BHUTAN STATISTICS QUALITY ASSURANCE FRAMEWORK(BSQAF)

VERSION 1.0

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FOREWORD

The National Statistics Bureau (NSB) is coming up with the 2020 Bhutan Statistics Quality Assurance Framework to promote its use throughout the Bhutan Statistical System. The adoption and use of the BSQAF in the management of statistical outputs, statistical processes, institutional environment and the statistical system will improve the quality of official statistics. In particular, with the adoption of the BSQAF, all data producers and providers within the country will be able to refer to this document and assuage whether their organization is able to fulfil the statistical quality requirements by measuring the quality and performance indicators.

The BSQAF adopted the basic framework of the United Nations National Quality Assurance Framework developed by the expert group and adopted by the UN Statistical Commission in March, 2019 at its 50th Session. The BSQAF consists of four broad levels (Statistical output quality, Statistical Process Quality, Environment and Management) and under each level there are various dimensions ranging from three to seven. Each dimension is followed by quality related actions and quality and performance indicators.

The BSQAF will be reviewed and updated periodically to reflect developments in the quality standards, particularly the emergence of new standards with regard to innovative data sources including big data. To improve the overall quality of statistics, under the umbrella of this document, NSB is also publishing the Bhutan Standard Statistical Geographic Code, Bhutan Standard Statistical Code, Occupation and Industrial classification.

We are hopeful that this document will be helpful and will be extensively used for improving the quality of statistics by the statistical fraternity.

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TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

1.1 Purpose of Quality Framework

The purpose of the Bhutan Statistics Quality Assurance Framework (BSQAF) is directed at assuring the quality of official statistics throughout the entire Bhutan Statistical System (BSS), which consists of the National Statistics Bureau (NSB) and other producers of official statistics. The Framework also provides guidance for engagement with statistics producers and data providers outside of the BSS that cooperate with members of the BSS in the production of official statistics.

It aims to provide an overall perspective on how the quality of official statistics will be assured and maintained at the highest possible level by:

- Taking into account the over-arching institutional and cross-institutional level through the statistical production processes to the outputs:
- Identifying and describing all the various dimensions of quality under each level;
- Considering quality related actions under each dimension;
- Proposing possible quality and performance indicators; and
- Providing a framework for documenting quality related procedures.

The expected benefits of the BSQAF is that it will:

- Provide a generic model for the members of the BSS to adopt and follow the quality assurance framework;
- Create a basis for creating and maintaining a quality culture within the BSS;
- Provide a systematic mechanism for ongoing identification of quality problems and possible actions for their resolution;
- Stimulate interaction among officials;
- Contain reference material that is helpful in training;
- Give greater transparency to the processes by which quality is assured and reinforce the image of the Bhutan Statistical System as a credible provider of good quality statistics; and
- Be the mechanism for exchange of ideas on quality assurance with other NSOs and international statistical organizations.

1.2 Basis and Content of Quality Framework

The Quality, Quality Management Framework and BSQAF are based on the United Nations National Quality Assurance Frameworks Manual for Official Statistics.

1.2.1 UN National Quality Assurance Framework (UN NQAF)

UN NQAF arranges its quality principles and associated requirements into four levels, ranging from the over-arching institutional and cross-institutional level through the statistical production processes to the outputs.

Level A: Managing the statistical system

Level B: Managing the institutional environment

Level C: Managing statistical processes

Level D: Managing statistical outputs

1.2.2 Quality

Definition: *Quality* is the degree to which a set of inherent characteristics of an object fulfills requirements (International Standards Organization, ISO 9000:2015). In the context of statistical organizations, the object is the statistical output or product, the process, the institutional environment or the whole statistical system.

A simple definition of quality is "fit for use" or “fit for purpose”.

- It is the users' needs that define the quality. Different users may have different needs that must be balanced against each other to give the quality concept a concrete content.
- The concept of quality of statistical information is multi-dimensional and that there is no one single measure of quality.
- For a statistical product, the general definition of quality is operationalized by specifying a set of factors or dimensions that characterize its quality: Relevance, Accuracy and reliability, Timeliness and punctuality, Accessibility and clarity, Coherence and comparability.
- The dimensions of quality are interrelated and, there are trade-offs between some of them. Adequate management of each of them is essential. At the same time, they must be seen in relation to each other within the statistical production processes.

1.2.3 Quality Management Framework

Definition: A *Quality management framework* provides a coherent and holistic system as a basis for quality management

- There are various general quality management frameworks_applicable to any organization, such as Total Quality Management (TQM), International Organization for Standardization (ISO), Six Sigma, European Foundation for Quality Management (EFQM), Balanced Scorecard, Lean and Lean Six Sigma. These frameworks are largely based on common definitions and principles, but their main focus and formalization vary.

