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GUIDE FOR THE IMPLEMENTATION OF A QUALITY ASSURANCE FRAMEWORK FOR STATISTICAL PROCESSES AND OUTPUTS

SUMMARY

UNITED NATIONS

ECLAC

INTRODUCTION

This document summarizes the main elements of the "Guide for the implementation of the quality assurance framework for statistical processes and products", prepared by the working group created by resolution 11(X) of the Statistical Conference of the Americas of the Economic Commission for Latin America and the Caribbean (ECLAC). The working group was coordinated by Colombia (National Administrative Department of Statistics (DANE)) and Mexico (National Institute of Statistics and Geography (INEGI)).[1]

The document is intended as a guide for the adoption, adaptation and application in Latin America and the Caribbean of the United Nations National Quality Assurance Frameworks Manual for Official Statistics. The Guide was prepared from the Manual and its diagnostic tools in an unofficial translation into Spanish produced by the national statistical offices of Colombia and Mexico. It is also based on discussion of those inputs with the countries of the region to obtain recommendations for adapting the Manual to the context of Latin America and the Caribbean.[2]

In order to provide inputs enabling the region's countries to formulate and implement their own national quality frameworks and to improve existing ones, this guide is divided into four chapters. The first contextualizes statistical quality assurance and provides a brief summary of the United Nations National Quality Assurance Frameworks Manual for Official Statistics as a mandatory reference for engaging in quality assurance. It also introduces the concept of statistical quality, based on the experiences of Latin American and Caribbean countries; and the concept of the data ecosystem in the quality assurance framework in terms of the opportunities that arise from the digital transformation and the proliferation of new data sources.

The second chapter makes recommendations for actions to develop, implement and strengthen quality assurance in the region. These include implementing a self-assessment questionnaire to diagnose the relevance of risk management to statistical quality assurance, the application of standards, and considerations relating to new data sources and the Sustainable Development Goals (SDGs).

The third chapter presents best practices, including the tools and indicators (if any) that have been used in the region to implement statistical quality assurance. The fourth and last chapter draws on the information contained in the previous chapters to recapitulate the steps to be followed when starting, from the most technical levels, to implement a statistical quality assurance framework in the region's countries.

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[1] The authors are grateful to the agencies of various countries in the region and to the United Nations entities for valuable assistance during the preparation of this document.

[2] A pilot test was conducted of the diagnostic instrument (the questionnaire) adapted to the regional context, focusing on the quality of the statistical processes and outputs that are the focus of this guide.

A. THE CONTEXT OF QUALITY ASSURANCE

This first chapter discusses the conceptual framework and definitions that must be taken into account when implementing a statistical quality assurance framework. For this purpose, it provides a summary of the United Nations National Quality Assurance Frameworks Manual for Official Statistics, explaining the dimensions of quality and the principles associated with each of them.

Subsequently, the concept of statistical quality is introduced, and a definition is established, based on the aforementioned manual and adopted by the countries of the region. Lastly, the chapter discusses the advantages offered to the region by a new data ecosystem which, permeated by the digital transformation and the appearance of new data sources, makes it possible to produce more disaggregated data in a timely and reliable manner. It also makes it possible to reimagine how national statistical offices can contribute to quality assurance in this context.

1. United Nations National Quality Assurance Frameworks Manual for Official Statistics

The national quality assurance framework provides guidance primarily for quality assurance to ensure that official statistics are a reliable source of information in a changing environment. It contains the United Nations' recommendations for ensuring the availability and quality of official statistics produced by components of the national statistical system (NSS).

However, in specific cases, the recommendations can be adopted by other members of the extended data ecosystem that also produce non-official statistics, but are not part of NSS. These include international and supranational organisations, firms that produce data on a regional or global scale, and private or public-private professional organizations, among others.

The quality framework principles and associated requirements are organized in the following levels:

- Level A: Managing the statistical system. This level refers to the coordination that should prevail among the statistical agencies and units that make up NSS, to ensure: (i) quality assurance and efficiency in the production of official statistics; and (ii) the use of common statistical standards throughout the system.

- Level B: Managing the institutional environment. This level concerns the technical independence that national statistical offices need, to be able to ensure the credibility of official statistics in terms of their development, production and dissemination.

- Level C: Managing statistical processes. This level focuses on compliance with international standards, guidelines and good practices issued by statistical agencies for the development, production and dissemination of official statistics.

- Level D: Managing statistical outputs. This level ensures that the statistics serve the needs of national Governments, research institutions, businesses, the general public and the international community.

Each level includes a set of principles and quality requirements that are related to the Fundamental Principles of Official Statistics, which United Nations Member States adopted and are required for quality assurance in statistical production. These requirements are vital indicators that, once satisfied, guarantee that measures have been adopted to ensure statistical quality.

