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DRAFT

UN Statistics Quality Assurance Framework

Including a Generic Statistical Quality Assurance Framework

for a UN Agency

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Prepared by the Committee of the Chief Statisticians of
the United Nations System (CCS-UNS)

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1 Introduction

1.1 Motivation for the Document

There is a growing awareness and appreciation of the value and need for good quality information, and its transparency, to support and inform public policy decisions. The importance of data is highlighted by recent high profile reports, such as 'A World that Counts' and the significance given to high quality indicators for monitoring the 2030 Agenda for Sustainable Development strongly reinforce this trend.

Achieving and maintaining public trust in official statistics requires that those statistics are produced in an objective, transparent and professionally independent manner. The United Nations Statistical Commission preserved these and other important principles in 1994 when it adopted a set of *Fundamental Principles of Official Statistics*. In 2014, these principles were adopted by the UN General Assembly. Many countries around the world have adopted a *national code of practice* and/or a *statistical quality assurance framework (SQAF)*[1] to capture the principles and best practices, and to safeguard public trust. To support the development of SQAFs the United Nations Statistics Division (UNSD) produced a generic *National Quality Assurance Framework (NQAF),* comprising a *Template and Guidelines,* that is designed to assist countries in developing their particular SQAFs. It has been endorsed by the United Nations Statistical Commission (UNSC) and is widely referenced.

These principles and frameworks target national statistical organisations. For international organisations producing statistics the Committee for the Coordination of Statistical Activities (CCSA) in 2005 adopted the *Principles Governing International Statistical Activities,* which enshrines principles similar to the Fundamental Principles of Official Statistics.

The *United Nations Statistics Quality Assurance Framework (UNSQAF)* is designed to go a step beyond these principles for international organisations by introducing a common understanding of the quality dimensions and quality assurance for all relevant UN agencies*,* i.e. agencies in the United Nations Statistical System (UNSS). It also aims to clarify the status of statistics compiled by the system and address a number of aspects of statistical work germane to the system, such as data sharing between UN agencies, adjusting national data, and the use of non-official data, including big data. It takes the view that every agency in the UNSS should have its own SQAF, which is in particular important for agencies where production of statistics is not the core business and where a SQAF provides a basis for support and coordination. The document outlines the measures that might be taken to ensure that SQAFs are established, building on recent initiatives by the CCSA to coordinate and promote better quality statistics in the UNSS, in particular the newly established role of chief statistician for each agency.

Several international organisations, in particular the OECD, FAO, ITU and UNIDO, have already developed and implemented their own SQAFs. To facilitate the development and implementation of SQAFs by UN agencies, the document includes a framework referred to as

[1] or equivalently a *data quality assurance framework (DQAF)* – the terms *SQAF* and *DQAF* are effectively synonyms, as discussed later.

the *Generic Statistical Quality Assurance Framework (Generic SQAF).* This framework is modelled on the NQAF Template and Guidelines produced by the UNSD but tailored to the circumstances of UN agencies rather than national statistical organisations (NSOs). It recognises that a 'one size SQAF that fits all agencies' is not realistic and thus presents a generic SQAF that can be adapted to the specific circumstances of an individual agency. This is the closest to harmony across the UNSS that is likely to be achieved in the context of quality assurance

The timing of this document is important given the context of UN projects emerging from the data revolution initiative and the UN's 2030 Agenda for Sustainable Development. The global community needs to be reassured that members of the UNSS are taking all reasonable steps to ensure the quality of the data underpinning measurements of economic, social and environmental progress and the reporting of data for the global SDG indicators agreed by Member States.

1.2 Aims of Document

The aims of this document are to:

- provide a starting point for promoting a statistical quality culture across the UNSS;
- stimulate an exchange of ideas on the extent to which quality assurance within the UNSS can be coordinated;
- provide material that can be helpful in establishing individual SQAFs in UN agencies.

1.3 Audience for Document

The intended readership/users of the document are:

- *managers and staff involved in statistical activities in UN agencies* – the Generic SQAF provides principles, quality dimensions and broad guidelines for quality assurance across the UNSS;
- *senior management of the UN agencies* – the document indicates how quality is, or will be, assured and assessed across the UNSS as a whole;
- *national data providers, typically national statistical offices and other national organisations* – the document indicates how quality of the data they provide to UN agencies is, or will be, assured;
- *the UN Statistical Division (UNSD)* – as coordinator of the UNSS, the UNSD is the agency with overall responsibility for ensuring that quality is assured by the UN agencies
- *international and national data users* – the document gives users of statistics produced by UN agencies an overview of the UNSS approach to quality assurance.

1.4 Scope of Document

The starting point for development of the document is a clear understanding of the *statistical activities* that are in scope for quality assurance. This means defining what is meant by *statistical activity.*

A *statistical activity* is an activity in which the primary focus is on acquiring, processing, analysing, storing and/or disseminating statistical data (rather than on using them), or on building the statistical infrastructure to support such activities. A statistical activity may be conducted by a person with the formal title of statistician or another title such as economist or sociologist,

metadata management expert, statistical systems development expert or data scientist. It may be conducted by a person on a full-time or part-time basis.

In general, *statistical activities* do not include human resource management, financial management and ICT infrastructure as these are not specific to the agency's statistical activities but rather reflect the management of the organisation as a whole. The only respect in which such activities may be covered is where their management is having a notably adverse effect on the agency's statistical activities.

For the purposes of description and assurance, statistical activities thus defined may be divided into two groups:

(1) *statistical production activities,* associated with acquiring, processing, storing and disseminating specific statistical data, including the specification and design of these activities; and

(2) *statistical infrastructure activities*, associated with developing and maintaining the *statistical infrastructure* that supports production activities and that includes overall planning of the statistical programme as a whole, standard definitions and classifications, standard data acquisition, processing, storage, dissemination and metadata management methods and tools.

As there are typically many statistical production activities within an agency, for ease of description and assessment, they are divided into separate *statistical production processes*. A statistical production process (sometimes called a *statistical production line*). For more information on statistical production processes see the Generic Statistical Business Process Model (GSBPM)[2].

1.5 Contents of Document

The document contains three further sections and an Annex.

- Notes on the distinct characteristics of UN agencies as context for discussion of quality.
- Guidance on a number of issues that need to be discussed and resolved to ensure harmonisation across the UNSS.
- A summary of the action items required in order to better assure quality across the UNSS

Annex: The Generic SQAF.

Descriptions of the underlying principles for international agencies, the quality dimensions, the groups into which statistical activities are categorised, and an annotated list of reference documents appear in the Generic SQAF.

[2] The latest version is 5.0 dated December 2013. Available at: http://www1.unece.org/stat/platform/display/GSBPM/GSBPM+v5.0

2 Characteristics of UN Agencies Producing Statistics

2.1 Characteristics that distinguish UN agencies from NSOs

UN agencies (and, indeed, international organisations in general) that produce statistics have some characteristic features that are quite similar to, or quite distinct from national statistical offices (NSOs), as follows.

- The requirement for a country to report to a UN agency is typically not supported by a national law and frequently based on a voluntary agreement of countries, whereas the requirement to report to an NSO is underpinned by a statistics act.
- A UN agency may process data and produce statistics as a *by-product*, possibly an important by-product, of its main function, whereas for NSOs these are its main functions.
- Typically statistics are produced by more than one organisational unit within UN agency. This is somewhat similar to statistics being produced through independently operated surveys within an NSO and/or by other organisations within a national statistical system (NSS).
- It is desirable, but by no means always the case, that a particular unit in a UN agency is designated as having responsibility for coordinating statistics within the agency. If such a unit is so designated it is typically the unit that is the largest producer of statistics within the agency. This is somewhat similar to the situation that the NSO is the largest producer of statistics within the NSS.
- UN agencies are not usually *primary* data collectors in the sense of gathering data directly from individual households, businesses and institutions, although a UN agency may directly support the compilation of data at national level. UN agencies typically obtain data from NSOs and other national ministries, departments and agencies, which are the primary data collectors. Nevertheless, if the data obtained by an agency would not otherwise have been collected, then the respondent burden on the individual households, businesses or institutions can be attributed to the agency.
- A UN agency gathers data for a range of countries and typically adds value by verifying the data, combining them, harmonizing them, aggregating them, analysing them across countries, and providing cross country commentaries. This is a not a role undertaken by NSO's.
- Quite often data provided by countries to a UN agency are considered to be *official statistics* by those countries. Nevertheless, verification and harmonisation by the UN agency may result in changes to these data in order to obtain internationally comparable official statistics - defined in this report as 'official international statistics' - see Section 3.2.
- A UN agency does not undertake estimation in the sense of weighting a sample as does an NSO. It does undertake estimation in a quite different sense, namely that of deriving and publishing estimates for individual counties by modelling the data for countries where data are missing. Whilst an NSO may impute data for individual units where data are missing, it will not typically publish these data.
- Primary users of statistics collected by a UN agency are often within the agency itself, as the mandate for data collection is usually closely related to, or directly derived from purpose of

the organization. There is a very heavy focus on gathering together data from possibly many sources and analysing them in order to produce commentary and underpin policy making. In this context it is especially important that the users are fully aware of the limitations of the data, particularly where the data have been derived by modelling. This puts a significant obligation on UN agencies that produce statistics to ensure that users are fully informed about data quality and do take account of data deficiencies, especially where data have been modelled.[3] In this context the Guidelines for Accurate and Transparent Health Estimates Reporting (GATHER) currently being prepared by a working group of health experts will provide an example of best practice. It will include checklist of items to report whenever global health estimates are published. Whilst NSOs certainly have a role in informing users about data quality they rarely publish data that have been modelled.

These distinctive characteristics have been taken into account in developing the *Generic SQAF*. They are the reason why the generic NQAF for NSOs cannot be directly applied to UN statistical agencies.

2.2 Differences between UN Agencies

Although UN agencies have these characteristics in common they can differ quite substantially in structure from one other. At one end of the spectrum are agencies that have a *centralised statistical function*, i.e. agencies where most statistical activities take place within a single organisational unit within the agency and that unit has a designated statistical coordination role. Examples are the UN, the IMF and UNESCO, where most statistical activities are undertaken within the (UN) Statistics Division, the (IMF) Statistics Division, and the Institute for Statistics, respectively. At the other end of the spectrum is an agency, such the World Health Organisation (WHO) which has a decentralised statistical function whereby statistics are produced independently in a number of organisational units without a substantial coordinating role. The Food and Agriculture Organisation (FAO) was in a similar situation until recently when it introduced a Chief Statistician and established the Inter-Departmental Working Group on Statistics to oversee the FAO Statistical Programme of Work as a collaborative effort.

