United Nations
Climate Change

Management of QA/QC and documentation material

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What is “QA/QC”?

QA/QC = Quality Assurance and Quality Control

Generally,
in the context of ISO, Manufacturing, Service industries,
Mechanism contributes/ensures
CONTINUOUS IMPROVEMENT

in the context of GHG Inventory

MPG (18/CMA.1)

the IPCC guidelines for GHG inventories

“QA/QC” in MPG (5/CMA.1)

Chapter II. National inventory report of anthropogenic emissions by sources and removals by sinks of GHGs

B. National circumstances and institutional arrangements

§19. Each Party shall report on the following functions related to inventory planning, preparation and management:
(a) Its national entity or national focal point with overall responsibility for the national inventory;
(b) Its inventory preparation process, including division of specific responsibilities of institutions participating in the inventory preparation to ensure that sufficient activity data collection, choice and development of methods, emission factors and other parameters are in accordance with the IPCC guidelines referred to in paragraph 20 below and these MPGs;
(c) Its archiving of all information for the reported time series, including all disaggregated emission factors and activity data, all documentation about generating and aggregating data, including quality assurance/quality control (QA/QC), review results and planned inventory improvements;
(d) Its processes for the official consideration and approval of the inventory.

E. Reporting guidance

1. Information on methods and cross-cutting elements

§46. Each Party shall report the QA/QC plan and information on QA/QC procedures already implemented or to be implemented in the future, in accordance with paragraphs 34−36 above.

Report
- QA/QC plan
- QA/QC implementation

“QA/QC” in MPG (5/CMA.1)

Chapter II. National inventory report of anthropogenic emissions by sources and removals by sinks of GHGs
C. Methods
6. Quality assurance/quality control

QA/QC plan

§34. Each Party shall elaborate an inventory QA/QC plan in accordance with the IPCC guidelines referred to in paragraph 20 above, including information on the inventory agency responsible for implementing QA/QC; those developing country Parties that need flexibility in the light of their capacities with respect to this provision are instead encouraged to elaborate an inventory QA/QC plan in accordance with the IPCC guidelines referred to in paragraph 20 above, including information on the inventory agency responsible for implementing QA/QC.

- General / Category-Specific QC procedures
- QA Peer Review

§35. Each Party shall implement and provide information on general inventory QC procedures in accordance with its QA/QC plan and the IPCC guidelines referred to in paragraph 20 above; those developing country Parties that need flexibility in the light of their capacities with respect to this provision are instead encouraged to implement and provide information on general inventory QC procedures in accordance with its QA/QC plan and the IPCC guidelines referred to in paragraph 20 above. In addition, Parties should apply category-specific QC procedures in accordance with the IPCC guidelines referred to in paragraph 20 above for key categories and for those individual categories in which significant methodological changes and/or data revisions have occurred. In addition, Parties should implement QA procedures by conducting a basic expert peer review of their inventories in accordance with the IPCC guidelines referred to in paragraph 20 above.

Reference Approach

§36. Each Party should compare the national estimates of CO_2 emissions from fuel combustion with those obtained using the reference approach, as contained in the IPCC guidelines referred to in paragraph 20 above, and report the results of this comparison in its national inventory report.