2. The concept of quality

The concept of statistical quality is present in the work of the national statistical offices and is understood multidimensionally. Although the countries of the Latin America and the Caribbean region use different definitions of quality, they have common characteristics such as orientation towards the satisfaction of users' needs and the obligation to satisfy a set of specifications or criteria.

There are also other international benchmarks that provide guidance for defining statistical quality. These include the United Nations Fundamental Principles of Official Statistics, which promote confidence in the integrity of statistical systems and foster credibility in the statistics produced by its Member States.

It is important to note that quality is operationalized through certain dimensions or principles, which must be adequately balanced, so that their implementation contributes to the continuous improvement of statistical processes.

Based on the process of analysis and discussion of the manual and its diagnostic and application tools with the region's countries, a concept of statistical quality applicable to the region is presented. This specifies the criteria and characteristics that the statistical process and output must fulfil for the purpose of satisfying the users' information needs.

This concept is materialized through the following dimensions:

- Accessibility: the ease with which the statistical information can be located and obtained by users. This includes the format in which the information is provided, the dissemination media, and the availability of the metadata and the support services for its consultation.

- Clarity: the availability of appropriate documentation relating to the statistics and the additional assistance that producers make available to users. Statistical methods and processes should be documented so that they can be replicated.

- Credibility: the confidence that users have in the statistical outputs, based on the perception that they are produced professionally and according to appropriate statistical standards, and that policies and practices are transparent.

- Consistency: the degree to which the concepts used, the methodologies applied and the results produced by the operation are logically connected.

- Comparability: the characteristic that enables the results of different statistical operations to be related, aggregated and interpreted with each other or with respect to a common parameter.

- Timeliness: the length of time between the occurrence of the phenomenon under study and the dissemination of the statistics, in such a way that they are useful for decision-making.

- Precision: the closeness of the estimates to the exact value of the phenomenon to be measured. Precision can be expressed in terms of standard deviation.

- Punctuality: the time lag between the release date set in the publication schedule the actual delivery of the data.

- Relevance: the degree to which the statistics meet users' information needs.

3. Quality in the data ecosystem

In recent years, technological progress has given rise to new data sources, new data providers and new producers of statistics. Additional demands for detailed and timely data for policymaking have also arisen in the context of the 2030 Agenda for Sustainable Development. This has led to the consolidation of a new data ecosystem, understood as a system in which several actors interact to exchange, produce and use data. Defined simply, a system can be understood as a set of connected parts that form a complex whole. However, there are many other definitions of a data ecosystem. The model used by the United Nations Development Programme (UNDP) considers the data ecosystem to consist of data producers, data objects, infomediaries (in other words, the media and other commercial information services) and data users (UNDP, 2017). Other models envisage the national statistical system as one led by the national statistical office, situated at the centre of a system consisting of government agencies, academic and research institutions, the private sector, civil society and international and regional organizations.

This new data ecosystem raises both challenges and opportunities for official statistics. For example, national statistical offices in the future are likely to play progressively diminishing role in the production of official statistics, but an increasingly important role as managers of statistics and data produced by other agents. This guide seeks to provide parameters and recommend actions to guarantee the quality of statistical processes and outputs, helping countries to safeguard the role of official statistics as a reliable source of information in a changing environment.

The new role of the statistical offices should include promoting statistical quality frameworks not only among the institutions of national statistical systems but also with different actors in the private sector that increasingly generate data. A diagnostic assessment of the degree of maturity of national statistical offices in terms of these requirements will make it possible to steer the institution towards this possible new role. The next chapter discusses additional aspects of statistical quality assurance in this new data ecosystem, considering both the producers of official statistics and the new data providers.

B. ACTIONS TO STRENGTHEN STATISTICAL QUALITY
ASSURANCE IN THE REGION

Although this guide is based on the United Nations National Quality Assurance Frameworks Manual for Official Statistics, the aim is to adapt it to the regional reality, following the discussions held within the working group on statistical quality. The first regional adaptation exercise involved applying a diagnostic self-assessment questionnaire, as proposed in the Manual as one of various quality assessment methods and tools (see the annex of the Manual).

Secondly, as the preparation of this guide coincided with the coronavirus disease (COVID-19) pandemic, and given the changing role of the statistical offices, emphasis is placed on incorporating risk management into the concept of statistical quality. In this process, the aim was to learn about and document the practices adopted in the countries of the region to maintain the quality of official statistics in the face of the challenges of the pandemic and in a context of high demand for information.

Thirdly, it addresses the need to adapt statistical quality standards. Various international organizations have promoted the adoption of norms that aim to standardize countries' statistical production, in order to achieve data comparability and interoperability. Accordingly, this guide includes the main standards used in the region, along with a number of actions that have contributed to their implementation in different countries.