For agencies at the decentralised end of the spectrum, a SQAF is particularly important. This is exemplified by the FAO, which, in the introduction to its SQAF notes *the initiative is particularly important within the current context of a decentralized statistical system, where each FAO technical department carries out its own statistical programme of work and maintains ownership of its data. In such system, and without the proper coordination mechanisms, common standards and methodologies are not consistently applied on a corporate scale, and any adoption is undertaken on a good-will basis*.

Another closely related characteristic that can vary between UN agencies is whether or not they have a formal mandate to collect statistics. For example, the UNSD has such a mandate, whereas some other agencies do not. Evidently such a mandate gives support to statistical activities.

[3] See Economic and Social Council resolution 2006/6 on strengthening statistical capacity, which contains reference to the fact that estimates should always be carried out in full consultation with concerned countries and through transparent methodologies.

3 Definitions, methods and coordination

3.1 Introduction

The following paragraphs deal with issues that need to be addressed in order to ensure there is a common understanding and harmonisation across agencies compiling statistics within the UN.

3.2 Definitions

Definition of "official statistics" at national level

Because UN agencies are dependent upon national statistical offices (NSOs) and other organisations within national statistical systems (NSSs) to provide data it is important to have a common understanding of what should be considered as official statistics at national level.

Official statistics at national level are:

- *all statistics produced by the NSO, other than those explicitly stated by the NSO not to be official; and*
- *all statistics produced by the National Statistical System (NSS) i.e. by other national organisations that have, in some sense, been certified or considered acceptable by the NSO and/or by the international agency with responsibility in the domain to which the statistics refer.*

In short, if an NSO produces statistics they are, de facto, official unless stated otherwise because their production is the core function of the NSO. If another organisation within the NSS produces statistics then they need to have some form of recognition by the NSO or by the relevant international organisation in order to be considered official.

In principle, official statistics should be accompanied by sufficient metadata for users to form an accurate impression of their likely quality. However this is not a condition for them to be considered official.

Definition of "official statistics" at international level

It is entirely possible that a UN agency, or other international organisation, will modify official statistics at national level that have been provided by an NSO or other organisation in the NSS. Such modifications may be made to harmonise the data across countries or to correct evidently erroneous values. Also, in the absence of a national source, the UN agency or other international organisation may estimate the data using a model. Thus, it is not sufficient to define official statistics at international level to be simply the reproduction of official statistics at national level.

Official International statistics are statistics produced by a UN agency or other international organisation that have been made available to the relevant national organisations for verification and are considered acceptable by those organisations.

- *The "relevant national organisation" is the national organisation that provided the original data, or, in the case that the data were acquired from other sources or estimated by the international agency, the national agency to whose activities the statistics are relevant.*

- *The absence of a comment by the relevant national organisation when given ample opportunity to do so is interpreted as the statistics being acceptable to that organisation.*
- *A data value that is disputed by a national organisation is not considered official, but can be disseminated along with official values provided it is accompanied by appropriate metadata to inform users of the dispute.*

3.3 Methods and Sources

Adjusting national official statistics

Official statistics received from an NSO or other national organisation should be adjusted in either of two circumstances:

- *they have to be adjusted to standard classifications, definitions or methods in order to be harmonised with data from other countries; and/or*
- *they are clearly in error, or at least implausible, because of internal inconsistencies or based on comparison with data from similar countries.*

Use of non-official national data in producing international statistics

In the absence of official data at national level, UN agencies often resort to a variety of national government sources and extract any data that are relevant. Typically, UN agencies do not use commercial data.

A UN agency should be prepared to use commercial data sources if by doing so it can improve the quality of its statistics. The source should be acknowledged.

Statistics based on non-official data can result in official international statistics if they meet the criterion, i.e., are made available to the relevant national organisation for verification and are considered acceptable by that organisation.

Use of Secondary Data in producing international statistics

Owing to digitisation of many administrative data sources and the widespread use of new telecommunications and other devices, huge volumes of potentially usable data are being generated (e.g. by global positioning system devices, automated teller machines, scanning devices, sensors, mobile phones, satellites and social media). Because of their high volume, high velocity and wide variety, many of these data are commonly referred to as *big data*. More generally, *big data* is a broad term for data sets so large or complex that traditional data processing applications are inadequate. Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying and information privacy.

The potential of using big data sources for official statistics resides in the timely —sometimes real-time —availability of large amounts of data, often at minimal cost. However, taking advantage of big data requires identification of the user needs they will address, it requires new tools and methods for their acquisition and processing, and it raises issues in terms legislation, privacy, management and finance. There are also many challenges to accessing big data sources, particularly proprietary data sources. Utilising big data for the compilation of international official statistics also poses challenges for the relationship between the UN statistical agencies and their members, in particular, where sources independent of the member state are used to

estimate values for the member state e.g. if satellite imagery data are used to compile estimates for hectares covered by forest.

In response to the need to investigate the benefits and challenges of big data for official statistics the *Global Working Group on Big Data for Official Statistics (mandated by the Statistical Commission in 2014)* have formulated recommendations, including drafting a special International Statistics Code of Practice for Big Data, which would be the yard stick against which the National Statistics Code of Practice could be established. Recommendations on Access to Big Data (and Partnerships with Big Data Providers) would be dealt with in such a Code.

Conclusion

Incorporate the International Statistics Code of Practice for Big Data when it is available. But in principle, big data should not be treated any differently from any other potential data source. A big data source should be evaluated for its potential in producing multi-country statistics in the same way as any other data source by determining whether the data acquired will meet a need and is fit for purpose and if so how the data can be acquired and processed.

3.4 Data Sharing and Coordination

Production of the same data by more than one agency

Whilst efforts have been made by international organisations to collect any given set of data only once from a national source, this has not reduced the incidence of dissemination of different sets of values for the same data by different organisations. For example estimates of GDP per capita are produced by several agencies and they are different. This is confusing for users, who then have to make a judgement which source is best.

Within international organisations, or within UN agencies at least, there should be one and only one definitive source of data for any given indicator or statistics. This does not preclude the possibility of an earlier estimate being produced by another agency provided that that estimate is acknowledged as preliminary and not definitive. Nor does it prelude the possibility of an agency republishing data that it has acquired from another organisation, or reconfiguring the data for agency specific classifications, provided it does not change the data and provided it acknowledges the original definitive source.

Data sharing between UN agencies and with other international organisations

Data sharing between agencies does not always happen when it should, which can result in multiple production of the same data. To avoid this:

As far as is practicable, all compiled data should be published and made available freely to all users.

UN agencies should share any unpublished data if requested by another UN agency, unless those data are confidential or are of sufficiently poor quality to justify not sharing (in this case, this should be then addressed as part of SQAF).

The possibilities of acquiring some data items from another UN agency or international organisation rather from national sources should be examined when designing a new statistical process or evaluating the quality of an ongoing one.

There should be a single conduit for acquisition of data from other international organisations so that data are consistently accessed, imported and used within the agency.

Data sharing within a UN agency

Data sharing within an agency does not always happen when it should. It is not unknown for a unit within an agency to use data from another international organisation rather than data on the same topic produced by a unit in its own agency.

As far as is practicable, all compiled data should be published and made available freely to all users.

Compiling units should share any unpublished data if requested by another unit within the same agency, unless those data are confidential or are of sufficiently poor quality to justify not sharing (in this case, this should be then addressed as part of SQAF).

Use of UN agency data by a third party

Third party use of data is actively encouraged on the understanding that the UN agency is acknowledged as the source of the data.

Use by the UN of data under copyright

UN agencies should be prepared to use data under copyright if these data improve the resulting statistics, of course respecting the conditions of the copyright.

4 Actions to Promote Quality Assurance in the UN

The following actions by the UNSD are envisaged.

- Promote and monitor development of SQAFs by UN agencies.
- Distribute the *Generic SQAF* as a starting point for individual SQAF development.
- Monitor implementation of quality assessments by UN agencies based on their SQAFs.
- Conduct an assessment of selected statistical production processes in selected agencies.

The following actions by individual agencies are envisaged (if not already done):

- designate a chief statistician ;
- designate a statistical coordinating unit;
- develop or adopt a SQAF and ensure it is implemented.

The following actions by the designated coordinating unit within each agency are envisaged:

- identify all statistical production processes in the Agency;
- ensure the staff involved in these processes receive SQAF training;
- ensure that all processes are subject to a quality assessment in accordance with the SQAF assessment programme and that action is taken on the recommendations.
- ensure there are tools to support use of standard concepts, definitions and classifications;
- ensure there are tools to facilitate making data and metadata produced by the Agency unit readily available to other organisational units in the Agency;
- ensure there is a single conduit for acquisition of data and metadata from each other international organisation so that data from this organisation are consistently used within the Agency;
- ensure that staff in the Agency unit use data and metadata produced by other units in the Agency in preference to data on the same topic produced by another international organisation, as appropriate.

Annex

Generic Statistical Quality Assurance Framework for a UN Agency

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Preface

{The purpose of this document is to present the *Generic Statistical Quality Assurance Framework (Generic SQAF)* to assist in the development and implementation of a SQAF in a UN agency that does not have one, and as a basis for review of a SQAF in an agency that already has one.

For agencies that do not presently have a SQAF

The Generic SQAF refers to "an Agency". It can be specialised to an actual agency in essentially three steps.

Step 1

Throughout the text replace "Agency" by the actual name of the agency and "SQAF" by the actual name to be given to the framework by the Agency.

Step 2

Follow the instructions in the text in parentheses and red italic script {such as this}. Eliminate this text after following the instructions as it should not be carried through to the agency specific SQAF.

Step 3

Adapt the rest of the text as required to deal with the particular circumstances of the agency. This is, of course, the major step. It may well result in significant changes in content and quite possibly in structure. It should be the subject of widespread discussion so that staff of the agency become familiar with the material in the Agency SQAF and take ownership of it.

For an agency that already has a SQAF or equivalent

The Generic SQAF provides a basis for review and revision of the existing SQAF. It suggests what might be considered for inclusion in the revised version.

It is quite possible that the structure of the existing SQAF will be retained by the Agency and the revision will be additions or changes to content. Alternatively the revision may involve a significant change in structure as well. In either case the review should be the subject of widespread discussion so that staff of the Agency are familiar with the revised SQAF and take ownership of it.}

1 Introduction

1.1 Context for the SQAF Development

{The primary function of the Agency should be briefly described here.}

{Review and amend the following paragraphs as appropriate}

In addition to its primary function of *{...}*, the Agency collects data from NSOs and other national organisations and produces and disseminates statistical data. The most important uses of these data are to inform the organisation's analytical reports. In the absence of an analytical need within its organisational units for a particular type of data the Agency does not have the mandate to acquire, process and publish the data of that type.

