Introduction to the Toolkit for Building National GHG Inventory Systems

Remote Training on the Building of Sustainable National Greenhouse Gas Inventory Management Systems

John Steller

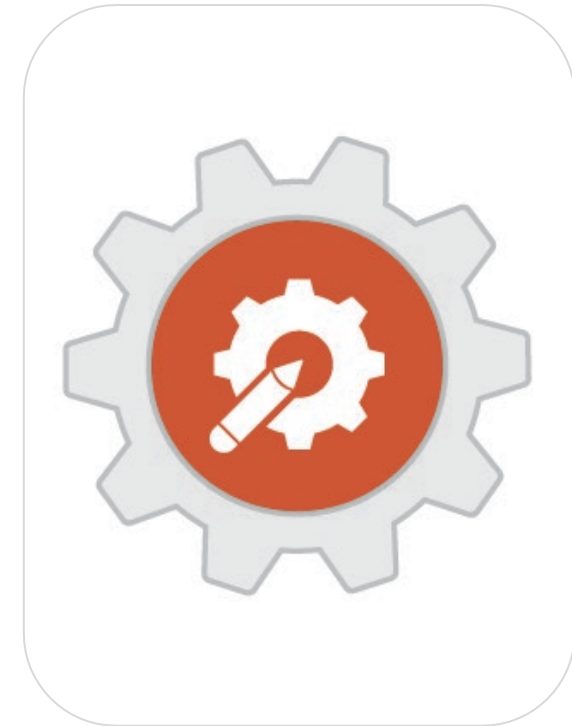U.S. Environmental Protection Agency

October 24, 2022

Overview

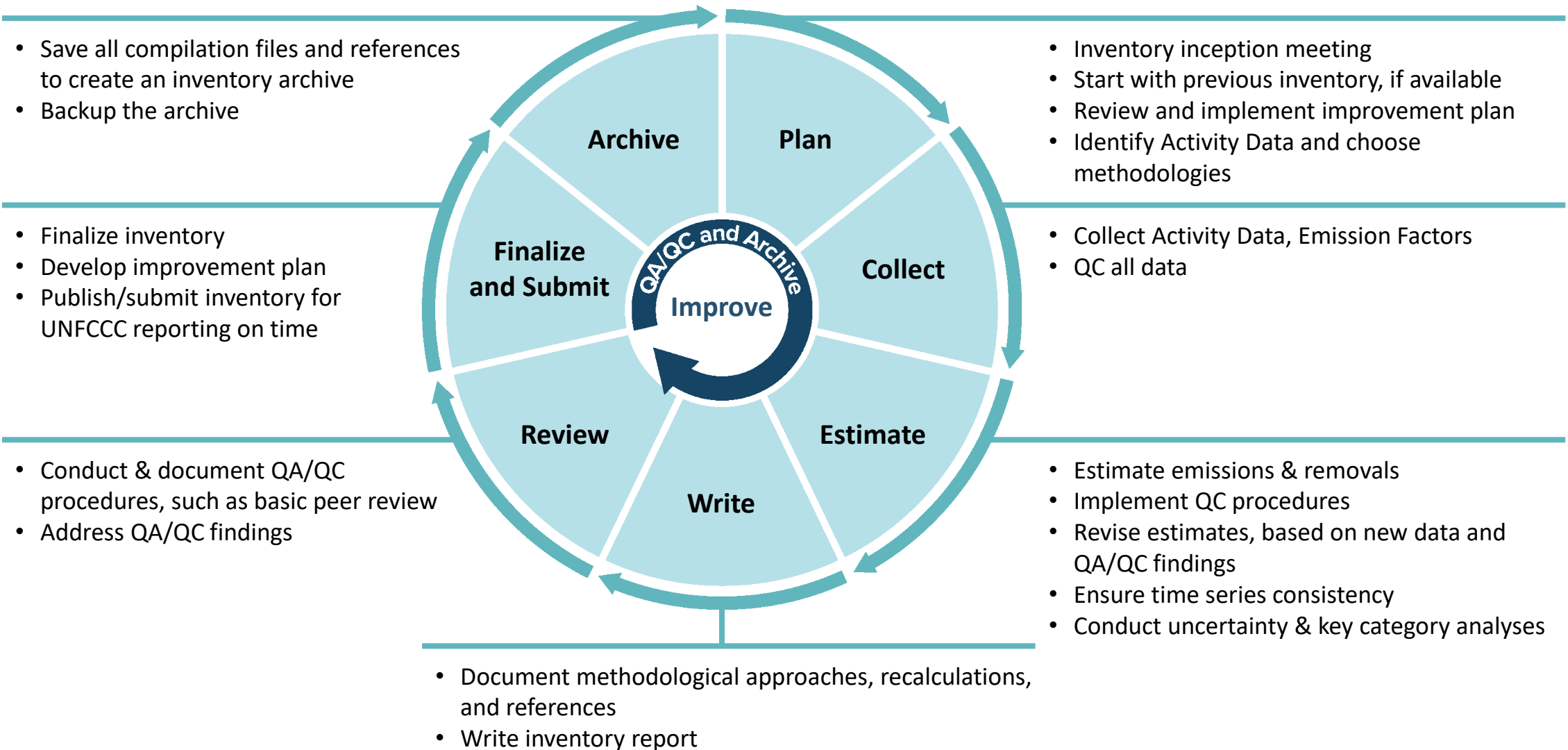**Introduction to GHG Inventory Management Systems and the Toolkit**

