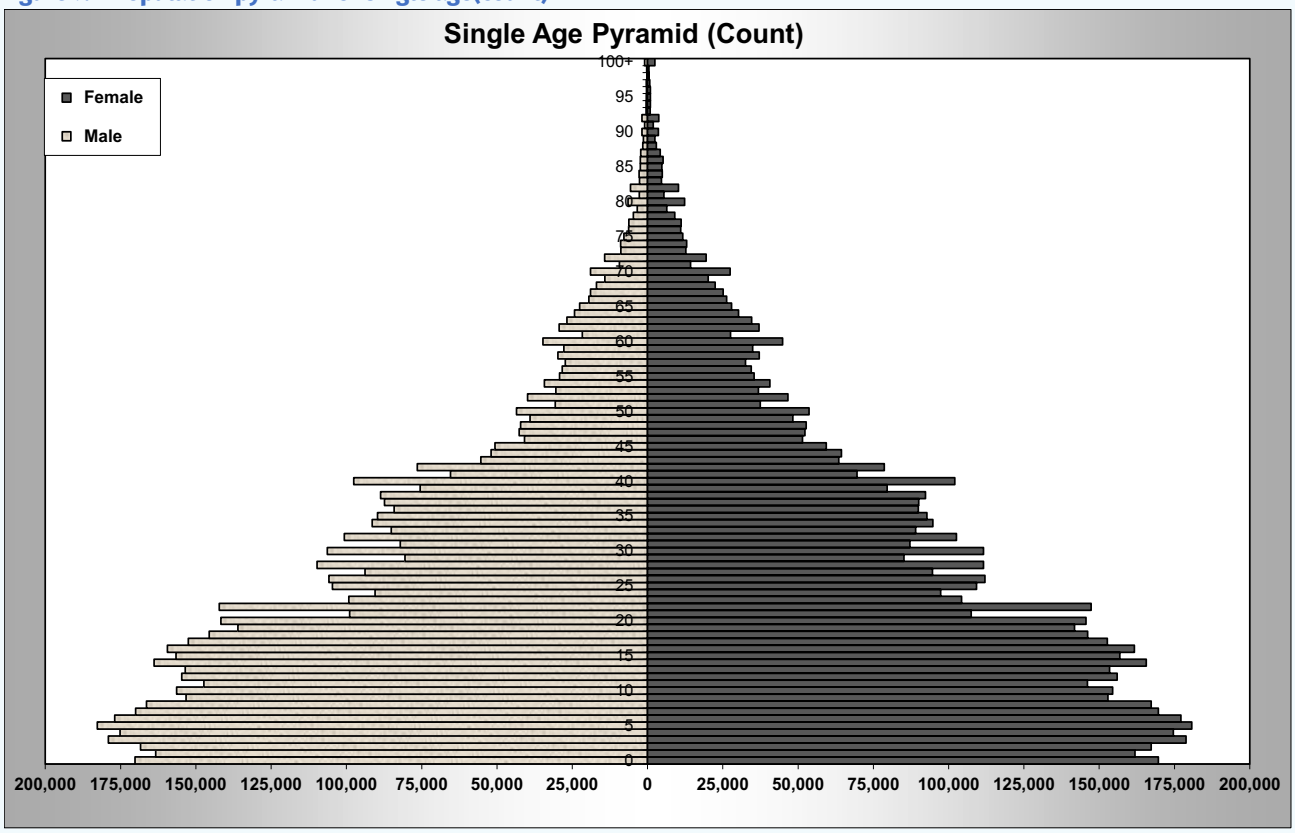
Further and as one would expect, the population distribution by sex indicates that females (51.5%) are slightly more than males (48.5%). The overall population structure is further presented by urban-rural distribution (Table7. 2). Population distributions in Table7. 2 and Table7. 3 show that the rural population is still predominant in the country, though with considerable increase in urban population by 7.8% over the inter-censual period of 2012-2022. Rural-urban population distribution by age and sex indicates adequate reporting of male and female births, though there is some evidence of underreporting of male births. The sex ratio continues to decline gradually with increasing ages, thus demonstrating excess mortality among males compared to female population. There is some evidence of sex imbalance in age group 15-19 (87.5) suggesting underreporting of males at this age group, perhaps they were absent from homes for attending tertiary educational institutions or other activities. As would be expected, there is sex imbalance in favour of males in age groups 25-29 to 55-59 showing more males than females in urban areas with corresponding lower sex ratio in rural areas, which can be explained by the economic reason of labour migration to cities.

Figure 7. 1 Population pyramid for grouped ages (counts)



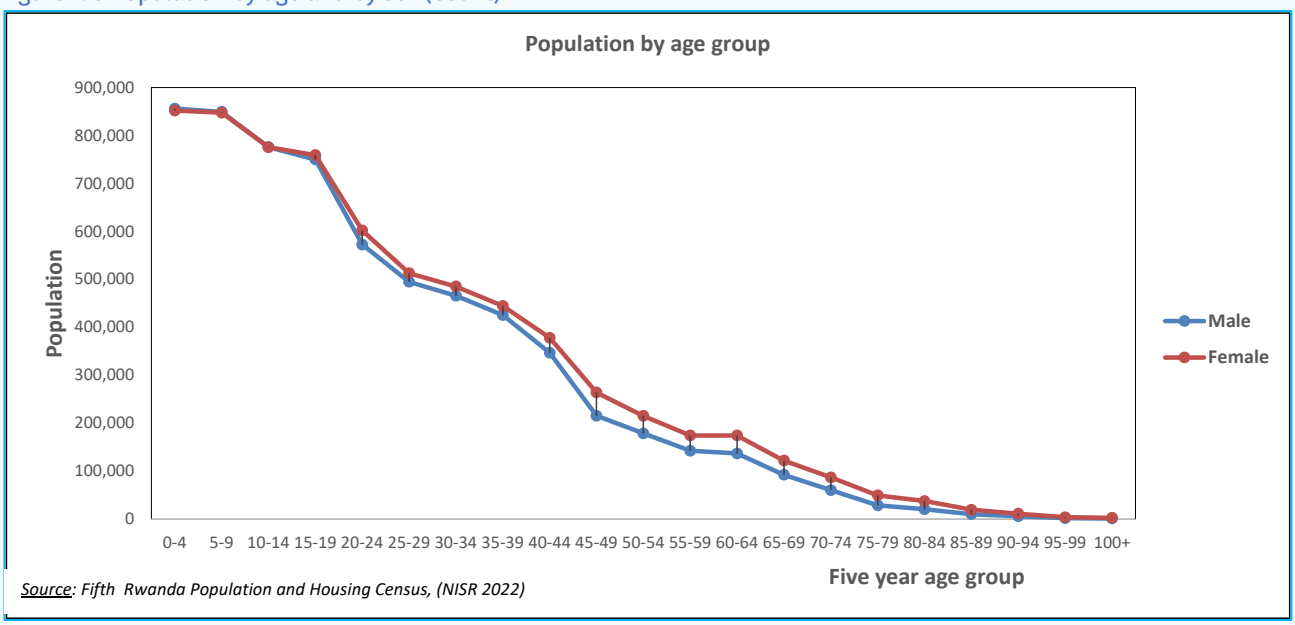
Source: Fifth Rwanda Population and Housing Census, NISR 2022.

Figure 7. 2 Population pyramid for single age(count)



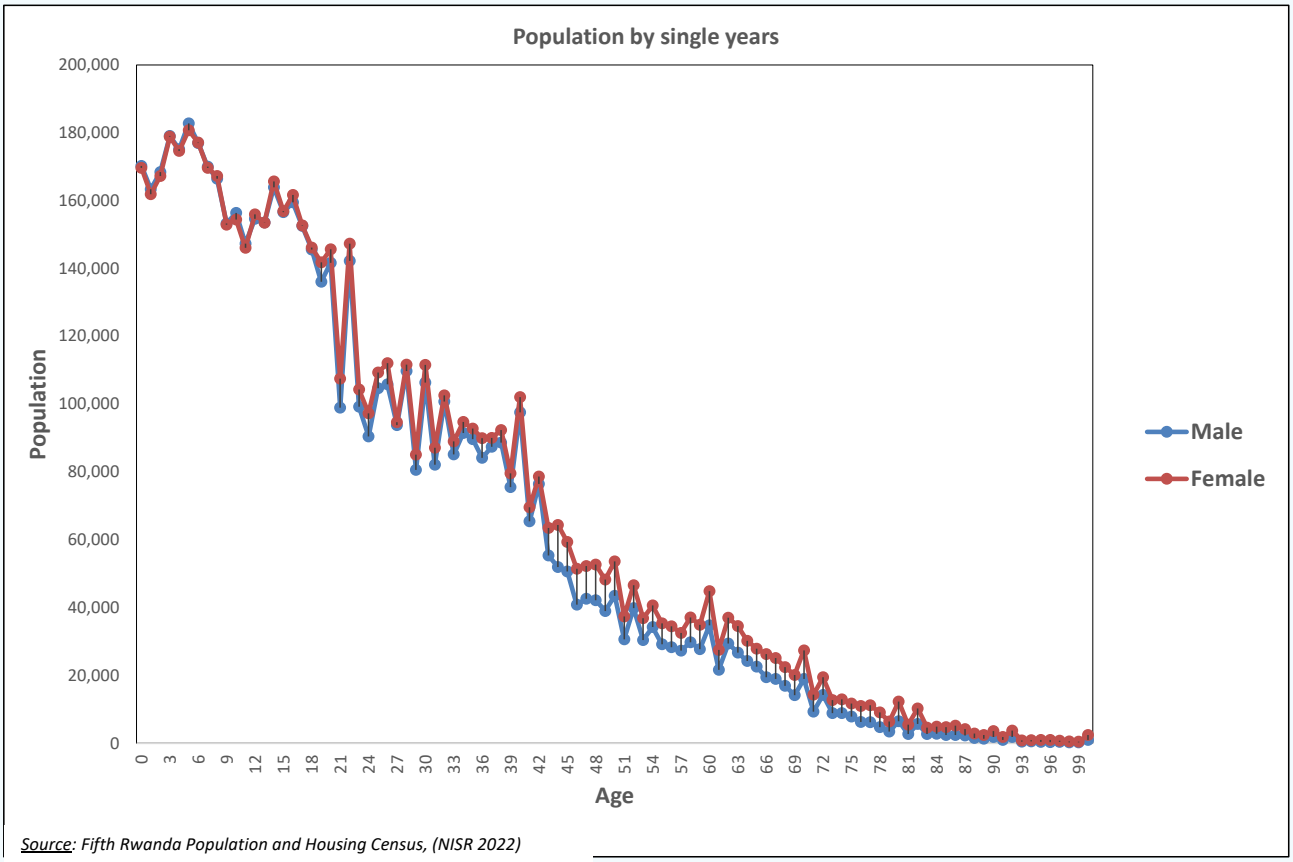
Source: Fifth Rwanda Population and Housing Census, NISR 2022.

Figure 7. 3 Population by age and by sex (Count)



Source: Fifth Rwanda Population and Housing Census, (NISR 2022)

Figure 7. 4 Population by age single years and by sex(count)



Source: Fifth Rwanda Population and Housing Census, (NISR 2022)

Table7. 2: Five-year age-sex structure of the resident population

Five years age group	RWANDA			URBAN			RURAL		
	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes
0-4	856,228	852,232	1,708,460	238,913	237,293	476,206	617,315	614,939	1,232,254
5-9	849,389	847,616	1,697,005	216,386	215,022	431,408	633,003	632,594	1,265,597
10-14	775,772	775,575	1,551,347	178,399	182,075	360,474	597,373	593,500	1,190,873
15-19	750,163	759,178	1,509,341	183,178	209,786	392,964	566,985	549,392	1,116,377
20-24	572,543	602,006	1,174,549	192,193	200,735	392,928	380,350	401,271	781,621
25-29	494,594	512,713	1,007,307	189,192	182,561	371,753	305,402	330,152	635,554
30-34	465,744	485,003	950,747	178,965	166,519	345,484	286,779	318,484	605,263
35-39	425,313	444,670	869,983	147,185	127,651	274,836	278,128	317,019	595,147
40-44	346,800	378,154	724,954	113,177	98,167	211,344	233,623	279,987	513,610
45-49	215,314	263,941	479,255	66,456	62,438	128,894	148,858	201,503	350,361
50-54	178,670	215,118	393,788	49,237	45,089	94,326	129,433	170,029	299,462
55-59	142,329	174,400	316,729	33,937	32,729	66,666	108,392	141,671	250,063
60-64	136,793	174,208	311,001	27,532	29,656	57,188	109,261	144,552	253,813
65-69	92,098	121,903	214,001	17,061	20,093	37,154	75,037	101,810	176,847
70-74	60,277	86,861	147,138	10,826	14,540	25,366	49,451	72,321	121,772
75-79	28,476	49,329	77,805	5,071	8,689	13,760	23,405	40,640	64,045
80-84	20,408	37,591	57,999	3,628	6,612	10,240	16,780	30,979	47,759
85+	18,415	36,570	54,985	3,189	7,065	10,254	15,226	29,505	44,731
Total	6,429,326	6,817,068	13,246,394	1,854,525	1,846,720	3,701,245	4,574,801	4,970,348	9,545,149
	49%	51%	100%	14.0%	13.9%	27.9%	34.5%	37.5%	72.1%

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

The overall growth rate reported in Table 7.1 for the inter-censual period seems plausible, but we can also consider the progression of the population from 2012 to 2022. Figure 7.8 shows the proportion of an age-group in 2012 that is surviving in 2022. So, for example, it is the ratio of 10 to 14 year-olds in 2022 to 0- to 4-year-olds in 2012. The general pattern is sensible with male survivorship declining more than female for the older age-groups due to higher mortality among males than females. There appears to be some anomaly with the survivorship of female population aged 0-4 which appears lower than the expected pattern. While the 2012 census indicated evidence of some temporary international migration in that the count of those actually present on census night (residents and visitors) was less than the total count of residents (present and absent), the reverse is the case in 2022 census, as the number of total residents (present and absent) exceeded the number counted on the census night (residents and visitors)

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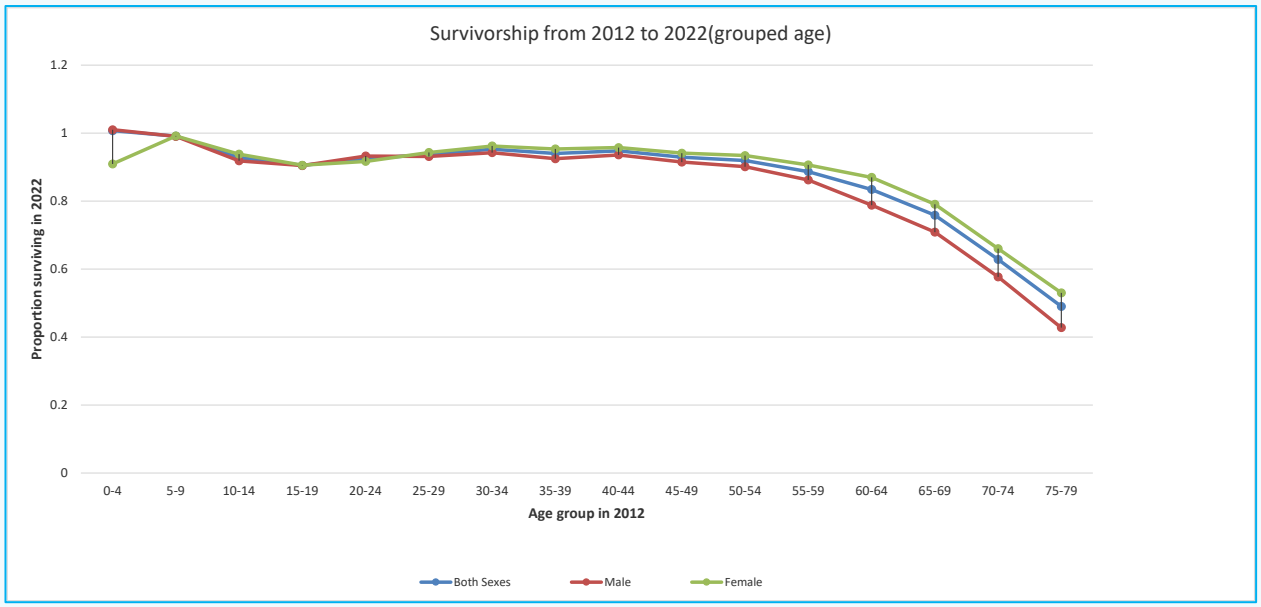
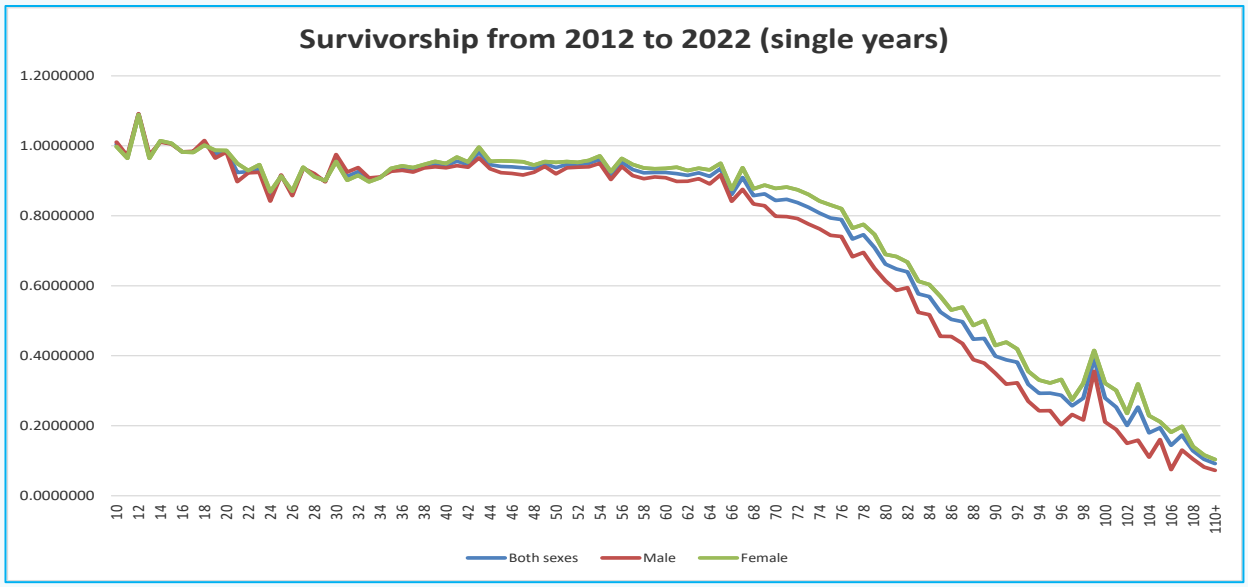
Figure 7. 5 Survivorship from 2012 to 2022(grouped age)



Source: Fifth Rwanda Population and Housing Census, NISR 2022.

Figure 7. 6 Survivorship from 2012 to 2022(Single years)



Source: Fifth Rwanda Population and Housing Census, NISR 2022.

Looking at the sex ratios more generally, Table7. 3 presents the sex ratio by age-group for Rwanda as a whole, and by urban-rural distribution. Looking at the sex ratios for Rwanda, although slightly higher than it was in 2012, it is clear that the ratio of 100 from the youngest age-group looks somewhat low compared to the expected sex ratio at birth of 103 to 107. In general, the pattern of decline of sex ratio in successive age groups is reasonable but is lower than would be expected. Of course, the sex ratio is very sensitive to the usual pattern of excess male under-coverage in censuses, but this is often in the young adult ages. Under-coverage of children is more usually either non-differential with respect to sex or more prevalent for female children. The impact of the past history of Rwanda is evident in the considerable decline in sex ratio for the population in their late 40s and early 50s. Further, a comparison of sex ratio for urban and rural areas indicates the expected impact of male economic migration and greater sex imbalance in terms of more males in urban areas during the main years of economic activity, with a corresponding drop for the rural area.

Table7. 3: Sex Ratios by 5-yeras age-group

5-year age-group (Years)	2002			2012			2022		
	Rwanda	Urban	Rural	Rwanda	Urban	Rural	Rwanda	Urban	Rural
0-4	98.5	100.2	98.2	99.5	100.3	99.4	100.5	100.8	100.4
5-9	97.5	97.8	97.5	98.9	100.2	98.7	100.2	100.6	100.1
10-14	96.2	92.4	96.8	97.2	95.8	97.4	100.0	98.0	100.6
15-19	95.3	94.0	95.6	96.6	87.2	98.7	98.8	87.5	103.1
20-24	89.4	124.2	81.5	94.4	105.3	91.5	95.1	96.5	94.4
25-29	83.7	132.1	72.7	96.9	121.5	90.6	96.5	104.5	92.0
30-34	87.1	146.1	74.9	93.6	125.2	86.7	96.0	108.2	89.7
35-39	86.8	152.1	75.5	84.1	116.8	77.6	95.6	115.6	87.7
40-44	87.0	155.6	76.9	85.0	123.6	78.5	91.7	115.8	83.4
45-49	84.2	149.1	75.4	83.9	123.1	78.5	81.6	106.4	73.9
50-54	81.7	134.2	74.2	81.4	117.0	77.3	83.1	109.5	76.1
55-59	68.8	103.7	63.8	79.4	109.3	76.3	81.6	104.3	76.4
60-64	67.9	89.0	64.9	76.6	100.4	74.1	78.5	93.1	75.6
65-69	70.7	83.8	68.9	64.4	75.9	63.2	75.6	85.4	73.6
70-74	77.3	84.5	76.4	62.1	68.8	61.4	69.4	74.7	68.3
75-79	74.8	76.1	74.6	63.9	65.0	63.7	57.7	59.4	57.4
80-84	82.1	71.9	83.7	67.7	59.7	68.6	54.3	54.5	54.2
85+	80.3	65.1	83.1	62.5	49.8	64.2	50.4	45.4	51.6
Total	91.3	112.7	87.5	92.9	105.4	90.6	94.3	100.8	91.9

Source: Rwanda Population and Housing Censuses 2002, 2012, 2022

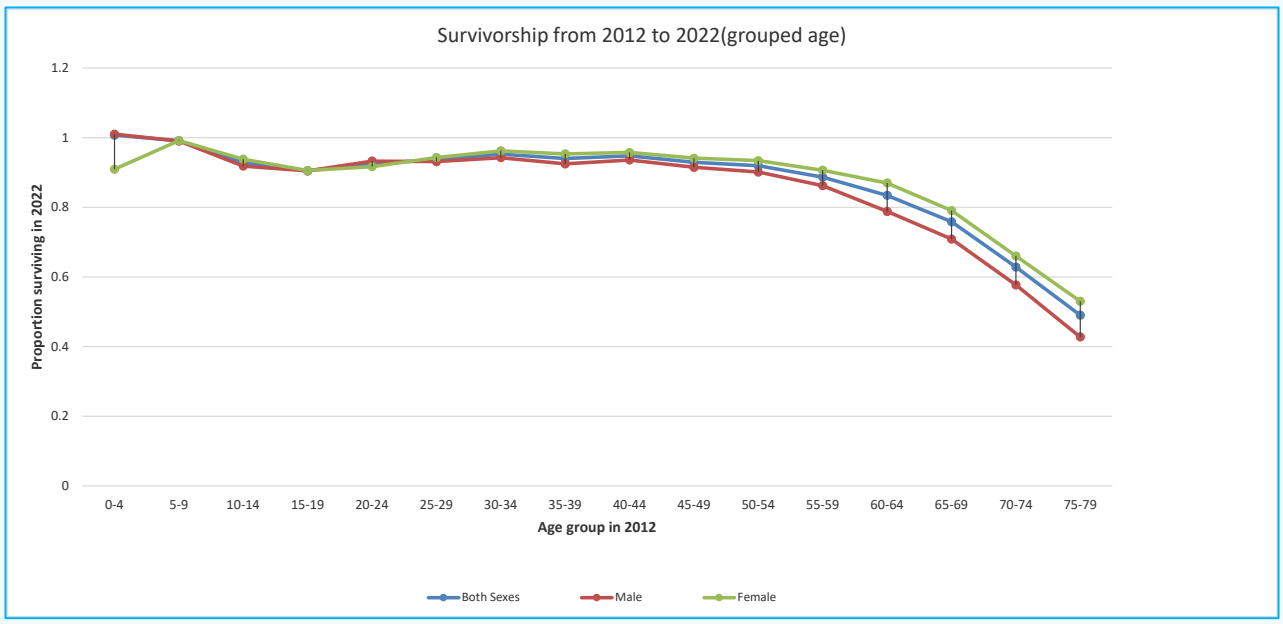
The comparison of sex ratios for the three censuses (Table7. 3) indicates a better reporting of age-sex data in 2022 census compared to 2002 and 2012. The general age-sex structure of the population in RPHC5 is sensible, although there is some suggestion of slight under-coverage of 0-4-year-olds and an apparent systematic under-reporting of males. This second issue is also confirmed by the PES, which estimates the coverage of males to be slightly lower than females, although not by enough to fully explain the sex ratio effects seen here.