Although statistics are a by-product of the Agency's main function, they are nevertheless a very important output in their own right. They cover many countries and span long periods. The Agency adds value to the data it obtains from national statistical offices (NSOs) and other orgisations within the national statistical systems (NSS) by editing the data and eliminating erroneous values, by harmonising these data across countries, by adjusting for series breaks and by estimating data for countries for which no data have been received or the data received are of poor quality.

The Agency disseminates statistics externally in two distinct ways.

- Statistics are disseminated in the form of *databases* that can be interrogated and as free standing *statistical tables* in electronic and printed publications. Such statistics can be valuable to users, internal or external to the organisation, for analytical or policy purposes. This may be referred to as *direct* data dissemination and is the primary form of dissemination.
- In addition, the Agency publishes data in the form of *statistical tables embedded in analytical and policy reports and studies*. These tables support analyses or policy proposals rather than being a statistical end in themselves. This may be referred to as *indirect* data dissemination.

1.2 Concepts Underlying the SQAF

{Review and amend the following as appropriate}

In order to address quality and efficiency concerns in the Agency it is vital to have a commonly accepted statistical framework on the basis of which quality and performance can be evaluated. Such a framework itself depends upon commonly agreed principles, a clear understanding of quality and its dimensions, quality guidelines, and a quality assessment program. These are the components of the Agency's Statistical Quality Assurance Framework (SQAF).

Here the term *quality* is interpreted in a broad sense, encompassing all aspects of how well statistical processes and outputs fulfil user and stakeholder expectations. Good quality outputs are statistics fit for purpose from the user perspective, more specifically meaning that they are relevant, accurate, reliable, coherent, timely, accessible, and interpretablele. They are produced

by good quality processes, meaning processes that use sound methodology and systems and are cost-effective, within an institutional environment that recognises the need for objectivity, impartiality and transparency and for statistical coordination.

1.3 Benefits of the SQAF

{Review and amend the following as appropriate}

The benefits of the SQAF are that it will:

- provide a systematic mechanism for facilitating the ongoing identification of data quality problems and possible actions for their resolution;
- provide a basis for creating and maintaining a data quality culture within the Agency;
- stimulate and maximize the interaction among the Agency staff involved in production or use of statistics;
- give greater transparency to the processes by which statistics are produced and their quality is assured and thereby reinforce the Agency's image as a trustworthy provider of good quality statistics;
- provide reference material that can be helpful in training;
- provide a mechanism for the exchange of ideas on quality assurance with other producers and users of statistics, at international and national levels.

The SQAF is a statement of intent as well as a description of good practices. The aim over the coming years is to ensure that all output statistics and associated processes are assessed in accordance with the framework and that quality and performance improvement possibilities are identified, considered and implemented.

1.4 Audience for the SQAF

{Review and amend the following as appropriate}

The intended readership/users of the SQAF are:

- Agency managers and staff involved in statistical production – the SQAF provides a framework for assessment of statistical activities;
- Agency senior management – the SQAF provides an indication how quality may be assessed;
- data providers – the SQAF includes quality guidelines and an indication of roles data providers can play in quality assurance;
- data users – the SQAF provides users of the statistics with evidence of quality assurance by the Agency.

1.5 Scope of the SQAF

{It is recommended that the following definitions of statistical activity *and* statistical production process *be used without change. Ideally the scope of the SQAF is all statistical production activities in the Agency. If this level of coordination is not feasible in the near future a less*

favourable but still useful alternative is for the SQAF to apply to all the statistical production activities of a specified organisational unit or set of units within the Agency. In this case reference to "Agency" throughout the text should be changed to the name of the organisational unit(s) where appropriate.}

The SQAF includes all statistical development and production activities within the Agency *{or unit}*, whether conducted by persons with a formal role of statistician or any other role such as economist or sociologist, metadata management, statistical systems development, and whether on a full time or part-time basis. It does not include human resource management, financial management and ICT infrastructure as these are not specific to the Agency's statistical activities.

For the purposes of the SQAF, a *statistical activity* is an activity in which the primary focus is acquiring, processing, storing or disseminating statistical data rather than analysing or otherwise using them.

The Agency's statistical activities are divided into two groups:

- *statistical production activities* - associated with acquiring, processing, storing and disseminating specific statistical data, including the specification and design of these activities – this is the larger group;
- *statistical infrastructure activities* - associated with developing or maintaining the *statistical infrastructure* that supports production activities and that includes statistical concepts such as standard statistical classifications, and processing procedures and storage mechanisms.

For ease of description and quality assessment, the statistical production activities are divided into separate *statistical production processes,* each of which:

- is under the control of a single manager;
- covers a specified topic or range of topics;
- acquires data from a specific source or set of sources; and
- produces a specific statistical product or set of related products.

As of the date this document was written there were *{ }* production processes in the Agency. Statistical production processes may be added or removed over the years according to data needs.

1.6 Development of the SQAF

Several other international and supra-national organisations have well established SQAFs and the UNSD has published a Generic SQAF. The Agency's SQAF has been developed taking advantage of these frameworks, adapting and elaborating the ideas to the Agency's unique circumstances. Documents that were particularly influential include:

{Replace the following list by the actual documents used}

- UNSD's *Generic Statistical Quality Assurance Framework*
- UNSD's *Template and Guidelines for a Generic National Quality Assurance Framework (NQAF)*;
- WHO's *Data Quality Assurance Framework for the Global Health Expenditure Data Production Process*;

- OECD's *Quality Framework and Guidelines (QFG)*;
- European Statistics *Code of Practice*.

A full set of reference documents is provided in the Annex.

1.7 SQAF Components

{Review and amend the following as appropriate}

The SQAF has five components.

- The first component describes those aspects of the statistical processes of the Agency that need to be described in order to give context to the SQAF.

{The first component is not included in the Generic SQAF as it is Agency specific and must be developed by the Agency.}

- The second component is a set of *underlying statistical principles* that provide the basis for formulating the SQAF.
- The third component is a set of *quality dimensions,* highlighting the various aspects of data and process quality.
- The fourth component is a set of *quality guidelines,* comprising good practices for assuring quality, including management of metadata.
- The fifth component includes and *quality governance procedures* and a *quality assessment and improvement program,* which jointly ensure that the SQAF is implemented, that quality is monitored and assessed, and that appropriate quality improvement actions are taken.

2 Underlying Statistical Principles

{It is recommended that the following principles are used without modification. Agency specific principles and values can be added as considered appropriate.}

The underlying *Principles Governing International Statistical Activities* upon which the SQAF is based were formulated by the Committee for the Coordination of Statistical Activities and endorsed by the chief statisticians/coordinators of statistical activities of UN agencies in 2005. They are as follows.

1. ***High quality international statistics, accessible for all, are a fundamental element of global information systems***

Good practices include:

- Having regular consultations with key users both inside and outside the relevant organisation to ascertain that their needs are met
- Periodic review of statistical programmes to ensure their relevance
- Compiling and disseminating international statistics based on impartiality
- Providing equal access to statistics for all users
- Ensuring free public accessibility of key statistics

2. ***To maintain the trust in international statistics, their production is to be impartial and strictly based on the highest professional standards***

Good practices include:

- Using strictly professional considerations for decisions on methodology, terminology and data presentation
- Developing and using professional codes of conduct
- Making a clear distinction, in statistical publications, between statistical and analytical comments on the one hand and policy prescriptive and advocacy comments on the other

3. ***The public has a right to be informed about the mandates for the statistical work of the organisations***

Good practices include:

- Making decisions about statistical work programmes publicly available
- Making documents for and reports of statistical meetings publicly available

4. ***Concepts, definitions, classifications, sources, methods and procedures employed in the production of international statistics are chosen to meet professional scientific standards and are made transparent for the users***

Good practices include:

- Aiming continuously to introduce methodological improvements and systems to manage and improve the quality and transparency of statistics

- Enhancing the professional level of staff by encouraging them to attend training courses, to do analytical work, to publish scientific papers and to participate in seminars and conferences.
- Documenting the concepts, definitions and classifications, as well as data collection and processing procedures used and the quality assessments carried out and making this information publicly accessible
- Documenting how data are collected, processed and disseminated, including information about editing mechanisms applied to country data
- Giving credit, in the dissemination of international statistics, to the original source and using agreed quotation standards when reusing statistics originally collected by others
- Making officially agreed standards publicly available

5. Sources and methods for data collection are appropriately chosen to ensure timeliness and other aspects of quality, to be cost-efficient and to minimise the reporting burden for data providers

Good practices include:

- Facilitating the provision of data by countries
- Working systematically on the improvement of the timeliness of international statistics
- Periodic review of statistical programmes to minimise the burden on data providers
- Sharing collected data with other organisations and collecting data jointly where appropriate
- Contributing to an integrated presentation of statistical programmes, including data collection plans, thereby making gaps or overlaps clearly visible
- Ensuring that national statistical offices and other national organisations for official statistics are duly involved and advocating that the Fundamental Principles of Official Statistics are applied when data are collected in countries

6. Individual data collected about natural persons and legal entities, or about small aggregates that are subject to national confidentiality rules, are to be kept strictly confidential and are to be used exclusively for statistical purposes or for purposes mandated by legislation

Good practices include:

- Putting measures in place to prevent the direct or indirect disclosure of data on persons, households, businesses and other individual respondents
- Developing a framework describing methods and procedures to provide sets of anonymous micro-data for further analysis by bona fide researchers, maintaining the requirements of confidentiality

7. Erroneous interpretation and misuse of statistics are to be immediately appropriately addressed

Good practices include:

- Responding to perceived erroneous interpretation and misuse of statistics
- Enhancing the use of statistics by developing educational material for important user groups

8. Standards for national and international statistics are to be developed on the basis of sound professional criteria, while also meeting the test of practical utility and feasibility

Good practices include:

- Systematically involving national statistical offices and other national organisations for official statistics in the development of
- international statistical programmes, including the development and promulgation of methods, standards and good practices
- Ensuring that decisions on such standards are free from conflicts of interest, and are perceived to be so
- Advising countries on implementation issues concerning international standards
- Monitoring the implementation of agreed standards

9. Coordination of international statistical programmes is essential to strengthen the quality, coherence and governance of international statistics, and avoiding duplication of work

Good practices include:

