

**Terms of Reference**

**Develop and install a system for data quality control, on behalf of the National Institute of Statistics of Rwanda (NISR).**

# Background

The National Institute of Statistics of Rwanda (NISR) conducts surveys and censuses that update various indicators to support monitoring of national, regional, and global development programs and their targets. These are for instance the National Strategy of Transformation (NST), Sustainable Development Goals (SDGs) and other different policies. One example of these surveys is the seventh Integrated Household Living Conditions Survey (EICV7), which comes with updated information on poverty among others. EICV7 data collection will last for a period of 12 months from October 2023 to October 2024.

To make a census or survey successful, there is a need of a comprehensive and rigorous digital and web-based system with clear indicators, strong methods, tools, and techniques to ensure the highest level of data quality that will be collected through a sample-based surveys such as EICV, IBES, SAS, etc; or a census such as Population and Housing Census, Establishment Census, etc.

It is in this context that SMRP Unit would like to request your office to look for a way that a firm with expertise in data quality control is hired and engaged to support NISR teams with the upcoming surveys and censuses such as EICV7 (whose data collection will last for a period of 12 months from October 2023 to October 2024), and also for other surveys that NISR will conduct in coming periods.

# Scope of the Work

The main mandate of the National Institute of Statistics of Rwanda (NISR) is to produce the reliable and good quality statistics through different national surveys and censuses.

Since 2016, the NISR is using CAPI as main method of data collection and the collected data are submitted directly to the NISR servers. This technological way of data collection requires technological based systems to ensure the best quality of data as the work on field is still going on.

In this context, and to leverage the current development of ICT and Data Science, NISR wants to put in place a strong data quality control system that will allow an easy and in real time interaction between the NISR staff at the head office and field workers during the data collection. The objective is to minimize potential non-sampling errors that may occur during the data collection.

The scope of work is summarized in the following points:

1. Detailed analysis of the existing survey processes and data workflows.
2. Development of a centralized Data Quality Control System tailored to the specific needs of each survey.
3. Integration of automated data validation checks, including outlier detection, logical consistency, and completeness.
4. Real-time alerts and notifications for field teams and supervisors in case of data anomalies.
5. Design and implementation of a user-friendly dashboard for visualization of data quality metrics.
6. Capacity building for NISR staff to effectively use and manage the DQCS.
7. Piloting the system on select surveys and incorporating feedback for refinements.
8. Full-scale deployment of the system across all relevant surveys.

# Objectives of the Assignment

## General objective

The main objective of the assignment is to Develop and install a comprehensive quality control system that runs on national ICT infrastructure to assure high-quality data on real time during the data collection Specifically, the firm will:

## Specific Objectives:

* Suggest the list of checks and validations into electronic questionnaires to provide instant feedback to interviewers for different survey conducted by NISR.
* Suggest a list of indicators to monitor for quality check for each concerned survey.
* Develop a dashboard with a user-friendly interface for consistency checks in all submitted interviews to detect univariate and multivariate outliers and other anomalies.
* Use Para data and interview data to build survey-specific quality indicators by interviewer.
* Build a composite Interviewer Risk Index that synthesize the quality indicators and swiftly identifies underperforming interviewers or teams.
* Monitor nonresponse and missing data, by team and interviewer, to prevent potential nonresponse bias.
* Develop a comprehensive Data Quality Control System that can monitor data collection, processing, and reporting across various surveys.
* Develop a system for audio recordings for all interviews and their audit for the purpose of data quality control.

# Key Deliverables

Under the supervision of Director General of NISR, International firm in collaboration with the labor force team will provide the following:

* Inception Report on how international experts intend to accomplish the task.
* Developed and tested Data Quality Control System tailored for NISR's concerned survey.
* Training manual for NISR IT staff on managing and update the system.
* Training manual for data quality monitors
* Documentation of the system architecture, processes, and maintenance guidelines.
* The final report for the assignment

# Qualifications and Requirements

The international firm should demonstrate the following qualifications and experience:

1. Proven record in developing and implementing Data Quality Control Systems including audio interview recording systems for statistical agencies or similar institutions.
2. Expertise in data management, statistical analysis, and quality assurance for at least 3 years.
3. Proficiency in software and application development using different languages such as Java script, PHP, HTML, Json etc, database management, and data visualization with experience of at least 5 years.
4. Proven 5 years of experience in the development of CAPI questionnaire application using CSEntry
5. Expertise in statistical methodologies, data validation techniques, and quality control procedures.
6. Demonstrated expertise in statistical survey methodology, particularly in designing complex and large-scale surveys.
7. Strong analytical skills and the ability to use statistical software for simulations and analysis.
8. Excellent communication skills and the ability to collaborate effectively with technical teams from different cultural backgrounds.
9. Knowledge of the specific survey domains and challenges in Rwanda's context is an advantage.