- The strategic core of all major TQM models is continuous improvement, often illustrated with reference to the Plan-Do-Check-Act cycle (PDCA) made popular by Deming. This cycle is a four-step process which guides all changes for continuous improvement.

1.2.4 Bhutan Statistics Quality Assurance Framework

Based on the above, the BSQAF is elaborated by characterizing the various *aspects* of the quality in terms of four levels of *quality dimensions*:

- Dimensions reflecting the quality of the survey statistical outputs (7 dimensions): *relevance, accuracy, timeliness, punctuality, coherence, clarity, and accessibility;*
- Dimensions reflecting the quality of the survey production process (4 dimensions): *sound methodology and statistical procedures; adequate resources and cost-effectiveness; managing respondents and response burden*; and *metadata management*;
- Dimensions reflecting the quality of the Bhutan Statistical System institutional environment (4 dimensions): *mandate for data collection; professional independence, impartiality, objectivity and transparency; confidentiality, privacy and security;* and *commitment to quality*.
- Dimensions reflecting the quality of the overall Bhutan Statistical System (3 dimensions): *Well-coordinated BSS; Relationship with stakeholders; and Statistical standards*

The logic behind this grouping is as follows.

- Users of official statistics will be primarily interested in, and/or affected by, the *output quality* dimensions.
- The quality of these outputs will be largely determined by the *statistical production process quality*.
- The quality of the statistical production process will, in part, be determined by the quality of the *institutional environment* within which it is produced.

- The quality of the institutional environment will, in part, be determined by the quality of *the statistical system* within which the institution is anchored.

1.3 Structure and Content of Document

The BSQAF has five chapters following the introduction and are summarised as follows;

1. It covers the dimensions of statistical system that could impact the output of official statistics. These aspects are discussed first as they are prerequisites for institutional environment setting and the quality of process and output.
2. It covers the dimensions of institutional environment that could impact the output of official statistics. These aspects are discussed in addition to the statistical system as they are prerequisites for process and output quality.
3. It covers the dimensions of survey process quality.
4. It covers the dimensions of Output quality (Accuracy).
5. It covers the dimensions of Output quality (Other aspects).

Each quality dimension is defined, and the actions that can help ensure quality are listed together with quality and performance indicators. Some actions and indicators are repeated as they assure quality in more than one dimension.

CHAPTER TWO

BHUTAN STATISTICAL SYSTEM

Definition: The *Bhutan Statistical System (BSS)* comprises the statistical agencies that collect, process and disseminate official statistics on behalf of the government, with the National Statistics Bureau as the central statistical authority. Coordination of this system and managing relations with all stakeholders is a prerequisite for the quality and efficient production of official statistics. The use of common statistical standards throughout is an integral part of this system.

2.1 Well-Coordinated BSS

Definition: *Well-Coordinated BSS* means that there is a coordination and collaboration mechanism within the BSS to produce and disseminate statistics. Coordination within the BSS is essential for improving and maintaining the quality of official statistics.

Quality Related Actions

- Adhere to the parenting framework of statistical personnel and the Executive Order of the government which establishes the main responsibilities of the NSB and other members of the BSS.
- Develop a legal statistical framework for effective governance of BSS.
- Identify members of the BSS in a formal document.
- Ensure there is at least one statistician in each agency (including local government) responsible for production of official statistics by the parent agency.
- Coordinate statistical activities within the BSS to improve cost effectiveness and reduce respondent burden.
- Specify the mandates of the statistical divisions/units within the BSS for collection, processing and dissemination of official statistics.
- Monitor and review guidelines for the collection, processing and dissemination of official statistics.
- Develop and monitor the use of agreed standards, concepts, definitions, classifications and methods throughout the BSS.
- Promote and enhance data sharing within the BSS and liaise with members of the extended data ecosystem.
- Promote the sharing of technical knowledge and statistical best practices.
- Provide adequate capacity development of statistics officials.

- Establish a mechanism for statistics produced outside the BSS, to be consider as official statistics.
- Develop a periodic National Strategy for the Development of Statistics.
- Develop an Annual Statistical Calendar and Advance Release Plan for the BSS.

Quality and Performance Indicators

- Legal statistical framework instituted.
- Data sharing mechanism developed.
- Number of statistical coordination and technical committee meetings held.
- Statistical calendar and advance release plan for BSS developed.
- All agencies producing official statistics has at least one statistician.

2.2 Relationship with stakeholders

Definition: *Relationship with stakeholders* means the building and sustaining of good relationships with all key stakeholders, including data users, data providers, funding agencies, government officials, relevant community organizations, academia and media. The BSS should have access to all data and information needs of society in an effective and efficient way.