Lastly, the National Quality Assurance Frameworks Manual for Official Statistics recognizes a new data ecosystem in which new data sources are appearing, and new information demands are arising from the 2030 Agenda for Sustainable Development. It was considered essential to expand the traditional sources on which statistical offices have relied thus far, and to define strategies to meet the challenges involved in using them. This section includes the key issues to be considered for enhancing the quality of the information obtained from these new data sources.

1. The diagnostic self-assessment questionnaire

The self-assessment questionnaire is primarily designed to evaluate the national statistical system, as seen by the national statistical office in its capacity as coordinating institution. The questionnaire was designed by the Expert Group on National Quality Assurance Frameworks and uses the United Nations National Quality Assurance Framework as a reference.

The purpose of this self-assessment is to identify strengths, weaknesses (and risks), and then identify possible improvement actions. The self-assessment should be followed by the preparation and implementation of an improvement plan. The self-assessment checklist can also help in monitoring the progress of the national statistical office. However, it is important to clarify that the scores obtained on self-assessment by different national statistical offices are not comparable, given the way the questionnaires are implemented, and the questions asked.

The self-assessment should be conducted by a team working at various levels of management, including subject-matter experts drawn from across the statistical office. This will mitigate biases that could render the replies less objective; and it will also forge a collective understanding of the situation from a less biased perspective. Documentation, metadata and independent verification of the information provided are other measures that can help address the risk of subjectivity.

Adaptation of the questionnaire for the countries of the region began with a pilot test that was self-applied in the different countries represented in the working group. It also focused on levels C (Managing the statistical process) and D (Managing statistical outputs) of the United Nations National Quality Assurance Framework. In addition, questions were selected corresponding to levels A (Managing the statistical system) and B (Managing the institutional environment) to place the results in context. Table 1 shows how the instrument was structured following adaptation.

Table 1
Number of requirements and elements contained in the adapted questionnaire

Level	Number of requirements	Number of elements
A: Managing the statistical system	14	68
B: Managing the institutional environment	27	100
C: Managing the statistical process	21	86
D: Managing statistical outputs	24	99

Source: Prepared by the authors on the basis of, "Annex: Detailed list of elements to be assured", *United Nations National Quality Assurance Frameworks Manual for Official Statistics: Including recommendations, the framework and implementation guidance*, Series M, No. 100 (ST/ESA/STAT/SER.M/100), United Nations, New York, 2019.

Instructions for completing the questionnaire were prepared, along with an Excel file containing the questionnaire adapted for the countries of the region. The latter is designed so that the countries that perform the assessment only use the first spreadsheet "Elements to be assured", in which they must complete the "Compliance" column for each of the elements, using the following reply alternatives:

(i)   Full compliance: the element described has already been implemented, and there is little room for improvement.

(ii)   Partial compliance: the stated element is not fully addressed, and significant improvements are required to comply.

(iii)   Non-compliance: progress on implementation of the element described is minimal, and urgent action is required.

The implementation of a given element may also consist of the implementation of an equivalent activity or practice; so it is useful to record descriptions of how the elements are complied with. These can be useful for preparing plans of action, and can be used as a reference for a future self-assessment exercise.

Lastly, the elements are evaluated directly by classifying their compliance in the pre-defined categories. Once the elements have been evaluated, the corresponding rating of the requirements and principles of the quality assurance framework is automatically obtained. This can be verified in the other two spreadsheets.

2. Linking risk management with statistical quality assurance

Risk management needs to be coordinated closely with statistical quality management activities, as the two frameworks are complementary and should not operate independently of one another. A coordinated approach to quality and risk management is cost-efficient and facilitates involvement and support from the management of the organization.

The National Quality Assurance Framework specifies that risk management in the production of statistical information can be considered as "quality assurance, in terms of risk mitigation, for the different phases of a statistical production model" —in other words, the Generic Statistical Business Process Model (GSBPM) (United Nations, 2019, p. 38). Moreover, risk management is part of the statistical quality compliance requirements and is included in requirement 8.8: "That risk analyses are conducted with the aim of validating the quality of key statistical products and processes" (United Nations, 2019, p. 23). Therefore, completion of the questionnaire could be a first step in verifying the institution's maturity level in terms of adopting measures to mitigate risk.

In the countries of the region, decrees require public agencies to establish and maintain their internal control and risk management systems. Consequently, some national statistical offices have a risk management policy that includes the steps needed for risk identification, analysis, evaluation and treatment processes. In some cases, such as the National Institute of Statistics of Chile, this management model is translated into a risk matrix that is applied to statistics production processes and subprocesses. In cases such as Colombia's National Administrative Department of Statistics (DANE), this risk map of the statistical production process usefully includes the statistical quality attributes. The respective matrices usually contain sensitive information, which should be reserved and kept under controlled access.