Figure 7.7 shows an obvious spike at age 22, which relates to a mini baby boom in 2000 and a spike that was observed at age 12 according to the 2012 census. We can also look at the 10-year survivorship from 2012 to 2022 by single year age. Figure 7.7 demonstrates a zig-zag pattern but as age increases, we start to see declines in survivorship with males below females. As earlier pointed out, we can see a high number of 22-year-olds which also corresponds to an unusually high number of 12-year-olds in 2012 thus signifying evidence of a mini baby-boom in 2000. Again, the pictorial presentation of 10-year survivorship from 2012 to 2022 in grouped age shows a much smoother pattern, thus confirming the evidence of age heaping in single-year age data.

Figure 7. 7 Survivorship from 2012 to 2022 (single years)

Source: Fifth Rwanda Population and Housing Census, NISR 2022.

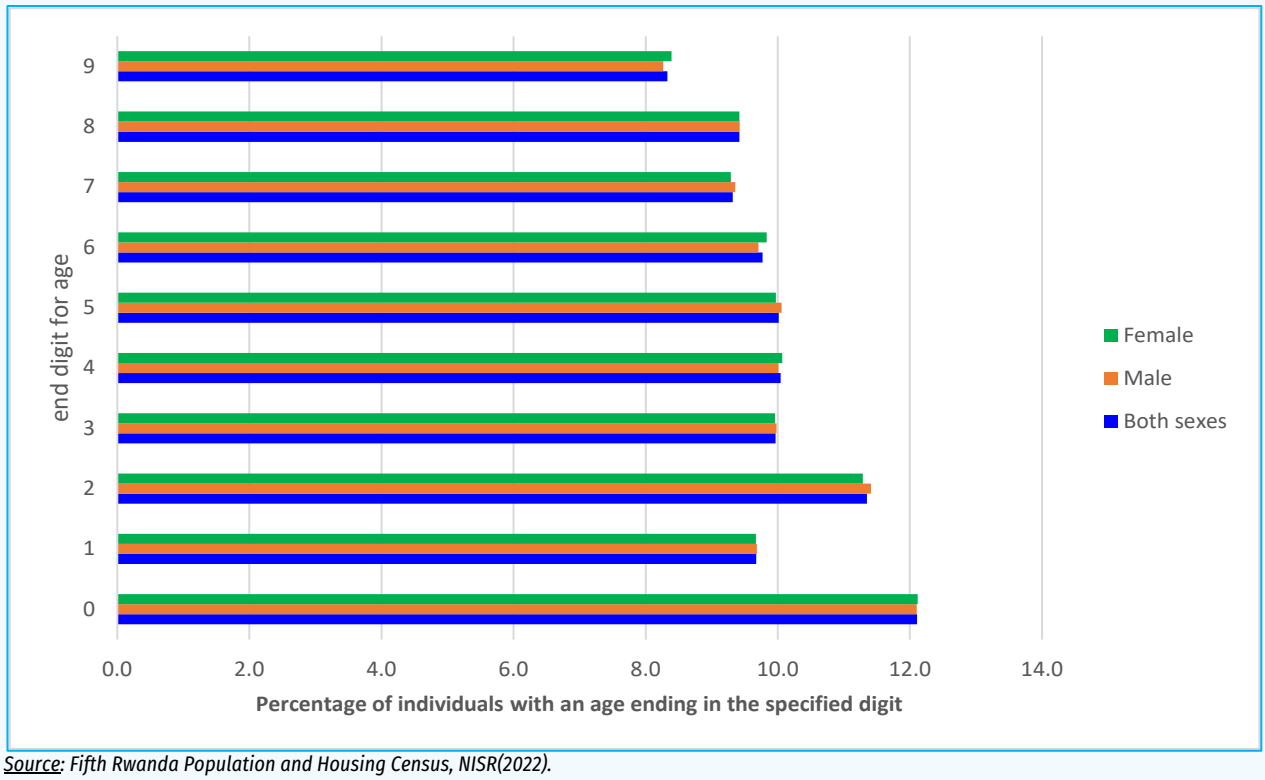
Figure 7. 8 Survivorship from 2012 to 2022 (grouped age)



Source: Fifth Rwanda Population and Housing Census, NISR 2022.

Less survivorship among females aged 0-4 compared to males suggests excess mortality among females – a rare scenario, or alternatively a possible under-reporting of males in the previous census. Putting this together with the population pyramid and the line graph in Figure 7.2 and Figure 7.6 respectively suggests that there were some irregularities in age reporting in 2022, although a comparison of the observed patterns of age-sex reporting in 2022 with the two previous censuses (2002 and 2012) signifies an improvement in the accuracy and quality of age-sex data.

Figure 7. 9 Percentage of individuals with an age ending in the specified digit

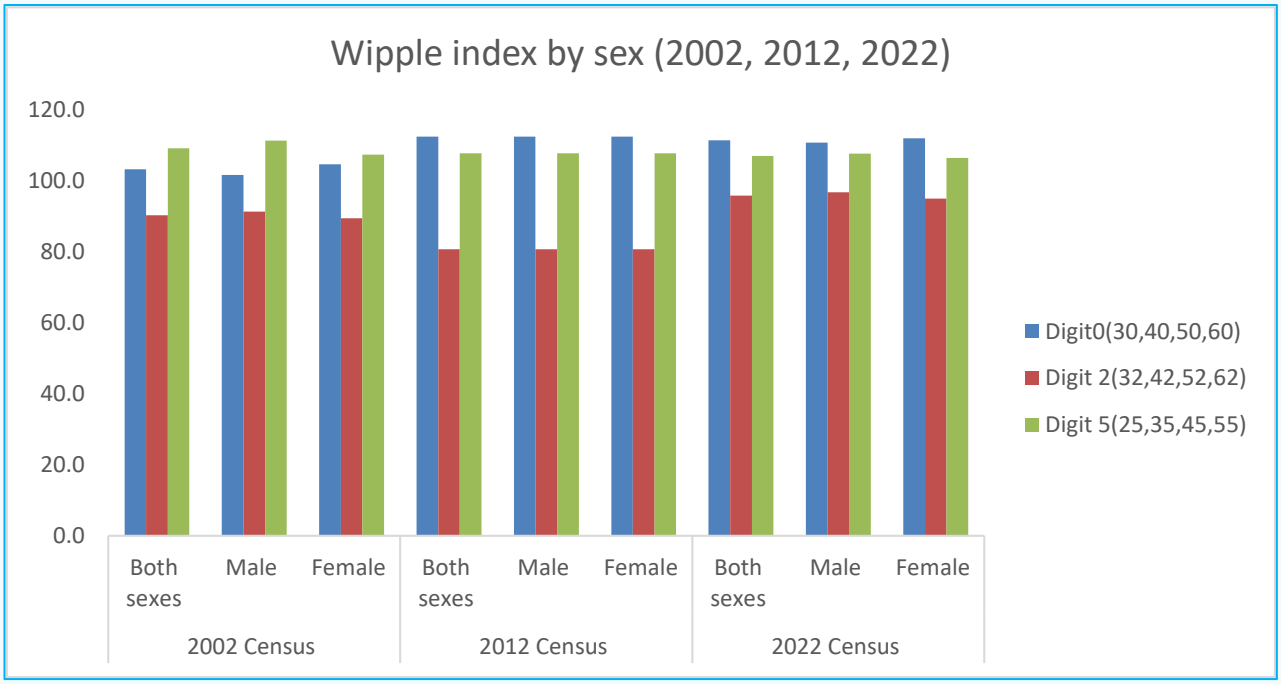


Source: Fifth Rwanda Population and Housing Census, NISR(2022).

While looking at patterns in the single years, we can overly concentrate on a single age issue and neglect the overall pattern. For this, more summary measures can be useful. Figure 7.9 shows the distribution of end digits from zero to nine (for those with reported age from 0 to 99) and pictorially shows some preference for 0 when reporting age either in completed years (0 in the figure) or by year-of-birth (2 in the figure). To further evaluate the age data, more summary measures (Whipple's, Myers' and UN age-sex accuracy indices) are considered. The Whipple's index focuses on specific digits, while Myers' index and the UN age-sex accuracy index look for general evidence of age-heaping (and sex misreporting in the case of the UN) across all the terminal digits 0-9. The trend in summary indices is presented to compare the quality of age data for the last 3 censuses (2002, 2012 and 2022). Whipple's index is employed in Figure 77.10 to explore the extent of age heaping in the data with respect to 0, 2, and 5 for ages 23 to 62[6]. Whipple's index shows a consistent pattern of heaping for terminal digits 0 and 5 for the last three censuses, however, a greater heaping was observed for terminal digit 2 in 5RPHC compared to the two previous censuses.

[6]The UN standard is 23 to 62, allowing the exploration of digit preference with respect to 25, 35, 45, and 55; or 30, 40, 50 and 60.

Figure 7. 10 Whipple index by sex for the last three censuses (2002, 2012 and 2022)



Source: Rwanda Population and Housing Census 2002, 2012, 2022

Table7. 4: UN recommendations for interpreting Whipple's index

WI < 105	**Highly accurate**
105 ≤ WI ≤ 109.	Fairly accurate
110 ≤ WI ≤ 124.9	Approximately accurate
125 ≤ WI ≤ 174.9	Roughly accurate
WI ≥ 175	Very Roughly accurate

The values for the Myers' Index in Table7. 5 are encouraging with zero representing no age heaping, while the UN measures are slightly more than 20; where less than 20 is desirable for evidence of accurate recording of age and sex and over 40 is considered highly inaccurate. Comparison of Meyers' index and UN summary measures for 2002 to 2022 (Table7. 5) signifies an improvement in the quality of age reporting in the RPHC5. The overall Myers' blended index for the 2022 census indicates improved quality and less age heaping compared to the 2002 census. Also, the UN age-sex accuracy index (Table7. 5) for the RPHC5 shows a more accurate reporting of age data compared to the previous censuses, with UN's recommendation of less than 20 as desirable, 22.9 was obtained from the 2022 census. From the evaluation of age data, we can conclude that the age data of RPHC5 is of high quality, although, as earlier reported, the distribution of ages in single year suggests some evidence of rounding of ages mainly within age groups. Thus, the use of 5-year age group may be preferred, where applicable, rather than the single-year age distribution as the former appears to correct the systematic measurement errors arising from rounding of ages. This is because avoidance of a terminal digit in preference for another often occurs within the same five-year age-group.

Table7. 5:Myers index by sex for the last three censuses (2002, 2012 and 2022)

Myers Blended Index Calculation 2002-2022									
End digit	2002			2012			2022		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
u	$100T_u/T$			$100T_u/T$			$100T_u/T$		
0	11.42	11.30	11.53	12.02	11.89	12.09	11.68	11.60	11.70
1	9.24	9.25	9.23	8.65	8.63	8.66	8.54	8.48	8.60
2	10.81	10.91	10.72	11.48	11.59	11.39	11.24	11.35	11.14
3	9.34	9.37	9.31	9.22	9.22	9.22	9.21	9.20	9.23
4	9.68	9.72	9.64	9.83	9.82	9.85	9.65	9.60	9.71
5	9.88	9.94	9.83	9.83	9.89	9.78	9.91	9.97	9.87
6	9.69	9.59	9.77	9.84	9.74	9.94	9.99	9.92	10.06
7	9.93	9.96	9.89	9.61	9.70	9.54	9.87	9.96	9.80
8	10.10	10.11	10.09	10.46	10.50	10.44	10.48	10.55	10.42
9	9.92	9.84	9.98	9.06	9.02	9.08	9.44	9.38	9.48
Total (T)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Myers index	4.66	4.64	4.68	7.94	7.95	7.84	6.78	6.99	6.63

Source: Rwanda Population and Housing Census 2002, 2012, 2022

Table7. 6: The United Nations age-sex accuracy index for the last 3 censuses (2002,2012 and 2022)

	2002	2012	2022
United Nations age-sex accuracy gross index (UN joint score)	23.70	25.18	21.20
United Nations age-sex accuracy net index (UN joint score)	25.00	26.68	22.86

Source: Rwanda Population and Housing Census 2002, 2012, 2022

Pulling together the information in this Chapter, there is some evidence of slightly lower under-reporting of males compared to females, and this is confirmed by the PES data. The under-reporting is especially true for children but as we move into adult ages it could also be partly related to a work migration pattern and PES coverage of young adult males, particularly ages 15-44, is slightly lower than other male groups. There is apparent evidence of under-reporting of very young children in the population pyramid, but this has to be weighed against a population that is experiencing both fertility and mortality decline. The heaping on the preferred terminal digits does not potentially create any problem particularly when grouped age structure is used as shown in

Figure 7. 1 and Figure 7.3. Overall, the age-sex structure in RPHC5 is sufficiently well-reported to be used, especially when grouped, and the high level of net coverage indicated by the PES fits with the results. There is no proposal to adjust the age-sex structure based on either the PES results or the demographic analysis presented here.

7.2 Fertility Data

Fertility data obtained through censuses are prone to possible errors, including coverage error or systematic misreporting of information. Such errors may vary in size and nature depending on the quality control measures put in place during enumeration and data processing. Evaluation of fertility data from censuses is an important quality assurance measure (US Census Bureau, 2019). This section focuses on the basic data reported in the fertility section of the household questionnaire. As a simple check on the completeness of fertility data, it is expected that, after accounting for the impact of infant mortality, the number of recent births (i.e., births in 12 months before the census) should be about the same as the size of the resident population aged less than 1year on the Census Night. A comparison of recent births with the size of the resident population

aged less than 1 year on the Census Night (Table7. 7) suggests that recent births were well reported, but with some evidence of possible underreporting of infant deaths. This is because the number of recent births exceeded the resident population aged less than 1year by 7% (Table7. 7). If there is no significant underreporting of infant deaths, the difference between recent births and resident population aged less than 1year should be approximately the same as the reported number of infant deaths, except there is significant out-migration of babies which is highly unlikely in the prevailing situation. Table7. 8 shows that the lifetime reporting of fertility in RPHC5 looks plausible and somewhat better than those reported in the RPHC4, when sex ratios are examined, although we can observe from the lower sex ratio some evidence of under-reporting of male births in the younger age of mother, particularly at age group 10-14. Underreporting of births is expected at the younger ages of mother like 10-14, not just for the male births, but also for females. The lifetime reports of fertility for this group of young mothers will be mostly associated with the most recent fertility

.Table7. 7:Number of births in the past 12 months, and number of resident population less than 1

	Male children	Female children	Both sexes
Number of births reported in past 12months	186,497	178,052	364,549
Number of 0-year olds in the population	170,246	169,654	339,900

Source: Fifth Rwanda Population and Housing Census 2022(NISR)

Table7. 8: Children ever born by mother's age

Mother's age	2022			Average(2012)	Sex Ratio(2012)	Average (2022)	Sex Ratio(2022)
	Males ever born	Females ever born	Total				
12-14 [7]	2,642	4,036	6,678	0.01	93.1	0.01	65.5
15-19	21,376	21,042	42,418	0.05	98.5	0.06	101.6
20-24	149,424	142,211	291,635	0.53	102.2	0.48	105.1
25-29	332,180	318,674	650,854	1.57	101.8	1.27	104.2
30-34	536,413	519,417	1,055,830	2.91	101.4	2.18	103.3
35-39	706,416	689,581	1,395,997	4.18	100.9	3.14	102.4
40-44	754,266	738,996	1,493,262	4.97	100.8	3.95	102.1
45-49	593,062	584,415	1,177,477	5.60	100.7	4.46	101.5
50-54	513,748	507,514	1,021,262	6.14	99.9	4.75	101.2
55+	2,016,486	2,002,348	4,018,834	7.10	98.8	5.90	101.4
Total	5,626,013	5,528,234	11,154,247		100.2		101.8

Source: Rwanda Population and Housing Census 2012, 2022

Using the reported fertility, we can estimate the crude birth rate and general fertility rate. Technically, the denominator should be adjusted back from the Census Day to six months earlier[8] but this has not been done here as the aim is to judge the likely quality of the fertility data, not present the final fertility analysis of the thematic report. Similarly, as the aim is to study the trend in the indicators over a short time interval the indicators are not standardised for age.

Figure 7.9 presents both rates and for comparison figures from the 2002, 2012 and 2022 censuses. Additionally, relevant fertility indicators from other sources, that is, the sequences of Demographic and Health Surveys (DHSs) are included for comparison purpose.

[7] In the RPHC4, the target population for the questions on fertility were females aged 12 years and above, while in the RPHC5, the target population were females aged 10 years and above.

[8]This can be done by either using the inter-censal growth rates to interpolate backwards or by using the births and deaths data with an assumption of a uniform distribution over 12 months. This would assume that half the births and half the deaths reported for the 12-month period would have occurred at six months prior to the census.

Table7. 9 :Evolution between 1992 and 2012 of basic fertility measures

Year (source)	Crude Birth Rate (‰)	General Fertility Rate (‰)	Mean Parity at end of childbearing
1992 (DHS)	41.0	197	7.7
2000 (DHS)	39.2	180	6.8
2002 (PHC)	41.2	162	7.06
2005 (DHS)	43.2	190	6.6
2007-08 (DHS)	39.2	179	6.0
2010 (DHS)	34.4	151	5.9
2012 (PHC)	28.5	113	5.60
2014-15(DHS)	32.6	141	5.8
2019-20(DHS)	31.8	134	5.0
2022(PHC)	27.8	105.5	5.9

Source: ICF International, 2022, MEASURE DHS STAT compiler - http://www.statcompiler.com –accessed October 7, 2022, for the DHS results; 2002 Census results as published in National Census Service (2005). Fourth Rwanda Population and Housing Census as published by the NISR. Notes: (1) Rates from the DHS are based on averaging the three years prior to the survey date recorded in the table, while mean parities at the end of childbearing are based on ages 40 to 49 rather than 45 to 49 for the two censuses.

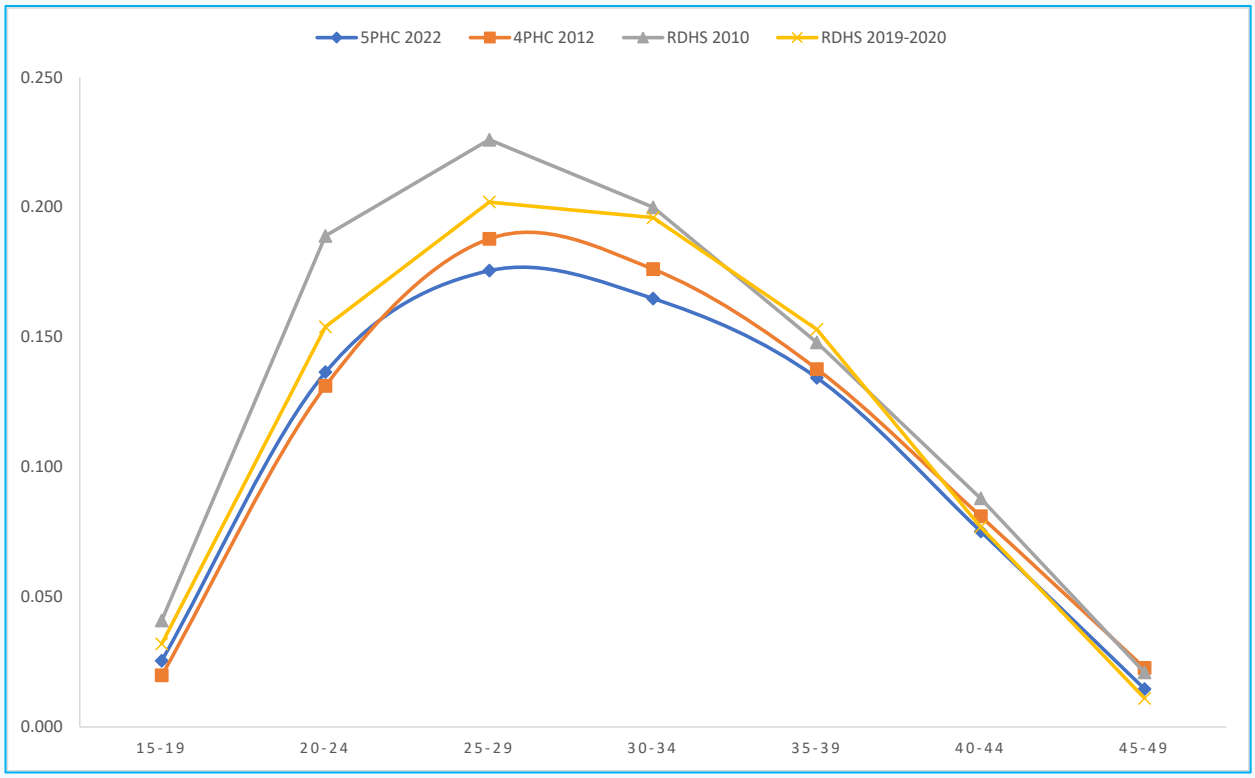
From Table 7.9 we can see that fertility has been declining both in terms of the crude birth rate (CBR) and the general fertility rate (GFR) since the early 2000s. Comparing CBR and GFR from the RPHC5 with those obtained from the last two censuses and the previous Rwanda DHSs indicates a continuous decline in fertility, although earlier reports indicate an under-reporting of recent births during the RPHC4. As shown in Table 7.9 results on mean parity at the end of childbearing show some evidence of fertility stall, in that the reported mean parity was around 5.8 to 6.0 over a period of 12 years (i.e., the period between 2007/08 DHS and RPHC5). A comparison of the pattern of ASFR for RPHC5 and RPHC4 (Figure 7.11) suggests a situation of inaccurate/over-reporting of current fertility by young mothers ages 15-24 and older women aged 35 and above. The figure shows a better reporting of fertility for women ages 24-34, thus corroborating the assumptions of more accurate fertility reporting for this group of women compared to others, as has been reported in the seminal work of Coale and Brass (1968) and others (Adedini, 2014, Mba, 2013). Generally, we can conclude that both the current births and lifetime fertility are of high quality and there would be no need for adjustment of fertility level. One important point to take note from this section is the evidence of some underreporting of infant mortality.