Quality Related Actions

- Identify stakeholders for consultation regarding their interests, needs and obligations;
- Develop strategy and institutional arrangements to engage with users;
- Install a toll free number and a central email contact to respond to inquiries in a timely manner;
- Maintain and develop cooperation with funding agencies, academic institutions and international statistical organizations, as appropriate.
- Develop legal or formal provisions for collection, processing and dissemination of official statistics through surveys and censuses.
- Develop legal or formal provisions to obtain administrative data and adequate access to these data from other government agencies for statistical purposes.
- Develop legal or formal provisions to access and use data (including "big data") maintained by private, corporations or other non-governmental organizations for statistical purposes on a regular basis, including for testing and experimentation.
- Develop agreements with owners of administrative data to operationalize data access which describes technical conditions for access and possibilities for linking the data with data from other administrative data sources.

- Involve statisticians in the design, development and improvement of administrative data, to make it appropriate for statistical purposes.
- Collaborate with administrative data owners to develop quality reports; describing accuracy, completeness, timeliness, punctuality, clarity, and among others.
- Provide technical support to data providers and producers.

Quality and Performance Indicators

- Number of stakeholders identified and consulted in different statistics fields.
- Number of linkages established with owners of administrative data. Number of agreements with privately-held data owners for access and use.
- Number of quality reports of administrative data developed in collaboration with the data owners.
- Number of feedbacks on quality of data provided to holders of administrative data, businesses and other organizations allowing for further improvements.

2.3 Statistical Standards

Definition: *Statistical Standards* refer to a comprehensive set of statistical concepts, definitions, classifications, methods and procedures used to achieve uniform treatment of statistical issues within or across processes and across time and space. The use of standards promotes the consistency and efficiency of statistical systems at all levels.

Quality Related Actions

- Cooperate in the development and implementation of international, regional and national statistical standards.
- Identify statistical staff within divisions/sections to facilitate and coordinate the adoption and development of international, regional and national statistical standards within their work domain where appropriate.
- Prepare a repository of all standard classifications for BSS.
- Advocate to comply with statistical standards and any changes made thereafter to all statistical agencies.
- Conduct impact assessment of the adoption of new statistical standards, document and communicate to users; and where applicable to provide conversion tables.
- Conduct regular review of statistical standards (concepts, definitions, classifications, etc.)

- Monitor the use of statistical standards by data providers and producers of official statistics.
- Provide support and guidance to all data providers and producers of official statistics in the implementation of statistical standards.
- Minimize divergences from the international, regional or national statistical standards which should be documented and communicated to all stakeholders. Develop concordance tables wherever required.

Quality and Performance Indicators

- Statistical Standards developed and made accessible.
- Number of data providers and producers of official statistics to whom statistical standards are communicated and made available.
- Number of times of technical support provided to other statistics producers and data providers to implement international, regional and national statistical standards.
- Number of concordance tables to international, regional and national standard classifications developed and made available in case diverging standards used.
- Number of stakeholders to which adopted standards (concepts, definitions, classifications etc.) are communicated.
- Number of advocacy programmes conducted to the stakeholders on the compliance of international, regional and national statistical standards.
- Number of stakeholders in compliance with statistical standards.

CHAPTER THREE

INSTITUTIONAL ENVIRONMENT

3.1 Mandate for Data Collection

Definition: Having a *mandate for data collection* means that Statistical authorities/entities under BSS shall have clear mandate to collect and access information from multiple data sources for official statistical purposes. An entity/person may be required by law or formal provisions to allow access to or deliver data for statistical purposes.

Quality Related Actions

- Develop a law or other formal provision explicitly declaring statistical authorities/entities under BSS are obligated to collect, process and disseminate statistics to meet the data needs of the country.
- Develop a law or other formal provision requiring an entity/person to allow access to or deliver data for statistical purposes.
- Develop list of key stakeholders of official statistics comprising users, producers, providers, sponsors and target population.
- Ensure all key stakeholders are aware of the plans for the data collection.
- Create awareness on the mandates of statistical authority for data collection, emphasising its benefits and indicating that they depend upon the information provided by the target population.

Quality and Performance Indicators

- List of key stakeholders.
- Number of key stakeholders with whom data collection process has been discussed.
- Number of announcements/notification appearing in the newspapers, social media and television.

3.2 Professional Independence, Impartiality, Objectivity and Transparency

Definition: *Professional independence* means that the designing, development, production and dissemination of statistics is carried out following professional standards without any interference or pressure from providers or users with vested interests in the outputs. The credibility of statistics depends upon professional independence.

Impartiality and objectivity mean that statistical outputs are designed, developed, produced and disseminated in a manner that respects scientific independence and that is professional, neutral and unbiased, and in which all users are treated equitably regarding access.