3. Use of standards

The use of standards is fundamental in quality assurance, since it establishes a common language between the information-producing unit and the user. Experiences in the region's countries include the widespread use of national and international standards adopted as part of the methodologies, using benchmarks from the United Nations, the Economic Commission for Europe (UNECE), Eurostat, the Economic Commission for Latin America and the Caribbean (ECLAC), the Organization for Economic Cooperation and Development (OECD) and the International Organization for Standardization (ISO), among others.

The regional experience uses six types of standard in particular, which are described briefly below along with actions that can contribute to their implementation. These are based on the experiences of different countries in the region that were presented in the working group:

(i) **Quality assurance framework and the United Nations Fundamental Principles of Official Statistics**: It is desirable to have an institutional document that establishes the commitment to quality and serves as guidance for the actions of the various institutions and individuals involved in the production and dissemination of statistics.

(ii) **Generic Statistical Business Process Model (GSBPM)**: This model regulates the statistics production process, defining eight phases (specify needs, design, build, collect, process, analyse, disseminate and evaluate) and four subprocesses.

(iii) **Catalogues, classifications and good practices**: There are several catalogues and classifications based on international recommendations that have been adopted by some of the region's countries. Ecuador has adopted the International Standard Industrial Classification of All Economic Activities (ISIC)), the Central Product Classification (CPC), and the International Standard Classification of Occupations (ISCO).

(iv) **Metadata of publicly available information**: Some countries, such as Ecuador and Mexico, have adopted the open data standard, which seeks to ensure that information is freely available and accessible (preferably downloadable from the Internet); that it is presented in a convenient and modifiable form; that the data can be reused and redistributed, and even integrated with other datasets.

(v) **Internal metadata for statistics production**: Several of the region's countries use standards for statistical production metadata. For example, Brazil uses the Single Integrated Metadata Structure (SIMS), which is based on Statistical Data and Metadata Exchange (SDMX) and the Generic Statistical Information Model (GSIM) for structural metadata.

(vi) **Standards for mainstreaming the gender perspective in the statistical process**: Some countries in the region (such as Chile and Colombia) have developed guidelines for mainstreaming the gender perspective in each phase of statistical production and analysis. At the international level, the Department of Economic and Social Affairs (DESA) of the United

Nations has produced a document to guide the gender mainstreaming process in each country's official statistics (United Nations, 2015). It is essential that the region's national statistical offices implement, adapt and update the concepts, variables, questionnaires, classifications applied, and the tools and training, striving for statistical quality in their operations by applying this approach.

4. Thoughts on new data sources and the Sustainable Development Goals

Implementing the 2030 Agenda for Sustainable Development, and achieving the Sustainable Development Goals (SDGs) as measured through fulfilment of their targets and indicators, raise statistical challenges in terms of both the scope and the disaggregation of the respective goals and indicators, and the timeliness and reliability of their measurement. However, the digital transformation and new data sources provide an opportunity to overcome these challenges.

The National Quality Assurance Frameworks Manual for Official Statistics distinguishes data sources by their purpose and by the entity responsible for collecting the information. According to these criteria, data sources are classified into statistical sources, administrative records and other information sources. Each information source poses challenges that can be overcome by incorporating another type of source into the statistical work. For example, statistical sources, which are those in which the information was collected through sample surveys for specific statistical purposes, pose challenges such as a high non-reply rate, high production costs and low frequency of completion. These challenges can be overcome, to a considerable degree at least, by using administrative records in the statistical production process.

The challenges inherent in using each information source have an impact on satisfying the quality requirements of both the national quality assurance framework and the Fundamental Principles of Official Statistics. Accordingly, using different information sources in the production of official statistics is essential for meeting the quality requirements and the ever-increasing demands for information arising from the Sustainable Development Goals and the general need to produce information for decision-making.

C. BEST PRACTICES IN THE REGION FOR COMPLIANCE WITH THE LEVELS C D. AND D PRINCIPLES OF THE NATIONAL QUALITY ASSURANCE FRAMEWORK (PRINCIPLES 10 TO 19)

The region's countries make constant efforts to fulfil the Fundamental Principles of Official Statistics and especially to ensure their quality. This chapter highlights these endeavours, by identifying the best practices proposed by the countries to fulfil the requirements for maintaining quality levels in the statistical process and output.

The countries' efforts go beyond the practices compiled in this chapter.[3] However, considering the length of the document, priority was given to describing replicable and innovative practices. Accordingly, emphasis is placed on practices for which there is sufficient information and forms of measurement through synthetic indicators, together with practices that differ from what most national statistical offices implement (for a summary of these, see table 2).

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[3] The prioritized practices are described in detail in the full document "Guide for the implementation of a quality assurance framework for statistical processes and outputs", to be published shortly. The present document summarizes the practices pertaining to the topics covered.