- Designating one or more statistical units to implement statistical programmes, including one unit that coordinates the statistical work of the organisation and represents the organisation in international statistical meetings
- Participating in international statistical meetings and bilateral and multilateral consultations whenever necessary
- Working systematically towards agreements about common concepts, classifications, standards and methods
- Working systematically towards agreement on which series to consider as authoritative for each important set of statistics
- Coordinating technical cooperation activities with countries between donors and between different organisations in the national statistical system to avoid duplication of effort and to encourage complementarities and synergy
- to the improvement of statistics in the organisations and in countries

10. Bilateral and multilateral cooperation in statistics contribute to the professional growth of the statisticians involved and to the improvement of statistics in the organizations and in countries

Good practices include:

- Cooperating and sharing knowledge among international organisations and with countries and regions to further develop national and regional statistical systems
- Basing cooperation projects on user requirements, promoting full participation of the main stakeholders, taking account of local circumstances and stage of statistical development
- Empowering recipient national statistical systems and governments to take the lead
- Advocating the implementation of the Fundamental Principles of Official Statistics in countries
- Setting cooperation projects within a balanced overall strategic framework for national development of official statistics

3 Quality Dimensions

{There is no single agreed international standard set of quality dimensions. The following quality dimensions are presented as a plausible set. They should be reviewed and agreed or modified as the Agency feels best suits its situation.}

3.1 Introductory Remarks

It is generally agreed that, whilst *statistical product quality* can be summarized in line with the definition in the ISO 9000 Series for any product as *fitness for use*, there is a need to elaborate this definition in terms of the various quality aspects or *dimensions*. Many versions of quality dimensions have been proposed over the last 20 years, most of which contain essentially the same ideas and all of which include a significant expansion of the original narrow interpretation of quality as simply *accuracy*.

In developing the following set of dimensions particularly influential documents were:

- UNSD's generic *National Quality Assurance Framework (NQAF) Template and Guidelines*;
- WHO's *Data Quality Assurance Framework for the Global Health Expenditure Data Production Process*;
- OECD's *Quality Framework and Guidelines (QFG)*;
- European Statistics *Code of Practice*.

Other reference documents are listed in the Annex.

In line with the Code of Practice, and as illustrated in Figure 1, the quality dimensions for a UN agency (hereafter referred to as the *Agency*) are in three groups: those relating to *output quality*; those relating to *process quality;* and those relating to *institutional quality.* The last two groups are important because the basis for output quality is well designed and executed processes within an appropriate institutional setting.

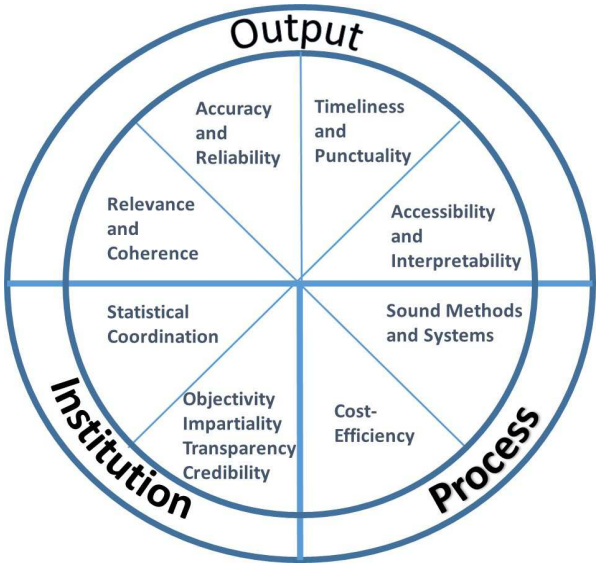

Figure 1. Quality Dimensions

3.2 Output Quality Dimensions

Relevance

The *relevance* of a statistical output is the degree to which the data serve to address the purposes for which they are sought by users. Relevance has three aspects: coverage of the required population (completeness); inclusion of the appropriate content: and use of appropriate concepts. Relevance is further characterised by the merit of the data uses in terms of the Agency mandate.

Typically a data product has multiple users and uses. Thus, measuring relevance requires the identification of user groups and their needs, whilst recognizing that these may change over time.

Relevance may be indirectly assessed by ascertaining whether there are processes in place to determine the views of users and the uses they make of the data.

Users of the Agency data may be divided into two main groups;

- *internal users* - primarily analysts within the Agency departments; and
- *external users* - including other UN organisations, other international organisations, national governments, national statistical offices and other national organisations, ICT operators and other businesses, academic institutions and the media.

Amongst these groups individual *key users* should be identified and given whatever special consideration is appropriate according to their status. Whilst internal users are the very important, it is essential that the content and format of published outputs be adapted to the full range of potential users.

Accuracy

The *accuracy* of a statistical output is the degree to which the data correctly estimate or describe the quantities or characteristics they are designed to measure. Accuracy refers to the closeness between the values provided in the product and the (unknown) true values. Accuracy has many attributes, and, in practical terms, there is no single overall measure of it. Typically, accuracy is described in terms of the errors, or the potential significance of errors, introduced at various stages in the production process from initial acquisition of the data to dissemination of aggregates.

In the case of data from sample surveys, the major sources of error are coverage, sampling, non-response, response, processing, and seasonal adjustment. For data from censuses there are no sampling errors. For data from administrative sources, there are also no sampling errors, but there are additional problems due to mismatching of administrative concepts and/or classifications to statistical requirements.

The accuracy of the data produced by the Agency is largely determined by the volume and accuracy of the data received from the contributing organisations within the countries. However, Agency activities can also improve accuracy; for example, quality checks may result in detection and correction of errors in data provided by countries and thus lead to improvements in the data. Conversely, Agency activities may also have an adverse effect, for example by introducing errors during the processing stages. In particular the Agency may estimate data for countries for which data are not provided. Such estimates typically depend upon statistical models and thus are subject to model error, i.e. the difference between the model based values and the true (but unmeasured) values.

Reliability

Reliability is the closeness of the initially released values of a statistical output to the values that are subsequently released for the same reference period. The second release may be a planned revision to take into account more complete or accurate observation data, or an ad hoc revision to correct erroneous values.

In the SQAFs of many organisations, reliability is considered to be aspect of accuracy. In this document reliability is separated from accuracy to emphasise the difference between an accurate value (one that is close to the truth) and a reliable value (one that is not subsequently likely to change, whether it is accurate or not).

In this context it useful to consider the possible sources for a planned revision, which include:

- replacement of data from a particular source with later data from the same source;
- replacement of data from a particular source with later data from another source that is considered to be more accurate;
- replacement of estimated data with source data; and
- changes resulting from changes in definitions, classifications and/or estimation procedures.

Coherence

The *coherence* of a statistical output reflects the degree to which it is logically connected and mutually consistent with other statistical ouputs. Coherence implies that the same term should not be used without explanation for different concepts; that different terms should not be used without explanation for the same concept; and that variations in methodology that might affect data values should not be made without explanation.

Coherence in its loosest sense implies the data are "at least reconcilable". For example, if two output purporting to cover the same phenomena differ, the differences in time of recording, valuation, and coverage should be identified so that the outputs can be reconciled.

Coherence has four important sub-dimensions.

- *Coherence within a dataset* implies that the elementary data items are based on compatible concepts, definitions, and classifications. Incoherency within a dataset occurs, for example, when component values that should add up to a total do not.
- *Coherence across datasets* implies that the data are based on common concepts, definitions and classifications, or that any differences are explained and can be allowed for. An example of incoherency across datasets would be if ICT usage of households could not be reconciled with ICT supply. Unexplained inconsistencies across datasets can seriously reduce the interpretability and credibility of the Agency statistics.
- *Coherence over time* implies that the data are based on common concepts, definitions, and methods over time, or that any differences are explained and can be allowed for. Incoherence over time refers to breaks in a series resulting from changes in concepts, definitions, or methodology.
- *Coherence across countries* implies that, from country to country, the data are based on common concepts, definitions, classifications and methodology, or that any differences are explained and can be allowed for. Ensuring coherence across countries, commonly referred to as *harmonization*, is one of the major sources of value added by the Agency.

Metadata play a fundamental role in conveying the information relevant to users for assessing coherence, i.e., by indicating differences in concepts or methodologies, over time and across countries.

Timeliness

The *timeliness* of a data pro a statistical output is the length of time between its availability and the event or phenomenon it describes. Timeliness is assessed in terms of a time scale that depends upon the period for which the data are of value, i.e., are sufficiently timely to be acted upon. The concept applies equally to short-term (sub-annual) or structural (annual or longer period) indicators. The only difference is the time scale.

Although the Agency processes themselves have an impact on timeliness, for the most part the timeliness of the Agency outputs is determined by the timeliness of the data it receives from the contributing organisations within countries.

Punctuality

Because punctuality and timeliness are inter-related, punctuality is often grouped with timeliness as a single quality dimension in the SQAFs of many organisations. Here they are kept separate as they are achieved by quite distinct means.

The *punctuality* of a statistical output implies the existence of and adherence to a *output dissemination schedule.* An output is punctual if it is disseminated in accordance with the schedule. In the case of an output published externally, the schedule may comprise a target release date or may involve a commitment to release data within prescribed time period. (Here "release date" refers to the date on which the output is first made publicly available, by whatever medium, typically, but not inevitably the web site).

A dissemination schedule assists:

- internal users, by enhancing their capacity to plan their work based on target internal dissemination dates for data they require;
- external users, by improving their capacity to make timely use of the Agency statistics;

There may be occasions when the Agency simply cannot adhere to the dissemination schedule due to the late acquisition of data from input sources. In such circumstances advance warning regarding the delay in dissemination should be communicated to users.

Accessibility

The *accessibility* of a statistical output reflects how readily the data can be discovered, located and accessed from within the Agency data holdings. It includes the suitability of the formats in which the data are available, the media of dissemination, the availability of metadata and user support services, and, in the event that there is a charge, the affordability of the data to users.

From the perspective of data availability, the Agency users are divided into two very distinct groups: internal users; and external users. Typically, because of the differences in access methods, internal users can access data earlier and in more detail than external users. Thus these two groups may have quite different perceptions of accessibility.

The range of different external users leads to the need for multiple dissemination formats and selective presentation of metadata. A publication policy should be articulated and made publicly known.

Interpretability

The *interpretability* (sometimes called *clarity*) of a statistical output reflects the ease with which users can understand and properly use the data. The degree of interpretability is largely determined by the adequacy of the metadata that accompany the data, including definitions of concepts, target populations, indicators and other terminology describing the output and its limitations.

If there are several dissemination mechanisms they should be harmonised in order to avoid confusing users.