Enhanced Transparency Framework

Inventory Planning Template

National GHG Inventory Compilation Cycle

- Save all compilation files and references to create an inventory archive
- Backup the archive

- Finalize inventory
- Develop improvement plan
- Publish/submit inventory for UNFCCC reporting on time

- Conduct & document QA/QC procedures, such as basic peer review
- Address QA/QC findings

Archive **Plan**

Finalize and Submit **Collect**

QA/QC and Archive
Improve

Review **Estimate**

Write

- Inventory inception meeting
- Start with previous inventory, if available
- Review and implement improvement plan
- Identify Activity Data and choose methodologies

- Collect Activity Data, Emission Factors
- QC all data

- Estimate emissions & removals
- Implement QC procedures
- Revise estimates, based on new data and QA/QC findings
- Ensure time series consistency
- Conduct uncertainty & key category analyses

- Document methodological approaches, recalculations, and references
- Write inventory report

# National Inventory Management System

- Organize the steps and arrangements needed to prepare national inventories

- Transition from a project-based approach to an institutional approach that can prepare inventories regularly

- Critical starting point for building inventories that are more transparent, accurate, complete, consistent, and comparable (TACCC)

- Efficient use of time and resources over the long term

Toolkit for Building National GHG Inventory Systems

EPA has organized key elements of UNFCCC and IPCC guidance into easy-to-use templates to help inventory compilers develop a sustainable national GHG inventory management system
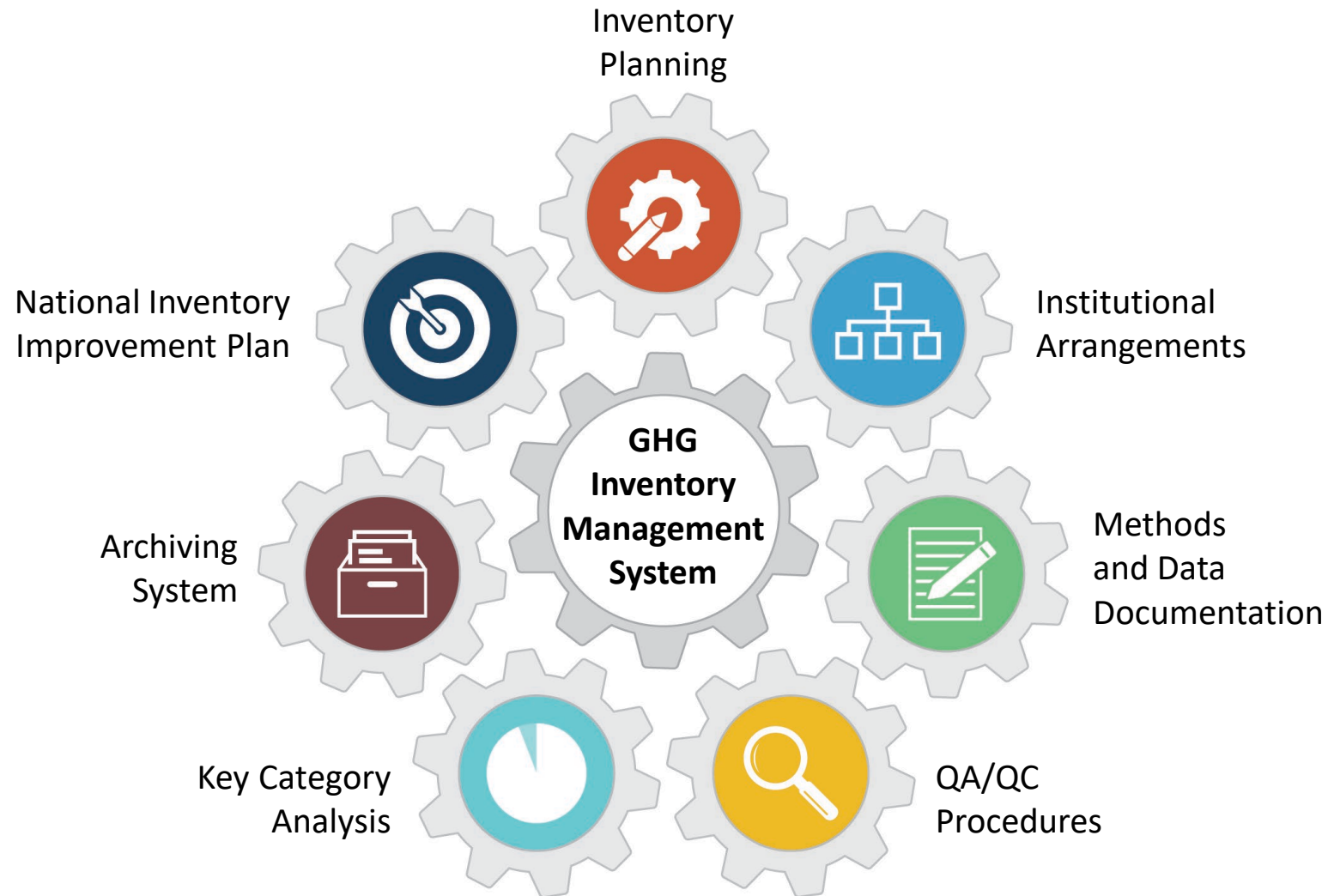
✓ Based on EPA's 20+ years of experience preparing the U.S. inventory and working with countries to develop inventory systems