Table7. 10: Age-specific fertility rates (ASFR) and total fertility rates (TFR) for the last two censuses and the two most recent RDHS (National and rural-urban distribution)

Women's age group	Comparison of the PHCs Age-Specific Fertility Rates (ASFR) and TFR with those from the DHSs											
	RWANDA				URBAN					RURAL		
	5PHC 2022	4PHC 2012	RDHS 2010	RDHS 2019-2020	5PHC 2022	4PHC 2012	RDHS 2010	RDHS 2019-2020	5PHC 2022	4PHC 2012	RDHS 2010	RDHS 2019-2020
15-19	0.025	0.020	0.041	0.032	0.020	0.020	0.040	0.022	0.028	0.020	0.041	0.034
20-24	0.137	0.131	0.189	0.154	0.104	0.106	0.143	0.110	0.153	0.138	0.198	0.168
25-29	0.176	0.188	0.226	0.202	0.158	0.160	0.180	0.180	0.186	0.195	0.235	0.21
30-34	0.165	0.176	0.200	0.196	0.162	0.159	0.137	0.170	0.166	0.180	0.211	0.202
35-39	0.134	0.138	0.148	0.153	0.126	0.118	0.113	0.137	0.138	0.142	0.153	0.156
40-44	0.075	0.081	0.088	0.077	0.066	0.065	0.058	0.057	0.078	0.084	0.092	0.081
45-49	0.015	0.023	0.021	0.011	0.012	0.023	0.016	0.003	0.015	0.023	0.021	0.012
TFR	**3.63**	**3.78**	**4.57**	**4.1**	**3.24**	**3.26**	**3.44**	**3.40**	**3.82**	**3.90**	**4.76**	**4.32**

Source: Rwanda Population and Housing Census 2012, 2022, RDHS 2010, 2019-20

Figure 7. 11 Age-Specific fertility rates (ASFR) for the last two censuses and two most recent RDHS



SSource: Rwanda population and Housing Census 2012, 2022, RDHS 2010, 2019-2020

7.3 Mortality Data

Accurate mortality estimations are essential for public health planning (Makinde *et al*, 2021, Salzberg *et al*, 2019) and for monitoring performance of national development goals such as the Rwandan Vision 2050. While civil registration and vital statistics (CRVSs) are the veritable data sources for estimating mortality rates, CRVSs are incomplete in many sub-Saharan African countries (Adedini *et al*, 2021). In the absence of high-quality vital registration data, population census serves as important data source for estimating mortality rates of the population. However, there is always a concern that mortality data from census may be under-reported, and also considering that the questions come at the very end of the questionnaire, thus raising further issues regarding whether enumerators properly ask the questions on mortality.

First, after accounting for the effect of infant mortality, it is expected that the number of recent births should be about the same as the count of resident population aged less than 1 year, unless there has been a significant international in-migration of babies (in the case of more births reported) or a considerable out-migration of babies (in the case of less births reported). A comparison of recent births and resident population under 1 year of age as shown in Table7. 11 indicates that the former exceeds the latter by 7%, with higher disparities for males than females (8.7% vs. 4.7%). This difference should approximately be the same as the reported number of infant deaths, except there was a significant out-migration of babies which is highly unlikely in the prevailing situations. However, this difference, as presented in Table7. 11, exceeds the reported number of infant deaths by 52.8% (59.8% for males, and 39.3% for females), thus suggesting some evidence of underreporting of infant mortality

.

Table7. 11: Summary data relating to numbers of births reported in 12 proceeding months, 0-year olds in the resident population, and reported infant deaths for 12 preceding months Estimated from direct method

Measure	Total	Male	Female
Number of infant deaths for 12 preceding months (mortality section)	11,628	6,528	5,100
Number of births reported in past 12months	364,549	186,497	178,052
Number of 0-year olds in the resident population	339,900	170,246	169,654
Difference between numbers of births reported in past 12 months and resident population <1 year	24,649	16,251	8,398
% difference between recent births and population <1 year	6.8%	8.7%	4.7%
Difference between the excess of recent births over resident population <1 year and number of infant deaths for12 preceding months	13,021	9,723	3,298
% difference between the excess of recent births over resident population <1 year and number of infant deaths for12 preceding months	52.8%	59.8%	39.3%

Source: Rwanda 5th Population and Housing Census, 2022 (NISR)

Table 7.12 presents the summary data from the mortality section. The denominators have been adjusted to the mid-period population. The crude death rates from the 2002 and 2012 Censuses are also included for comparison

Table7. 12: Summary data relating to mortality

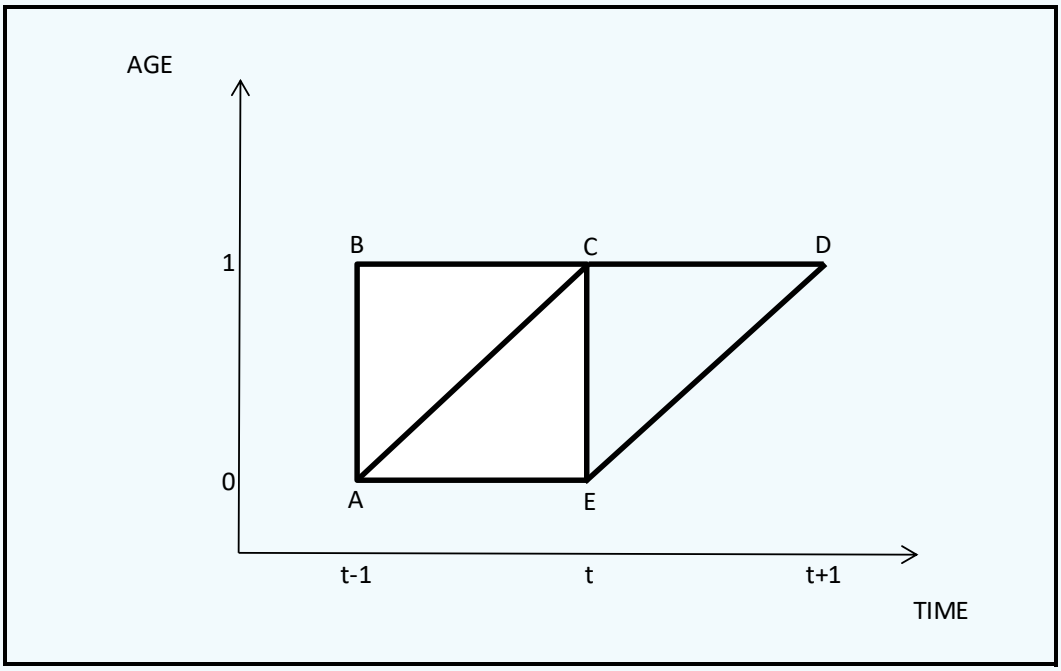
	Male	Female	Total
Number of Deaths (2022 Census)	28,228	20,309	48,537
Mid-period population (2022 Census)	6,355,972	6,739,290	13,095,262
Crude Death Rate ‰ (2022 Census)*	4.4	3.0	3.7
Adjusted number of Deaths	39,291	42,950	82,242
Crude Death Rate ‰ (2022 Census)**	6.2	6.4	6.3
Crude Death Rate ‰ (2012 Census) *	3.3	2.1	2.7
Crude Death Rate ‰ (2012 Census) **	8.0	7.4	7.7
Crude Death Rate ‰ (2002 Census)*	9.5	7.3	8.4
Crude Death Rate ‰ (2002 Census)**	16.2	14.0	15.4

*Source: Rwanda Population and Housing Census 2012 and 2022; *Unadjusted results, **Adjusted results constructed from indirect methods as published by NISR (2022).*

Results presented in Table 7.12, which compare the unadjusted and adjusted crude death rates (CDR) for 2012 and 2022 censuses indicate some evidence of improved quality of death reporting for RPHC5, albeit, underreporting of mortality data persists in 2022. This is because the crude death rate from RPHC5 is also low; though government's interventions in the health sector and the improvement in living standard of people is expected to have brought about some reduction in mortality rates in the country. Subtracting the CDR from CBR yields the rate of natural increase (i.e., growth rate in the absence of migration). The difference between the CBR and CDR is 24.1 per 1000 population (or simply 2.41%) which is slightly higher than the growth rate of 2.3%, thus indicating some evidence of possible underreporting of deaths. If the difference between the reported crude rates is sensible with respect to population growth, it implies there is some evidence of underreporting of death at around 11%, assuming there was no considerable out-migration of people from the country over the inter-censal period. Pulling the evidence together, the under-reported infant deaths and the difference in the crude rates vis-à-vis the population growth translate show some evidence of under-reporting of overall deaths.

Table7. 13 focuses on the specific indicator of infant mortality. The infant mortality rate (IMR) compares deaths to those under one in a year with the births for that year. However, the DHS typically estimates 1q0, the probability that a baby will survive one year. The Lexis Diagram in Figure 7.12 highlights this point. The traditional measure of infant mortality for the year t-1 to t has all the deaths in ABCE in Figure 7.12 as the numerator, and divides by all the births in that year given by AE. The alternative 1q0 is a cohort measure which has all the deaths in ACDE in Figure 7.12 as the numerator and divides by all the births in that year given by AE.

Figure 7. 12 Lexis Diagram highlighting the two measures of infant mortality



With the census data, we can calculate the traditional infant mortality rate directly using the deaths to children under one reported in the mortality data to capture the deaths occurring in ABCE, and births reported in the fertility data as the denominator. This can be compared to the q-rates from the DHS, which will be similar to the traditional infant mortality rate unless there has been either a dramatic change in fertility or mortality over a single year period. With the census data, we can also approximate the infant mortality rate by using the deaths reported in the fertility data. These relate to the triangle ACE in Figure 7.12 which should give a lower number of deaths than those reported in the actual mortality section. The results on the evolution of infant mortality rate by sex are presented in Table7. 13, including the published rates from the DHS and the last two censuses.

Table7. 13:Evolution between 1992 and 2022 of the Infant Mortality Rate (IMR) by sex

Data source	Infant Mortality Rate ‰		
	Male	Female	Both sexes
1992 (DHS)*	98(CI: 89-108)	82(CI: 73-91)	90(CI: 83-98)
2000 (DHS)*	123(CI: 114-133)	112(CI: 102-121)	117(CI: 110-125)
2002 (census)	58.7	47.2	52.9
2002 (census – fertility section)	61.3	48.5	54.8
2002 (census) – from indirect methods	145	133	139
2005 (DHS)*	106(CI: 98-114)	99(CI:90-107)	103(CI: 96-109)
2007-08 (DHS)*	83(CI: 73-93)	71(CI: 63-80)	77(CI: 69-85)
2010 (DHS)*	67(CI: 61-73)	55(CI: 50-61)	61(CI: 57-66)
2014-15(DHS)*	45(CI: 40-50)	39(CI:34-44)	42(CI: 38-46)
2019-20(DHS)*	35(CI: 31-40)	34(CI: 29-39)	35(CI: 31-38)
1992 (DHS)**	92(CI: 80-104)	78(CI: 66-89)	85(CI: 76-94)
2000 (DHS)**	113(CI: 101-125)	102(CI: 90-113)	107(CI: 98-116)
2005 (DHS)**	88(CI: 78-98)	84(CI: 74-95)	86CI: 78-94()
2007-08 (DHS)**	70(CI: 58-82)	55(CI:45-64)	62(CI: 53-71)
2010 (DHS)**	55(CI: 48--63)	44(CI: 38-50)	50(CI: 45-55)
2012 (census)*	35.8	23.8	29.8
2012 (census – fertility section)	77.1	70.7	73.9
2012 (census) – from indirect methods	53.0	44.0	48.6
2014-15(DHS)**	37(CI: 30-43)	28(CI: 22-34)	32(CI: 28-37)
2019-20(DHS)**	35(CI: 29-42)	30(CI:23-36)	33(CI: 28-37)
2022(census) from direct methods	34.2	28.1	31.2
2022(census) from indirect methods	35	23	29
2022(census – fertility section)	19.9	17.3	18.6

Source: ICF International, 2022, The DHS Programme STAT compiler Funded by USAID - http://www.statcompiler.com –accessed 15/12/2022 for the DHS results. 2002 Census results as published in National Census Service (2005). Fourth Rwanda Population and Housing Census (2012), Fifth Rwanda Population and Housing Census (2022).

Notes: 1. (*) Rates from the DHS based on averaging the ten years prior to the survey date recorded in the table. (**)The overall rates can also be estimated using just the preceding five years and these are also given in the table to highlight the strength of the overall decline in the most recent years; (2) 2002 and 2012 Census results as published in National Census Service (2005) and NISR (2014), and IMR from 2022 Census are constructed from indirect methods; (3) 2012 results from direct method.; (4) CI: confidence interval

A careful look at the results presented in Table7. 13 shows clear evidence of continuous decline in infant mortality prior to the conduct of RPHC5. Specifically, a comparison of results computed from indirect methods for the previous censuses shows a considerable decline in infant mortality rates (per 1000 live births) from 139 (2002 census) to 48.6 (2012 census). The results also demonstrate that the 2012 Census estimate, i.e., 48.6 is higher (by 52%) than the comparable five-year figure, i.e., 32 for the 2014-15 DHS. The DHS is of course a survey and subject to both under-reporting as well as sampling error. The results further show that infant mortality rate for 2022 census (31.2 per 1000 live births) computed using direct method is only slightly lower than the rate obtained from the most recent RDHS conducted in 2019-20 (33 per 1000), thus suggesting evidence of better reporting of infant deaths in the RPHC5 relative to the previous censuses. The reductions in infant mortality may be explained by the government's health interventions and programmes for children and pregnant women/nursing mothers across the country.

Table7. 14:Mismatches between mortality section and fertility section regarding the reporting of infant mortality in past 12 months (%)

Reporting of infant deaths in past 12 months	2012	2022
Household reports no infant death in past 12 months	99.0	99.5
Household reports infant death both in mortality and fertility sections	0.1	0.1
Household reports infant death in fertility section only	0.7	0.2
Household reports infant death in mortality section only	0.2	0.2
Total (%)	100.0	100.0
Count	2,406,176	3,312,743

Source: Fourth and Fifth Rwanda Population and Housing Census.

Table 7.14 presents information on mismatches in the reporting of infant mortality between mortality and fertility sections of the RPHC5. Results in the table suggests evidence of less mismatches in infant death reporting in the RPHC5 compared to the RPHC4, thus suggesting an improvement in infant death reporting in 2022 census. For instance, of all households reporting a death of an infant anywhere on the form, 20% reported the death only in the fertility section of the questionnaire. Similarly, 20% reported the death only in the mortality section of the questionnaire.

Pulling all the evidence together, the results indicate considerable improvement in mortality reporting in the RPHC5 compared to the previous censuses. Nevertheless, as earlier discussed, there is some evidence of under-reporting in the overall mortality level, therefore we recommend the use of indirect techniques to obtain the best attainable mortality estimates, particularly for the thematic report on mortality.

7.4 Selected Demographic And Socio-Economic Indicators

This section presents the results of the assessment of selected key demographic and socio-economic variables. These include marital status, migration, education, and life expectancy.

7.4.1 Marital Status

Marital status is an important characteristic because of its influence on many other variables such as health outcomes, socio-economic position, wealth status and fertility behaviours (Joung, 2010; Adedini *et al,* 2021). Marital status is a key socio-demographic characteristic that is measured in the 2022 census.

Table 7.15 presents percentage distribution of resident population aged 12 years and above by current marital status for both sexes and separately for males and females. Given the young age structure of the country's population, it is plausible that majority of the total population (44.4%), with more males (48.8%) than females (40.4%) are never married. With younger age at first marriage for females than males, the results seem credible that fewer females aged 12 and above are never married compared to males. The results show that polygyny is very minimal in Rwanda. This seems credible and may be explained by the effect of modernization in the contemporary society. It is observed that widowhood is almost non-existent among males (0.9%), while it is relatively high among females (8.0%), thereby confirming the evidence of excess male mortality relative to females, particularly among the older population. The results also seem credible that levels of divorce and separation are higher for females than males as men will find it easier to re-partner or will have died since the divorce or separation took place. Overall, the reporting of marital status in the RPHC5 is also consistent with the levels and patterns observed in the 2012 census. In general, there is enough evidence that the basic data obtained on marital status is credible and of high quality

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Table7. 15: Distribution (%) of the resident population aged 12 years and above by current marital status by Sex

Marital status	Male		Female		Both sexes	
	Count	%	Count	%	Count	%
Married to one wife/husband officially	1,406,723	31.8	1,472,987	30.6	2,879,710	31.2
Married to one wife/husband not officially	740,036	16.7	817,747	17.0	1,557,783	16.9
Live in a polygamous	31,453	0.7	66,691	1.4	98,144	1.1
Divorced	5,307	0.1	13,293	0.3	18,600	0.2
Separated	39,889	0.9	114,502	2.4	154,391	1.7
Never married	2,156,030	48.8	1,946,827	40.4	4,102,857	44.4
Widowed	40,553	0.9	384,651	8.0	425,204	4.6
Total	*4,419,991*	*100*	*4,816,698*	*100.0*	*9,236,689*	*100.0*

Source: Fifth Rwanda Population and Housing Census, NISR (2022).

7.4.2 Migration

Along with fertility and mortality, migration is one of the three components of population change and a key demographic variable that affects several other important outcomes such as health, economy, labour force, and brain drain or brain gain, among others (Adepoju, 2011; Fisher *et al*, 2021; Holmes *et al*, 2021). Levels and patterns of migration is measured in the 2022 census and Table7. 16 presents the distribution of recent migrant population. The results indicate there are 889 thousand recent migrants, with City of Kigali having the largest in-flow of migrants (around one-third, i.e., 354,970), followed by the East (306,091), South (109,488), North (72,841) and West (45,783). These results are consistent with those reported in 2012 Census which also indicates strong migration flows out of the South and West, and strong flows into the City of Kigali and Eastern Province. The large flows of recent migrants into these two provinces may be explained by the fact that City of Kigali is Rwanda's capital city while East is experiencing growth as a result of the availability of lands in the province. The levels and patterns of migration flows observed in the 2022 Census follows the expected trend and pattern. They are also consistent with other data sources such as the 2012 census. There is reasonable evidence to suggest that the basic migration data obtained in the 2022 Census is of high quality.

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Table7. 16: Distribution (count) of the recent migrant population (in the preceding 5 years before census, both sexes)

Province of previous residence	Province of residence (Destination)					Outmigrant
	City of Kigali	South	West	North	East	
City of Kigali	146,452	47,402	13,832	25,716	93,663	**180,613**
South	140,755	102,895	13,207	10,482	68,067	**232,511**
West	88,282	37,177	66,033	23,905	68,081	**217,445**
North	47,504	8,718	9,703	29,055	76,280	**142,205**
East	78,429	16,191	9,041	12,738	146,547	**116,399**
Not stated	595	370	482	372	954	**2,773**
In-migrant	**354,970**	**109,488**	**45,783**	**72,841**	**306,091**	

Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

This table include Rwanda native and foreign born

Notes: (1) A recent migrant is defined as an individual that lives in a different district than the district where he/she lived five years ago. The above table presents information at the provincial level, please note that recent migrants that have moved to another district may still be residing in the same province.

7.4.3 Quality of Economic Activity and Labour Force Data

Data on economic activity and labour force participation is very critical for economic planning of a country. Rwanda started using the new international standard on work, employment, and underutilisation in 2016. These standards are being implemented in the quarterly labour force survey for which data collection is carried out in February, May, August and November of each year. During the 2022 census enumeration, the data collection for quarter three of the labour force survey was also ongoing. The fact that the labour force survey was conducted at the same time as the census gives a strong ground for assessing the quality of census data using the labour force survey for the comparable questions.

7.4.3.1 Employment

Even though the questions to identify employed persons in the census were not as detailed as in the labour force survey, the results on the employment-to-population ratio were almost the same at the national level. According to the results in Table7. 17, the employment-to-population ratio is 0.5 percentage points lower in census than in labour force, which falls in the confidence interval of the labour force data.

Table7. 17: Comparison of employment to population ratio from labour force and census data

Province	Labour force Survey, August 2022			PHC August 2022		
	Male	Female	Total	Male	Female	Total
Kigali city	63.5	47.3	55.4	65.6	45.0	55.4
Southern Province	53.7	36.7	44.8	49.0	37.6	42.9
Western Province	52.2	34.0	42.3	47.9	37.6	42.3
Northern Province	56.1	42.3	48.5	48.3	38.2	42.9
Eastern Province	55.0	35.5	44.7	53.2	43.2	47.9
Total	55.5	38.2	46.4	52.4	40.2	45.9

Source: Fifth Rwanda Population and Housing Census,(2022), Rwanda Labor Force Survey quarter 3 (August 2022) NISR

The breakdown of employment by economic activities (Table7. 18) reveals that the structure/distribution of economic activities is the same for the census and the labour force but the employment in agriculture activities is over reported in the census on one hand, and activities in construction and manufacturing are under reported also in the census on the other hand. It is important to note that the under-reported activities are often practised in parallel with agriculture, especially in rural areas. This implies the possibility that respondents reported the usually practised activities instead of paying attention to the ones carried out in the reference period.