Table 2
Summary of good practices in the region for compliance with the levels C and D principles
of the National Quality Assurance Framework (principles 10 to 19)

Principle	Good practice
Level C: Managing the statistical process	
10. Assuring methodological soundness	For this principle, good practices were collected in relation to consistency between the methodologies used and international standards, the presence of qualified staff, the selection of data sources, and cooperation processes with the scientific community.
	Notable examples include:
	– The presence of expert committees to review relevant methodological changes in statistical operations (Chile).
	– The existence of annual training and knowledge refresher programmes for civil servants involved in the production of statistics (Mexico).
	– The formation of interdisciplinary teams to address issues such as the transfer, access, security, treatment, storing and use of administrative records (Costa Rica).
	– The existence of agreements with public institutions for the management of large databases (Chile).
11. Assuring cost-effectiveness	For this principle, good practices involve mechanisms to ensure cost-efficiency, evaluate the demands for new statistics and the permanency of those currently being produced, verify the application of information and communications technologies (ICT) to improve processes, improve the statistical potential of administrative records, and promote and implement integrated production systems. The most important examples included the following:
	– Implementation of the "Data System" tool to calculate the costs of statistical operations (Colombia and Mexico).
	– The existence of procedures for the detection, standardization and assessment of evaluation needs, as well as systems for members of the national statistical system to make requests for new statistical operations (Brazil, Chile, Colombia and Costa Rica).
	– Use of "web scraping" to extract information from the Internet and machine learning to automate the coding and collection of data for the consumer price index (CPI) (Chile).
	– Use of administrative records to create unique population registers (Costa Rica)
	– National adaptation of the Generic Activity Model for Statistical Organizations (GAMSO) version 1.2 (2019) and the generic statistical business processes model (GSBPM) version 5.1 (Colombia).
12. Assuring appropriate statistical procedures	This principle embraces good practices related to the review of statistical processes and their establishment and monitoring, and the existence of a standard review procedure. These key practices were as follows:
	– The application, as from the design phase, of pilot tests on the collection and storage instruments (Brazil, Chile, Colombia and Mexico).
	– Application of the GSBPM-based production model with a process and subprocess orientation to standardize methods and procedures (Chile, Colombia, Mexico).
	– Review and analysis of statistical outputs based on public-data review policies (Brazil).

Principle	Good practice
13. Managing the respondent burden	This principle includes good practices related to the proper range of statistical products, as well as the use of sound methods for minimizing the respondent burden. The key practices were as follows: – The use of guides to reduce the respondent burden (Colombia), – Use of computer-assisted personal collection techniques to speed up survey implementation (Brazil,, Colombia, Costa Rica and Mexico).
Level D. Managing statistical outputs	
14. Assuring relevance	For this principle, good practices were compiled for considering user needs and requirements, as well as the use of statistics based on new and existing data sources that meet society's information needs: – The existence of systems to evaluate the general statistical information plans currently in use, for the purpose of structuring new versions (Brazil) – Existence of protocols for responding to requests for information in crisis or emergency situations, based on the differentiated processing of information already collected, by designing special modules that are incorporated into ongoing surveys (Costa Rica).
15. Assuring accuracy and reliability	This principle compiles good practices in the assessment and validation of data sources, integrated data, intermediate results and final results; the measurement, assessment and documentation of sampling errors; and the application of studies and analysis of revisions to statistical outputs: – Inclusion of the evaluations of statistical results in quality reports, particularly considering accuracy indicators (Mexico). – Establishment of a standard in household survey quality estimations to verify criteria for publication (Chile) – Implementation of a statistical quality instrument to identify the causes of problems reported by the users of statistical operations in the national statistical system (Colombia).
16. Assuring timeliness and punctuality	This principle relates to good practices in meeting international standards on the timeliness of statistics, proper management of the relationship with data providers, and measurement and monitoring of the timeliness of release: – Existence of statistical opportunity indicators to support decision-making in the dissemination area (Mexico). – Existence of a document containing recommendations for preparing the release schedule (Colombia). – Existence of numerical indicators of punctuality. (Mexico)
17. Assuring accessibility and clarity	This principle contains good practices related to the ease of interpretation of the statistics, the publication policy and strategy, the use of technology to facilitate access to the information, access to microdata, and dissemination of the quality of statistical outputs: – Existence of documents containing recommendations for the dissemination of statistical information and access to it in accordance with international practices (Colombia). – Annual development of a dissemination plan and a system for approving it (Colombia). – Existence of a statistical and geographical data platform to access the content interactively and the possibility of downloading documents of interest in PDF and Excel formats (Belize).