✓ Documents the critical components of national inventory systems

✓ Supports the task of reporting on national inventory arrangements, QA/QC plans, etc.

✓ Helps countries meet reporting requirements of the Enhanced Transparency Framework under the Paris Agreement

Developing a National Greenhouse Gas Inventory System
TEMPLATE WORKBOOK
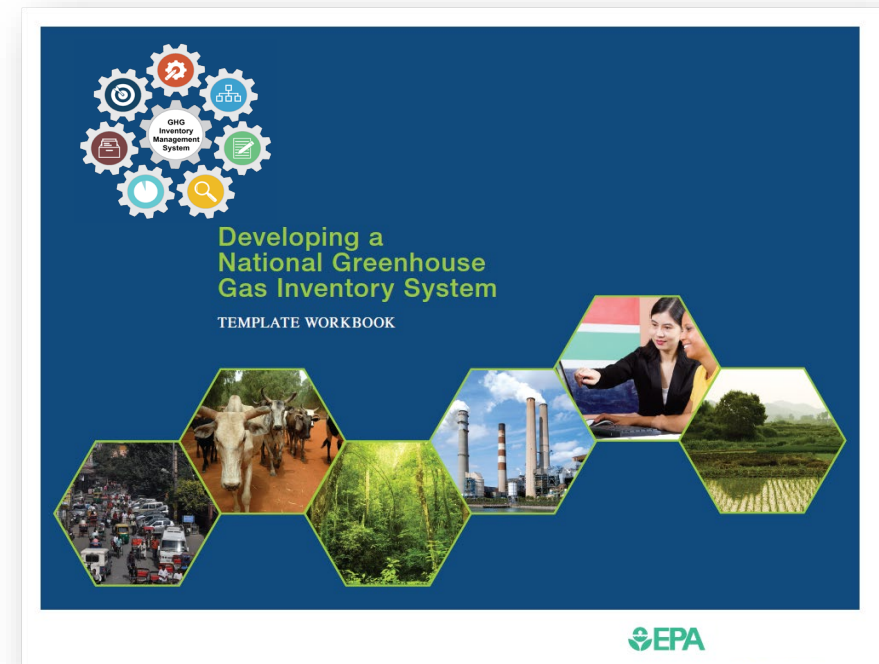
Benefits of the National Inventory System Templates

Completing the templates will help you…	…which yields these benefits
Document critical information about inventory plans and procedures	Improve Transparency and Credibility
Define inventory tasks and development stages	Break down work into discrete tasks
Accommodate varying levels of national capacity	Different priorities and roles based on budget and staff capacity
Clarify roles and responsibilities of individuals and institutions	Easier accountability and role development
Identify priorities for future improvements	Continuous improvement and refinement
Provide a clear starting point for future inventories	Help establish a sustainable national system that • Meets TACCC principles • Enables transition to ETF commitment of submitting a Biennial Transparency Report (BTR) every 2 years