Coping with the needs of the broad range of external users leads to the use of metadata presentation in layers of increasing detail. The content and format of published outputs should be adapted to the different target groups.

Balancing Output Quality Dimensions

The data quality dimensions are not interdependent in the sense that there are relationships between the factors that contribute to them. Factors leading to improvements with respect to one dimension may result in deterioration with respect to another. Thus, in designing a statistical process and its outputs it is often necessary to trade-off quality in one dimension with quality in another. The most significant trade-offs to consider are as follows.

- *Accuracy and timeliness.* This is probably the most frequently occurring and important quality trade-off. Improvement in timeliness can be obtained by terminating data acquisition earlier and compiling outputs based on a smaller number of countries and/or reduced editing. However, as this reduces accuracy, there needs to be a trade-off. For major outputs a compromise is to disseminate a preliminary version of the output based on partial acquisition and then one or two revision based on successively more acquisition and editing. The difference between preliminary and revised versions is an indicator of degree of accuracy that is being sacrificed in order to produce the increased timeliness.
- *Relevance and accuracy*. Relevance can be increased by acquiring more data items, but accuracy may be diminished because the additional data are less accurately reported. Conversely, deciding not to disseminate inaccurate data items increases accuracy but reduces relevance.
- *Relevance and timeliness*. Timeliness may be improved by reducing the number of data items collected or by replacing those that are difficult to collect by ones that are easier to collect. In either case there is a negative effect on relevance.
- *Relevance and coherence*. Improvements in relevance, for example by redefining the indicators in the light of a better understanding of user needs, or moving to a later version of a classification, reduces comparability over time, perhaps to the point of requiring a series break. Conversely, the desire to retain comparability over time tends to inhibit changes in content that would improve relevance.
- *Accuracy and coherence*. Improved methods may increase accuracy but reduce coherence by introducing changes in data that are attributable to changes in methods not in what is being measured. Conversely, the desire to retain coherence may inhibit changes required to improve accuracy.

- *Timeliness and punctuality*. Having a publication schedule and adhering to it, reduces timeliness in the event that the data are actually available earlier than the due release date.
- *Accuracy and reliability.* If values are not revised in the light of new or better observation data, they are less accurate than they would be if revisions were to take place. On the other hand, if values are revised, reliability is reduced.

3.3 Process Quality Dimensions

Sound Methods and Systems

Sound methods refers to the use of international standards and best practices through all stages of a statistical process from identification of requirements, through design, data collection, processing, analysis, dissemination, and evaluation. Application of standards and best practices not only engenders process and product quality, it fosters comparability across countries and international organisations.

Sound systems refer to the use of international standards and best practices in systems development, including liaising with systems developers in other statistical organisations and making optimum use of off-the-shelf or shared statistical products where available.

Sound methods and systems includes both theory and its application in the sense of ensuring that methods and systems are well designed, developed, implemented and documented, and that staff are well trained in their use.

Cost-Efficiency

The *cost-efficiency* with which statistical outputs are produced as a measure of the costs incurred and resources expended relative to the benefits of the products. The aim is to produce a specified set of output of specified quality at minimum cost.

Efficiency can affect all dimensions of output quality in the sense that, if an output can be produced more efficiently with the same quality, then the resources released can be used to improve any dimension of the quality of that output or other outputs, or to create new outputs.

Three types of costs may be incurred, as described below.

- The direct costs to the Agency of acquiring, processing and disseminating the data.
- The costs incurred by the national organisations from which the data are acquired. These costs depend significantly on whether or not the national organisations in any case collect and use all the data for national purposes. If they do, then the costs imposed by the Agency are only that of repackaging and transmitting data already collected. Otherwise the costs are those of the additional data collection by the national organisations.
- The costs incurred by the households, businesses, or other units providing their data to the national organisations. Again the costs imposed by the Agency depend on whether or not the national organisations in any case collect and use the data for national purposes. If they do, then no extra costs are imposed by the Agency. Otherwise the Agency is responsible for the additional costs in responding to questions required only for the Agency

3.4 Institutional Quality Dimensions

The following dimensions refer to institutional environment within the Agency as a whole.

Objectivity, Impartiality, Transparency and Credibility

Objectivity, impartiality and *transparency* within the Agency imply that:

- statistical methods and outputs are determined by statistical considerations and not by pressure from providers, users or other stakeholders;
- commentaries and press releases are objective and non-partisan;
- users are informed about sources and methods, and about changes to these that might affect the outputs;
- the limitations of the outputs, and of the processes by which they are produced, are acknowledged: and
- errors discovered in published data are corrected as soon as possible, and are publicised.

The *credibility* of the Agency and its output refers to the confidence that users have in the products based primarily on their image of the Agency and its statistical outputs, i.e., the *brand image*. Credibility is built over time. It depends significantly on accuracy, or, more precisely, on users' *perceptions* of accuracy, which in turn depends upon all the other quality dimensions. Other particularly important contributors to credibility: trust in the objectivity and impartiality of the methods used; the perception that outputs are produced professionally in accordance with appropriate statistical standards; that data are not manipulated to suit the countries to which they refer; that estimation methods are appropriate; that the release of outputs is not timed in response to political pressure.

Statistical Coordination

Statistics produced by the Agency should be harmonised in the sense that they use common concepts, classifications and definitions wherever possible and that the data are mutually compatible. This is achieved through *statistical coordination* i.e., coordination of statistical activities within the Agency. Aspects of statistical coordination are as follows.

- An organisational unit within the Agency is designated as having responsibility for statistical coordination in the Agency.
- A position within the Agency is designated as including the role of chief statistician for the Agency.
- There are tools to support use of standard concepts, definitions and classifications.
- There are tools to ensure that all statistical data produced by the various organisational units are readily available to other organisational units in the Agency.
- There is a single conduit for acquisition of data from each other international organisation so that data from this organisation are consistently used within the Agency.
- Staff in the Agency use data produced by another unit in the Agency in preference to data on the same topic produced by another international organisation.
- A SQAF covering all statistical activities is developed, or adopted, and implemented.

4 Quality Guidelines

4.1 Introductory Remarks

The guidelines are presented in two broad groups: those applying to each *individual statistical production process* within the Agency; and those applying to the Agency *statistical infrastructure* as a whole.

The guidelines for a statistical production process, are subdivided into eight groups corresponding to the *phases* defined in the *Generic Statistical Business Process Model (GSBPM)* published by United Nations Economic Commission for Europe (UNECE). The GSBPM is the international standard for describing a statistical production process. Relative to the GSBPM, two of groups have been slightly expanded to include *Manage User Relations, and Manage Provider Relations*.

The remaining activities associated with the statistical infrastructure are presented in four groups, namely *Manage Metadata, Manage Data and ICT Systems, Assure Objectivity, Impartiality, Transparency and Professionalism,* and *Coordinate and Assure Quality.*

{Other options for the infrastructure groups should be considered according the particular situation in the Agency}

Even though not explicitly referenced, staff training is part of every subgroup.

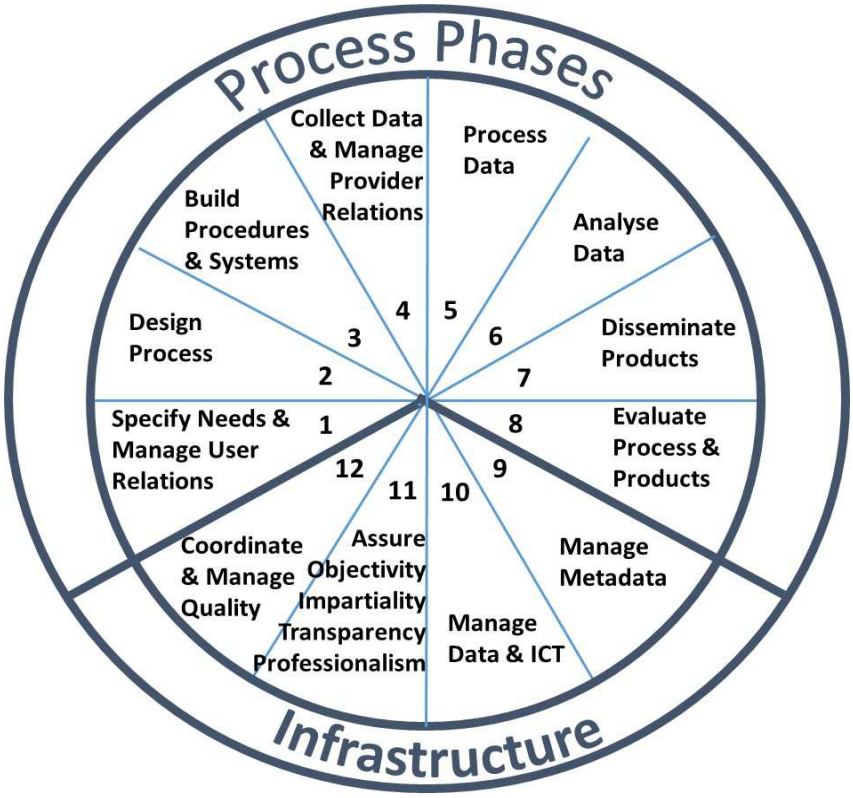

Figure 2: Quality Guidelines Structure

For each subgroup of statistical activities thus defined, the guidelines include the following:

1. *Scope* – a short description of the statistical activities to which the guidelines refer;
2. *General guidelines* – statements of best practice reflecting the aims of the guidelines in general terms;
3. *Links to more detailed guidelines* – comprising standard methods and standard operating procedures;
4. *Monitoring mechanisms* – the methods by which adherence to the guidelines might be monitored, including quality and performance indicators and quality assessments; and
5. *Reference documentation* – documents that elaborate the guidelines and/or that were instrumental in their formulation.

[In this document only the first two items are provided. The remaining items are specific to the Agency and should be provided when this section is being developed by the agency.]

4.2 Process Guidelines

These guidelines relate to each individual statistical production process conducted by the Agency and should be applied by the organisational unit responsible for the process. The first three groups of activities are *developmental* and are primarily required prior to the first data collection cycle of a new or redesigned process. The last five groups are *operational* and are repeated for each cycle of the process.

[Given that the groups of activities are based on GSBPM, which is an international standard, it is recommended that they be used unchanged. However the guidelines within each group should be reviewed and adjusted as needed to the specific situation in the Agency.]

1. Specify Needs and Manage User Relations

Scope

This group covers all activities associated with engaging users to identify their statistical needs, proposing strategic options for meeting these needs, and, if required, preparing a business case for changes to the production process and products. It includes: maintaining a knowledge of, and good relationships, with users, and examining their statistical needs in detail; checking the extent to which current statistical production process and other data sources meet these needs; defining the general content of new or changed statistical products to meet the needs; and preparing a business case where needed to secure approval and resources to re-engineer the production process and/or produce new or changed statistics.