Transparency means that statistical policies and the terms and conditions (including the legal basis) under which the statistical outputs are designed and developed, and procedures by which the data are acquired, edited, imputed, tabulated and disseminated, are documented and made available to staff, users, respondents and the public.

Quality Related Actions

- Make maximum use of international best practices in design, development, conduct and dissemination of statistics.
- Develop standard procedure to ensure that respondents understand the legal basis for a survey and the confidentiality provisions for the data that are collected.
- Publicise the fact that statistical processes are designed, developed and the outputs are produced and disseminated impartially and objectively.
- Publicise the skills and experience of the staff involved in the production of statistics.
- Make the metadata describing processes and outputs readily accessible online.
- Ensure statistical releases and statements made to the media are objective and based strictly on the available evidence and do not take any position on a political issue.
- Develop publicly and easily accessible annual release calendar containing information on the release plan.

Quality and Performance Indicators

- List of international standards and best practices used in the statistical production process.
- List of staff assigned to the statistical production process and their qualifications and skills.

3.3 Confidentiality, Privacy, and Security

Definition: *Respecting the privacy* of individual respondents means the privacy of individual respondent are respected during the data collection process.

Ensuring confidentiality means that no data for any individual respondents can be identified, either directly or indirectly, from statistical outputs (whether these be aggregates or unit record data files) except where specifically allowed under a provision of a law.

Ensuring security means that data collected cannot be accessed by unauthorized persons inside or outside the organization.

Quality Related Actions

- Develop policy or guideline for data privacy, confidentiality and security.

- Ensure that data will be used only for statistical purposes and that no individual data will be revealed.
- Use the data collected only to produce statistical aggregates and (possibly) anonymized unit record data files.
- Define the criteria under which disclosure of individual data may be deemed to occur.
- Incorporate statements that data will be used only for statistical purposes and individual data will remain confidential in statistical tables in the preamble to the survey/census questionnaire/administrative data collection forms.
- Acquire software to check for potential disclosure or residual disclosure in a table of aggregates.
- Check all aggregate outputs for potential disclosure, suppress any cells that would result in disclosure and inform users why this has been done prior to dissemination.
- Decide whether an anonymized unit record data file will be produced, and if so, define the criteria for anonymization and the software to ensure the criteria are applied in creating the file.
- Define the criteria for determining which statistical official should have access to individual data and/or to unpublished aggregates.
- Define and develop the IT procedures required to ensure individual data and unpublished aggregates cannot be accessed other than by authorised persons.

Quality and Performance Indicators

- Publication of policy or guideline.
- Statement of disclosure criteria.
- Software to detect potential disclosure including residual disclosure in aggregate tables.
- Number of tables in which potential disclosure has been detected prior to dissemination.
- Statement of criteria for authorised access to individual data and/or to unpublished aggregates.
- Documented data access procedures.

3.4 Commitment to Quality

Definition: *Commitment to quality* means that all officials involved in the statistical process are dedicated to assuring quality in their work by systematically identifying weaknesses and continually improving processes and output quality, also that officials and facilities are in place to promote quality awareness and to check that processes and outputs are commensurate with quality objectives.

Quality Related Actions

- Develop BSQAF that describes the work standards, formal obligations (such as laws and rules) and quality control actions that prevent, monitor and evaluate errors and control the statistical production process.
- Develop work plans, schedules and standard forms or templates and ensure that it is used in updating the documents related to quality assurance procedures and actions in a consistent way.
- Ensure all statistical officials are familiar with the BSQAF and implement it.
- Create awareness of the BSQAF to users and other key stakeholders.
- Build quality related actions into statistical training.
- Develop a mechanism to assure the quality of data collection (including the use of administrative data and other sources) and data editing.
- Periodic quality reviews of key products and processes to assess adherence to internal guidelines and international standards are performed.

Quality and Performance Indicators

- Statistical training material.
- Number of statistical officials trained.
- Number of days of training provided to statistical officials.
- Number of interviewers and supervisors trained.
- Number of days of training provided to interviewers and supervisors.

CHAPTER FOUR

ASSURING PROCESS QUALITY

4.1 Sound Methodology and Operational Procedures

Definition: *Sound methodology and operational procedures* means that methods are based on internationally agreed standards, guidelines and best practices, and are consistent with established scientific principles. Effective and efficient procedures are in place for all phases of the statistical production process, from user requirements to dissemination and evaluation.

Quality Related Actions

Standards and methods

- Ensure statistical methods and systems are consistent with international, regional and national standards and guidelines and justify any deviations.
- Ensure that sampling design is based on sound methodology in the conduct of sample surveys.
- Evaluate the use of alternative sources of data, including existing surveys and census, administrative data, big data or other sources of data constantly to minimize the conduct surveys.
- Assess the quality when using administrative data or other data sources. Ideally, when using administrative data, it should be assured that:

  – The population is consistent with the statistical output requirements

  – The classifications are appropriate

  – The underlying concepts are appropriate

  – The records are complete and up to date

  – The geographical coverage is complete and the measurement units are appropriately defined/identified
- Consider the specific methodological challenges such as those linked to the statistical population and the veracity and volatility of such data when using other data sources (such as big data).
- Document all statistical methods and systems.