Documentation is important

“QA/QC” in the 2006 IPCC guidelines

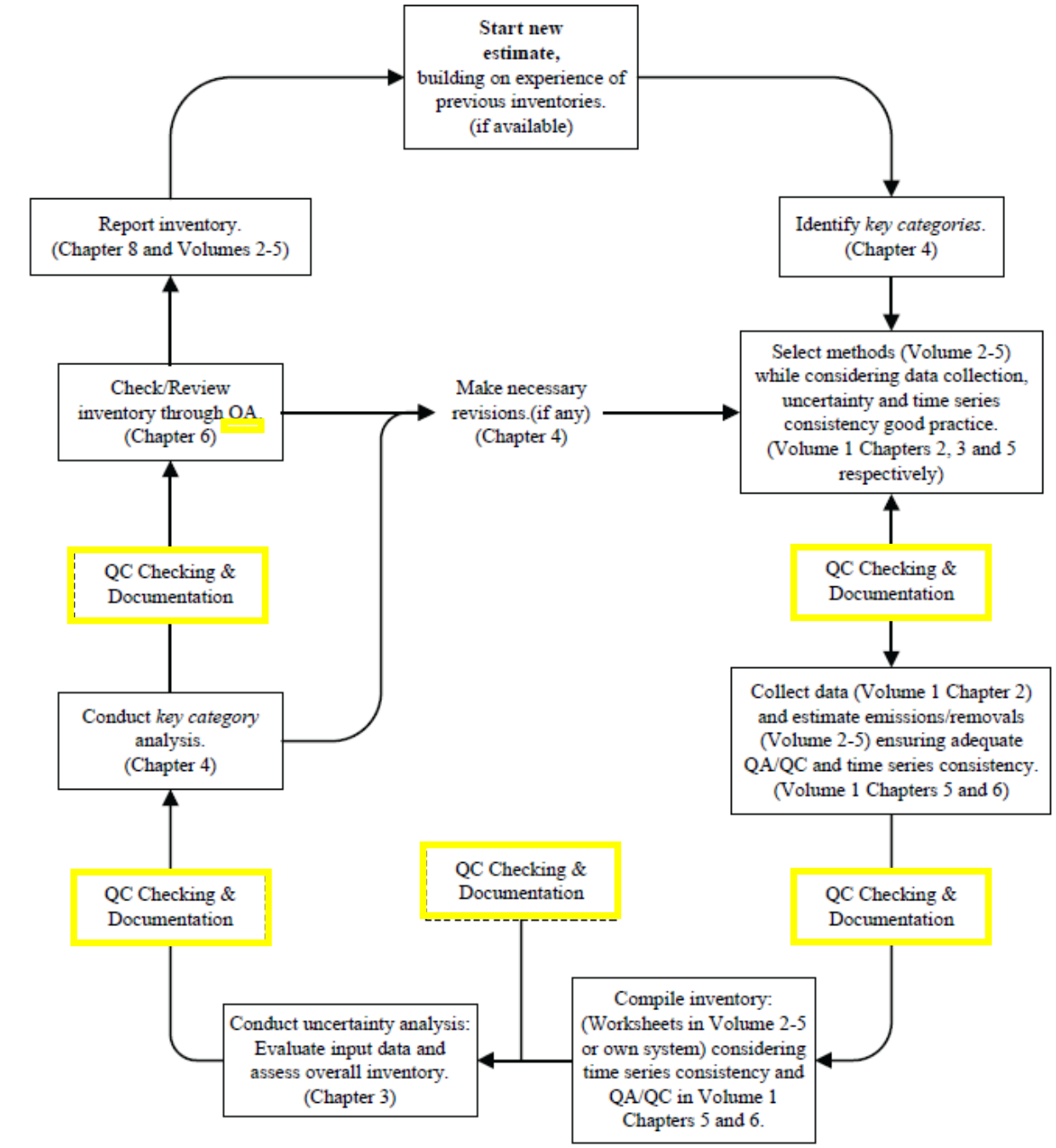
Why “QA/QC”?

The periodic review and revision of the QA/QC plan is an important element to drive the continued inventory improvement.
(6.5 QA/QC PLAN)

to enable continuous improvement to inventory estimates
(6.11.1 Internal documentation and archiving)

Part of Inventory development plan
(1.5 Compiling An Inventory)

Figure 1.1 Inventory development cycle



What is “QA/QC plan”?

- The plan should, in general, **outline the QA/QC and verification activities** that will be implemented and the institutional arrangements and responsibilities for implementing those activities.
- The plan should include **a scheduled time frame for the QA/QC activities** that follows inventory preparation from its initial development through to final reporting in any year.
- The QA/QC plan is **an internal document to organize and implement QA/QC** and verification activities that ensure the inventory is fit for purpose and allow for improvement.
- Once developed, it **can be referenced and used in subsequent inventory preparation**, or modified as appropriate (notably, when changes in processes occur or on advice of independent reviewers).
- As part of the QA/QC plan, it is *good practice* to accommodate **procedural changes and a feedback of experience**. Conclusions from **previous reviews** need to be used to improve the procedures.
- The **periodic review and revision of the QA/QC plan** is an important element to drive the continued inventory improvement.