Principle	Good practice
	– Implementation of specialized off-site processing rooms so that researchers who need to access and process anonymized microdata that are not available on the Internet can do so (Colombia). – Existence of differentiated quality criteria for the results of statistical outputs (Mexico).
18. Ensure consistency and comparability.	This principle contains good practices in the use of international standards for definitions, units, variables and classifications; comparability of statistics over time periods and geographical areas; and procedures to ensure internal intra- and intersectoral coherence and consistency: – Existence of methodological guidelines for developing information programmes (Mexico and Colombia). – Audits of the use of classifications to monitor the correct coding of the current classifications (Chile)
19. Metadata management	This principle contains good practices related to the definition and documentation of the metadata management system, the structuring of internationally accepted standards for documenting, filing and disseminating metadata, as well as training and development programmes for staff involved in information and documentation systems management: – Implementation of methodological documentation processes using international standards on metadata and microdata management such as the Data Documentation Initiative (DDI); the Dublin Core Metadata Initiative (DCMI); and the Statistical Data and Metadata Exchange (SDMX), which are part of the Accelerated Data Programme (ADP) (Mexico, Costa Rica and Colombia). – Annual training programmes on the development of metadata based on international standards, for the members of the national statistical system, according to the technical standards adapted for each country.

Source: Prepared by the authors, based on information gathered by the working group.

The table does not include practices for all the requirements evaluated at the corresponding levels. There are to two possible reasons for this: either they correspond to requirements for which most of the countries are already at a high level of compliance; or else they are requirements for which there were no practices that met the replicability and innovation criteria.

The main tools used by the countries to assess fulfilment of the requirements are self-assessment tools created to monitor the code of good practice of the country or region, as the case may be. There is little information available on indicators or tools designed to assess quality requirements directly; so the self-assessment questionnaire described in section A of chapter II could be an important support tool for the countries.

E. CONSIDERATIONS FOR IMPLEMENTING A QUALITY FRAMEWORK

1. Establishing a baseline in terms of compliance with quality principles

As a first step in implementing the quality assurance framework, it is essential that the national statistical office assess the functioning of the national statistical system from its standpoint as governing and coordinating body. In making this assessment, it is advisable to use the self-diagnostic instrument described in the second chapter of this guide.

Once the evaluation process indicated in the instructions for completion has been fulfilled, the national statistical office will have a set of quantitative and qualitative criteria for identifying its main strengths and weaknesses in terms of fulfilment of the requirements of the assurance framework. First, the self-assessment tool provides an overall score on a scale of 0 to 100 for each principle. This quantitative criterion can serve as a primary input for identifying the principles with the most critical levels of implementation and which, consequently, require priority action by the national statistical office. The latter should establish a ranking based on this quantitative criterion, giving higher priority to principles with more critical performance levels. Once this ranking has been established, the national statistical office should identify the requirements that are not being fulfilled and therefore require immediate action.

Using the ranking defined in the previous phase, it is important to establish a plan for complying with the framework elements, emphasizing the prioritized principles. This means setting execution deadlines and establishing implementation mechanisms, short-, medium- and long-term targets, systems for verifying achievement of the targets, and work teams to focus on their implementation.

This process of diagnostic assessment and formulation of actions requires collaborative working arrangements with other producers of statistics in the national statistical system. It is also essential that the strategic level of the national statistical office is committed to the prioritization of the work agenda for implementation of the framework, and to providing the human, financial and technological resources needed for its development.

2. Modelling the statistical process

The Generic Statistical Business Process Model (GSBPM) is considered the best model for regulating the production process in statistical operations, and it is recommended by international organizations. Its focus on processes makes it possible to: (i) develop a common language for all types of information programme;

(ii) structure and reuse practices established prior to its implementation; (iii) make it easier to implement gradual changes; (iv) have a framework in place to build and manage standardized software products; (v) more easily break down tasks to provide improvements; (vi) clearly identify responsibilities among the different actors; and (vii) more easily define management indicators that are comparable over time.

The following activities, in particular, are necessary for implementing GSBPM:

- Establish technical standards that regulate the phases of the production process.

- Develop a repository information supporting each phase of the production process.

- Design a cost model for each information programme and phase of the production process, including information programmes and statistical activities produced in accordance with the national statistical office's internal programme structure and expenditure register.

- Provide specific training courses for individuals who contribute to a phase, regardless of whether they work on different information products.

- Develop conceptual guidelines to standardize criteria between the different types of information programme (censuses, surveys, administrative records, among others) in order to have the information needed to document different phases of GSBPM.

- Develop guidelines for harmonizing statistical production within the national statistical system, listing the inputs and outputs involved in each phase and its corresponding subprocesses.

- Conduct evaluations and use indicators to monitor certain phases and subprocesses.

Throughout the adoption of the GSBPM model, it is also important to generate standards for the outputs involved in the different stages of the process, which incorporate minimum requirements depending on the type of information source.

For the above, the unit in charge of quality, working in conjunction with the technical teams, is advised to establish specific guidelines for creating or using products, such as:

- **Classifiers**: define the classifiers to be used by the institution, making sure they are kept up-to-date with international standards. Specify the analyses that should be undertaken in the event of changes in the classifiers to determine their effects on the series.