Table7. 18:Distribution of employed persons by main economic activity in labour force survey and census.

ISIC High level	Labour force survey , August 2022			Population Census 2022		
	Male	Female	Total	Male	Female	Total
Agriculture forestry and fishing	38.5	54.7	45.6	44.3	63.9	53.4
Mining and quarrying	1.9	0.8	1.4	2.3	0.3	1.4
Manufacturing	6.2	6.8	6.5	4.9	3.6	4.3
Electricity gas stream and air condition in supply	0.0	0.1	0.0	0.2	0.0	0.1
Water supply gas and remediation services	0.2	0.1	0.1	0.4	0.4	0.4
Construction	19.5	3.5	12.5	11.3	2.1	7.0
Wholesale and retail trade repair of motor vehicles and motorcycles	7.7	12.6	9.8	8.6	9.4	9.0
Transportation and storage	9.0	0.8	5.4	7.4	0.4	4.1
Accommodation and food services activities	1.8	2.2	2.0	1.4	1.2	1.3
Information and communication	0.4	0.1	0.3	0.5	0.3	0.4
Financial and insurance activities	0.6	0.7	0.7	0.5	0.6	0.6
Real estate activities	0.2	0.0	0.1	0.1	0.0	0.1
Professional scientific and technical activities	1.1	0.4	0.8	1.5	1.0	1.3
Administrative and support activities	1.9	1.1	1.5	3.6	1.6	2.7
Public administration and Defence compulsory social security	2.4	1.1	1.8	1.0	0.8	0.9
Education	2.9	3.7	3.3	3.0	3.4	3.2
Human health and social work activities	0.8	1.9	1.3	0.8	1.0	0.9
Arts entertainment and recreation	0.2	0.2	0.2	0.3	0.2	0.2
Other services	1.8	3.6	2.6	3.0	3.4	3.2
Activities of households as employers	2.7	5.8	4.0	3.0	4.7	3.8
Activities of extraterritorial organization and bodies	0.2	0.0	0.1	0.0	0.0	0.0
Not stated	-	-	-	2.1	1.6	1.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Fifth Rwanda Population and Housing Census,(2022), Rwanda Labor Force Survey quarter 3 (August 2022) NISR

Results of assessment from triangulating the census and labour force data offer some lessons for future census enumeration. First, the design of the module on employment in the Census questionnaire must follow the UN guidelines for measuring the economic activity in a population and housing census. Second, during enumerators' training for future censuses, it is important to give a thorough training and make clear emphases on economic activities such as construction works which serve as alternatives to agriculture, particularly among the rural residents. Third, as it is done in the labour force surveys, future census enumerations should consider identifying employment in agriculture using two steps – (i) identifying all persons engaged in agriculture, and (ii) using a follow-up question to separate them on the destination or use of the product from the agriculture.

The comparison of the institutional sector in the labour force survey and population census as indicated in Table 7.22, shows a high similarity in the distribution from both sources. However, for the status in employment, despite the same structure in the distribution from both sources, the proportion of employees in the census seems to be underestimated compared to the labour force survey (Table7. 20). One possible reason may be the displacement of some alternative activities to agriculture like construction whose 'status in employment' often is "employee" compared to people in agriculture whose 'status in employment' is mainly "self-employment".

Table7. 19:Distribution of employed persons by institutional sector in the labour force survey and census

Institutional sector	Labour force survey(August 2022)			Population census(August 2022)		
	Male	Female	Total	Male	Female	Total
Public institution	4.8	4.5	4.7	4.3	4.4	4.3
Mixed public and private	0.7	0.7	0.7	0.6	0.7	0.7
Private/VUP	91.3	88.4	90.0	91.7	89.7	90.8
International NGO	0.3	0.3	0.3	0.1	0.1	0.1
Local NGO/Religious organizations	0.3	0.4	0.3	0.0	0.0	0.0
Cooperative	0.2	0.1	0.2	0.3	0.2	0.2
Household	2.5	5.6	3.9	3.1	4.8	3.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Fifth Rwanda Population and Housing Census,(2022), Rwanda Labor Force Survey quarter 3 (August 2022) NISR

Table7. 20:Distribution of employed persons by status in employment in the labour force survey and census

Status in employment	Labour force survey(August 2022)			Population census (August 2022)		
	Male	Female	Total	Male	Female	Total
Employee	72.2	68.9	70.8	63.2	55.1	59.4
Paid apprentice/Inter	0.2	0.1	0.1	0.8	0.5	0.6
Employer (with regular employees)	1.2	0.9	1.0	1.3	1.1	1.2
Own account worker (without regular employees)	24.9	22.1	23.7	30.1	37.3	33.5
Member of cooperative	0.2	0.1	0.2	0.5	0.3	0.4
Contributing family w	1.4	7.9	4.2	2.0	3.3	2.6
Others				2.2	2.5	2.3
Total	100.0	100.0	100.0	100	100	100

Source: Fifth Rwanda Population and Housing Census,(2022), Rwanda Labor Force Survey quarter 3 (August 2022) NISR

7.4.3.2 Unemployment

In the census and labour force survey, an unemployed person is identified using three questions. There is not much difference in the proportion of persons without employment in the labour force and the census (53.6% and 55.0% respectively). However, significant differences appear in the answers provided to the questions posed to people actively looking for a paid job. While the proportion of the eligible population who affirmatively responded to this question from the labour force is 18.8%, it is only 7.7% in the census. This difference resulted in a big discrepancy between the unemployment rates of both census and labour force survey. The possible reason for the observed disparity is the respondents' wrong interpretation of the concept of "paid job" arising from the enumerators' inability to provide detailed explanations on the concept . Another possible reason for the discrepancy may be due to the complexity of the concept of a "paid job" and a "profit job" as indicated in the question. If not clearly asked, the respondent may respond negatively referring to one concept instead of the other with the opposite response. In future censuses, it is recommended to conduct a series of cognitive tests among enumerators on such complex questions and concepts. Appropriate probing techniques should be employed during the training to ensure adequate comprehension of concepts among the enumerators. Besides, Pilot Census could be used during future enumeration to assess the understanding of respondents on such complex questions and concepts. More importantly, future enumerations should consider simplifying difficult questions using relevant probing questions.

7.4.4 Education

Education is an important characteristic for measuring a country's human capital development (Shani, 2020). Therefore, high-quality reporting of a country's basic and higher levels of education is critical for setting appropriate national priorities. It also serves to identify gaps and to guide the framing of educational programmes and interventions, where necessary. Hence, there is a need to ascertain the quality of reporting on education as measured in the census.Table7. 21 presents the distribution of the population aged 15 years and above by language(s) of literacy. The result shows that slightly more than half of Rwandan population are literate in Kinyarwanda only. This pattern is consistent across all provinces, except in City of Kigali where less than half (46.5%) of the population are literate in Kinyarwanda only. This pattern is expected as higher rates of educational attainment is associated with higher level of literacy in languages other than one's local language. City of Kigali has the highest proportion of educated population in the country; hence it also has the highest percentage (21.6%) of people with literacy in Kinyarwanda and English languages.

The percentage of the population who never attended school in Rwanda is 22.3 percent (Table7. 21), with slightly higher proportion among females (23.4%) compared to males (21.1%), thus showing the expected pattern of higher educational attainment among the male population relative to females. The rural-urban distribution also shows the expected pattern of higher percentage of people who never attended school in rural communities (24.0%) compared to urban areas (18.0%), thereby demonstrating high confidence in the reported basic data on education. It is, however, important to note that 3.2% of the households needed to have the information they reported on 'never attended school' changed to 'currently attending school' due to inconsistencies in reporting (see Annex B)

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Table7. 21: Distribution of the population aged 15 years and above by language(s) of literacy and by province[9]

Language of Literacy	Province					
	Rwanda	City of Kigali	Southern	Western	Northern	Eastern
Counts	8,289,582	1,182,667	1,888,697	1,752,855	1,298,763	2,166,600
Percentage	100.0	100.0	100.0	100.0	100.0	100.0
Kinyarwanda only	54.0	46.5	55.9	54.2	56.1	55.2
English only	0.0	0.2	0.0	0.0	0.0	0.0
French only	0.0	0.0	0.0	0.0	0.0	0.0
Swahili only	0.0	0.0	0.0	0.0	0.0	0.0
Kinyarwanda and English	14.1	21.6	11.7	13.0	13.1	13.8
Kinyarwanda and French	1.9	2.5	1.7	1.6	2.0	1.8
Kinyarwanda and Swahili	0.7	1.7	0.4	0.8	0.3	0.7
Kinyarwanda, English and French	4.1	9.6	3.3	3.0	3.6	2.9
Kinyarwanda, English and Swahili	1.0	2.5	0.6	0.7	0.6	0.8
Kinyarwanda, English, French and Swahili	1.5	4.6	0.9	1.1	0.9	1.0
Other	1.4	4.3	0.5	0.9	0.6	1.3
None	21.2	6.5	24.9	24.7	22.8	22.4
Not stated	0.0	0.1	0.0	0.0	0.0	0.0

Source: Fifth Rwanda Population and Housing Census, 2022(NISR)

[9] *Literacy means here being able to read, to write and to understand any language*

Table7. 22:Distribution of the population 3 years and above by highest level of educational attainment, sex and area of residence

Level of education attended	Counts			Percentages		
	Both sexes	Male	Female	Both sexes	Male	Female
Rwanda	12,245,590	5,927,311	6,318,279	100	100	100
Never attended School	2,004,330	880,393	1,123,937	16.4	14.9	17.8
Pre-nursery/ECD	245,899	120,357	125,542	2	2	2
Nursery	318,532	155,968	162,564	2.6	2.6	2.6
Primary	7,139,525	3,543,088	3,596,437	58.3	59.8	56.9
INGOBOKA/Vocational	96,357	51,720	44,637	0.8	0.9	0.7
Lower secondary	1,154,349	520,274	634,075	9.4	8.8	10
Upper secondary	850,334	408,754	441,580	6.9	6.9	7
University	434,476	245,384	189,092	3.5	4.1	3
Not Stated	1,788	1,373	415	0	0	0
Urban	3,416,641	1,711,845	1,704,796	100	100	100
Never attended School	389,149	182,717	206,432	11.4	10.7	12.1
Pre-nursery/ECD	26,809	13,095	13,714	0.8	0.8	0.8
Nursery	123,582	61,556	62,026	3.6	3.6	3.6
Primary	1,655,811	836,815	818,996	48.5	48.9	48
INGOBOKA/Vocational	33,058	18,483	14,575	1	1.1	0.9
Lower secondary	417,709	198,759	218,950	12.2	11.6	12.8
Upper secondary	444,340	219,581	224,759	13	12.8	13.2
University	325,044	179,938	145,106	9.5	10.5	8.5
Not Stated	1,139	901	238	0	0.1	0
Rural	8,828,949	4,215,466	4,613,483	100	100	100
Never attended School	1,615,181	697,676	917,505	18.3	16.6	19.9
Pre-nursery/ECD	219,090	107,262	111,828	2.5	2.5	2.4
Nursery	194,950	94,412	100,538	2.2	2.2	2.2
Primary	5,483,714	2,706,273	2,777,441	62.1	64.2	60.2
INGOBOKA/Vocational	63,299	33,237	30,062	0.7	0.8	0.7
Lower secondary	736,640	321,515	415,125	8.3	7.6	9
Upper secondary	405,994	189,173	216,821	4.6	4.5	4.7
University	109,432	65,446	43,986	1.2	1.6	1
Not Stated	649	472	177	0	0	0

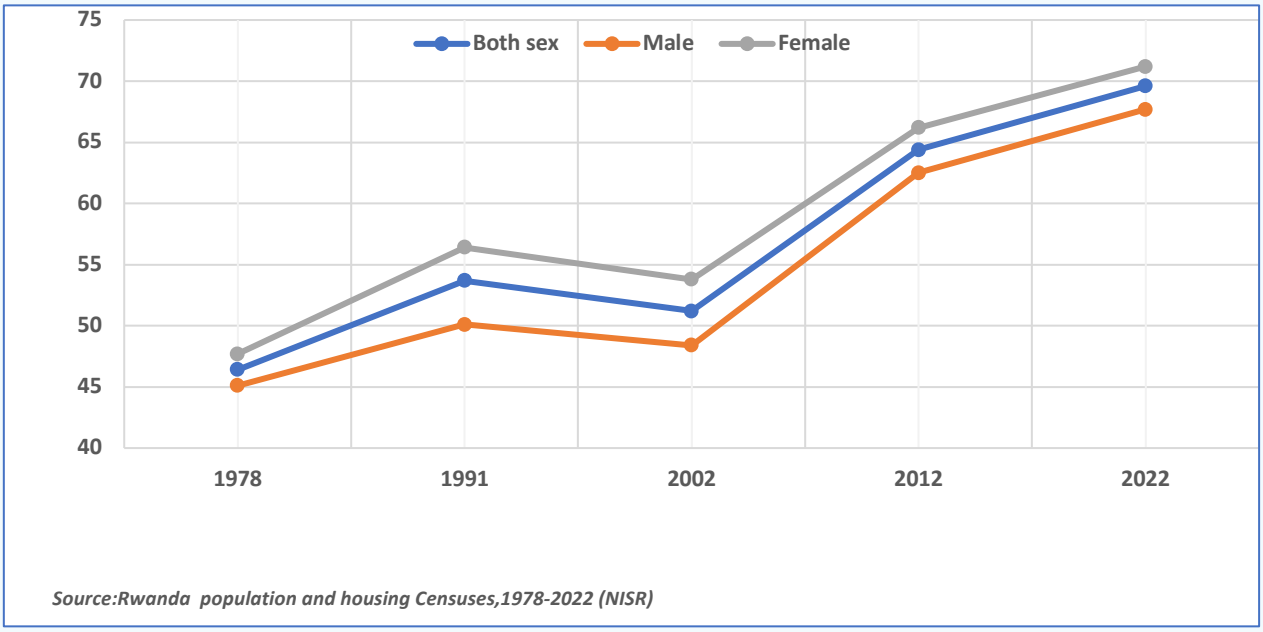
Source: Fifth Rwanda Population and Housing Census, 2022 (NISR)

7.4.5 Life Expectancy

Life expectancy is an important indicator of health and wellbeing and a critical index of development that is used to evaluate the progress of a country's human development index (Echevarria & Iza, 2006). There is therefore the need to assess the life expectancies generated from the reported mortality data and the life table parameters adopted, to confirm whether the numbers are plausible. Figure 7.13 shows the trend in life expectancy at birth over a period of 44 years (1978-2022). The life expectancy at birth increased from 46 to 54 years between 1978 and 1991. It decreased from 54 to 51 years between 1991 and 2002, and later increased to 64 years in 2012 and 69.6 years in 2022 according to the RPHC5. This trend and pattern align well with the history of Rwanda and reflects the impact of government programmes in the health sector as well as the general improvements in the socioeconomic wellbeing of the population. Figure 7.13 also shows the expected pattern of higher life expectancy at birth for females (71.2 years) relative to males (67.7 years), thereby indicating excess mortality among the former than the latter. Further, the life expectancy computed based on RPHC5 is close to the medium

scenario projection values based on the RPHC4 (68.2 years)[10] and from the UN (67.1 years)[11]. Although, assessment of mortality data in Section 7.3 indicates some evidence of underreporting of death at total population level, however, the indirect methods used appears to have yielded plausible estimates that are in tandem with current development and socio-economic reality in the country. Thus, there is strong evidence that life expectancy figures obtained from the RPHC5 are of high quality.

Figure 7. 13 Evolution of life expectancy at birth between 1978 and 2022 by sex



Source:Rwanda population and housing Censuses,1978-2022 (NISR)

[10] **As reported in the main indicator report of the Fourth Rwanda Population and Housing Census, 2014 (NISR).**

[11] **UN Population Division (2022): World Population Prospects, https://population.un.org/wpp/Download/Standard/CSV.**

CHAPTER 8: CONCLUSIONS AND LESSONS LEARNT FOR THE NEXT CENSUS

8.1. Census Operations And The Use Of Modern Technologies

A careful evaluation of the activities implemented during the pre-enumeration, enumeration, and post-enumeration phases of the RPHC5 indicates a rigorously planned and well executed processes carefully managed by the NISR to maximise the data quality both with respect to the measurement of the population's attributes and its representation within the final database. Although, during parts of the pre-enumeration phase in 2020, there were challenges regarding the restriction of movement following the outbreak of COVID-19 pandemic, nevertheless, reports obtained on the census operation indicate that the pilot census was carefully planned and well implemented to effectively test different aspects of census operations, including the questionnaire development, training of enumerators and fieldwork management processes. The lessons learnt from the pilot census were carefully used to refine the entire components of the census operation. This largely contributed to the quality of data from the census. Importantly, the use of modern technologies at different stages of the census operation, as recommended by the UN, considerably enhanced the overall quality of the RPHC5. The use of hand-held devices (mobile phones) introduced stringent quality control measures and checks during the enumeration. It also eliminated the need for daunting post-enumeration activities like data entry and coding. Further, a comparison of data imputation reports for the two most recent censuses shows that efforts required at the editing and imputation phase had greatly reduced in the 2022 Census. There is a greater improvement regarding the number of variables needing imputation as well as the magnitude of data imputation done in the RPHC5 compared to RPHC4. The use of modern technologies also greatly reduced the turnaround time for data analysis and report writing. There is good evidence that the use of modern technologies eliminated several data quality issues that may have arisen from the use of PAPI and manual data processing, thereby ensuring a high quality of the final database.

Lesson: There is a need to continue ensuring more rigorous planning and implementation of pilot census for future censuses. Despite analysing the pilot census data, some limitations were identified in the responses to some questions on economic activity. Based on the role played by enumerators as far as quality of data is concerned, it is recommended to conduct thorough trainings and a series of cognitive tests for enumerators for this end. In addition, appropriate probing techniques should also be employed during the training to ensure adequate comprehension of concepts among the enumerators.

8.2. Questionnaire Development

There was multi-sectoral collaboration in the planning and development of the questionnaire. This was done with the involvement of many relevant Government Ministries in the questionnaire planning to ensure the inclusion of relevant questions in the enumeration tools. Where possible, UN standard questions were used and were thoroughly pretested to ensure adaptation to the local context of Rwanda. During the data editing and imputation phase, however, some data quality issues were identified with regards to a few questions, such as those on economic activities and school attendance. While a high number of households needed imputation for information on school attendance, responses to some questions on economic activity are of low quality.

Ensure that the analysis is more directly connected to questionnaire design from the start and attempt to complete all processes on the pilot census to ensure the questionnaire can be fully processed efficiently and deliver the data needed for relevant indicators and thematic analysis. While future enumeration exercise should consider simplifying difficult census questions, pilot census should be used to assess the understanding of both the enumerators and respondents on complex questions and concepts.

8.3. Recruitment And Training Of Enumerators

Apparently, there were quality issues that arose from the enumerators. It is well established that census enumeration requires a huge number of enumerators who may have varying aptitude and capacity for comprehension and ability to implement activities as trained. To some extent, the enumerators introduced some errors during the enumeration such as in the questions on economic activities and school attendance, despite the use of hand-held devices.

There is need for more stringent measures at the stage of recruiting fieldworkers to ensure that enumerators with high aptitude and capacity are recruited for the census.. In future censuses, it is recommended to conduct a series of cognitive tests for the enumerators. Appropriate probing techniques should also be employed during the training to ensure adequate comprehension of concepts by the enumerators.

8.4. Post-Enumeration Survey

The UN standard approach has been adopted with respect to the planning, conduct, and analysis of the PES. This is broadly based on the model developed for the PES by the US Census Bureau. It confirms the RPHC5 has a very high net coverage of 98.7% and the gross coverage error rate is 1.78% . Given the high estimated net coverage established by the PES, it is not recommended that any adjustment to the census database be contemplated based on the PES results.

Continue to use robust post-stratification approaches to ensure the future PES continues to yield reliable estimates of net coverage.

8.5. Age-Sex Data

Evaluation of age-sex data, as recommended by the UN, shows that there are some quality issues with respect to the reporting of age, nevertheless there are considerable improvements in the quality of age data in the RPHC5 when compared to the RPHC4. There is some evidence of age heaping and preference especially for ages with terminal digits 0 and 5. This evidence is clear in the population pyramid and line graph based on single years. However, summary measures from Whipple's, and Myers' indices as well as the UN joint scores indicate comparatively some improvement and reduction in age heaping in 2022 Census compared to the 2012 Census. Overall, the issue of age heaping disappears in the population pyramid and line graph based on grouped age data, thus indicating that avoidance of an age in preference for another largely occurred within the same five-year age-group. There is therefore strong evidence that age heaping is not sufficient to negatively impact the data quality when analysing grouped age.

Continue to emphasise the importance of age-sex data during enumerator training to ensure that age reporting continues to improve in future censuses.

8.6. Fertility Data

There is strong evidence that the current births and lifetime fertility from the 2022 Census are of high quality. There is, however, some evidence of underreporting of births at the younger ages of mother, particularly ages 10-19. This is often the case for teen mothers in many censuses, nevertheless, with increasing median age at first birth in Rwanda, currently at 23 years, fertility level at younger ages is likely to be minimal. In this regard, a comparison of relevant fertility indicators for RPHC5 and other sources like the Demographic and Health Surveys (DHSs) shows a consistent pattern of fertility decline in the country. Independent fertility evaluation shows strong evidence of high quality of reporting for the current births and lifetime fertility. Thus, there would be no need for adjustment of fertility. However, evidence on the infant mortality rate as measured using the reported deaths in the fertility section indicates some underreporting of infant

mortality. ***Continue to emphasise the importance of the fertility data during enumerator training to ensure that its coverage of recent births does not decline in future censuses.***

8.7. Mortality Data

Under-reporting of death in the year before the census has been the consistent feature of the past censuses of Rwanda, as is often the case with many household-based mortality reporting in many countries. This necessitated the use of indirect techniques to derive the best attainable mortality estimates from the 2002 and 2012 Censuses. Evaluation of mortality data for the 2022 Census shows some improvement in the quality of death reporting compared to the past censuses. Nevertheless, underreporting of death persists in the 2022 Census. There is evidence of under-reporting of infant deaths and across other ages, hence, the use of indirect methods is recommended and used for estimating mortality rates.

To ensure improved reporting on mortality questions, there may be need to move the mortality section from the very end of the questionnaire to perhaps the middle of the questionnaire. Mortality is a difficult subject for enumeration due to socio-cultural reason, asking question on it towards the end of the enumeration interview when fatigue may have set in would further raise quality issues.

Strengthen the checking of the mortality data within the field by the monitors to ensure that the yes/no question has been completed.

Take advantage of the available restriction features in the electronic devices in CAPI and use proper in-built consistency checks and linkages towards ensuring that data such as recent deaths recorded in the fertility section are also reflected in the mortality section.