Examples of “QA/QC plan” in the 2006 IPCC GL

Box 6.2
ISO STANDARDS RELATED TO QUALITY MANAGEMENT SYSTEMS

The International Organization for Standardization (ISO) series programme provides standards for data documentation and audits as part of a quality management system. Within the ISO series, there are several standards that relate to the compilation of greenhouse gas inventories, independent validation and verification, and the accreditation and the requirements for validation and verification bodies.

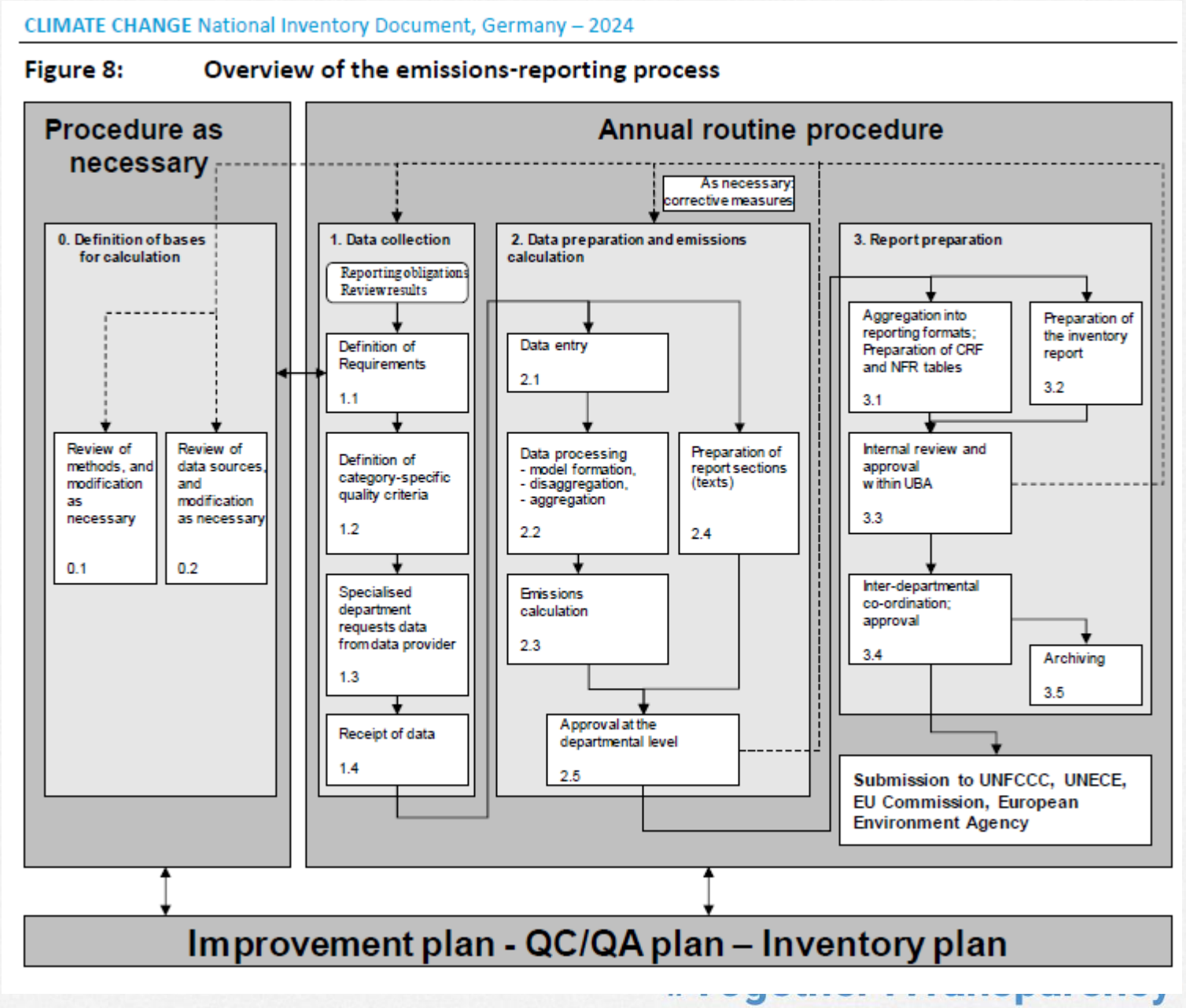
ISO 14064-1:2006	Greenhouse gases – Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals
ISO 14064-2:2006	Greenhouse gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements
ISO 14064-3:2006	Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions

Many of the *good practice* principles of quality management derive from a series of generic quality related standards and their subsidiary parts. Inventory compilers may find these documents useful as source material for developing QA/QC plans for greenhouse gas inventories.