- **Methodology**: establish the methodology's minimum information requirements, according to the type of information source used, to help the user gain an in-depth understanding of the processes involved in each phase.

- **Standardized non-response variables**: establish an instrument (or variables in an already-used collection tool) that allow for the classification and reduction of non-response and the generation and monitoring of performance indicators in fieldwork in operations that use statistical sources.

- **Sampling frameworks**: define processes for updating the sampling frameworks for operations with statistical sources; and define the inputs, methodology and schedule for reducing the bias arising from their obsolescence.

- **Definitions**: generate a glossary of terms for the different topics worked on in the national statistical office, such as demographics, employment, income, expenditure, among others.

- **Guidelines for mainstreaming the gender perspective**: formulate guidelines, in accordance with international standards, for mainstreaming gender in the various statistical operations. As a basic principle, these should correctly characterize phenomena by gender; and they should be capable of capturing the implications of the specific phenomenon being measured for men and for women.

- **Metadata standards**: establish the application of standards for the information that is available to users, including DDI, SDMX and open data, among others.

3. Making the best use of administrative records for statistical purposes

As explained above, using administrative records in the production of official statistics has several advantages, but also poses multiple challenges that directly affect the principles that ensure the quality of official statistics.

Addressing any of the challenges requires knowledge of the administrative records available in the country, to be able to conduct a diagnostic assessment of them. For this reason, it is first recommended that an inventory be made of the administrative records available in the national statistical system, by subject, periodicity, target population and producer institution. This will allow for an initial assessment to be made of the existence or otherwise of administrative sources, in the context of new demands for information, and studies to evaluate their cost-efficiency relative to existing statistical sources.

The most frequent challenge is the poor accessibility of administrative records, in cases where there is no statistical law, or the law does not authorize the national statistical office, as the NSS governing body, to access them. In this case, the existence of agreements or memoranda of understanding with data providers allows for progress to be made by incorporating new sources.

In view of compliance with the fundamental principles and the region's own experience, it is recommended that agreements or memoranda of understanding be drawn up that specify the objectives for which administrative records are made available, the data to be delivered in the database, the term of the agreement, the responsibilities of both parties, and the technical media and security modalities applicable to information transfer.

The possibility of conducting quality assessments on administrative records, using measurement instruments developed for this purpose, is another challenge confronting the region. Measurement instruments should be available that ensure impartiality and objectivity in the process of generating statistical data from administrative records. They should also support the methodology for defining and validating the target population of the statistics, given the potential for selection bias in the capture of administrative data and the calculation of the associated non-sampling error. This will ensure the accuracy and reliability of the data.

Another factor that needs to be considered for ensuring the quality of statistical data when using administrative records or other data sources, is the use of unique identifiers for the records that are available, firstly, to the national statistical office and, subsequently, to the national statistical system as a whole.

**4. Seeking measurement modalities based on the dimensions of quality
and stages of the statistical process.**

One of the fundamental aspects of statistical quality management is that it should be assessable through different tools. The National Quality Assurance Framework defines three levels of assessment, according to the degree of progress achieved by each national statistical office. The first level includes the use of quality indicators, the production of quality reports and the application of user surveys. For this level, a number of actions are recommended that stem from good practices generated by the countries of Latin America and the Caribbean:

- Process mapping using GSBPM with the aim of monitoring each of the phases of the statistical process. This is based on the belief that, to enhance the quality of statistical products, it is necessary to improve the statistical processes involved. The mapping consists of comparing the activities carried out in each phase of the statistical process with what is established in GSPBM, identifying progress in its implementation.

- Preparation of quality reports based on indicators that make it possible to continuously monitor the performance of the statistical process. The indicators can be formulated on the basis of different criteria, including quality attributes or the phases of the statistical process.

For the second level, which involves self-assessment and auditing processes, the recommended actions include the following:

- The formulation of checklists that enable for a qualitative assessment to be made of compliance with the requirements of the statistical operation, in light of the quality benchmark and its own objectives. Its aim is to ensure that those responsible for the operation check that the activities have been carried out for each subprocess in each phase, as needed to execute and control the statistical operation; and that this occurs under the expected statistical quality conditions. These lists may include the following elements: phase, subprocess, characteristic, if applicable to the statistical operation, as well as the status, name and description of the supporting data.

- The issuance of final reports, following the execution of quality assessments, including the preparation of improvement plans based on the results obtained. For this purpose, it is essential to previously establish an evaluation criterion and specify the issues to be addressed in the final report. These may include the context of the statistical operation, the description of the evaluation and its results, and the conclusions in terms of strengths, opportunities for improvement and non-conformities, among others.

Lastly, for the third level, involving labelling and certification, the tools specified for the previous levels must have been implemented, since this will provide elements for defining a more advanced evaluation criterion. This latter may consist of the construction and/or formulation of a technical quality standard, the application of which has advantages in terms of fostering a process approach, establishing minimum requirements and contributing to the statistical process improvement cycle.