Consider using the local leaders as another quality check as they will likely have some knowledge of deaths that have occurred during the previous year.

Consider a specific follow-up survey, in addition to the PES, to just target the measurement of mortality. This could either be an independent check, as with the PES, or more dependent in nature with a sample of household being drawn from those enumerated by the census.

8.8. Socio-Economic Indicators

Key socio-economic variables considered for evaluation include marital status, migration, economic activity, education and life expectancy. Less comparisons are made for these subjects relative to key demographic variables like age, fertility and mortality. Evidence from the assessment done shows plausible numbers and high-quality of reporting for marital status, migration, education and life expectancy. However, as discussed earlier, data on some indicators on economic activity is of low quality.

Lesson: Ensure more thorough pilot census not only to properly pretest all questions in the census questionnaire, but also to process and analyse the pilot data and apply the lessons learnt to ensure a well-implemented census enumeration.

8.9. Concluding Remarks

All NISR teams involved in the planning and implementation of the RPHC5 are to be commended for meticulously undertaking such a dauting task with a relatively short turnaround time. Without mincing words, RPHC5 is of high quality. The overall impression is that the data quality both with respect to the measurement of the population's attributes and its representation within the final database are good. This is further supported by additional triangulation and inspection

of other key attributes in this report, as well as comprehensive analysis in the full set of thematic reports. Age-heaping is evident but minor, and the only significant weakness in the final database is with respect to the direct measurement of mortality.

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ANNEX A : CENSUS QUESTIONNAIRE

This annex provides the full questionnaire of the Census questionnaires.
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 population record, a household record and a mortality record. The questionnaire for institutional households contained only a population record.

A.1 Private households: person record

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GENERAL POPULATION AND HOUSING CENSUS
16 – 30 AUGUST 2022

***Legal Basis**: Law n° 45/2013 of 16/06/2013 on the organisation of statistical activities in Rwanda.*

CENSUS QUESTIONNAIRE (PRIVATE HOUSEHOLD)

SECTION ML: LOCALISATION AND IDENTIFICATION OF HOUSEHOLD

ML01.	PROVINCE/KIGALI CITY:	|__|
ML02.	DISTRICT:	|__|__|
ML03.	SECTOR:	|__|__|
ML04.	CELL:	|__|__|
ML05.	VILLAGE:	|__|__|
ML06.	ENUMERATION AREA (N0 EA):	|__|__|
ML07.	AREA OF RESIDENCE (1.URBAN 2.RURAL) :.....	|__|
ML08.	BUILDING NUMBER:	|__|__|__|
ML09.	HOUSEHOLD NUMBER:	|__|__|__|
ML10.	FOOT PRINT NUMBER (as it is shown on the map) :.....	|__|__|__|
ML11.	GPS COORDINATES:	Latitude: |__|__|__|__|__|__|__|__| Longitude: |__|__|__|__|__|__|__|__|
ML12.	DISTANCE:	|__|__|__|
ML13.	HOUSEHOLD TYPE: 1. Private HH 2. Institutional HH	|____|

My names is ....., I work for the National Institute of Statistics of Rwanda as the enumerator of the General Population and housing census. The objective of the general population census is to have the full enumeration of all Rwandan residents as well as their key characteristics; for the planning of the well-being of Rwandan residents. I wish to talk with the head of the household. In general, the interview will last 30 min. All provided answers will be kept confidential. I hope that you accept the interview, as your responses are very important for the country.

ML14	CONSENT:	1. Interview accepted => **P01A (Start by making a list of HH members)** 2. Interview is not done	|____|
ML15.	THE REASON OF NO INTERVIEW:	1.Uninhabited dwelling 2. Dwelling turned into business building 3.Dwelling destroyed 4.Refused 5.All residents are absents during the whole period of enumeration 6. The house is still inhabited by some members of HH	|____|

HOUSEHOLD SCHEDULE (List of household members and visitors)	
N°	**Name(s) of household members and visitors**
Serial Number	**1. Resident household members** **INSTRUCTION:** WRITE THE NAMES OF ALL RESIDENT MEMBERS WHO WERE PRESENT OR ABSENT IN THE REFERENCE CENSUS NIGHT: (15-16/08/2022) ACCORDING TO THE FOLLOWING ORDER: 1.Household head 2.Spouse 3.Household head son or daughter 4.Household adoptive child 5.Father/ Mother 6.Father-in-law/Mother-in-law 7.Brother-in-law/Sister-in-law 8.Brother/Sister 9.Grand Child 10. Son/Daughter-in-law 11.Other relative 12.House help 13.Non- relative 14.Unknown relationship to household head **2. Visitors** RECORD THE NAMES OF ALL VISITORS WHO SPENT THE CENSUS NIGHT WITHIN THE HOUSEHOLD (IF ANY). (Please remember that visitors should be recorded after recording resident members)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
17	
19	
20	

SECTION P: CHARACTERISTICS OF THE POPULATION

FOR ALL MEMBERS OF HOUSEHOLD

P01A: Serial Number of the person

P01B: Surname of the person:.....

P01C: Other names of the person.....

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

01.Household head
02.Spouse
03.Son or daughter
04.Adoptive child
05.Father/ Mother
06.Father-in-law/Mother-in-law
07.Bother-in-law/Sister-in-law
08. Brother/Sister
09. Grand Child
10. Son/Daughter-in-law
11. Other relative
12. House help
13. Non-relative
14. Unknown relationship

P03: What is [NAME]'s Sex? 1.Male 2.Female

P04: How old was [NAME] at his/her Last Birthday?
NOTE: RECORD AGE IN COMPLETED YEARS

P05A: In which month was [NAME] born?

P05B: In which year was [NAME] born?
NOTE: RECORD 9999, IF THE YEAR IS UNKNOWN

P06: What is [NAME]'s marital status?
ALL PERSONS AGED 12 YEARS AND ABOVE
1.Married to one wife/husband officially
2.Married to one wife/husband not officially
3.Live in a polygamous union
4.Divorced
5. Separated
6. Never married
7. Widowed

P07A: Is [NAME] usual resident or was a visitor on census night?
1. Usual resident
2. Visitor => GO TO THE NEXT PERSON

P07B: Did [NAME] sleep in this household on census night?
1. Yes, slept in this HH (PR)
2. No, did not sleep in this HH (AR)

SECTION S: HOUSEHOLD SUMMARY TABLE

Residence status	*Both sexes*	*Male*	*Female*
Present Resident (PR)			
Absent Resident (AR)			
Total Resident (PR+AR)			
Visitors(VIS)			
Total Enumerated			

ALL RESIDENT(P07A=1) AGED 12 YEARS AND ABOVE

P08A: How many spouses does [NAME] have? => P08C
(FOR MEN IN POLYGAMOUS UNION ONLY)
IF THE NUMBER OF SPOUSES IS 8 OR ABOVE, WRITE 8
IF THE NUMBER OF SPOUSES IS UKNOWN WRITE 9

P08B: What is the rank of [NAME] to His Husband?
(FOR FEMALE IN POLYGAMOUS UNION ONLY)
IF THE RANK IS 8 OR ABOVE, WRITE 8. IF THE RANK IS UNKOWN WRITE 9

P08C: How old was [NAME] when he/she first got married or lived together with his/her partner (AGE AT FIRST MARRIAGE)?
RESERVED FOR ALL PERSONS WHO RESPOND 1,2,3,4,5, AND 7 ON QUESTION P06 IF THE AGE AT THE FIRST MARRIAGE IS NOT KNOWN, WRITE 99

FOR RESIDENTS ONLY (P07=1)

P09A: was [NAME] born in Rwanda or abroad?
1.In Rwanda
2. Abroad =>P09C

P09B: In which District was [NAME] born? =>P10A
SELECT ONE DISTRICT FROM THE LIST OF ALL DISTRICTS

P09C: In which Country was [NAME] born?
(SELECT THE COUNTRY FROM WORLD COUNTRIES LIST)

P10A: How many years has [NAME] been living continuously in [District]?
- Record 000 if less than 1 year
- Record 888 if the residence has not changed since birth
- If the residence has not changed since birth =>P12A

P10B: Prior to come living in [district], was [NAME] residing in Rwanda or abroad
1.In Rwanda
2.Abroad =>P11B

P11A: In which District was [NAME] residing previously?
(SELECT THE DISTRICT FROM THE LIST OF ALL DISTRICTS)
=>P12A

P11B: In which Country was [NAME] residing previously?
(Select the country among the world countries List)

P12A: Is there any member of this household who does not have Rwandan Nationality?
1.Yes (Choose all non-Rwandans from the list of Household members
2.No (Make all Rwandans) => P13

P12B: What is [NAME]'s nationality?
CHOOSE THE NATIONALITY FROM WORLD COUNTRIES LIST

P13: What is [NAME's] Religious affiliation?
01.Catholic
02.ADEPR
03.Protestant
04.Adventist
05.Other Christians
06.Muslim
07. Jehovah witness
08.Traditional/Animist
09. Other religion
10. No Religion
11. Not stated
99. Do not Know

P14: What is [NAME]'s Medical insurance?
1.Mutuelle
2.RSSB (former RAMA)
3.MMI
4.Schools
5. Employer
6. Private insurance companies
7. NGOs
8. None
9. Do not know

DISABILITY: FOR RESIDENT AGED 5 YEARS AND ABOVE

P15: In this household, does any member have difficulty seeing?
1.Yes
2.None of the Household members has the difficulty =>P16

P15A: Who has difficulty seeing?
CHOOSE FROM THE LIST OF HOUSEHOLD MEMBERS

P15AA: Does [NAME] wear glasses?
1. Yes 2. No =>P15B

P15AB: Does [NAME] continue to have difficulties even when wearing glasses?
1. Yes 2. No =>P16

P15B: Would you say [NAME] has Some difficulty seeing, a lot of difficulty or cannot do at all?
0. No difficulty (To be filled by CAPI if P15AA==2 OR P15AB==2)
1.Some difficulty 2.A lot of difficulty 3.Cannot see at all

SECTION P: CHARACTERISTICS OF THE POPULATION

DISABILITY: FOR RESIDENT AGED 5 YEARS AND ABOVE

P16: In this household, does any member have difficulty hearing?
1.Yes
2.None of Household member has the difficulty **=>P17**

P16A: Who has difficulty hearing?
CHOOSE FROM THE LIST OF HOUSEHOLD MEMBERS

P16AA: Does [NAME] use hearing aid?
1. Yes 2. No **=>P16B**

P16AB: Does [NAME] continue to have hearing difficulties even if using hearing aid?
1. Yes
2. No **=>P17 (After the automatic fill in of modality "No difficulty" by CAPI on P16B)**

P16B: Would you say [NAME] has Some hearing difficulty, a lot of difficulty or cannot do at all
0. No difficulty 1.Some difficulty
2.A lot of difficulty 3.Cannot hear at all

P17: In this household, does any member have difficulty walking or Climbing steps?
1.Yes 2.None of Household member has the difficulty **=>P18**

P17A: Who has difficulty walking or climbing steps?
CHOOSE FROM THE LIST OF HOUSEHOLD MEMBERS

P17B: Would you say Some difficulty, a lot of difficulty or cannot do at all?
0. No difficulty 1.Some difficulty
2. A lot of difficulty 3. Cannot walk or climbing steps at all

P18: In this household, does any member has difficulty communicating, for example being understood by others?
1.Yes
2.None of Household member has the difficulty **=>P19**

P18A: Who has difficulty communicating, for example being understood?
CHOOSE FROM THE LIST OF HOUSEHOLD MEMBERS

P18B: Would you say Some difficulty, a lot of difficulty or Cannot do at all?
0. No difficulty 1.Some difficulty
2.A lot of difficulty 3.Cannot communicate at all

P19: In this household, does any member have difficulty remembering or concentrating?
1.Yes
2.None of Household member has the difficulty **=>P20**

P19A: Who has difficulty remembering or concentrating?
CHOOSE FROM THE LIST OF HOUSEHOLD MEMBERS

P19B: Would you say Some difficulty, a lot of difficulty or Cannot do at all?
0. No difficulty
1.Some difficulty
2.A lot of difficulty
3.Cannot remember or concentrate at all

P20: In this household, does any member have difficulty with self-care such as washing all over or dressing?
1.Yes
2.None of Household member has the difficulty **=>P21**

P20A: Who has difficulty with self-care such as washing all over or dressing?
CHOOSE FROM THE LIST OF HOUSEHOLD MEMBERS

P20E: Would you say Some difficulty, a lot of difficulty or cannot do at all
0. No difficulty
1. Some difficulty
2. A lot of difficulty
3. Cannot do at all

P21: In this household, Does any member have short stature?
1.Yes
2.None of Household member has the difficulty **=>P22**

P21A: Who has a problem of short stature?
CHOOSE FROM THE LIST OF HOUSEHOLD MEMBERS

P22: In this household, does any member have albinism?
1.Yes 2.None of Household member has the difficulty **=>P23A**

P22A: Who has a difficulty with albinism?
CHOOSE FROM THE LIST OF HOUSEHOLD MEMBERS

ALL RESIDENT AGED LESS THAN 18 YEAS OLD

P23A: Is [NAME]'s biological mother alive?
1.Yes
2.No
9.Don't know } **=>P23C**

P23B: Does [NAME]'s biological mother live in this household?
1.Yes 2.No **=> P23C**

P23BB: Who is **[NAME]'s biological mother?**
FROM THE LIST OF ALL FEMALES AGED [THE AGE OF CHILD +10] YRS OR ABOVE CHOOSE THE MOTHER

P23C: Is [NAME]'s biological father alive?
1.Yes
2.No
9.Don't know } **=>P24**

P23D: Does [NAME]'s biological father live in this household?
1.Yes 2.No **=>P24**

P23DD: Who is **[NAME]'s biological father?**
FROM THE LIST OF ALL MALES AGED [THE AGE OF CHILD +15] YRS OR ABOVE CHOOSE THE FATHER

P24: Was [NAME]'s birth registered in the Civil Registration books?
1.Yes **=> P29**
2.No
9.Don't know

QUESTION P25 IS FOR THOSE WHO HAVE 18 YEARS OLD AND ABOVE AND THOSE WITH LESS THAN 18 YEARS BUT RESPONDED 2 AND 9 IN QUESTION P24

P25: What is the type of official identification document does [NAME] have?
01.Rwandan Identity Card 09. Refugee ID
02.Foreign Identity Card 10. Rwanda Birth Certificate
03.Rwandan Passport 11. Foreign Birth Certificate
04.Foreign Passport 12. Embassy/ Consular issued Documents
05.Rwandan Nationality Certificate 13. No document
06.Foreign Nationality Certificate 14. Other (specify)
07.Refugee travel document 99. Don't know
08. Proof of registration for refugees

QUESTION P25A-P28 ARE FOR THOSE WHO ANSWERED 13 ON P25

P25A: Why does [NAME] not have any official identification document?
1. In process looking for it 4. Personal reasons
2. The request got rejected 5. Other reason(specify)
3. Under required age 9. Do not know

P26: What is the Nationality of [NAME]'s Parents?
1. Both are Rwandan
2. One is Rwandan
3. Both are non-Rwandan
9. Don't know
IF P25A=1 or 3 AND P26=1 =>P29

P27: Are [NAME]'s Parents still alive?
FOR RESIDENT AGED 18 YEAS OLD OR MORE
1. Yes Both 3. No
2. Yes, one of them 9. Don't know

SECTION P: CHARACTERISTICS OF THE POPULATION

P28: Do Parents of [NAME] have or had legal Residence in Rwanda?
1. Yes Both 3. No
2. Yes, one of them 9. Don't know

EDUCATION: ALL HOUSEHOLD RESIDENTS

P29: Has [NAME], previously attended or is currently attending school / ECD?
1.Has previously attended
2.Is currently attending
3.Has never attended =>P32

P30A: What is the highest level of education did [NAME] attend or is currently attending?
1.ECD =>P32
2.Nursery
3.Primary
4.INGOBOKA /Vocational training
5. Lower secondary 6. Upper secondary 7. Tertiary

P30B: How many years of school did [NAME] complete successfully at that level? YEARS

WRITE 99 IF THE NUMBER OF COMLETED YEAR IS UNKOWN

P31: What is the highest certificate/degree [NAME] obtained?

THE QUESTION IS ASKED IF P30A IS 3,4,5,6 ,7

1. Primary school certificate
2. Post primary certificate (CE/FM/TVET I/TVET II)
3. EMA/ENTA
4. O' level Certificate
5. A3/D4/D5
6. A2/D6/D7
7. TVET certificate III
8. TVET certificate IV
9. TVET certificate V
10. TVET advanced diploma (A1)
11. Diploma(A1): D6+2-3yrs
12. Bachelor(A0): D6+3-6yrs
13. Post Graduate Diploma
14. Masters: Bachelor+1-2yrs
15. Doctorate(PhD)
16. None 99. Do not know

QUESTIONS P32 -P36 ARE RESERVED FOR PERSONS AGED 10 YEARS OLD AND ABOVE

P32: Can [NAME] read, write and understand the following languages? MORE THAN ONE LANGUAGE IS ALLOWED READ MODALITIES STARTING BY KINYARWANDA
1. Kinyarwanda 8. Swahili
2. English 16. Other
4. French 0. None

P33: Has [NAME] ever attended or currently attending Informal adult literacy Program?
(RESERVED FOR THOSE WHO ANSWERED P29=3 OR P30A<4 AND P30B<4)
1.Yes, Still Attending
2.Yes, Completed
3.Never attended

INTERNET ACCESS

P34: Did [NAME] use internet in the last 12 months?
1. Yes
2. No =>P36A
9. Don't know =>P36A

P35: Where does [NAME] often access Internet?
1.From Home
2.From work place
3.From School/Place of Education
4.From Another Person's home
5.From Community Internet access facility
6.From cyber café/From Commercial Internet Access facility
7.Other

MOBILE PHONE OWNERSHIP

P36A: Does any member of this household own the mobile phone?
1.Yes 2. =>P37

P36B: Who own the mobile phone among members of the household? CHOOSE FROM THE LIST OF HH MEMBERS

P36C: What type of mobile phone does [NAME] have?
1.Smart phone
2.Ordinary phone with radio
3.Ordinary phone without radio

IF ONE HAS BOTH TYPE, CHOOSE SMART PHONE

EMPLOYMENT: FOR RESIDENTS AGED 16 YEARS OLD AND ABOVE

P37: During the last 7 days, did [NAME] do at least one of the following even if only for one hour?
-Work for wage or salary, commission or tips
-Work for pay in kind
-Work in own business
-Helped unpaid in a family business or a job of a family member
-Farming for pay in cash or in Kind
-Self-employed in farming/fishing/forestry mainly for market
-As paid internees
1.Yes =>P46 2. No

P38: During the last 7 days, did [NAME] have a paid job or a business from which he/she was temporarily absent and for which he/she expects to return?
1.Yes 2.No =>P42

P39: What was the main reason for which [NAME] was absent from work during the last 7 days?
1.Sick leave due to own illness or injury
2.Annual leave/ maternity leave
=>P46
3.Seasonal worker =>P42
4.Business closed due to COVID-19
5.Self or Family in Quarantine
6.Laid off because of COVID-19 while business continued
7.Not able to go to work due to COVID-19 movement restrictions
8.Other

P40: Does [NAME] continue receiving an income from his/her job during absence?
1.Yes =>P46
2.No 9. Don't know

P41: Was [NAME] planning to go to work for a period less than 3 months?
1.Yes =>P46
2. No
9.Don't know

P42: During the last four weeks did [NAME] work in farming, fishing or hunting mainly for own consumption
1.Yes
2.No

SECTION P: CHARACTERISTICS OF THE POPULATION

ONLY FOR THOSE AGED 16 YEARS AND ABOVE

P43: During the last four weeks did [NAME] look for a paid job or tried to start a profit job?
1.Yes =>P45
2.No

P44: In the last 4 weeks, did [NAME] find a profit job or was planning to start his/her own business?
1. Yes
2. No

P45: If a paid job or business opportunity become available, could [NAME] have started work during the last 7 days or within the next two weeks?
1.Yes
2.No } =>P50A

P46: What is [NAME]'s institutional sector of employment?
READ ANSWERS FOR RESPONDENT
1.Public institution/enterprise
2.Mixed public and private enterprise
3.Private in non-agriculture activities
4.Private in agriculture activities
5.VUP
6.International NGO/International organization"
7.Local NGO/Religious organization
8.Cooperative
9.Household(Domestic workers)

P47: What is the main product, service or activity of [NAME]' place of work? (Explain):
.....
P47A. ISIC

P48: What was [NAME]'s main occupation (main duty) during the last 7 days?
Main occupation:.....
Example: Teacher in primary school, Vegetable seller, House help, Taxi Driver **P48A. ISCO**

P49: In this job, is [NAME]' working as…?
(What is [NAME]'s status in employment?)
READ ANSWERS FOR RESPONDENT
1.Employee
2.Paid apprentice/Internee
3.Employer (with regular employees)
4.Own account worker (without regular employees)
5.Member of cooperative
6.Contributing family worker
7.Other

FOR RESIDENT WOMEN AGED 10 YEARS AND ABOVE

P50A: Has [NAME] ever given a live birth?
1.Yes
2.No =>Next Person

P50B_Boys: How many live boys has [NAME] ever had?

P50B_Girls: How many live girls has [NAME] ever had?

P50C_Boys: Among those boys how many are still alive?
TO BE ASKED IF P50B_BOYS>0

P50C_Girls: Among those girls how many are still alive?
TO BE ASKED IF P50B_GIRLS>0

P51A: During the 12 months prior to the census night (From 16/08/2021-15/08/2022) Did [NAME] give a live birth?
1.Yes
2.No =>Next Person

P51B_Boys: How many live boys did [NAME] have during the 12 Months prior to the census night (From 16/08/2021-15/08/202

P51B_Girls: How many live girls did [NAME] have during the 12 Months prior to the census night (From 16/08/2021-15/08/2022)?

P51C_Boys: Among those boys how many are still alive?
TO BE ASKED IF P51B_BOYS>0

P51C_Girls: Among those girls how many are still alive?
TO BE ASKED IF P51B_GIRLS>0

=>GO TO NEXT PERSON/SECTION H

A.2 Private households: household record and mortality record

SECTION H: HOUSING CHARACTERISTICS

TYPE OF HABITAT

H01: What the type of Habitat?

1.Planned rural settlement
2.Integrated Model Village
3.Old settlement
4.Unplanned clustered rural housing (Dispersed/Isolated housing)"
5.Modern planned urban area
6.Spontaneous/Squatter housing
6.Spontaneous/Squatter housing in Rural area
8.Other type of housing

TYPE OF BUILDING

H02: What is the Type of Building?