Questionnaire

- Justify every question in the questionnaire in terms of user needs.
- Ensure that data from every question are disseminated or are used in compiling or checking data that are disseminated or as used to support a skip. If not eliminate the question.

- Design the questionnaire with proper structure (skips and flows) to minimize collection and capture time.
- Pilot test the questionnaire and make changes as needed based on the results.

Frame and Listing

- Ensure a systematic approach is in place for updating the survey frames to ensure accurate coverage of the target population.
- Ensure that the appropriate statistical population frames are updated regularly.
- Information gathered during the conduct of surveys is used to assess and improve the quality of the frame, especially with regard to its coverage and the quality of the contact variables and the auxiliary information (variables used in the sampling design).
- Define and document the listing process in accordance with international best practice, taking into account local specificities.
- Train officials in the listing process.

Data Collection, Capture and Processing

- Define and document the data collection and capture processes.
- Prepare, test and distribute data collection, capture, coding and editing training materials and operating procedures well in advance.
- Train staff in the data collection and capture processes.
- Provide effective supervision and monitoring system.
- Follow up non-respondents intensively.
- Incorporate edit rules (including outlier detection) in the data entry system to the maximum extent possible enabling data verification and correction at entry point.
- Automate coding to the extent possible, referring difficult cases to experts in the relevant classification.
- Automate imputation based on best practice.
- Ensure statistical editing procedures are based on sound methodology.
- Ensure collection systems for administrative and other data are tested before use.

Data Analysis and Dissemination

- Define and document in advance the analysis plan (preparation of dummy tables, editing and imputation rules, validation procedures, etc…) to be undertaken prior to dissemination.
- Define and document a dissemination plan.
- Undertake confidentiality checking prior to dissemination.

- Identify the officials responsible for media relations.
- Manage media relationships and maintain regular contact with the media to ensure that the media play a role in disseminating statistical outputs to a wide audience.
- Develop and follow a policy of responding as appropriate to negative media reporting or misuse of data.
- Develop standard mechanisms for user and stakeholder communications and feedback.
- Provide a channel to handle special requests and provide other assistance to users.

Quality and Performance Indicators

- List of international standards used.
- List of variables and classification not conforming to an international standard with reasons for not using international standard (including possibly that there is no applicable international standard).
- Number of cells for which values are imputed.
- Number of errors detected during data entry.
- Number of errors detected subsequent to data entry.
- Number of cells for which values are suppressed to avoid disclosure of individual data.
- Number of user requests for assistance.
- Number of incidence of negative reporting or misuse of statistical data.

4.2 Managing Respondents and Respondent Burden

Definition: The response rates and the quality of data provided by survey/census greatly depend upon how the respondents feel about their obligations. Mechanisms to maintain good relationships with respondents are essential. An important aspect of the relationship is the respondent burden.

Managing respondents means building and maintaining good relationships with respondents.

Managing respondent burden has two aspects. First, it means balancing the data that are to be collected (in response to user needs) against the burden that collection is imposed on respondents. Second, it means minimizing respondent burden associated with data objectives by not duplicating data available from surveys or administrative sources, by good questionnaire design, and by data collection procedures reflecting respondents' preferences.

Quality Related Actions

- Develop annual statistical calendar.
- Sample surveys are coordinated to distribute the burden on respondents.
- Consider the availability and suitability of existing surveys and administrative or other data sources before suggesting a new survey.
- Explain and justify the collection of each data item of a survey.
- Create awareness among respondents of their rights and responsibilities, including legal obligations, and confidentiality, privacy and security provisions in advance publicity and in the preamble of the questionnaire.
- Community groups, relevant associations, schools and libraries are contacted to raise awareness of the value of the survey/census and to solicit their support.
- There is an active presence on social media to promote and provide access to survey/census data.
- Questions are expressed in a language understood by respondents.
- The average time a questionnaire will take to complete is estimated and made known to the respondents in advance.
- The actual time taken to complete each questionnaire is recorded.
- Standard practices are in place to obtain feedback from respondents and to respond to their requests and complaints in a regular manner.
- Appropriate sampling techniques are used to minimize sample sizes to achieve the target level of accuracy.
- Documentation of data already available within the BSS, including archived data, exists and is shared.
- Ensure that procedures and technical tools for data sharing and data linkage within the BSS (e.g., formal agreements, web services, and common databases) exist.