Guidelines

The Agency unit should:

a) categorise the users of its statistics into groups according to their type of use and data needs;

b) regularly review user requests, queries and comments, and identify new or changing user needs;

c) conduct user satisfaction surveys on a regular basis;

d) regularly determine the changes in needs for its statistical products;

e) identify the most important, say 20, individual users, discuss their needs and specify in detail the corresponding data requirements;

f) establish memoranda of understanding, service level agreements, or equivalent, for provision of data to key users;

g) consult with key users on proposed changes to statistical products;

h) in the case of a substantial revision of the statistical process and products, prepare a business case and present to senior management, with a request for additional resources if required.

2. Design Production Process and Supporting Infrastructure

Scope

The statistical activities in this group follow from, and build on, the results of specifying user needs. They include the research and design work needed to define (or redefine as appropriate) the statistical concepts and indicators, and the data collection, processing, storage and dissemination procedures required to produce the envisaged statistical products. They include specification of the metadata that are inputs to and outputs from the subprocesses within the production process, also design of the systems and workflows that support and enable efficient conduct of all the subprocesses.

General Guidelines

The Agency unit should:

a) define and justify the scope and content of the data to be collected, i.e., countries to be included, indicators and classifications;

b) identify and use the most appropriate concepts, definitions, and classifications, taking advantage of those already developed and used by the international statistical community;

c) identify and review all possible available data sources and select the most appropriate;

d) design efficient and effective data acquisition systems and procedures, including making formal agreements with providers where required;

e) design efficient, effective and integrated data processing procedures and systems for coding, verifying, estimating, and integrating data, and assembling data products, using internationally accepted methods to the fullest extent possible;

f) design statistical products, including tables, datasets, databases, and analyses in accordance with the specified data requirements;

g) identify and include all the metadata required to support data collection, processing, analysis and dissemination, and to inform users;

h) provide opportunities to interested staff in other units within the Agency to contribute to the development or redevelopment of the data production process;

i) check the coherence of statistical concepts with statistics produced by other units in the Agency and eliminate or justify any differences;

j) involve experts within and outside the Agency, whenever available, in designing processes and products.

3. Build Statistical Procedures and Systems

Scope

The statistical activities in this group cover building procedures and systems to implement the production process, and to use the supporting infrastructure, and testing them prior to production. They include identifying and preparing the data collection tools, data repositories, processing tools, management control tools, and metadata management tools, making use of Agency statistical infrastructure wherever available and appropriate. They include configuring workflows to handle the data as they are transformed from acquisition to dissemination. They include producing documentation and training production staff, providers, and users in use of the systems and procedures.

General Guidelines

The Agency unit should:

a) prepare efficient data collection tools, taking advantage of Agency statistical infrastructure and using the latest technology;

b) prepare efficient and effective processing tools and metadata management tools, taking advantage of Agency statistical infrastructure and using the latest technology;

c) prepare appropriate and efficient data storage mechanisms that interface well with the collection and processing tools, taking advantage of Agency statistical infrastructure and using the latest technology;

d) configure smooth workflows in which all activities within the entire production process fit together efficiently without gaps or redundancies;

e) document all systems and procedures;

f) train production staff, providers and users in use of the systems;

g) specify and meet deadlines for introduction of new statistical products and/or reengineering of statistical processes;

h) test all new procedures and systems before putting them into production.

4. Collect Data and Manage Provider Relations

Scope

This is the first of the *operational* groups of activities. The statistical activities in this group refer to the actual acquisition of data, using the various sources and collection modes specified in

the design phase, using the tools prepared during the build phase and storing the acquired data securely in an appropriate repository. They include implementing procedures and systems for data collection from databases of national and international organisations, including follow-up procedures in the event of dubious or missing data values. They include liaising with national organisations that are collecting or providing data specifically in response to requests from the Agency, making them aware of the reasons for and specifics of the data required, and responding to their comments, queries and complaints. They include ensuring that the data and associated metadata are loaded into a suitable repository.

General Guidelines

The Agency unit should:

a) implement procedures to obtain data and corresponding metadata direct from the databases of national, international or commercial organisations, where available;

b) ensure that national organisations collecting and supplying data are totally familiar with the reasons for data collection and the precise meanings of the indicators to be provided;

c) implement efficient and effective procedures for collecting data and associated metadata from these national organisations;

d) make provision for responding to comments, queries and complaints from these national organisations;

e) monitor and follow up non-responses and partial responses from these national organisations and thus ensure that as much of the required data and metadata are collected as possible;

f) ensure the risk of errors in data and metadata acquisition is minimised;

g) minimise the reporting burden on providers;

h) ensure that all information concerning data and metadata flows between an organization within a country and the Agency is reported to the country national statistical office (in respect for its role as statistical coordinator for the country).

5. Process Data

Scope

The statistical activities in this group refer to the capture, verification, editing, and harmonisation of incoming data and their preparation for analysis. They include integrating data from various sources: classifying and coding them where needed; applying checks that identify missing, invalid or inconsistent data or metadata; imputing values where the data are inadequate or in error; applying adjustments to harmonise data across countries; deriving values of indicators based on data acquired; producing model based estimates for countries for which no data are available; and storing data and metadata in databases from which data can be readily extracted for analysis purposes, statistical products can be compiled, and internal users can make extracts.

General Guidelines

The Agency unit should:

a) implement efficiently and effectively the procedures and systems for data verification, editing, harmonisation, and estimation including a full range of validity checks and edits;

b) implement efficiently and effectively the procedures and systems for aggregation, including production of totals, averages and ratios for regions, and measures of dispersion where relevant;

c) implement efficiently and effectively the procedures and systems for storage of data and metadata in an internal database from which statistical products can readily be compiled and internal users can take extracts;

d) collect, review and analyse all operational metadata, including, in particular, the number of countries for which data are adjusted or modelled;

e) promote and facilitate internal user access to the data;

f) promote and facilitate internal user understanding of the data and their limitations, through provision of metadata describing procedures and operations and through discussions and training sessions;

g) bring together the data and data from other production processes as the starting point for checking their coherence.

6. Analyse Data

Scope

The statistical activities in this group include to the analyses required for verification of the statistical products and their preparation for dissemination. They involve preparing draft statistical products and checking whether they meet the needs for which they were designed. They include scrutinizing, analysing and explaining the data in relation to expectations and identifying divergences from expectations. They include finalising the statistical products including commentary, interpretation notes, briefings, quality indicators and other relevant metadata that will accompany the data.

General Guidelines

The Agency unit should:

a) prepare and review draft data products and scrutinize, analyse and explain the data in relation to expectations;

b) compare the data with data for previous reference periods and check for comparability over time;

c) confront the data with related data from other sources and check for coherence;

d) view the data from all perspectives and ensure there is an in-depth understanding of the data content before dissemination;

e) produce quality indicators for users;

f) discuss the results with internal experts and otherwise check that statistical products and associated metadata are fit for purpose before external dissemination.

7. Disseminate Statistical Products

Scope

The statistical activities in this group refer to the dissemination of the statistical products to internal and external users. They include: formulating and applying a dissemination strategy, including a release schedule and pricing policy; reformatting the data and metadata as required and loading them into publicly accessible databases; and preparing and disseminating printed publications in accordance with the Agency publishing and presentation guidelines. They include: notifying users of the release of the statistical products; giving briefings for key users and user groups; promoting the products to ensure that they reach the widest possible range of users; and managing communications with internal and external users, including ensuring that user queries are recorded and that responses are provided.

General Guidelines

The Agency unit should:

a) implement efficiently and effectively the procedures and systems for data dissemination;

b) notify internal users and enable their access to statistical products at the earliest possible opportunity;

c) prepare statistical products in accordance with relevant Agency publishing and presentation guidelines;

d) maximize internal and external interpretability of the data products by accompanying them with appropriate metadata;

e) ensure that products are timely and punctual by maintaining and adhering to detailed production and release schedules;

f) disseminate statistical products externally, including making databases accessible via the web site and preparing material for printed publications;

g) share information about new or revised statistical products with other units in the Agency that are involved in data collection thereby maximizing data coherence and minimizing the risk of duplication of effort;

h) give briefings to key users, including senior officials of relevant international, national and commercial organisations, members of think tanks, academia and the media;

i) promote products externally via wikis and blogs and social media to ensure that they reach the widest possible audience;

j) manage communications with internal and external users by ensuring that user queries are recorded, that responses are provided.

8. Evaluate Process and Products

Scope

The statistical activities in this group refer to evaluation of the quality of the process and products, including the services provided by the supporting infrastructure, at the end of the process cycle. It includes: defining the evaluation objectives and procedures; establishing the evaluation team; assembling the relevant documentation; analysing the documentation; discussing the statistical processes, products and/or services with the staff responsible for them, and with key users and providers; identifying quality and performance issues; and making recommendations for improving quality and performance.

Other quality assurance activities, in particular establishing and implementing a quality assurance framework and monitoring quality during each phase of the production process, are included in the *Coordinate and Assure Quality* group of activities (Item #12) discussed below.

General Guidelines

The Agency unit should

a) review and become familiar with quality concepts and the need for quality assurance;

b) prepare and establish a data quality assurance framework, including quality principles, dimensions, guidelines and a quality assessment checklist;

c) conduct an annual quality self-assessment of the production process and products and supporting infrastructure;

d) from time to time, or in the case of severe problems, commission an external quality evaluation of the production process and products and supporting infrastructure, including:

- setting the objectives and scale of the evaluation;
- providing the evaluation team with comprehensive documentation;
- reviewing and discussing the evaluation results;

e) based on the results of quality monitoring, assessment or evaluation results, identify and implement quality and performance improvements;

f) prepare a business case for quality and performance improvements that require additional resources and submit to senior management.

4.3 Infrastructure Guidelines

The following infrastructure guidelines refer to activities that cover all phases of the statistical production process, i.e., that are, or should be, part of every phase. These activities should be coordinated at Agency level and carried out using statistical infrastructure that is available to all statistical production processes conducted by the Agency.

9. Manage Metadata

[This section needs to be adjusted to the situation and terminology of the Agency. The metadata types described here are for explanatory purposes to illustrate the range of metadata to be considered. They do not have international standing.]