1.House occupied by one household
2.House occupied by several households
3.Storey building occupied by one household
4.Storey building occupied by many households
5.Several buildings in a compound occupied by one household
6.Several buildings in a compound occupied by several households"
7.Other

TENURE STATUS

H03: What is the tenure status of the housing Unit?

1.Owner (Even when he/she is still paying the bank loan) => H05
2.Tenant
3.Hire purchase(Having payment contract with the owner) => H05
4.Free lodging
5.Staff housing
6.Temporary camp or settlement
7.Other

H04: Is this Household has its own housing unit in this village or elsewhere?

1.Yes 2.No

MAIN MATERIAL OF THE ROOF

H05: What is the main material used for the roof?
(In case of a store building, consider the roof of the last floor)

1.Iron Sheets
2.Local tiles
3.Industrial tiles
4.Asbestos
5.Concrete
6.Cartoons/Sheeting/ all non-durable roofing materials
7.Grass
8. Other

MAIN MATERIAL OF THE WALLS

H06: What is the main material used for the exterior walls?

1.Wood with mud and cement
2.Wood with mud without cement
3.Sun dried bricks with cement
4.Sun dried bricks without cement
5. All non-durable wall materials (Cartoons/Sheathing)
6.Cement blocks
7.Concrete
8.Stones with cement
9.Stones without cement
10.Timber
11.Burnt bricks with cement
12.Burnt bricks without cement
13.Other

MAIN MATERIAL OF THE FLOOR

H07: What is the main material used for the floor?

1. Earth
2. Dung hardened
3. Concrete
4. Stones
5. Burnt bricks
6. Wooden floor
7. Ceramic/clays/Granite tiles
8. Cement
9. Other

NUMBER OF ROOMS

H08: How many rooms do the housing units have, including bathrooms, toilets, kitchen, store rooms?

NUMBER OF ROOMS FOR SLEEPING

H09: How many rooms are used for sleeping?

H10: Are Sleeping rooms for Boys separated from those for Girls?

1.Yes
2.No
3.NA

MAIN SOURCE OF WATER

H11: What is the main source of water used by your household for general purposes such as cooking and handwashing?

1.Internal pipe-born water
2.Pipe-born water in the compound
3.Pipe-born water from the neighbor HH
4.Public tap out of the compound
5.Tube Well /Borehole
6.Protected Spring/Well
7.Unprotected Spring/Well
8.Rain water
9.Tanker Truck
10.River/Lake/Pond/Stream/Irrigation Channel "
11.Lake/Stream/Pond/Surface water
12.Other

SOURCE OF DRINKING WATER

H12: What is the main source of drinking water for members of your household?

1. Internal pipe-born water
2. Pipe-born water in the compound
3. Pipe-born water from the neighbor HH
4. Public tap out of the compound
5. Tube Well /Borehole
6. Protected Spring/Well
7. Unprotected Spring/Well
8. Rain water
9. Tanker Truck
10. River/Lake/Pond/Stream/Irrigation Channel
11. Lake/Stream/Pond/Surface water
12. Mineral water
13. Other

SECTION H: HOUSING CHARACTERISTICS

TYPE OF TOILET FACILITY

H13: "What is the main type of toilet facility used by the members of the household?"

1.Flush toilet used by one Household
2.Flush toilet used by several Households
3. Pit Latrine with constructed floor slab used by one HH
4. Pit Latrine with constructed floor slab used by several HH
5.Pit Latrine without constructed floor slab used by one HH
6.Pit Latrine without constructed floor slab used by several HH
7. Bush
8. Other

MAIN SOURCE OF ENERGY FOR LIGHTING

H14: Is this HH connected to the REG grid line or to other electric lines?

1.Yes 2.No

H15: What is the main source of energy that the household uses for lighting?

01. Electricity from REG
02. Private Hydro Mini grid
03. Standalone solar system
04. Private Solar Mini Grid
05. Generator
06. Kerosene/ Paraffin lamp
07. Biogas
08. Candles
09. Firewood
10. Batteries
11. flashlight /phone flashlight
12. Rechargeable battery
13. Lantern
14. Other

ENERGY FOR COOKING

H16: "What is the main source of energy the household uses for cooking?"

01. Firewood
02. Charcoal
03. Gas
04. Electricity
05. Kerosene/Parafine
06. Biogas
07.Solar power
8. Crop waste
09. Animal dung
10. Briquette
11. Peat
12. sawdust
13. Straw/shrub/grass
14. Other(specify)
15. Do not cook **=>H19**

H17: "Is there any additional source of energy the household uses for cooking?" If Yes; which?

01. Firewood
02. Charcoal
03. Gas
04. Electricity
05. Kerosene/Parafine
06. Biogas
07.Solar power
8. Crop waste
09. Animal dung
10. Briquette
11. Peat
12. sawdust
13. Straw/shrub/grass
14. Other(specify)
15. None

ENERGY SAVING STOVE

H18: Does your HH use a cooking energy saving stove? (Do not ask if H16 and H17 responded 3,4,5,6,7)

1. Yes
2. No

MODE OF WASTE DISPOSAL

H19: "What is the main mode of household waste disposal used?"

1.Public Composit dumping
2.Household ompost dumping
3.Waste collection companies
4.Thrown in the household's fields or bushes "
5.Burnt
6. In a River/Stream/Drain/Gutter/lacs
7. Other

MODE OF SEWAGE DISPOSAL

H20: 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

HH ASSETS

H21: Does your household has the following assets in functioning Condition ? 1. Yes 2. No

1. Radio		9. Bed	
2.Television		10. Tables	
3. Refrigerator/ Freezer for HH use only		11. Sofa	
		12. Computers	
4.Gas/Electrical Cooker		13. Vehicles for household use only	
5. Washing machine		14. Motorcycles for household use only	
6.Microwave		15. Bicycles for household use only	
7. Mattress		16. Electrical/Charcoal Iron	
8. Bench/Chair			

LIVESTOCK

H22: Does your household has any big /small livestock, beehive or dog?

1.Yes 2.No **=>H23**

H22A: What type of livestock do you have?

Livestock type	SELECT
01. Local breed cows	
02. Exotic breed cows	
03. Cross breed cows	
04. Local goats	
05.Exotic goats	
06.Cross goats	
07. Local sheep	
08. Exotic sheep	
09. Local pigs	
10. Exotic pig	
11. Cross pig	
12. Rabbits	
13. Broiler chicken	
14. Layers chicken	
15. Dual purpose chicken	
16. Local chicken	
17.Duck	
18.Turkey	
19.Other poultry	
20.Camel	
21.Bees hive	
22.Dogs	
23.Others	

SECTION H: HOUSING CHARACTERISTICS

H22B: "How many (Type of livestock) do you have now and in which district are they located?"

Livestock type	Number	Location/District
01. Local breed cows		
02. Exotic breed cows		
03. Cross breed cows		
04. Local goats		
05.Exotic goats		
06.Cross goats		
07. Local sheep		
08. Exotic sheep		
09. Local pigs		
10. Exotic pig		
11. Cross pig		
12. Rabbits		
13. Broiler chicken		
14. Layers chicken		
15. Dual purpose chicken		
16. Local chicken		
17.Duck		
18.Turkey		
19.Other poultry		
20.Camel		
21.Bees hive		
22.Dogs		
23.Others		

AGRICULTURAL ACTIVITIES

H23: During the last 12 months did any member of this household grow crop?
(DO NOT INCLUDE AGRICULTURAL ACTIVITIES DONE IN KITCHEN GARDEN)

1. Yes
2. NO → H28A

H23A: Where were agricultural activities done?

1.In household owned land
2.In rented land (in cash or in kind payment or for free)
3.In both households owned land and in rented land

H24: " What types of crops did your household grow in last 12 months?

01.Maize		12. Yams& Taro	
02.Rice		13. Cooking Banana	
03.Sorghum		14. Dessert Banana	
04.Wheat		15. Banana for Beer	
05.Bean		16. Vegetables	
06.Pea		17. Tea	
07.Groundnut		18. Coffee	
08.Soybean		19. Sugarcane	
09.Cassava		20. Pyrethrum	
10.Sweet potato		21. Flowers	
11.Irish potato		22. Others, specify...	

H25: What type of vegetables that household grew in last 12 months? Ask this question if on question H24 vegetables is in selected crops"

ASK THIS QUESTION IF H24=16

01.Amaranths		13.Garlic	
02.Tomato		14.Lettuce	
03.Cabbage		15.Broccoli	
04.Onion		16.Spinach	
05.Carrot		17.Celery	
06.Eggplant		18.Leeks	
07.Black eggplant		19.Pumpkin	
08.Sweet pepper		20.Cocumber	
09.Pepper		21.Mushroom	
10.Cauliflower		22.Chayote	
11.French beans		23. Cassava Leaves	
12.beetroot		24.Other vegetables	

H26: "How many tea trees does your households has? Ask this question if on question H24 tea tree is in selected crops

H27: How many coffee trees does your households has? Ask this question if on question H24 Coffee tree is in selected crops

H28A: Does your household has any fruit tree?
1.Yes 2.No => Go to Section M

H28B: What Type and How many (fruit trees) does your household grow?

	28BA: Type	28BB: How many trees do you have?
1.Avocado		
2.Orange		
3.Papaya		
4.Guava		
5.Lemon		
6.Mango		
7.Mandarin		
8.Jack fruits		
9.Beefheart		
10.Passion fruits		
11.Pineapple		
12.Tree tomato		
13.Watermelon		
14.Strawberry		
15.Other fruit		

SECTION M: MORTALITY

M1: Is there any member of the household who died 12 months prior to the census night (16/08/2021-15/08/2022)?
1.Yes 2.No => End of the interview

If there was a death in the HH during the 12 months prior to the census night ,Write their Names and ask the following questions

S/N	M2: Names Write the names of those who died during the last 12 months	M3: SEX 1.Male 2.Female	M4: AGE at Death How old was [NAME] when (he/she) died? IF THE AGE IS 1 YEAR OR ABOVE => M5 (Record 000 if less than 1 year)	M4A:Age at death for infants How many months or days [NAME] had before dying? RECORD THE ANSWER IN MONTHS IF THE AGE WAS FROM 1 TO 11 MONTHS. RECORD THE ANSWER IN DAYS IF THE AGE WAS FROM 0 TO 29 DAYS	M5: Place of death where the death for the [NAME] took place? 1. At community 2. At health facilities	M6: Manner of Death "What is the manner of death of [NAME]? 1.Natural cause/disease 2.Accident 3.Suicide 4. Homicide 9. Don't know IF THE ANSWER IS 2-9 =>Next Person End if no other died person	If the Deceased Person was a female aged 10-49 years, we ask the following questions:		
							M7: "Did [NAME] death occur while Pregnant? 1.Yes => Next Person 2.No	M8: "Did the death Occur during the childbirth? 1.Yes =>Next Person 2.No	M9: "Did the death occur during the 6 weeks' period following the termination of pregnancy? 1: Yes =>Next Person 2: No=>Next Person =>Next Person End if no other died person
1	.....			1:days 2:months					
2	.....			1:days 2:months					
3	.....			1:days 2:months					

A.3 Institutional households: person record

SECTION P: CHARACTERISTICS OF THE POPULATION

FOR ALL RESIDENT IN THE INSTITUTIONAL HOUSEHOLD

P01A: Serial Number of the person

P01B : Surname of the person: .....

P01C: Other names of the Person: .....

P03 : What is [NAME]'s Sex? 1.Male 2.Female

P04: How old was [NAME] at his/her Last Birthday?
Note: Record age in completed years

P05A: In which month [NAME] was born?

P05B: In which year [NAME] was born?
Note: RECORD 9999, IF THE YEAR IS UNKNOWN

P06 What is [NAME]'s marital status?
ALL RESIDENTS AGED 12 YEARS AND ABOVE

1.Married to one wife/husband officially
2.Married to one wife/husband not officially
3.Live in a polygamous union
4.Divorced
5.Separeted
6.Never married
7.Widowed

P07A Is [NAME] usual resident or was a visitor on census night?
1.Usual resident
2. Visitor => GO TO NEXT PERSON

P07B: Did [NAME] sleep in this household on census night?
1. Yes, slept in this HH (PR)
2. No, did not slip in this HH (AR)

P09A: Was [NAME] born in Rwanda or Abroad?
1. Rwanda
2. Abroad =>P09C

P09B: In which District [NAME] was born? => P10A
(SELECT ONE DISTRICT FROM THE LIST OF ALL DISTRICT)

P09C: In which Country [NAME] was born?
(SELECT ONE COUNTRY FROM WORLD COUNTRIES LIST)

P10A: How many years has [NAME] been living continuously in [District]?
- RECORD 0 IF LESS THAN 1 YEAR
- RECORD 888 IF THE RESIDENCE HAS NOT CHANGED SINCE BIRTH
- IF THE RESIDENCE HAS NOT CHANGED SINCE BIRTH
=>P12B

P10B: Prior to come living in [district], was [NAME] residing in Rwanda or abroad?
1.Rwanda
2.Foreign Country =>P11B

P11A: In which District [NAME] was residing prior to come living Here? =>P12B
(SELECT THE DISTRICT FROM THE LIST)

P11B: In which Country [NAME] was residing previously?
(SELECT ONE COUNTRY FROM OF WORLD COUNTRIES LIST)

DISABILITY: FOR RESIDENT AGED 5 YEARS AND ABOVE

P12B: What is [NAME's] Nationality ?
CHOOSE THE NATIONALITY FROM WORLD COUNTRIES LIST

P13 What is [NAME's] Religious affiliation?

01.Catholic
02.Protestant /Pentecost
03. Adventist
04. Other Christians
05.Muslim
06. Jehovah witness
07. Traditional/Animist
08. Other religion
09. No Religion
10. Not stated
99.Do not know

P14: What is [NAME]'s Medical insurance?

1.Mutuelle 5. Employer
2.RSSB (Ex: RAMA) 6. Private insurance companies
3.MMI 7. NGOs
4.Schools 8. None
9. Do not know

DISABILITY: FOR RESIDENT AGED 5 YEARS AND ABOVE

P15A: Does [NAME] have difficulty seeing?
1.Yes
2. No => P16A

P15AA: Does [NAME] wear glasses?
1.Yes
2. No => P15B

P15AB: Does [NAME] continue to have difficulties even when wearing glasses?
1.Yes
2. No => P16A

P15B: Would you say [NAME] has some difficulty seeing, a lot of difficulty or cannot do at all?
0. No, no difficulty 1.Yes some difficulty
2.Yes – a lot of difficulty 3.Cannot see at all

P16A: Does [NAME] have difficulty hearing ?
1.Yes
2. No => P17A

P16AA: Does [NAME] use hearing aid?
1.Yes
2. No => P16B

P16AB: Does [NAME] continue to have hearing difficulties even if using hearing aid?
1. Yes
2. No => P17A

P16B: Would you say [NAME] has some hearing difficulty, a lot of difficulty or Cannot do at all?

0. No, No difficulty 1.Yes some difficulty
2.Yes – a lot of difficulty 3.Cannot hear at all

EDUCATION: ALL HOUSEHOLD RESIDENTS

SECTION P: CHARACTERISTICS OF THE POPULATION

P17A: Does [NAME] have difficulty walking or climbing steps?

1.Yes
2. No => P18A

P17B: Would you say some difficulty, a lot of difficulty or cannot do at all?

0. No, No difficulty 1.Yes – some difficulty
2.Yes – a lot of difficulty 3.Cannot walk or climb steps at all

P18A: Using his/her usual (customary) language, does [NAME] have difficulty communicating, for example being understood?

1.Yes
2. No => P19A

P18B: Would you say some difficulty, a lot of difficulty or Cannot do at all?

0. No, No difficulty 1.Yes – some difficulty
2.Yes – a lot of difficulty 3.Cannot communicate at all

P19A: Does [NAME] has difficulty remembering or concentrating?

1.Yes
2.No => P20A

P19B: Would you say some difficulty, a lot of difficulty or Cannot do at all?

0. No difficulty 1.Yes – some difficulty
2.Yes – a lot of difficulty 3.Cannot do at all

P20A: Does [NAME] have difficulty with self-care such as washing all over or dressing?

1.Yes
2. No => P21A

P20B: Would you say some difficulty, a lot of difficulty or Cannot do at all?

0. No, no difficulty
1.Yes – some difficulty
2.Yes – a lot of difficulty
3.Cannot do at all

P21A: Does [NAME] have a short stature?

1.Yes
2.No

P22A: Does [NAME] have a problem with albinism?

1.Yes
2.No

P29: Has [NAME] ever attended or is currently attending school /ECD?

1.Has ever attended
2.Is currently attending
3.Has never attended =>P32

EDUCATION: ALL HOUSEHOLD RESIDENTS

P30A: What is the highest level of education did [NAME] attend or is currently attending?

1.ECD =>P32
2.Nursery
3.Primary
4.INGOBOKA /Vocational training
5. Lower secondary
6. Upper secondary
7. Tertiary

P30B: How many years of school did [NAME] complete successfully at that level?

WRITTE 99 IF THE NUMBER OF COMPLETED YEARS IS UNKNOWN

P31: What is the highest certificate/degree [NAME] obtained?

1. Primary school certificate
2. Post primary certificate (CE/FM/TVET I/TVET II
3. EMA/ENTA
4. O'level Certificate
5. A3/D4/D5
6. A2/D6/D7
7. TVET certificate III
8. TVET certificate IV
9. TVET certificate V
10. TVET advanced diploma (A1)
11. Diploma(A1): D6+2-3yrs
12. Bachelor(A0): D6+3-6yrs
13. Post Graduate Diploma
14. Masters: Bachelor+1-2yrs
15. Doctorate (PhD)
16. None 99. Do not know

QUESTIONS (P32-P36C) ARE RESERVED FOR PERSONS AGED 10 YEARS OLD AND ABOVE

P32: Can [NAME] read, write and understand the following languages?

MORE THAN ONE LANGUAGE IS ALLOWED READ MODALITIES STARTING BY KINYARWANDA

1. Kinyarwanda
2. English
4. French
8. Swahili
16. Other
0. None

P33: Has [NAME] ever attended or currently attending Informal adult literacy Program?

(RESERVED FOR THOSE WHO ANSWERED P29=3 OR P30A<4 AND P30B<4)

1.Yes, Still Attending
2.Yes, Completed
3.Never attended

FOR RESIDENT WOMEN AGED 10 YEARS AND ABOVE

SECTION P: CHARACTERISTICS OF THE POPULATION

P34: Did [NAME] use internet in the last 12 months?
NOT TO BE ASKED FOR PRISONS

1.Yes
2.No **=>P36A**
9. Do not know**=>P36A**

P35: Where does [NAME] often access Internet?
1.From Home
2.From work place
3.From School/Place of Education
4.From Another Person's home
5.From Community Internet access facility
6.From cyber café/From Commercial Internet Access facility
7.Other

P36A: Does [NAME] own a mobile phone?
1. Yes
2. No **=> P50A IF SHE IS A FEMALE AGED 10YEARS AND ABOVE. OTHERWISE GO TO NEXT PERSON**
NOT TO BE ASKED FOR PRISONS

P36 C: What type of mobile phone does [NAME] have?

1.Smart phone
2.Ordinary phone with radio
3.Ordinary phone without radio

IF ONE OWNS BOTH TYPES CHOOSE SMART PHONE

NOT APPLICABLE FOR RELIGIOUS ORGANISATIONS

P50A: Has [NAME] ever given a live birth?

1.Yes
2.No **=> Next Person**

P50B_Boys: How many live boys has [NAME] ever had?

P50B_Girls: How many live girls has [NAME] ever had?

P50C_Boys: Among those boys how many are still alive?
TO BE ASKED IF P50B_BOYS>0

P50C_Girls: Among those girls how many are still alive?
TO BE ASKED IF P50B_GIRLS>0

P51A: During the 12 months prior to the census night (From 16/08/2021- 15/08/2022) Did [NAME] give a live birth?

1.Yes
2.No **=> Next Person**

P51B_Boys: How many live boys did [NAME] have during the 12 Months prior to the census night (From 16/08/2021-15/08/2022)?

P51B_Girls: How many live girls did [NAME] have during the 12 Months prior to the census night (From 16/08/2021-15/08/2022)?