Quality and Performance Indicators

- Extent of social media presence.
- Efforts made to express questions in the language of the respondents.
- Time taken to complete questionnaire.

4.3 Adequate Resources and Cost-Effectiveness

Definition: Having *adequate resources* means that the human, financial and ICT resources are available and sufficient to those responsible for the statistical process (number and skills) to meet the needs for design, development, production and dissemination of statistics within the designated timeframe.

Cost-effectiveness means that resources assigned to development and implementation of the statistical process are effectively used and that it is possible to determine whether the objectives are achieved and at what cost.

Quality Related Actions

- The costs of producing the statistics are well documented at each stage of the production process and are regularly reviewed and analysed across statistical products to assess the effectiveness of their production.
- Before considering a new data collection, there are mechanisms to review whether already available data sources can be utilized with minimal impact on their purpose and quality.
- When introducing new statistics, a cost-benefit analysis is conducted.
- An appropriate IT strategy must exist and is regularly reviewed and updated to improve the effectiveness and efficiency of the statistical processes.
- The IT architecture and hardware infrastructure must be regularly reviewed and updated, and possibilities for innovation and modernization are identified.
- Routine clerical operations and statistical processes (e.g., data capture, coding, data editing, data validation, data exchange) must be automated where possible and are regularly reviewed.
- Centralized IT and methodological units must exist and provide possibilities for the pooling of resources and investments.

Quality and Performance Indicators

- Budget, by category, target and actual.
- Number of officials assigned by category, target and actual.
- Number of tablets available for use.
- Number of vehicles available for use.

4.4 Managing Metadata

In broad terms, *metadata* are data about data. In the specific context of the survey/census they are data about every aspect of a statistical process and its outputs. To provide a framework for description of metadata, they are divided into four broad types:

- *Definitional metadata* are the metadata that describe the statistical concepts and definitions. Examples are definitions of variable, classifications, and questionnaire wordings.
- *Methodological metadata* are metadata that describe the particular survey/census methods. An example of methodological metadata is the specification of the automated editing rules applied during data entry.
- *Operational metadata* are metadata that describe the inputs and outputs of a procedure, other than the actual data themselves. Operational metadata include process metrics, also called *paradata*, that are generated during the phases. An example of a process metric created during data collection is the number of interviews conducted. Such metadata are the source of quality and performance indicators.
- *Data-related metadata* are those metadata that directly describe the data that are input transformed and output during the operational phases of the survey/census. An example is the description of an output table.

Managing metadata means:

- defining, collecting and using all the definitional, methodological, operational and data-related metadata required to undertake the statistical process; and, from these metadata,
- extracting and disseminating the metadata that are required for users to find, access, and understand the statistical outputs - including concepts, variables, classifications, questionnaire, collection, editing, imputation and analysis methods, and quality indicators.

Quality Related Actions

- The metadata elements used for classifications, definitions of concepts and variables, descriptions of methods, and operations must be defined at the design stage, based to the extent possible on international standards.
- Metadata must be recorded at the time they are created, preferably automatically as a by-product of the process that generates them.
- There must be a single copy of each metadata value, which is created once and can be accessed or superseded, but not overwritten.
- Metadata for dissemination describing survey/census coverage and content of the outputs and the process by which they were produced must be presented at various levels of detail to meet the needs of different types of users.

Quality and Performance Indicators

- Number of classifications for which definitional metadata are disseminated.
- Number of variables for which definitional metadata are disseminated.
- Number of other concepts for which definitional metadata are disseminated.
- Number of methods for which descriptions are disseminated.

CHAPTER FIVE

ASSURING OUTPUT QUALITY (ACCURACY)

Definition: The *accuracy* of a statistical output is the degree to which the data correctly estimate or describe the quantities and characteristics they are designed to measure. Accuracy refers to the closeness between the values provided and the (unknown) true values.

Accuracy has many *aspects* and there is no single overall measure of it. Typically, it is described in terms of the *errors*, or the *potential significance of errors*, introduced at various stages in the statistical process from design to dissemination. *Reliability* is sometimes used as synonym for accuracy.

Quality Related Actions

- Assessing and validating source data, integrated data, intermediate results, and statistical output;
- Check and compare data systematically with data from other sources and over time.
- Compare results of statistics with other existing information in order to ensure validity.
- Identify and describe sources of possible sampling and non-sampling errors;
- Measure and evaluate sampling errors;
- Identify, describe and evaluate non-sampling errors;
- Analyze errors to identify improvement measures; and
- Information about the sampling and non-sampling errors must be made available to users as part of the metadata.

Quality and Performance Indicators

- Number of key indicators for which standard errors are published.

There are different sources of non-sampling errors and are described as follows:

5.1 Coverage Error

Definition: There is omission or duplication in listing the targeted population.