Scope

The statistical activities in this group cover all phases and touch on every aspect of production process and its products. They include identifying and classifying the various types of metadata of interest; determining how they are to be obtained, recorded, accessed and used; building appropriate procedures and systems to do so; and analysing the resulting metadata in order to better understand and improve the production process and products. There are two overarching goals. The first is to ensure coherence of the final products across the Agency by consistent creation and use of metadata across all phases of each production process. A second is for processes to be *metadata driven* to the fullest extent possible. This is a prerequisite for automation and implies that metadata have to be machine readable.

To provide a framework for description of metadata in the SQAF, they are divided into two distinct groups: *process specific metadata* and *Agency metadata*.

Process specific metadata are true metadata in the sense that they are data about data. They may relate to a process or to a cycle of the process. They are divided by use into three broad types *definitional metadata, procedural metadata,* and *operational metadata*.

- *Definitional metadata* are those metadata that directly describe the data that are input transformed and output during the phases of the production process. Examples are definitions of data items, indicators, classifications, and question wordings used by the process, descriptions of the tables in a database, descriptions of the rows and columns of an output table. Definitional metadata are the most frequently recorded and best understood type of metadata as they are essential in handling the data.
- *Procedural metadata* are those metadata that describe the particular subprocesses that constitute the phases of the production process. An example of procedural metadata is the specification of the automated verification rules applied during data entry or data verification. Process metadata may be *active* (or *prescriptive*) meaning they dictate and drive the process (whether automated or by humans following instructions) or they may be *passive* (or *descriptive*) meaning they describe the process but do not drive it.
- *Operational metadata* are metadata that describe the inputs and outputs of a procedure, other than the actual data. Operational metadata include *process metrics,* also called *paradata*, that are generated during the production phases. An example of a process metric created during data collection is the *number of countries for which the data have been estimated rather than based on data from national organisations*. Such metadata are the source of quality and performance indicators.

Agency metadata are metadata that are designated as Agency standards, for example, a standard industry classification, standard concepts, standard sampling methods, standard operating procedures. Strictly speaking they are not metadata as they exist without data. However, by convention they are considered to be metadata as they are a source of process specific metadata and have to be made managed in a similar way. Corporate metadata may also be divided into the

same three broad groups: definition metadata, procedural metadata, and operational metadata. Standard classifications, standard sampling schemes, and standard response status codes are examples of Agency definitional, procedural and operational metadata, respectively.

Management of metadata implies recording the *owner* of each metadata item, deciding who can register a new metadata item (the *registration authority*), and ensuring metadata are readily accessible and are reused to the fullest extent possible.

General Guidelines

The Agency unit should:

a) identify and fully document the various types of metadata, and the needs for and uses of them;

b) identify, design, build and operate a comprehensive set of metadata management tools, taking advantage of Agency statistical infrastructure wherever available;

c) appoint a registration authority for each metadata type;

d) register metadata using a registration process that is well documented so there is clear identification of ownership;

e) ensure that, to the fullest extent possible metadata are *active* in the sense that they are required and drive procedures, thereby ensuring they must be kept accurate and up-to-date, and paving the way for automation;

f) ensure that metadata are recorded at the time they are created, preferably automatically as a by-product of the processes that generate them, rather than manually and long afterwards;

g) ensure that there is a single copy of each metadata value, which is entered once and can be accessed or superseded, but not overwritten, earlier values being retained to allow historical access;

h) enable different views of metadata corresponding to the differing needs of the various users;

i) reuse metadata wherever possible rather than recreating them.

10. Manage Data and ICT Systems

{This section is for illustration. It needs to be adjusted to the situation at the Agency.}

Scope

The aim is to use Agency infrastructure to the extent possible in managing data and systems.

Where data repositories or systems have to be purpose built for the process, the activities in this group are aimed at ensuring that an informed choice is made of systems unit or contractor responsible for application development and support, that the platform where the data are stored and on which applications run is appropriate, that systems needs are well defined and conveyed to the systems unit or contractor, that tools, databases and other applications are tested before

being put into production, that problems with the systems are recorded, communicated to the systems unit or contractor, and corrected.

General Guidelines

The Agency unit should:

a) map and document the sequence(s) of activities constituting each phase of the process, and determine the potential for their automation;

b) ensure that systems' needs are well defined and conveyed to the systems unit or contractor;

c) ensure that all systems are tested before being put into production;

d) ensure that problems with the systems are recorded, communicated to the systems unit or contractor and corrected.

11. Assure Objectivity, Impartiality, Transparency and Professionalism

Scope

The statistical activities in this group aim at ensuring that the manner in which the Agency unit collects, produces and disseminates statistics is objective, impartial, transparent, and professional, and is seen to be so. The activities include: demonstrating the commitment to follow international standards and best practices; publicising the methods used; ensuring that statistics are determined by statistical considerations and not by pressure from providers or users; and explaining major changes in methodology to users.

General Guidelines

The Agency unit should:

a) make known its commitment to follow professional standards in collecting, producing and disseminating statistics that are objective and impartial, including by publicizing its data quality assurance framework;

b) develop and made public its data dissemination policy;

c) develop and made public its release calendar in which dissemination dates and times are pre-announced, and ensure that any subsequent deviations from the calendar are announced and justified to the users;

d) ensure that statistics are produced on an objective basis, determined only by statistical considerations;

e) select sources, concepts, methods, processes and dissemination practices on the basis of statistical considerations, using national and international principles and best practices;

f) explain major changes in methods and data revisions to users;

g) ensure that statistical releases are clearly distinguished from political/policy statements and issued separately from them;

h) ensure that statistical releases and statements made at press conferences are objective and non-partisan;

i) correct errors in data outputs as soon as possible after they are detected, and inform users.

12. Manage Quality and Performance and Coordinate

{Depending on extent of statistical coordination across the Agency and the role played by the unit, consideration should be given to splitting the activities in this group into two groups – managing quality and performance, and statistical coordination.}

Scope

There are three goals for the activities in this group. The first is to ensure that quality assurance framework is in place and that quality and performance are monitored and assured throughout the production process. The second is to ensure that the Agency unit is well organised and operates efficiently, and that the human and financial resources available are adequate in magnitude and quality for effective conduct of the production process. The third is to ensure that, to the extent possible, statistical activities are coordinated across the Agency as a whole.

General Guidelines

As regards quality assurance the Agency unit should:

a) review and become familiar with quality concepts and the need for quality assurance;

b) adopt a data quality assurance framework, including quality principles, dimensions, guidelines and a quality assessment checklist;

c) ensure quality and performance are monitored during most, if not all, subprocesses in all phases of the process ;

d) introduce quality gates at key points in the process to eliminate, or at least substantially reduce, the incidence of errors in disseminated data; *quality gates* are (usually manual) check points at which specified quality criteria must be specified before the next stage of processing is allowed to take place;

e) periodically, or the case of severe persistent problems, commission an external quality evaluation of the production process and products and supporting infrastructure; this includes setting the objectives and scale of the evaluation, providing the evaluation team with comprehensive documentation and reviewing and discussing the evaluation results;

f) based on the results of quality monitoring, assessment or evaluation results, identify and implement quality and performance improvements;

g) prepare a business case for quality improvements that require additional resources and submit to senior management.

As regards performance management, the Agency unit should:

h) measure and analyse the work effort involved in each phase of the production process;

i) organise work flows efficiently to minimize the human resources required;

j) ensure good communication channels within the unit and between the unit and data providers and users and stakeholders;

k) ensure that statistical activities and outputs have high profile with senior management of the Agency;

l) ensure user feedback is taken into account in determining priorities when resources are limited;

m) advise senior management when the financial and human resources available do not match the statistical activities envisaged;

n) prepare a business case to support any request for additional resources.

As regards statistical coordination, the Agency should:

o) (if not already done) designate an organisational unit within the Agency as having responsibility for statistical coordination in the Agency;

p) (if not already done) designate a position within the Agency to include the role of chief statistician for the Agency;

q) (if not already done) develop or adopt a SQAF and ensure it is implemented.

The designated coordinating unit (or the unit responsible for the process if there is no designed coordinating unit) should:

r) identify the statistical production processes in the Agency;

s) ensure the staff involved in these processes receive SQAF training;

t) ensure that all processes are subject to a quality assessment in accordance with the SQAF assessment programme and that action is taken on the recommendations.

u) ensure there are tools to support use of standard concepts, definitions and classifications;

v) ensure there are tools to facilitate making data produced by the Agency unit readily available to other organisational units in the Agency;

w) ensure there is a single conduit for acquisition of data from each other international organisation so that data from this organisation are consistently used within the Agency;

x) ensure that staff in the Agency unit use data produced by other units in the Agency in preference to data on the same topic produced by another international organisation.

5 Quality Governance and Assessment and Improvement Programme

{This chapter is to illustrate the possibilities. It has to be adapted to the situation of the Agency.}

5.1 Introductory Remarks

Quality is managed through quality governance arrangements and a comprehensive quality assessment and improvement programme that draw on and put into action the quality principles, dimensions and guidelines described above.

Quality governance requires an appropriate assignment of the authority and responsibility for SQAF implementation and monitoring.

The assessment programme comprises three types of quality assessment:

- monitoring quality and performance indicators for each repetition of each statistical production process, including quality gates;
- biennial quality self-assessment of each production process or component of the statistical infrastructure;
- external quality peer review of a particular process or infrastructure component on a periodic basis or in the event of a significant and persistent problem.

These types of assessment differ from one another in their aims, the amount of detail and effort involved, the frequency with which they are conducted and the sort of recommendations they may generate. In all cases the ultimate goal is to improve quality by taking action on the recommendations.

Annual and periodic assessments are facilitated through the use of a *quality assessment checklist*.

5.2 Quality Governance

The quality governance arrangements include the following.

- An Agency *Statistical Quality Policy* agreed and distributed by senior management indicating senior management commitment to statistical quality assurance through development and implementation of the SQAF. The policy takes account of other Agency policies that are in place that might affect, or by affected by, SQAF implementation.
- A senior management directive defining the role of Chief Statistician for the Agency and designating the person (or the position of the person) to hold that role. The role includes the authority to require those responsible for Agency statistical production processes to undertake quality assessments in accordance with the SQAF and to implement the subsequent improvement action items.
- A senior management directive designating or establishing the organisational unit responsible for the preparation of the statistical infrastructure elements (documentation, procedures, tools and systems) needed for SQAF implementation, for training Agency staff, and for supporting and monitoring quality assessments.

- A timetable agreed by senior management for conduct of the quality assessment, review of the findings and implementation of recommendations.
- An agreed mechanism for senior management review of business cases for quality improvements that require assignment of additional resources to implement.
- A training programme that reinforces a quality culture through SQAF implementation.