P51C_Boys: Among those boys how many are still alive?
TO BE ASKED IF P51B_BOYS>0

P51C_Girls: Among those girls how many are still alive?
TO BE ASKED IF P51B_GIRLS>0
=> GO TO NEXT PERSON

Annex B: RPHC5 edit specifications (version December 2022)

General procedure:

1. Identifier must be unique
2. There must be at least one person in the household
3. There must be one household record for every household
4. Institutional household should not have Housing Record and death record
5. Range checks on all variables in all records
6. Universe checks on all variables in all records
7. Consistency checks pop
8. Consistency checks death
9. Consistency checks housing

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
QUESTIONNAIRE LEVEL				
Various	Households Reported as Not interviewed	QUEST-01: Delete the Not interviewed cases.	Delete the Not interviewed Households	
Various	Empty Line in Records without Line Number	QUEST-02: if no Line Number ,delete that line.	if no Line Number, delete that line	
Various	Household status is not completed	QUEST-03:Delete all the data when the household status is not completed	Delete all the data when the household status is not completed	
Various	Set empty household as not visited	HH-01: Household with no household member	Impute with NHSTATUS = 6	TotHH
POPULATION RECORD				
P02	Head must be at least 12 years	POP_REC-01: HH head has less than 12 years.	Make the eldest the head.	TotPrivatePop
P02	Households without household head	POP_REC-03: No household head.	Keep the eldest as head. P02 = 1	TotPrivateHH
P02	More than one household head.	POP_REC-05: More than one hh head.	Keep the eldest head and impute others head with P02 = 11	TotPrivateHH
P02	The head of household is not a resident.	POP_REC-07: The head is not a resident.	Make the resident spouse as head. P02 = 1	TotPrivateHH
P02	Head is listed as Father but child is not the head's son	P02-01: Head is listed as Father but child is not the head's son.	Impute P02=3	TotPrivatePop
P02	Head is listed as Mother but child is not the head's son.	P02-02: Head is listed as Mother but child is not the head's son.	Impute P02=3	TotPrivatePop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P02	Age of spouse is less than 12 years. Relationship inconsistent with the marital status.	P02-03: Age of spouse is less than 12 years. Relationship inconsistent with the marital status.	Impute P02=11	TotPrivatePop
P02	More than one spouse for The Female head	P02-04: More than one spouse for The Female head .	Keep first spouse impute Others P02=11	TotPrivatePop
P02	More than one spouse and the head or none of the spouse is in polygamous union.	P02-05: more than one spouse and the head or none of the spouse is in polygamous union.	Keep first spouse ,impute Others P02=11	TotPrivatePop
P02	More than 2 parents in law of a Female head	P02-06: More than 2 parents in law of a Female head.	keep first Parent in law and Impute P02 = 11 for others	TotPrivatePop
P02	More than 2 parents of head.	P02-07: More than 2 parents of head.	keep the first reported Parent and for others P02=11	TotPrivatePop
P03	Male having fertility data.	P03-02: Male having fertility data.	Impute P03 = 2	TotPrivatePop
P03	Head and Spouse have same sex.	P03-03: Head and Spouse have same sex.	Impute with opposite sex	TotPrivatePop
P04	HH head is less than 12 years and no member greater than 12 years.	P04-04: HH head is less than 12 years and no member greater than 12 years.	Increase the head's age	TotPrivatePop
P04	Age of child must be 15 years less than age of Head.	P04-05: Age of child must be 15 years less than age of Head.	Increase head's age	TotPrivatePop
P04	Age of father in law must be greater than 30 years	P04-06: Age of Father in law must be > 30 years than age of Head.	Increase father in law age	TotPrivatePop
P04	Age of mother in law must be greater than 24 years of age head	P04-07: Age of Mother in law must be > 24 years than age of Head.	Increase mother in law age	TotPrivatePop
P04	Age of household head should be greater than 24 years age of grand child	P04-08: Age of grand child must be 24 years less than age of Head.	Increase age of Head	TotPrivatePop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P04	Age of parents must be 12/15years aolder than the head	P04-09: Age of parent's must be 12/15 years Older than head's age.	Increase Parent's age	TotPrivatePop
P04	Age of spouse must be > 12 years	P04-10: Age of spouse is less than 12 years.	Impute P04=21 (legal marriage age)	TotPrivatePop
P05A	Invalid month of birth.	P05A-01: Invalid month of birth.	Impute P05A = 99	TotPrivatePop
P05A	Unknow year of birth but know month of birth.	P05A-02: Unknow year of birth but know month of birth.	Impute P05A = 99	TotPrivatePop
P05B	Invalid year of birth.	P05B-01: Invalid year of birth.	Impute P05B = 9999	TotPrivatePop
P05B	Year of birth is 2022 and Month > 9(Month of Data collection).	P05B-02: Year of birth is 2022 and Month > 9(Month of Data collection).	Impute P05B = 2021	TotPrivatePop
P06	Spouse/head with spouse must be married.	P06-01: spouse/head with spouse must be married.	Impute P06 = notappl	TotPrivatePop
P06	The head and spouse must have the same marital status	P06-02: The head and spouse must have the same marital status.	Impute P06 = notappl	TotPrivatePop
P06	Age less than 12 years and responded marital status	P06-03: less than 12 years and responded marital status.	Impute P06 = notappl	TotPrivatePop
P06	age < 18 years and officially married	P06-04: age below 18 years and officially married.	Impute P06 = 2	TotPrivatePop
P06	Head marital status when his spouse is aged below 18 years and officially married	P06-05: Correct the head marital status when his spouse is aged below 18 years and officially married.	Impute P06 = 2	TotPrivatePop
P06	Boys below 17 years and live in polygamous union	P06-06: Boys between 12 and 17 years and live in polygamous union. Enumerators errors.	Impute P06 = 6	TotPrivatePop
P06	Divorced below age 21 years	P06-07: Divorced below age 21 years.	Impute P06 = 5 (separated)	TotPrivatePop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P06	Aged >12 years and no marital status(in private household)	P06-08: Missing P06 in private households.	Impute P06 with the most coherent value	TotPop
P06	Aged >12 years and no marital status(in institutions.)	P06-09: Missing P06 in institutions.	Impute P06=6 (The highest group)	TotPop
P07A	Incorrect residence status but there is a data in P09A and P13.	P07-01: Incorrect residence status but there is a data in P09A and P13.	Impute P07A = 1	TotPop
P07A	Correct empty P07A and there is no data.	P07-02: Correct empty P07A and there is no data.	Impute P07A = 2	TotPop
P07A	Incorrect residence status but there is no data in P09A and P13.	P07-03: Incorrect residence status but there is no data in P09A and P13.	Impute P07A = 2	TotPop
P07A	Make the head a usual resident	P07-05: If Head is visitor and some HH members are usual residents.	Impute P07A = 1	TotPop
P07B	Missing P07B.	P07B-01: Missing P07B.	Impute with the value of the highest group	TotPop
P08A	Invalid P08A.	P08A-01: Invalid P08A.	Impute P08A = missing.	TotPrivatePop
P08A	Not a man ,in polygamous union.	P08A-02: Not a man in polygamous union.	Impute P08A = notappl	TotPrivatePop
P08B	Invalid P08B.	P08B-01: Invalid P08B.	Impute P08B = missing	TotPrivatePop
P08B	Not a woman in polygamous union.	P08B-02: Not a woman in polygamous union.	Impute P08B = notappl	TotPrivatePop
P08C	Spouse must have a valid date of marriage.	P08C-01: Spouse must have a valid date of marriage.	Impute P08C = missing	TotPrivatePop
P08C	Age at first marriage cannot be greater than current age.	P08C-02: Age at first marriage cannot be greater than current age.	Impute P08C = P04	TotPrivatePop
P09A	Missing P09A and P09B have data	P09A-01: Missing P09A and P09B have data.	Impute P09A = 1	TotPrivatePop
P09A	Missing P09A and P09C have data.	P09A-02: Missing P09A and P09C have data.	Impute P09A = 2	TotPrivatePop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P09A	Missing P09A and no data in P09B & P09C.	P09A-03: Missing P09A and no data in P09B & P09C.	Impute P09A = 1	TotPrivatePop
P09A	Responded Rwandan on p09a and not responded p09b=district and P09C have data.	P09A-04: Responded Rwandan on p09a and not responded p09b=district and P09C have data.	Impute P09A = 2	TotPrivatePop
P09A	Responded abroad on p09a and have data on p09b=district.	P09A-05: Responded abroad on p09a and have data on p09b=district.	Impute P09A = 2	TotPrivatePop
P09B	Born abroad	P09B-01: Born abroad.	Impute P09B = notappl	TotPop
P09B	If the person never moved. P09B = current district	P09B-02: Invalid district code.	Impute P09B = current district	TotPop
P09B	The person moved. P09B = previous district	P09B-03: Invalid district code.	Impute P09B = missing	TotPop
P09C	Invalid country code.	P09C-02: Invalid country code.	Impute P09C = missing	TotPop
P10A	He/she responded to p10a(p10a!=888) and did not respond to p10b	P10A-01: Correct P10A = 888	Impute P10A= 888	TotPop
P10A	if P10A > P04.	P10A-02: if P10A > P04.	Impute P10A = P04	TotPop
P10A	Out of range of P10A.	P10A-03: Out of range of P10A.	Impute P10A=missing	TotPop
P10B	Missing P10B and P11A have data.	P10B-01: Missing P10B and P11A have data.	Impute P10B = 1	TotPop
P10B	Missing P10B and P11B have data.	P10B-02: Missing P10B and P11B have data.	Impute P10B = 2	TotPop
P10B	Missing P10B and no data in P11A & P11B.	P10B-03: Missing P10B and no data in P11A & P11B.	Impute P10B = 1	TotPop
P10B	Responded Rwandan on P10B and not responded P11A=district and P11B have data	P10B-04: Responded Rwandan on P10B and not responded P11A=district and P11B have data	Impute P10B = 2	TotPop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P10B	Responded abroad on P10B and have data on P11A=district.	P10B-05: Responded abroad on P10B and have data on P11A=district.	Impute P10B = 2	TotPop
P11A	prior residence abroad.	P11A-01: prior residence abroad.	Impute P11A = notappl	TotPop
P11A	The person moved. P11A = previous district	P11A-03: Invalid district code.	Impute P11A = current district.	TotPop
P11B	Invalid country code.	P11B-01: Invalid country code. impute P11B = missing.	Impute P11B = missing.	TotPop
P12B	Invalid nationality	P12B-01: Invalid nationality.	If P12A=1, Impute P12B = first valid nationality else P12B=A028	TotPop
P13	Missing religion.	P13-01: Missing religion.	Impute P13 with the first valid religion in the HH	TotPop
P13	Religious professionals without religion.	P13-03: Religious professionals without religion.	Impute P13=11	TotPop
P14	Missing medical insurance.	P14-01: Missing medical insurance.	Impute P14 with the first valid medical insurance in the HH	TotPop
P15B	Responded that he wears glasses on p15aa and don't have any difficult when	P15-01: Responded that he wears glasses on p15aa and don't have any difficult when wearing glasses but responded 2 or 3 on p15b	Impute P15B= 0	TotPop
	hearing glasses but responded 2 or 3 on p15b			
P15B	Responded to p15b but did not respond to any other question of disability	P15-02: missing P15B	Impute P15B=missing	TotPop
P16B	Responded that he wears glasses on P16aa and don't have any difficult when	P16-01: responded that he wears glasses on P16aa and don't have any difficult when wearing glasses but responded 2 or 3 on P16b	Impute P16B= 0	TotPop
	hearing glasses but responded 2 or 3 on P16b			
P16B	Responded to P16b but did not respond	P16-02: missing P16B	Impute P16B= missing	TotPop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
	to any other question of disability			
P17B	Responded that none with walking disability on P17b.	P17-01: responded that none with walking disability on P17b.	Impute P17B=0	TotPop
P17B	Responded to P17b but did not respond to any other question of disability	P17-02: missing P17B.	Impute P17B =missing	TotPop
P18B	Responded that none with communication disability on P18b.	P18-01: responded that none with communication disability on P18b.	Impute P18B=0	TotPop
P18B	Responded to P18b but did not respond to any other question of disability	P18-02: missing P18B.	Impute P18B =missing	TotPop
P19B	Responded that none with remembering disability on P19b.	P19-01: responded that none with remembering disability on P19b.	Impute P19B=0	TotPop
P19B	Responded to P19b but did not respond to any other question of disability	P19-02: missing P19B.	Impute P19B =missing	TotPop
P20B	Responded that none with selfcare disability on P20b.	P20-01: responded that none with selfcare disability on P20b.	Impute P20B=0	TotPop
P20B	Responded to P20b but did not respond to any other question of disability	P20-02: missing P20B.	Impute P20B =missing	TotPop
P21B	Responded that none with Short stature disability on P21b.	P21-01: responded that none with Short stature disability on P21b.	Impute P21B=0	TotPop
P21B	Responded to P21b but did not respond to any other question of disability	P21-02: missing P21B.	Impute P21B =missing	TotPop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P22B	Responded that none with Albinism disability on P22b.	P22-01: responded that none with Albinism disability on P22b.	Impute P22B=0	TotPop
P22B	Responded to P22b but did not respond to any other question of disability	P22-02: missing P22B.	Impute P22B =missing	TotPop
P23A	Missing P23A. But some data in P23BB.	P23A-01: Missing P23A. But some data in P23BB.	Impute P23A = 1	TotPrivatePop
P23A	Missing P23A and no data in P23BB.	P23A-02: Missing P23A and no data in P23BB.	Impute P23A = missing	TotPrivatePop
P23A	P23A is inconsistent with P23BB.	P23A-03: P23A is inconsistent with P23BB.	Impute P23A = 1	TotPrivatePop
P23B	Missing P23B. But some data in P23BB	P23B-01: Missing P23B. But some data in P23BB.	Impute P23B = 1	TotPrivatePop
P23B	Missing P23B and no data in P23BB.	P23B-02: Missing P23B and no data in P23BB.	Impute P23B = missing	TotPrivatePop
P23B	P23B is inconsistent with P23BB.	P23B-03: P23B is inconsistent with P23BB.	Impute P23B = 1	TotPrivatePop
P23BB	Sex on mother must be female.	P23BB-01: Sex on mother is not female.	Impute P23BB = missing	TotPrivatePop
P23BB	Invalid mother's line.	P23BB-05: Invalid mother's line.	Impute P23BB = missing	TotPrivatePop
P23C	Missing P23C. But some data in P23DD.	P23C-01: Missing P23C. But some data in P23DD.	Impute P23C = 1	TotPrivatePop
P23C	Missing P23C and no data in P23DD.	P23C-02: Missing P23C and no data in P23DD.	Impute P23C = missing	TotPrivatePop
P23C	P23C is inconsistent with P23DD.	P23C-03: P23C is inconsistent with P23DD.	Impute P23C = 1	TotPrivatePop
P23D	Missing P23D. But some data in P23DD.	P23D-01: Missing P23D. But some data in P23DD.	Impute P23D = 1	TotPrivatePop
P23D	Missing P23D and no data in P23DD.	P23D-02: Missing P23D and no data in P23DD.	Impute P23D = missing	TotPrivatePop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P23D	P23D is inconsistent with P23DD	P23D-03: P23D is inconsistent with P23DD.	Impute P23D = 1	TotPrivatePop
P23DD	Sex of the father must be male.	P23DD-01: Sex of the father is not male.	Impute P23DD = missing	TotPrivatePop
P23DD	Invalid father's line.	P23DD-05: Invalid father's line.	Impute P23DD = missing	TotPrivatePop
P24	Did not respond to p24 yet he should	P24-01: Missing P24.	Impute P24=1	TotPrivatePop
P25	Invalid P25.	P25-01: Invalid P25.	Impute P25=missing	TotPrivatePop
P25A	S/he reported to have official document on P25 and yet stated the reason for not having a document on P25A.	P25-01: S/he reported to have official document on P25 and yet stated the reason for not having a document on P25A.	Impute P25A=notappl	TotPop
P26	Answered P25 <> 13 and P26 is not missing.	P26-01: Answered P25 <> 13 and P26 is not missing.	Impute P26=notappl	TotPop
P26	S/he reported to have official document on P25 and yet stated the reason for not having a document on P26.	P26-02: S/he reported to have official document on P25 and yet stated the reason for not having a document on P26.	Impute P26=missing	TotPop
P27	S/he reported to NOT have official document (P25=13) and P27 is not stated.	P27-01: S/he reported to NOT have official document (P25=13) and P27 is not stated.	Impute P27=missing	TotPop
P28	S/he reported to have official document on P25 and yet stated the reason for not having a document on P28.	S/he reported to have official document on P25 and yet stated the reason for not having a document on P28.	Impute P28=missing	TotPop
P29	Data collection error on the school attendance.	P29-01: Data collection error on the school attendance.	Impute P29=2	TotPop
P29	He/She is 0:1 years old and previously attended school.	P29-02: He/She is 0:1 years old and	Impute P29=2	TotPop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
		previously attended school.		
P29	Invalid P29, P30A,P30B,P31, and P32 are valid.	P29-03: invalid P29, P30A,P30B,P31, and P32 are valid.	Impute P29=3	TotPop
P29	He/She is 0:6 years old and he/she in ECD and P29=missing.	P29-04: He/She is 0:6 years old and he/she in ECD and P29=missing.	Impute P29=1	TotPop
P29	He/She is 7:122 years old and he/she in ECD.	P29-05: He/She is 7:122 years old and he/she in ECD.	Impute P29=1	TotPop
P29	He/She is 2:7 years old and he/she in Nursery.	P29-06: He/She is 2:7 years old and he/she in Nursery.	Impute P29=2	TotPop
P29	He/She is 6:11 years old and he/she in Primary.	P29-07: He/She is 6:11 years old and he/she in Primary.	Impute P29=1	TotPop
P29	He/She is 6:11 years old and he/she in Primary.	P29-08: He/She is 6:11 years old and he/she in Primary.	Impute P29=2	TotPop
P29	He/She is >=12 years old and he/she in Primary.	P29-09: He/She is >=12 years old and he/she in Primary.	Impute P29=1	TotPop
P29	He/She is (12) 0:16 years old and he/she in (INGOBOKA /Vocational training)	P29-10: He/She is (12) 0:16 years old and he/she in (INGOBOKA /Vocational training).	Impute P29=2	TotPop
P29	He/She is >16 years old and he/she in (INGOBOKA /Vocational training).	P29-11: He/She is >16 years old and he/she in (INGOBOKA /Vocational training).	Impute P29=1	TotPop
P29	He/She is (12) 0:14 years old and he/she in (Lower secondary).	P29-12: He/She is (12) 0:14 years old and he/she in (Lower secondary).	Impute P29=2	TotPop
P29	He/She is >16 years old and he/she in (Lower secondary).	P29-13: He/She is >16 years old and he/she in (Lower secondary).	Impute P29=1	TotPop
P29	He/She is (15) 0:17 years old and he/she in (Upper secondary).	P29-14: He/She is (15) 0:17 years old and he/she in (Upper secondary).	Impute P29=2	TotPop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P29	He/She is >17 years old and he/she in (Upper secondary).	P29-15: He/She is >17 years old and he/she in (Upper secondary).	Impute P29=1	TotPop
P29	He/She is >= 18 years old and he/she in (Tertiary).	P29-16: He/She is >= 18 years old and he/she in (Tertiary).	Impute P29=2	TotPop
P29	He/She is >= 12 years old and he/she in (Tertiary).	P29-17: He/She is >= 12 years old and he/she in (Tertiary).	Impute P29=3	TotPop
P29	Data collection error on the school attendance.	P29-18: Data collection error on the school attendance.	Impute P29=missing	TotPop
P30A	P29 = 2 and Invalid combination between the level of education and the age.	P30A-01: P29 = 2 and Invalid combination between the level of education and the age.	Impute the P30A with hotdeck P30A_Age.	TotPop
P30A	P29 = 1 & Invalid combination between the level of education and the age.	P30A-02: P29 = 1 & Invalid combination between the level of education and the age.	Impute the P30A with hotdeck P30A_Age.	TotPop
P30A	Invalid combination between the level of education and the age.	P30A-03: Invalid combination between the level of education and the age.	Impute the P30A =3.	TotPop
P30B	Invalid combination between the level of education, the number of years completed and the age.	P30B-01: Invalid combination between the level of education, the number of years completed and the age.	Impute the P30A with hotdeck P30B_Age_Sex.	TotPop
P31	Invalid combination.	P31-01: Invalid combination.	Impute the P31 with hotdeck P31_lev_Years.	TotPop
P31	Invalid combination and nothing in the hotdeck.	P31-02: Invalid combination and nothing in the hotdeck.	Impute the P31 = missing	TotPop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P31	The PhD holder cannot be a domestic worker.	P31-03: The PhD holder cannot be a domestic worker.	Impute P31 = none	TotPop
P31	The certificate is not matching with some occupation.	P31-05: The certificate is not matching with some occupation.	Impute P31 = missing	TotPop
P32A	He has a degree on p31 and did not read, write and understand any language on p32a.	P32A-02: He has a degree on p31 and did not read, write and understand any language on p32a.	Impute P32A = A	TotPop
P32A	Does not read, write and understand any language and responded to have professional jobs that requires literacy in some languages, if P12BB=28.	P32A-04: Does not read, write and understand any language and responded to have professional jobs that requires literacy in some languages, if P12BB=28.	Impute P32A=Kinyarwanda (A)	TotPop
P32A	Does not read, write and understand any language and responded to have professional jobs that requires literacy in some languages, if P12BB<>28	P32A-05: Does not read, write and understand any language and responded to have professional jobs that requires literacy in some languages, if P12BB<>28.	Impute P32A=Other language €	TotPop
P32	Invalid P32.	P32-01: Invalid P32.	Impute P32 = missing	TotPop
P33	Invalid P33 and P30B<3.	P33-01: Invalid P33 and P30B<3. Impute P33 = 2	Impute P33 = 2	TotPop
P33	Invalid P33 and P30B in 0:3 and P32<>0 or P32.	P33-02: Invalid P33 and P30B in 0:3 and P32<>0 or P32.	Impute P33 = 3	TotPop
P34	Invalid P34, but responded P35.	P34-01: Invalid P34, but responded P35.	Impute P34 = 1.	TotPop
P35	Invalid P35.	P35-01: Invalid P35.	Impute P35 = missing	TotPop
P36C	Invalid P36C.	P36C-01: Invalid P36C.	Impute P36C = 0	TotPop
P37	Invalid P37.	P37-01: Invalid P37.	Impute P37=2	TotPop
P38	Invalid P38.	P38-01: Invalid P38.	Impute P38=1	TotPop
P39	Invalid P39.	P39-01: Invalid P39.	Impute P39=1	TotPop

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
P40	Invalid P40.	P40-01: Invalid P40.	Impute P40=1	TotPop
P41	Invalid P41.	P41-01: Invalid P41.	Impute P41=1	TotPop
P42	Invalid P42.	P42-01: Invalid P42.	Impute P42=1	TotPop
P43	Invalid P43	P43-01: Invalid P43.	Impute P43=missing	TotPop
P45	Invalid P45	P45-01: Invalid P45.	Impute P45=missing	TotPop
P46	Invalid P46	P46-01: Invalid P46.	Impute P46=missing	TotPop
P47A	Invalid correspondence between P46 and P47.	P47A-03: Invalid correspondence between P46 and P47.	Impute P46 with the first value in the matrix	TotWorkingAgePop
P50A	Invalid P50A but data on the remaining variables.	P50A-01: Invalid P50A but data on the remaining variables.	Impute P50A = 1	TotFemal10
P50A	Invalid P50A and NO data on the remaining variables.	P50A-02: Invalid P50A and NO data on the remaining variables.	Impute P50A = 2	TotFemal10
P50C_BOYS	Number of boys ever born on p50b_boys is less than Number of boys still alive	P50C-01: Number of boys ever born on p50b_boys is less than Number of boys still alive.	Impute P50C_BOYS=P50B_BOYS	TotFemal10
P50C_BOYS	CEB = 0 and children currently alive different than 0. Impute P50C_BOYS = 0	P50C_BOYS-02: CEB = 0 and children currently alive different than 0	Impute P50C_BOYS = 0	TotFemal10
P50C_BOYS	CEB = missing and children currently alive different than 0	P50C_BOYS-03: CEB = missing and children currently alive different than 0	Impute P50C_BOYS = missing	TotFemal10
P50C_GIRLS	Number of girls ever born on p50b_girls is less than Number of girls still alive	P50C_GIRLS-01: Number of girls ever born on p50b_girls is less than Number of girls still alive	Impute P50C_GIRLS=P50B_GIRLS	TotFemal10
P50C_GIRLS	CEB = 0 and children currently alive different than 0	P50C_GIRLS-02: CEB = 0 and children currently alive different than 0	Impute P50C_GIRLS = 0	TotFemal10
P50C_GIRLS	CEB = missing and children currently alive different than 0	P50C_GIRLS-03: CEB = missing and children currently	Impute P50C_GIRLS = missing.	TotFemal10