Quality Related Actions

- Develop comprehensive listing procedures;
- Pilot test listing procedures and make changes based on findings.

Quality and Performance Indicators

- Number of Ultimate Sampling Units (USUs) listed;
- Coverage rates.

5.2 Interviewer Error

Definition: The interviewer does not phrase a question correctly, or fails to ask a question.

Quality Related Actions

- Develop comprehensive interview procedures.
- Pilot test interview procedures and make changes based on the findings.
- Conduct comprehensive interviewer and supervisor training.
- Recruit interviewers with subject relevance;
- Check the data collected from a sample of interviews and take corrective action of the interviewer procedures and/or provide additional training as needed based on the findings.

Quality and Performance Indicators

- Number of interviewers trained.
- Number of supervisors trained.
- Number of days of interviewer training.
- Number of changes made to the questionnaire
- Number of interviews attended by supervisors.

5.3 Response Error

Definition: The respondent provides an incomplete or incorrect answer to a question.

Quality Related Actions

- Equip interviewers with adequate communication techniques/ skills.
- Provide the interviewer with checks on the internal consistency of the answers.
- Provide interviewers with sufficient information about questions for which answers are to be coded.
- Ensure the questions are expressed in language that the respondent can be expected to understand.
- Conduct pilot test on the questionnaire and make changes based on the findings.

Quality and Performance Indicators

- Identify the number of questions for which interviewers have problems in obtaining good responses.

5.4 Non-Response Error

Definition: No response is obtained from a respondent.

Quality Related Actions

- Create awareness on the importance of survey/census
- Publicise/advertise the need for the survey/census in advance of data collection.
- Develop and implement a well-defined intensive non-response follow-up procedure.

Quality and Performance Indicators

- Number of awareness created
- Number of non-respondents and non-response rates prior to follow-up.
- Number of non-respondents and non-response rates after follow-up.

5.5 Data Capture Error

Definition: An error occurs during the process of capturing the data from paper in electronic form.

Quality Related Actions

- Use tablets/electronic devices for data collection to the fullest extent possible including automated error checks.
- Use double data entry when capturing data collected on paper.

Quality and Performance Indicators

- Number of errors detected during double data entry;
- Error rates.

5.6 Editing or Imputation Error

Definition: An error that occurs during editing or imputation, in other words a correct value is wrongly discarded or altered, or a missing value is inappropriately imputed.

Quality Related Actions

- Ensure editing and imputation procedures are well defined.

- Automate editing and imputation procedures to ensure correctness, consistency and documentation of changes made.
- Test editing and imputation procedures before their use in production and make appropriate changes based on the findings.

Quality and Performance Indicators

- Number of errors detected by automated editing procedures;
- Error rates detected by automated editing procedures.
- Number of errors detected by manual editing procedures;
- Error rates.
- Number of outliers detected by automated procedures.

5.7 Tabulation, Analysis or Dissemination Error

Definition: An error occurs during the process of tabulation, analysis or dissemination, for example as a result of the use of a wrong version of a data file.

Quality Related Actions

- Ensure to provide distinguishable data file names. For example, use file name as *yyyy_mm_dd_file_name* to help in identifying the latest updated files and update accordingly.
- Ensure data and metadata management procedures are well defined and followed.
- Put all outputs through a final *quality gate* based on thorough scrutiny of the output.

Quality and Performance Indicators

- Number of errors detected in the final quality gate
- Number of errors detected by users.

CHAPTER SIX

ASSURING OUTPUT QUALITY (OTHER DIMENSIONS)

6.1 Relevance

Definition: The *relevance* of the statistics reflects the degree to which it meets the needs of the users to whom it is targeted.

Quality Related Actions

- Develop a well-structured and periodic consultation processes (e.g., advisory councils and committees or working groups) with key stakeholders and users to review the content of the statistical programme, its usefulness and to identify requirements for new statistics.
- Conduct periodic user satisfaction surveys.
- Collect feedback from a user support service, toll free number to understand and identify user needs.
- Cooperate with the scientific community and owners or holders of new data sources to experiment with and pioneer the use of these data sources.

Quality and Performance Indicators

- Number of key users and major stakeholders.
- Number of meetings with key users and major stakeholders.
- User satisfaction survey report published.

6.2 Timeliness and punctuality

Definition: *Timeliness* refers to how soon after the reference date, or the end of the reference period, the statistical outputs are released and disseminated.

Punctuality refers to whether outputs are delivered on the dates promised, advertised or announced. Typically, it implies the existence of a published *dissemination schedule*. An output is punctual if it is disseminated in accordance with the schedule.

Quality Related Actions

- Adhere to timeline of statistical products and services as per the release calendar to carter to data needs of the Five-Year Plan and the Government Performance Management System.
- Ensure that the timeliness and other dimensions of quality (e.g., accuracy, cost and respondent burden) are given due consideration when targets are being set.