## Qualifications and Experience of team leader:

The Team leader consultant must have at least master’s degree in statistics, labour economics or Economics, demography, data science and other related field, a PhD will be an advantage; He/she should also have:

* 1. Extensive knowledge in survey design, analysis and field monitoring.
  2. Extensive knowledge in developing survey data quality monitoring systems.
  3. Extensive knowledge in database management systems.
  4. Sound knowledge of Statistical and demographic analysis software such as CSPRO,

STATA, R and Advanced Excel, …

* 1. Minimum five (5) years of relevant work experience in large scale statistical data analysis activities; experience in survey data design.
  2. 5 years’ experience in survey management
  3. Ability to adapt to new environments and to establish and maintain good working relations with individuals of different cultural backgrounds.
  4. Extensive knowledge of the international standards in carrying out different surveys; especially household living standards surveys and labour force surveys.
  5. Experience in project management for overseeing the development and implementation of data quality control systems, ensuring they meet the institute's objectives and deadlines.
  6. Experience in developing the capacity of public and private institutions.

## Qualifications and Experience of technicians (system developers):

1. The technicians of the firm should have the following qualifications:

At least a bachelor's degree in a relevant field such as statistics, data science, computer science, mathematics, or a related quantitative discipline. A master's degree or higher can be advantageous.

1. **Statistical and Data Analysis Skills:** Be proficient in statistical software such as R or Python and be able to perform data cleaning, manipulation, and analysis with at least 5 years of experience.
2. **Domain Knowledge:** Understanding of household survey methodologies and including knowledge of survey sampling techniques, questionnaire design, and data collection processes.
3. **Programming Skills:** Proficiency in programming languages like Python, R, SAS, Cspro or others for developing data quality control systems and automating data validation processes with at least 3 years of experience.
4. **Application development:** Proficiency in software and application development using different languages such as Java script, PHP, HTML, Json etc,
5. **Database Management:** Knowledge of database management systems (e.g., SQL) to handle and store survey data securely.
6. **Data Quality Assurance:** Familiarity with data quality assurance practices, including the identification of data anomalies, errors, and outliers, and the ability to implement data cleaning and validation procedures.
7. **Data Visualization:** Skill in data visualization tools (e.g., Tableau, Power BI) to create reports and dashboards that monitor data quality and survey progress with a continuous experience of at least 3 years.
8. **Knowledge of Regulations and Ethics:** Awareness of data privacy regulations and ethical considerations when handling sensitive survey data is crucial.
9. **Communication Skills:** Effective communication skills in English are essential for collaborating with survey teams, explaining data quality control processes, and presenting findings and recommendations.
10. **Adaptability:** The ability to adapt to new technologies, methodologies, and changes in survey processes is important in the evolving field of data quality control.

## Required Competencies /Core Competencies:

* Commitment to NISR’s values and guiding principles.
* Developing people/fostering innovation and empowerment/performance management.
* Teamwork/communication/self-management.
* Strategic thinking/results oriented and commitment to excellence/decision making.
* Ability to work well within diverse teams.
* Ability to communicate fluently in English in both written and oral.
* Knowledge sharing.

## Functional Competencies:

* Conceptual innovation in the provision of technical expertise.
* Leveraging the resources of national government and partners/building strategic alliances and partnerships.
* Job knowledge/technical expertise.
* Personal qualities such as leadership, initiative, adaptability and sound judgment.

# CONTRACT MANAGEMENT

## Supervisory arrangements:

The firm will be supervised by the Director General of the National Institute of Statistics of Rwanda

## Monitoring and progress:

The International firm will be reporting on the accomplished tasks to the NISR’s Director General.

The work will be reviewed by the Director of SMRP, Survey program manager and the NISR’s Deputy Director General before submission to the NISR’s Director General.

The needed documents, tools and reports of the firm shall be submitted during the assignment and will constitute the basis for the payment to be made.

# REPORTING AND PAYMENT

UNFPA will issue the contract and pay the institution, based on the below payment schedule and after the approval of the deliverables by National Institute of Statistics of Rwanda.

**Payment schedule:**

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| --- | --- |
| **Deliverable Completion** | **Payment proportion** |
| 1st Installment: | 30% upon submission and validation of the inception report |
| 2nd Installment: | 30% Upon submission and validation of the progress report |
| 3rd Installment: | 40% upon submission and validation of the final report |