5.3 Monitoring Quality and Performance Indicators

The objectives of identifying and monitoring quality and performance indicators (QPIs) are to quickly check ongoing operations, to monitor performance with respect to target objectives, and to identify sources of operational errors and correct them.

QPIs monitor statistical operations in terms of quality (i.e., effectiveness) and performance (i.e., efficiency). They may be divided into two groups:

- *product QPIs* - monitoring output indicators and analyses;
- *process QPIs* - monitoring all phases of statistical processes and infrastructure.

[QPIs for the SQAF have to be developed by the staff with intimate knowledge of the statistical activities to be monitored. They must be very carefully chosen. Too few QPIs, or the absence of QPIs for key procedures or outputs, result in ineffective monitoring. Too many QPIs, or ill-chosen ones, overload the production procedures and are a waste of resources.]

The procedures involved in development and use of QPIs are:

- define a preliminary set of QPIs;
- designate selected QPIs as being *key* and set targets for each of these;
- analyse the values of process and product QPIs for each repetition of each statistical process;
- take immediate action to address the *operational* problems thereby identified; and
- document *structural* problems, i.e., problems that cannot be solved at operational level, and provide them as input to the next quality self-assessment, and, if serious, use them to trigger a quality self-assessment.

Quality and Performance Targets

After measuring quality and performance indicators for a cycle or two it should become possible and is useful to set target values for selected indicators. Such targets are a mechanism for focusing attention on quality improvement.

[As in the case of quality and performance indicators, they must be very carefully chosen.]

Quality Gates

Quality gates are (usually manual) check points at which specified quality criteria must be specified before the next stage of processing is allowed to take place. Their primary aim is to prevent errors in disseminated data, but they can be designed to ensure quality in other respects, too. Use of quality gates involves a review of all phases of the production process, identification of places of greatest risk to quality, and introduction of a quality gate to mitigate these risks.

[As quality gates involve manual intervention they are resource intensive. Thus, as in the case of QPIs, they should be carefully designed and judiciously used.]

5.4 Quality Self-Assessment

A self-assessment of quality is conducted by the staff responsible for the statistical process, on a biennial basis. Its objectives are to help the staff responsible to develop an impression of the quality of their process and products, and hence to identify structural weaknesses and to propose quality improvements. It is facilitated by use of a *quality assessment checklist*, as further discussed in Section 5.6.

Self-assessment involves:

- assembling documentation about the process and its products;
- convening one or more meetings with the staff responsible for all aspects of processing, and at these meetings reviewing the documentation, completing the relevant sections of the checklist, and identifying process and product weaknesses and potential improvements;
- convening one or more meetings with the principal users and at these meetings reviewing the products, completing the relevant sections of the checklist and identifying product weaknesses and potential improvements;
- convening one or more meetings with key data providers to review the data sources and acquisition methods, to complete the relevant sections of the checklist, and to identify data input weaknesses and potential improvements;
- taking action on any improvements that can be implemented with existing resources and documenting improvements that would require additional resources and/or support from other areas; and
- presenting a summary of the results to senior management.

5.5 External Quality Assessment

External quality assessment of a production process is appropriate on a periodic basis, or if concerns about the quality of some products or processes reach a high level. The assessment objectives are to provide Agency senior management with an objective view of the quality of the process, and hence to identify any structural weaknesses, to propose quality improvements to address them, and to draw attention to the resource implications.

An external quality assessment involves the following steps:

- defining the terms of reference for the assessment;
- identification of the assessment team, involving an external expert, with the manager of the statistical process as a resource person;
- obtaining documentation and the results of recently completed self-assessments;
- convening meetings with relevant the Agency staff to further elaborate the problem areas and improvements required to address them;
- convening meetings with the principal users and further investigating the problem areas that are reflected in product weaknesses;

- reporting the results of the assessment to the Agency management in accordance with the terms of reference.

5.6 Quality Assessment Checklist

A *quality assessment checklist* facilitates self-assessment and the results may be a starting point for an external quality assessment.

A quality checklist may readily be constructed from the guidelines in Chapter 4. For each individual guideline the checklist turns the guideline into a question and asks for the *current degree of conformance* on some suitable scale. It should also ask for *evidence to support the answer*.

Thus, for example, the very first guideline 1a) is:

1 a) Categorise the users into groups according to type of use and data needs

So the checklist asks

1 a) Are users categorised into groups according to their type of use and data needs?

the degree of conformance is requested on a scale:

3: complete

2: for the most part

1: to a limited extent

0: not at all

and accompanying request for evidence is:

Provide the list and any further details of user categories

The benefit of having a standard conformance scale is that the conformance scores can be aggregated (with appropriate weighting for each guideline) to give an average score of conformance for each of the 12 activity groups into which the guidelines are divided. Thus individual scores are available for *Specify needs and manage user relations*, *Design process and supporting infrastructure*, etc. An overall score can also computed, based on appropriate weightings being given to each group.

In addition, each guideline may be associated with one or more quality dimensions and thus a score for *performance by quality dimension* may be made available.

It should be emphasised that the main purpose of the checklist is expose quality and performance problems, to stimulate discussion of how they can be addressed, and what and how improvements can be made. In other words completion of the checklist is a means to an end not an end in itself. The scores the checklist can provide may give some limited idea of where to focus efforts but are most useful as a time series, giving a measure of improvement over time. On the other hand, the documentation collected during an assessment is certainly useful in uncovering and further investigating problems.

Annex 1: Reference Documents

{The list below should be replaced by the actual reference documents used.}

Many quality assessment/assurance frameworks have been developed by statistical organisations in recent years and there is no need to reinvent the wheel. Using standards and practices that have already developed is not only efficient but also helps promote harmonization across agencies. *Assuring Quality in the UNSS* draws on the frameworks listed and briefly described below.

The documents marked with an * are the SQAFs that have already been developed by UN agencies.

Fundamental Principles of Official Statistics (1994), UN Statistics Division

- The principals indicate how national statistical systems should be organized in order to produce appropriate and reliable data that adhere to appropriate professional and scientific standards.
- http://unstats.un.org/unsd/dnss/gp/fundprinciples.aspx

Principles Governing International Statistical Activities (2005), UN Statistics Division

- The document comprises principles and practices that were developed and publicized by the CCSA and that should underpin the production of statistics by an international organisation.
- http://unstats.un.org/unsd/methods/statorg/Principles_stat_activities/principles_stat_activities.htm

National Quality Assurance Framework (NQAF) Template and Guidelines (2012), UN Statistics Division

- The template is a general structure within which countries can formulate and operationalize national quality frameworks of their own or further enhance existing ones.
- The guidelines support the template by providing lists of tools and references specific to sections 3 and 4 of the template, including a detailed mapping showing the correspondence to several existing quality frameworks, and links to the online NQAF glossary.
- http://unstats.un.org/unsd/dnss/QualityNQAF/nqaf.aspx

European Statistics Code of Practice (2011), Eurostat

- The Code is based on 15 principles concerning the institutional environment, statistical processes and outputs. It aims to ensure that statistics produced within the European Statistical System are not only relevant, timely and accurate, etc., but also produced by sound methods and comply with principles such as professional independence, impartiality and objectivity.
- http://epp.eurostat.ec.europa.eu/portal/page/portal/quality/code_of_practice

European Statistical System Quality Assurance Framework (ESS QAF) (2011), Eurostat

- Developed by Eurostat, the framework identifies possible activities, methods and tools that provide guidance and evidence for the implementation of the European Statistics Code of Practice by European NSOs and Eurostat
- http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/QAF_2012/EN/QAF_2012-EN.PDF

Data Quality Assessment Framework (DQAF) (2003), International Monetary Fund

- Developed by the IMF Statistics Division, the framework is for use by NSOs and other national government agencies collecting and disseminating statistics.
- https://www.imf.org/external/np/sta/dsbb/2003/eng/dqaf.htm

Quality Framework and Guidelines for OECD Statistical Activities (2011), OECD

- The document was developed by the OECD to help manage quality within its own organisation and to demonstrate its quality commitment to users.
- http://www.oecd.org/std/qualityframeworkforoecdstatisticalactivities.htm

European Central Bank Statistics Quality Framework (ECB SQF)

- The document was developed by the ECB for managing quality within its own organisation.
- https://www.ecb.europa.eu/stats/html/sqf.en.html

**UNIDO Data Quality: A quality assurance framework for UNIDO statistical activities*

- The framework was developed by UNIDO Statistics Unit to support statistical quality assurance for UNIDO as a whole.
- It covers the major quality aspects of statistics produced by UNIDO, including the key quality dimensions applicable to UNIDO's statistical activities.
- http://www.unido.org//fileadmin/user_media/Publications/Research_and_statistics/Branch_publications/Research_and_Policy/Files/Working_Papers/2008/WP062008%20UNIDO%20Data%20Quality%20-%20A%20quality%20assurance%20framework%20for%20UNIDO%20statistical%20activities.pdf

**The FAO Statistics Quality Assurance Framework (FAO-SQAF)*

- Development of a SQAF was recognized as a key area in the FAO Long Term Strategy (2013-2017). The document was subsequently developed within the context of creating the position of Chief Statistician and establishing the Inter-Departmental Working Group on Statistics (IDWG-Statistics) at the FAO.
- The document comprises a quality framework and a mechanism to ensure the compliance of FAO statistics.
- http://www.fao.org/docrep/019/i3664e/i3664e.pdf

**The Data Quality Assessment Framework for ITU (Draft)*

- The framework addresses data quality and efficiency concerns in the ITU.
- It presents a definition of quality and its dimensions, quality guidelines, and a quality assessment program.

- https://www.itu.int/en/ITU-D/Statistics/Documents/events/wtis2014/018_E_doc.pdf

**Quality Assurance Framework Humanitarian Data Exchange (Draft)*

- The document is a descriptive report on the SQAF that will be adopted by the Humanitarian Data Exchange (HDX) platform.
- It builds on existing best practices within internationally recognised quality management frameworks.
- http://docs.hdx.rwlabs.org/wp-content/uploads/HDX_Quality_Assurance_Framework_Draft.pdf

Generic Statistical Business Process Model (GSBPM) Version v5.0 (2013), UNECE

- The model was developed by UNECE and endorsed by the UN Statistical Commission.
- It presents a generic model for the business processes that produce official statistics.
- It provides a standard framework and harmonised terminology to help statistical organisations to modernise their statistical production processes and to share methods and components.
- In the context of the Generic SQAF it provides a basis for presenting quality guidelines in terms of the sequence of subprocesses that constitute a production process.
- http://www1.unece.org/stat/platform/display/metis/The+Generic+Statistical+Business+Process+Model