- Ensure the preliminary data for key statistics is evaluated before the release. considering data accuracy and reliability.
- Modify the dissemination schedule only if slippage is unavoidable.
- Notify key stakeholders of any changes in the dissemination schedule.
- Ensure that any statistical outputs are made available to users at the same time.

Quality and Performance Indicators

- Number of planned statistical activities.
- Progress reports based on work plan published.
- Number of actions taken to mitigate slippage.

6.3 Coherence and Comparability

Definition: The *coherence* of statistical output means the degree to which it is internally consistent and is consistent with other BSS outputs. It implies that the same term should not be used for different concepts or variables without explanation; that different terms should not be used for the same concept or variable without explanation; and those variations in methodology that might affect data values over time should be accompanied by an explanation.

Coherence in its loosest sense implies the data are "at least reconcilable". For example, if the values of two outputs covering the same phenomena differ, the differences in the coverage, reference period and methodology should be identified so that the values can be reconciled. Coherence has three sub-dimensions.

- Coherence within the survey/census implies that the variables in all the various modules are based on compatible concepts, definitions, and classifications and can be meaningfully related. Incoherency occurs, for example, when the sum of a list of income items does not equal the total.
- *Coherence across outputs* implies that the statistical output is based on the same concepts, definitions and classifications as other outputs, or that any differences are explained and can be allowed for.
- Coherence over time, often called comparability, implies that the outputs of successive cycles of a statistical process are based on common concepts, definitions, and methodology.

Quality Related Actions

- Ensure the use of available international concepts, definitions, classifications and methods. Deviations (if any) are justified and documented.

- Ensure survey/census outputs are analysed jointly with outputs (if any) from other sources, and anomalies detected are explained.

Quality and Performance Indicators

- List of standard concepts, definitions, classifications and methods used.

6.4 Clarity

Definition: *Clarity*, sometimes referred to as *interpretability*, means the outputs are presented clearly, are readily understandable, and are accompanied by sufficient metadata to ensure that their fitness for purpose can be accessed by users. Such metadata typically include the underlying concepts and definitions of the variables and classifications, the sources of the data, the methods of data collection, processing and analysis, and quality indicators.

Quality Related Actions

- Outputs must be disseminated in accordance with the dissemination policy, including use of the specified formats and styles of text, tables, and charts.
- Outputs must be accompanied by summaries that can be easily understood by users.
- Statistical press releases, publication highlights and other explanatory texts must be produced.
- Metadata for dissemination describing coverage and content of the outputs and the process by which they were produced must be maintained at various levels to meet the needs of different types of users.

Quality and Performance Indicators

- Number of classifications for which definitional metadata are disseminated.
- Number of variables for which definitional metadata are disseminated.
- Number of other concepts for which definitional metadata are disseminated.
- Number of methods for which descriptions are disseminated.

6.5 Accessibility

Definition: *Accessibility* means that outputs and accompanying metadata can be found and obtained without difficulty by users, and are available and accessible to all users on an impartial and equal basis, in various convenient formats, and are offered free of charge or at minimal cost.

Accessibility includes making provision for access of unit record data (PUF) for research purposes in accordance with an established policy that ensures statistical confidentiality.

Quality Related Actions

- Ensure that all the statistical outputs are available on the website.
- Ensure that there is an online catalogue of statistical outputs and services.
- The website must be user friendly with good facilities for discovering and accessing data and metadata.
- Different types of formats must be available on website for users to generate their own tables.
- Based on user needs, selected outputs must be available in hardcopies.
- There must be policy and procedures for archiving survey/census outputs and accompanying metadata.
- There must be well-publicized user support service that can handle queries about outputs and requests for additional, possibly custom designed outputs.
- Access to anonymized micro-data must be allowed for research purposes, subject to specific conditions and procedures relating to statistical confidentiality and security.

Quality and Performance Indicators

- Number of website accesses.
- User satisfaction index.
- Number of anonymized micro-data shared.

REFERENCES

United Nations National Quality Assurance Frameworks Manual for Official Statistics; 2019; Expert Group

European statistics Code of Practice — revised edition; 2017; European Statistical System Committee (ESSC)

Bhutan Economic Census—Quality Assurance Framework; 2017; Michael Colledge

Strategic Plan to Improve Statistics in Bhutan (July 2020 –June 2023); 2020; NSB

12 Five Year Plan (1 November, 2018 - 31 October 2023); 2018, NSB

Bhutan Civil Service Rules and Regulations (Parenting Agency Framework); 2018; RCSC

Guidelines for conduct of surveys—Version 01; 2018; NSB

Executive Order; 2006; PMO

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