ISO 9000:2000	Quality management systems – Fundamentals and vocabulary
ISO 9001:2000	Quality management systems – Requirements
ISO 9004:2000	Quality management systems – Guidelines for performance improvements
ISO 10005:1995	Quality management – Guidelines for quality plans
ISO 10012:2003	Measurement management systems – Requirements for measurement processes and measuring equipment
ISO/TR 10013:2001	Guidelines for quality management system documentation
ISO 19011:2002	Guidelines for quality and/or environmental management systems auditing
ISO 17020:1998	General criteria for the operation of various types of bodies performing inspection

Source: http://www.iso.org/

An Example of "QA/QC plan" (in German NID)



An Example of “QA/QC plan” (in Swiss NID)

Table 1-7 Annual cycle of inventory planning, preparation and management. Note that for the 2024 submission the well-established procedure has been maintained. However, the submission to the UNFCCC is delayed until the reporting tables (CRT) can be finalised with the new reporting software to be provided by the UNFCCC.

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Data compilation												
QC EMIS Experts												
QC Sectoral Experts												
UN Review												
Inventory Development Plan												
CRT Tables												
QC CRT Tables												
Uncertainties / KCA												
NID												
Internal review NID and CRT Tables												
Official consideration and approval												
Submission												x
Archiving												
Meeting of Core Group	x				x			x		x		
Meeting of Working Group												x
Meeting of NIS Supervisory Board						x					x	

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What are the difference between “QA” and “QC”?

6.6 GENERAL QC PROCEDURES

General QC procedures include generic quality checks related to calculations, data processing, completeness, and documentation that are applicable to all inventory source and sink categories. Table 6.1, General inventory level QC procedures, lists the general QC checks that the inventory compiler should use routinely throughout the preparation of the inventory. …

TABLE 6.1
GENERAL INVENTORY QC PROCEDURES

QC Activity	Procedures
Check that assumptions and criteria for the selection of activity data, emission factors, and other estimation parameters are documented.	• Cross-check descriptions of activity data, emission factors and other estimation parameters with information on categories and ensure that these are properly recorded and archived.
Check for transcription errors in data input and references.	• Confirm that bibliographical data references are properly cited in the internal documentation. • Cross-check a sample of input data from each category (either measurements or parameters used in calculations) for transcription errors.
Check that emissions and removals are calculated correctly.	• Reproduce a set of emissions and removals calculations. • Use a simple approximation method that gives similar results to the original and more complex calculation to ensure that there is no data input error or calculation error.
Check that parameters and units are correctly recorded and that appropriate conversion factors are used.	• Check that units are properly labelled in calculation sheets. • Check that units are correctly carried through from beginning to end of calculations. • Check that conversion factors are correct. • Check that temporal and spatial adjustment factors are used correctly.

6.8 QA PROCEDURES

Quality assurance comprises activities outside the actual inventory compilation. *Good practice* for QA procedures includes reviews and audits to assess the quality of the inventory, to determine the conformity of the procedures taken and to identify areas where improvements could be made. QA procedures may be taken at different levels (internal/external), and they are used in addition to the general and category-specific QC procedures described in Section 6.7.

- EXPERT PEER REVIEW
- AUDITS

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Summary of “QA/QC”

QA/QC is for continuous improvements

Under MPG, following elements are required to report

- QA/QC plan
- QC procedures, etc.
- Reference Approach

Practically QA/QC is useful for inventory compilers

Documentation/Record of QA/QC are important and will help you in the continuous improvements and Technical Expert Review

The 2006 IPCC GL provides;

- Explanations on QA/QC
- Examples of general/category-specific QC procedures

Thanks!!