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
		alive different than 0		
P51A	Invalid P51A but data on the remaining variables.	P51A-01: Invalid P51A but data on the remaining variables.	Impute P51A = 1	TotFemal59
P51A	Invalid P51A and NO data on the remaining variables	P51A-02: Invalid P51A and NO data on the remaining variables.	Impute P51A = 2	TotFemal59
P51B_BOYS	Boys born the last 12 months is greater than the CEB	P51B_BOYS-02: Boys born the last 12 months is greater than the CEB.	Impute missing	TotFemal59
P51B_BOYS	CEB = 0 and children born the last 12 months different than 0	P51B_BOYS-04: CEB = 0 and children born the last 12 months different than 0	Impute P51B_BOYS = 0	TotFemal59
P51B_BOYS	CEB = missing and children born the last 12 months different than 0	P51B_BOYS-05: CEB = missing and children born the last 12 months different than 0	Impute P51B_BOYS = missing	TotFemal59
P51B_GIRLS	Girls born the last 12 months is greater than the CEB.	P51B_GIRLS-02: Girls born the last 12 months is greater than the CEB.	Impute missing	TotFemal59
P51B_GIRLS	Number of children is inconsistent with the age of the mother.	P51B_GIRLS-04: Number of children is inconsistent with the age of the mother.	Impute with the median	TotFemal10
P51B_GIRLS	CEB = 0 and children born the last 12 months different than 0	P51B_GIRLS-05: CEB = 0 and children born the last 12 months different than 0	Impute P51B_GIRLS = 0	TotFemal59
P51B_GIRLS	CEB = missing and children born the last 12 months different than 0	P51B_GIRLS-06: CEB = missing and children born the last 12 months different than 0	Impute P51B_GIRLS = missing.	TotFemal59
P51C_BOYS	Number of boys ever born on p51b_boys is less	P51C-01: Number of boys ever born on p51b_boys is less	Impute P51C_BOYS=P51B_BOYS	TotFemal59

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
	than Number of boys still alive	than Number of boys still alive		
P51C_BOYS	Children born the last 12 months = 0 and still alive different than 0	P51C_BOYS-02: Children born the last 12 months = 0 and still alive different than 0	Impute P51C_BOYS = 0	TotFemal59
P51C_BOYS	Children born the last 12 months = missing and still alive different than 0	P51C_BOYS-03: children born the last 12 months = missing and still alive different than 0	Impute P51C_BOYS = missing	TotFemal59
P51C_GIRLS	Number of girls ever born on p51b_girls is less than Number of girls still alive	P51C-01: Number of girls ever born on p51b_girls is less than Number of girls still alive	Impute P51C_GIRLS=P51B_GIRLS	TotFemal59
P51C_GIRLS	Children born the last 12 months = 0 and still alive different than 0	P51C_GIRLS-02: Children born the last 12 months = 0 and still alive different than 0	Impute P51C_GIRLS = 0	TotFemal59
P51C_GIRLS	Children born the last 12 months = missing and still alive different than 0	P51C_GIRLS-03: children born the last 12 months = missing and still alive different than 0.	Impute P51C_GIRLS = missing.	TotFemal59
HOUSING RECORD				
HH_REC_EDT	Not private HH or HH composed by only visitors	HH-01: Not private HH or HH composed by only visitors.	Delete the housing record	
H01	Invalid H01	H01-01: Invalid H01.	Impute H01 = missing	TotPrivateHH
H02	Invalid H02	H02-02: Invalid H02.	Impute H02 = missing	TotPrivateHH
H03	Invalid H03	H03-03: Invalid H03.	Impute H03 = missing	TotPrivateHH
H04	Invalid H04	H04-04: Invalid H04.	Impute H04 = missing	TotPrivateHH
H05	Invalid H05	H05-01: Invalid H05.	Impute H05 = missing	TotPrivateHH
H05	Type of habitat is incompatible with the type if roof	H05-02: Type of habitat is incompatible with the type if roof	Impute H05 =missing	TotPrivateHH

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
H05	Type of habitat is incompatible with the type of roof and toilet facilities	H05-03: Type of habitat is incompatible with the type of roof and toilet facilities	Impute H05=1	TotPrivateHH
H06	Invalid H06	H06-01: Invalid H06	Impute H06 = missing	TotPrivateHH
H06	Type of habitat is incompatible with the type of roof	H06-02: Type of habitat is incompatible with the type of roof	Impute H06= missing	TotPrivateHH
H06	Roof material incompatible with walls' material	H06-03: Roof material incompatible with walls' material	Impute H06= missing	TotPrivateHH
H07	Invalid H07	H07-01: Invalid H07.	Impute H07 = missing	TotPrivateHH
H07	Roof material incompatible with floor's material	H07-02: Roof material incompatible with floor's material	Impute H07 = missing	TotPrivateHH
H07	Walls material incompatible with floor's material	H07-04: Walls material incompatible with floor's material	Impute H07 = missing	TotPrivateHH
H08	Invalid H08	H08-01: Invalid H08	Impute H08 = missing	TotPrivateHH
H09	Invalid H09	H09-01: Invalid H09	Impute H09 = missing	TotPrivateHH
H09	Number of rooms used for sleeping greater than the total number of rooms.	H09-02: Number of rooms used for sleeping greater than the total number of rooms.	Impute H09=H08	TotPrivateHH
H10	Invalid H10	H10-01: Invalid H10	Impute H10 = missing	TotPrivateHH
H10	Boys & Girls in the household, but NA at the boys and girls used separate rooms	H10-02: Boys & Girls in the household, but NA at the boys and girls used separate rooms	Impute H10 = missing	TotPrivateHH
H10	Only one Sex in the household, but not NA at the boys and girls used separate rooms	H10-03: Only one Sex in the household, but not NA at the boys and girls used separate rooms	Impute H10=3	TotPrivateHH
H10	Only one room, but boys and girls used separate rooms	H10-04: Only one room, but boys and girls used separate rooms.	Impute H10=2	TotPrivateHH
H11	Invalid H11	H11-01: Invalid H11.	Impute H11=missing	TotPrivateHH

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
H11	Wealthy household but using unimproved source of water while others are using improved source	H11-02: Wealthy household but using unimproved source of water while others are using improved source	Impute H11 = 6	TotPrivateHH
H11	Wealthy household but using unimproved source of water while others are using improved source	H11-03: Wealthy household but using unimproved source of water while others are using improved source.	Impute H11 = 8	TotPrivateHH
H11	Wealthy household but using unimproved source of water while others are using improved source	H11-04: Wealthy household but using unimproved source of water while others are using improved source	Impute H11 = 12	TotPrivateHH
H12	Invalid H12	H12-01: Invalid H12.	Impute H12 = missing	TotPrivateHH
H12	Inconsistency between source of water and source of drinking water	H12-02: Inconsistency between source of water and source of drinking water	Impute H12=H11	TotPrivateHH
H13	Invalid H13	H13-01: Invalid H13.	Impute H13	TotPrivateHH
H13	Type of habitat is incompatible with the type of Toilet Facility.	H13-02: Type of habitat is incompatible with the type of Toilet Facility	Impute H13=missing	TotPrivateHH
H14	Invalid H14	H14-01: Invalid H14	Impute H14 = missing	TotPrivateHH
H14	Not connected to REG, but uses line electricity.	H14-02: Not connected to REG, but uses line electricity.	Impute H14=1	TotPrivateHH
H14	Not connected to REG, but uses electricity to cook	H14-03: Not connected to REG, but uses electricity to cook.	Impute H14=1	TotPrivateHH
H15	Invalid H15	H15-01: Invalid H15	Impute H15 = missing	TotPrivateHH
H16	Invalid H16.	H16-01: Invalid H16	Impute H16 = missing	TotPrivateHH
H16	Not connected to line electricity, but uses electricity to cook	H16-01: Not connected to line electricity, but uses electricity to cook.	Impute H16=missing	TotPrivateHH

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
H17	Invalid H17	H17-01: Invalid H17	Impute H17 = missing	TotPrivateHH
H17	Not connected to line electricity, but uses electricity to cook	H17-02: Not connected to line electricity, but uses electricity to cook.	Impute H17=missing	TotPrivateHH
H17	HHs reported identical cooking fuel both for primary and secondary cooking fuels (h16 & h17)	H17-03: HHs reported identical cooking fuel both for primary and secondary cooking fuels (h16 & h17)	Impute P17=none	TotPrivateHH
H18	Invalid H18	H18-01: Invalid H18.	Impute H18 = missing	TotPrivateHH
H19	Invalid H19	H19-01: Invalid H19	Impute H19 = missing	TotPrivateHH
H19	Type of habitat is incompatible with the main mode of household waste disposal	H19-02: Type of habitat is incompatible with the main mode of household waste disposal.	Impute H19 = missing	TotPrivateHH
H20	Invalid H20.	H20-01: Invalid H20	Impute H20 = missing	TotPrivateHH
H20	Type of habitat is incompatible with the main mode of household waste disposal.	H20-02: Type of habitat is incompatible with the main mode of household waste disposal.	Impute H20 = missing	TotPrivateHH
H21	Invalid H21.	H21-01: Invalid H21	Impute H21 = missing	TotPrivateHH
H21	HHs reported Gas or Electricity as source of energy for secondary cooking fuel on h17 and yet responded not to have a Gas/Electric Cooking machine on h21_04.	H21-02: HHs reported Gas or Electricity as source of energy for secondary cooking fuel on h17 and yet responded not to have a Gas/Electric Cooking machine on h21_04.	Impute P21_4=1	TotPrivateHH
H22	Invalid H22	H22-01: Invalid H22.	Impute H22 = missing	TotPrivateHH
H22	H22 incoherent with data in H22A	H22-02: H22 incoherent with data in H22A.	Impute H22 = 1	TotPrivateHH
H22	H22 incoherent with NO data in H22A.	H22-03: H22 incoherent with NO data in H22A.	Impute H22 = 2	TotPrivateHH
H22A	Invalid H22A	H22A-01: Invalid H22A.	Impute H22A = missing	TotPrivateHH

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
H22A	H22A is incoherent with the data in H22B1	H22A-02: H22A is incoherent with the data in H22B1.	Impute H22A = 1	TotPrivateHH
H22A	H22A is incoherent with the NO data in H22B1	H22A-03: H22A is incoherent with the NO data in H22B1	Impute H22A = 2	TotPrivateHH
H22B1	Invalid H22B1	H22B-01: Invalid H22B1	Impute H22B1 = missing	TotPrivateHH
H22B2	Invalid H22B2	H22B-02: Invalid H22B2	Impute H22B2 = missing	TotPrivateHH
H23	Invalid H23	H23-01: Invalid H23.	Impute H23 = missing	TotPrivateHH
H23	H23 incoherent with data in H23A	H23-02: H23 incoherent with data in H23A	Impute H23 = 1	TotPrivateHH
H23	H23 incoherent with NO data in H23A	H23-03: H23 incoherent with NO data in H23A	Impute H23 = 2	TotPrivateHH
H23	H23 incoherent with NO data in P42	H23-04: H23 incoherent with NO data in P42	Impute H23 = 1	TotPrivateHH
H23A	Invalid H23A	H23A-01: Invalid H23A	Impute H23A = missing	TotPrivateHH
H24	Invalid H24.	H24-01: Invalid H24	Impute H24 = missing	TotPrivateHH
H24	Hh responded that he didn't grow vegetables in the last 12 months and there is vegetable recorded	H24-02: Hh responded that he didn't grow vegetables in the last 12 months and there is vegetable recorded.	Impute H24_16=1	TotPrivateHH
H24	Hh responded that he grow vegetables in the last 12 months and there is no vegetable recorded	H24-03: Hh responded that he grow vegetables in the last 12 months and there is no vegetable recorded.	Impute H24_16=2	TotPrivateHH
H24	Hh responded that he didn't grows tea on h24_17 and responded yes on h23 and there is number of tea trees on h26.	H24-04: Hh responded that he didn't grows tea on h24_17 and responded yes on h23 and there is number of tea trees on h26	Impute H24_17=1	TotPrivateHH
H24	Hh responded that he grow tea on h24_17 and	H24-05: Hh responded that he grow tea on h24_17	Impute H24_17=2	TotPrivateHH

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
	responded yes on h23 and there is no number of tea trees on h26	and responded yes on h23 and there is no number of tea trees on h26.		
H24	Hh responded that he didn't grows coffee on h24_18 and responded yes on h23 and there is number of coffee trees on h27	H24-06: Hh responded that he didn't grows coffee on h24_18 and responded yes on h23 and there is number of coffee trees on h27	Impute H24_18=1	TotPrivateHH
H24	Hh responded that he grow coffee on h24_18 and responded yes on h23 and there is no number of coffee trees on h27	H24-07: Hh responded that he grow coffee on h24_18 and responded yes on h23 and there is no number of coffee trees on h27	Impute H24_18=2	TotPrivateHH
H25	Invalid H25.	H25-01: Invalid H25.	Impute H25 = missing	TotPrivateHH
H26	Invalid H26	H26-01: Invalid H26	Impute H26 = missing	TotPrivateHH
H27	Invalid H27	H27-01: Invalid H27	Impute H27 = missing	TotPrivateHH
H28A	Invalid H28A	H28A-01: Invalid H28A	Impute H28A = missing	TotPrivateHH
H28A	H28A incoherent with data in H28B1	H28A-02: H28A incoherent with data in H28B1	Impute H28A = 1	TotPrivateHH
H28A	H28A incoherent with NO data in H28B1	H28A-03: H28A incoherent with NO data in H28B1	Impute H28A = 2	TotPrivateHH
H28B1	Invalid H28B1	H28B1-01: Invalide H28B1	Impute H28B1 = missing	TotPrivateHH
H28B1	Hh responded yes on h28b1 and did not report a number of fruits h28b2	H28B1-02: Hh responded yes on h28b1 and did not report a number of fruits h28b2	Impute H28B1 = 2	TotPrivateHH
H28B1	Hh responded NO on h28b1 and did report a number of fruits h28b2	H28B1-03: Hh responded NO on h28b1 and did report a number of fruits h28b2.	Impute H28B1 = 1	TotPrivateHH
H28B2	Invalid H28B2.	H28B2-01: Invalid H28B2	Impute H28B2 = missing	
MORTALITY RECORD				

Variable	Specification (detect error)	Message	Method of correction of error	Denominator
MORTALITY_REC_EDT	All the variables are missing	MORTALITY-01: All the variables are missing	Delete the line	TotPrivateHH
MORTALITY_REC_EDT	Perfect duplicates.	MORTALITY-02: perfect duplicates.	Delete the last	TotPrivateHH
MD4A2	Invalid unit of death period.	D4A-01: Invalid unit of death period.	Impute MD4A1 = missing	ToTDeath
MD4A	Invalid period of death.	MD4A-02: Invalid period of death	Impute MD4A2 = missing	ToTDeath
MD4A2	The unit is incoherent with the period of death	MD4A-03: The unit is incoherent with the period of death.	Impute MD4A1 = 1	ToTDeath
MD5	Invalid Place of death	MD5-01: Invalid Place of death	Impute MD5 = missing	ToTDeath
MD6	Invalid Place of death	MD6-01: Invalid Place of death	Impute MD6 = missing	ToTDeath
MD6	Too young to commit suicide.	MD6-02: Too young to commit suicide.	Impute MD6 = 1	ToTDeath
MD7	Invalid Place of death	MD7-01: Invalid Place of death	Impute MD7 = missing	ToTDeath
MD8	Invalid Place of death	MD8-01: Invalid Place of death	Impute MD8 = missing	ToTDeath
MD9	Invalid Place of death	MD9-01: Invalid Place of death	Impute MD9 = missing	ToTDeath

ANNEX C: PERSONS AND INSTITUTIONS THAT CONTRIBUTED TO THE FIFTH RWANDA POPULATION AND HOUSING CENSUS, 2022

National Census Task Force

Institutions

Office of the President of the Republic of Rwanda
Office of the Prime Minister
Ministry of Finance and Economic Planning
Ministry of Local Government
Ministry of Defence
Ministry of Interior
Ministry of Health
Ministry in Charge of Emergency Management
Ministry of Foreign Affairs and Cooperation
Ministry of Education
Ministry of ICT & Innovation
Ministry of Public Service and Labour
Ministry of Infrastructure
Rwanda Information Society Authority
Office of Government Spokesperson
Rwanda National Police
Rwanda Correctional Service
Rwanda Public Procurement Authority
Rwanda Utilities Regulatory Authority
Rwanda Broadcasting Agency
Rwanda Education Board
National Examination and School Inspection Authority
Rwanda Biomedical Centre
Representatives of all Religious Confessions

Branches of the National Census Task Force

Members of the task Force at Province and the City of Kigali

Office of the Lord Mayor, City of Kigali
Office of the Governor, Southern Province
Office of the Governor, Western Province
Office of the Governor, Northern Province
Office of the Governor, Eastern Province
Representatives of all Religious Confessions

Members of the Branches of the Census Task Force at District Level

Office of the District of Nyarugenge
Office of the District of Gasabo
Office of the District of Kicukiro
Office of the District of Nyanza
Office of the District of Gisagara
Office of the District of Nyaruguru
Office of the District of Huye
Office of the District of Nyamagabe
Office of the District of Ruhango
Office of the District of Muhanga
Office of the District of Kamonyi
Office of the District of Karongi
Office of the District of Rutsiro
Office of the District of Rubavu
Office of the District of Nyabihu
Office of the District of Ngororero
Office of the District of Rusizi
Office of the District of Nyamasheke
Office of the District of Rulindo
Office of the District of Gakenke
Office of the District of Musanze
Office of the District of Burera
Office of the District of Gicumbi
Office of the District of Rwamagana
Office of the District of Nyagatare
Office of the District of Gatsibo
Office of the District of Kayonza
District of Office of the Ngoma
Office of the District of Bugesera

Census Technical Team

National Directors

Murangwa Yusuf, Director General of NISR
Murenzi Ivan, Deputy Director General of NISR

National Census Technical Director

Habarugira Venant, Director of Census Unit, NISR

Census National Coordinators

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Mutijima Prosper
Bigirimana Florent
Ndakize Michel
Munyarugerero Juvenal

Census National Field Coordinators

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Bigirimana Florent	NISR	Karagire Gonzague	MINEMA
Ndakize Michel	NISR		
Munyarugerero Juvenal	NISR		
Lt Col Ndikuriyo Jean Paul	RDF	CIP Habineza Hamiss	RCS
Maj Rugema Ntazinda	RDF	CIP B Karemera	RCS
Capt Mugemanyi Faustin	RDF	CIP Mukambarushimana Irene	RCS
Lt Muteteri Sophie	RDF	IP Karugaba Donath	RCS
SP Ndayisenga Alex	RNP	S/SGT Gatete Edison	RCS
SP Nzabonimpa Joseph	RNP	Mukansonera Pascasie	MINEMA
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CIP Nayihiki Elam	RNP	Mbabazi Emmanuel	MINEMA
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		Musoni Jean Damascene	MINEMA

Field Analysts

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Habimana Norbert
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Nshimiyimana Patrick
Uwimbabazi Denyse

Post Enumeration Survey

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Harerimana Massoud
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Uwamahoro Sandrine
Iranzi Orodha
Hagenimana Jean damascene
Ntagengerwa Bonus
Gaga Rukorera Didier
Mugenzi Gilbert
Nahimana Samuel
Akingeneye Seraphine
Ntambara Juvenal
Kambogo Francois
Ayingeneye Seraphine
Bosco Ndayiragije
Patrick Niyongira

Census District Team Leaders: 30 (1 per District)
District Data Quality Monitors: 60 (2 per District)
Sector Data Quality Monitors: 1,277 (416 Sector Education Inspectors, 416 primary school teachers, and 445 youths)
Enumerators: 26,437 (Primary School Teachers + Youth)
Special Groups Supervisors: 32

Special Groups Enumerators: 289

Data Processing, Cartography and ICT Infrastructures

Programmer:
Mukasa Jimmy, Director of ICT

Assistant Programmers:
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Mukanshimiye Peruth
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Kabandana Pierre Claver

ICT Infrastructures:
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Ndayiragije Bosco
Muvara Joseph
Nkamicaniye Gaetan
Niyonshuti Levi
Nshimiyimana Clement

Census Data Analysis

Data Analysts

Imanishimwe Valentine	Population size, structure& spatial distribution
Nilingiyimana Faustin	Marital status & nuptiality
Uwayezu Beatrice	Fertility
Kanyonga Ingabire Evelyne	Mortality
Mukazitoni Madeleine	Social cultural characteristics of the population
Serugendo Jean Baptiste	Migration and spatial mobility
Nzabonimpa Jean Claude	Characteristics of housing and households
Uwamahoro Pacifique	Economic Activity
Abalikumwe Francois	Measurement& mapping of non-monetary poverty
Uwitonze Martin	Education
Tuyisenge Methode	Gender status
Rukundo Ephrem	Socio-economic status of persons with disabilities
Bizimana Venuste	Socio-economic status of children
Ngomituje Xavier	Socio-economic status of youth
Didas Uwamahoro	Socio-economic status of aged people
Buramba Eric	Agriculture
Habarugira Venant	Population Projections
Nyabyenda Emmanuel Christian &Tuyisenge Methode	Compilation of the Main Indicators

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Mutijima Prosper
Munyarugerero Juvenal
Niyomugabo Pierre Celestin
Umuhoza Wa Shema Daniella
Neza Nadege

Corporate Services

Nkusi David	Head of Corporate Services	Gasana Patrick	Logistics Officer
Ingabire Alice	Ag. Director of HR and Admin.	Nzayisenga Cyrile	Logistics Officer
Museruka David	SPIU coordinator	Nshimiyumukiza Steven	Accountant
Munyemana Silas	Director of Finance	Muhima Jadot	Accountant
Nshimiyumukiza Steven	Accountant	Sibomana Diane	Accountant
Uwizeye Richard	Financial specialist	Dusenge Elias	Office Messenger
Munezero Nadia	Planning office	Uwamahoro Console	Secretary/Finance Unit
Mupende Emmanuel	M& E specialist	Shumbusho Alphonse	Procurement Specialist
Tuyisenge Alice	HR Officer	Nkurunziza Godfrey	Procurement Officer
Ntwali Abdul	HR Officer	Nshuti Henry	Procurement Support Staff
Kazimbaya Sita	Office Messenger	Umuhoza Nahayo Anaise	Procurement Support Staff
Ndungutse Emmanuel	Printing and Distribution Officer	Tuyisenge Yasin	Logistics Support Staff
Babyeyi Nadine	Ag. Head of Central Secretariat	Riziki Emma	Finance Support Staff
Uwimpuhwe Claire	SPIU Secretary	Iradukunda Pascasie	Finance Support Staff
Rutijanwa Felecite	Administrative Assistant/DG Office	Uwimana Thacienne	HR Support Staff
Umwari Angelique	Administrative Assistant/DDG Office	Musonerwa Claver	HR Support Staff
Murebwayire Theodette	Logistics Officer	Umutoni Alice	Secretary Census Unit

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