To implement this type of standard appropriately, the national statistical office needs to set up an evaluation and certification scheme that specifies techniques and activities to guarantee confidence in the quality of what is being evaluated. These include the need to form an independent committee for the

certification decision, and to specify its period of validity and subsequent oversight to check that the certification characteristics are maintained over time.

5. Having a risk-management plan in place

In the countries of the region, decrees require public agencies to set up and maintain their internal control and risk management systems. Consequently, some national statistical offices have a risk management policy that includes the steps needed for risk identification, analysis, evaluation and treatment processes. In some cases, such as Chile's National Statistical Institute (INE), this management model is expressed in a risk matrix that is applied to statistics production processes and subprocesses. It is useful for this risk map of the statistical production process to also consider the attributes of statistical quality, as is the case in Colombia's DANE.

The national statistical offices should therefore develop a statistical process risk matrix, in six steps. First, the context should be established to identify the risks adequately, taking into account external social, cultural, technological, legal and regulatory factors, among others. It should also identify risk generators and their threats, internal factors, vulnerabilities, failures or other causes that could generate the risk.

Secondly, the types of risks involved should be identified, most of which are usually of an operational type, as well as the source of the risks (where applicable) —for example, sampling problems or respondent access problems, among others.

Thirdly, a risk analysis must be performed, which should consider the consequences arising from materialization of the risk. In other words, it is necessary to evaluate the effects or impacts that would be caused if the damage associated with the risk occurred, such as economic losses, effects on employees or other processes, sanctions, fines, lawsuits, cessation of activities, the need to repeat processes, delays, among others. The consequences should not be confused with the risks. In this phase of risk analysis, factors such as the probability of the damage occurring (possible, almost certain, and other categories) and the impact (slight, moderate), must also be taken into account.

Fourthly, the risk assessment is established, in which everything to do with controlling the risk must be developed first —how to establish the person responsible for executing the control, which could be the managers or their delegates or the leaders of the statistical operation. The periodicity of the control activity must also be established, quarterly, half-yearly; or else whenever required.

This should be followed by a description of how the actions to mitigate or correct the risks encountered are controlled, such as reviewing and approving the completeness of the contents and the technical and economic components of the general plan. It is also important to describe the actions to be undertaken when deviations, inconsistencies or abnormal situations are encountered during the execution of the control. A record should be kept of the supporting data for control execution.

Lastly, the result of the evaluation of the control design should be indicated and early warnings should be put in place as preventive actions. These actions, which should aim to minimize vulnerabilities, are formulated because the set of controls may be insufficient; and they can be targeted towards implementing new controls or strengthening existing ones.

6. Documenting the National Quality Assurance Framework

As the National Statistical Quality Assurance Framework should be understood as a coherent and integrated system with elements that guarantee the quality of official statistics, it is essential that each national statistical office analyse, define and document its quality assurance framework. This will consolidate in a single document the instruments and tools needed to manage and ensure the quality of statistical processes and outputs, pursuant to users' requirements and needs, so that the statistical information has the attributes needed for decision-making.

7. Defining the data ecosystem of the country's official statistics

The national statistical office is the quality framework's first scope of implementation. However, the data revolution has materialized in the emergence of new actors and new data sources that have potential for statistical exploitation, which are essential to produce granular measurements that can be adapted to the SDG monitoring process. In this context, it is crucial to reflect on the scope of this framework in the data ecosystem of official statistics and how it is implemented both within and outside national statistical systems.

The discussion on the data ecosystem recognizes that interaction with other government actors, the private sector, academia and the general public has been intrinsically linked to the role of the national statistical office. This has sought to identify new needs and demands, capture the data needed for measurements and facilitate the use of statistics in decision-making processes. The novelty, or the value of the data ecosystem concept, is that it makes it possible to recognize new actors playing the role of data providers that should be considered in a collaborative production modality.

The data ecosystem concept makes it possible to recognize that these actors (producers, providers and users) operate at both the national and the subnational levels, that they need to be identified, and that working and interaction mechanisms need to be set up to generate statistical information that incorporates new territorial, differential and intersectional approaches. This ecosystem also requires capacity building on different levels (system, organization and individuals). Accordingly, the national statistical office needs to play an increasingly active role in statistical system coordination.

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Annex 1

TABLE OF CONTENTS OF THE "GUIDE FOR THE IMPLEMENTATION OF A QUALITY ASSURANCE FRAMEWORK FOR STATISTICAL PROCESSES AND OUTPUTS"[4]

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Annexes

Annex 1:   Requirements and elements of the adapted version of the self-assessment questionnaire
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Glossary of terms used in the guide

Bibliography

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[4]   The table of contents may be subject to minor editorial changes in the final document.