Key Components of an Inventory Management System

Inventory Planning

Institutional Arrangements

National Inventory Improvement Plan

GHG Inventory Management System

Methods and Data Documentation

Archiving System

QA/QC Procedures

Key Category Analysis

Template 1. Inventory Planning

This template will help you:

- Document inventory compilation schedule and workplan

- Track progress on completing each template

Supporting Templates, Guides, and Tools

- National Inventory Inception Memorandum Template

Template 2. Institutional Arrangements

This template will help you:

- Assess and document strengths and weaknesses
- Promote institutionalization of the inventory process
- Ensure long-term integrity of the inventory

Supporting Templates, Guides, and Tools

- National GHG Inventory Coordinator: Responsibilities and Qualifications Guide
- Sector Lead Roles and Responsibilities Guide for Energy, IPPU, Agriculture, LULUCF, and Waste
- Memorandum of Cooperation Template
- Statement of Work Template

Template 3. Methods and Data Documentation

This template will help you:

- Organize and document methodologies, activity data, and emission factors
- Identify future improvements
- Provide valuable documentation of inventory categories for future reference

Supporting Templates, Guides, and Tools

- Confidentiality Agreement and Amendment Template

Template 4. QA/QC Procedures

This template will help you:

- Provides a guide to establish cost-effective quality assurance and quality control (QA/QC) procedures
- Define roles and tasks of inventory staff
- Includes general and category-specific checks, as recommended by IPCC

Supporting Templates, Guides, and Tools

- Appendix 1: QA/QC Checklists
- Appendix 2: Expert Review Elicitation Template

Template 5. Key Category Analysis (KCA)
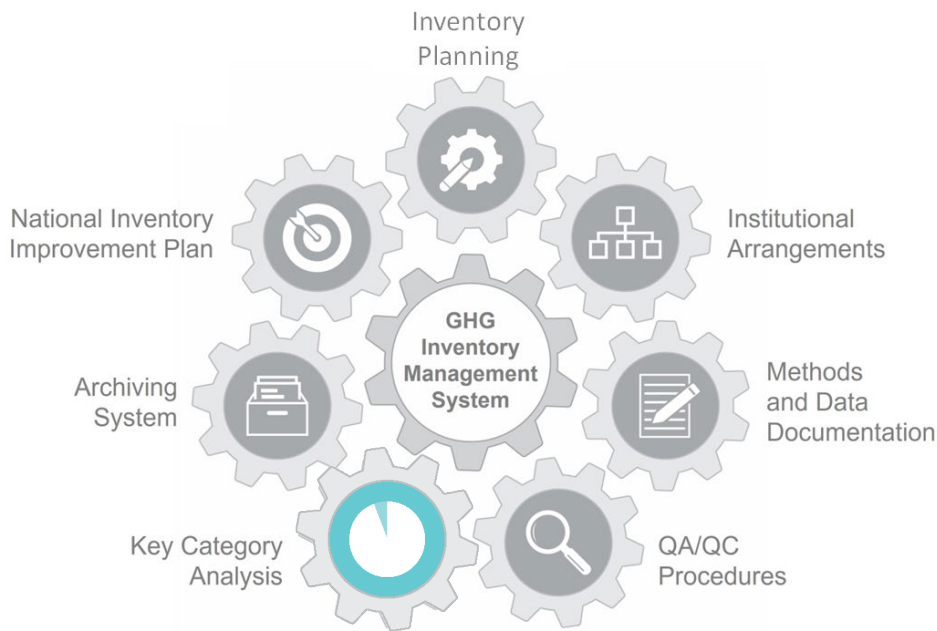
This template will help you:

- Identify the most important sources and sinks in the national GHG inventory
- Focus and prioritize inventory improvement

Supporting Templates, Guides, and Tools

- Key Category Analysis Tool

Template 6. Archiving System

This template will help you:

- Create a complete, accessible, and cost-effective archiving system
- Provide the critical starting point for future inventories
- Increase the transparency of the inventory

Supporting Templates, Guides, and Tools

- Archiving Procedures Checklist

Template 7. National Inventory Improvement Plan

This template will help you:

- Identify future improvements, based on the needs identified in the 6 other templates
- Prioritize improvements that enhance your inventory's transparency, accuracy, completeness, comparability, and consistency (TACCC) over time

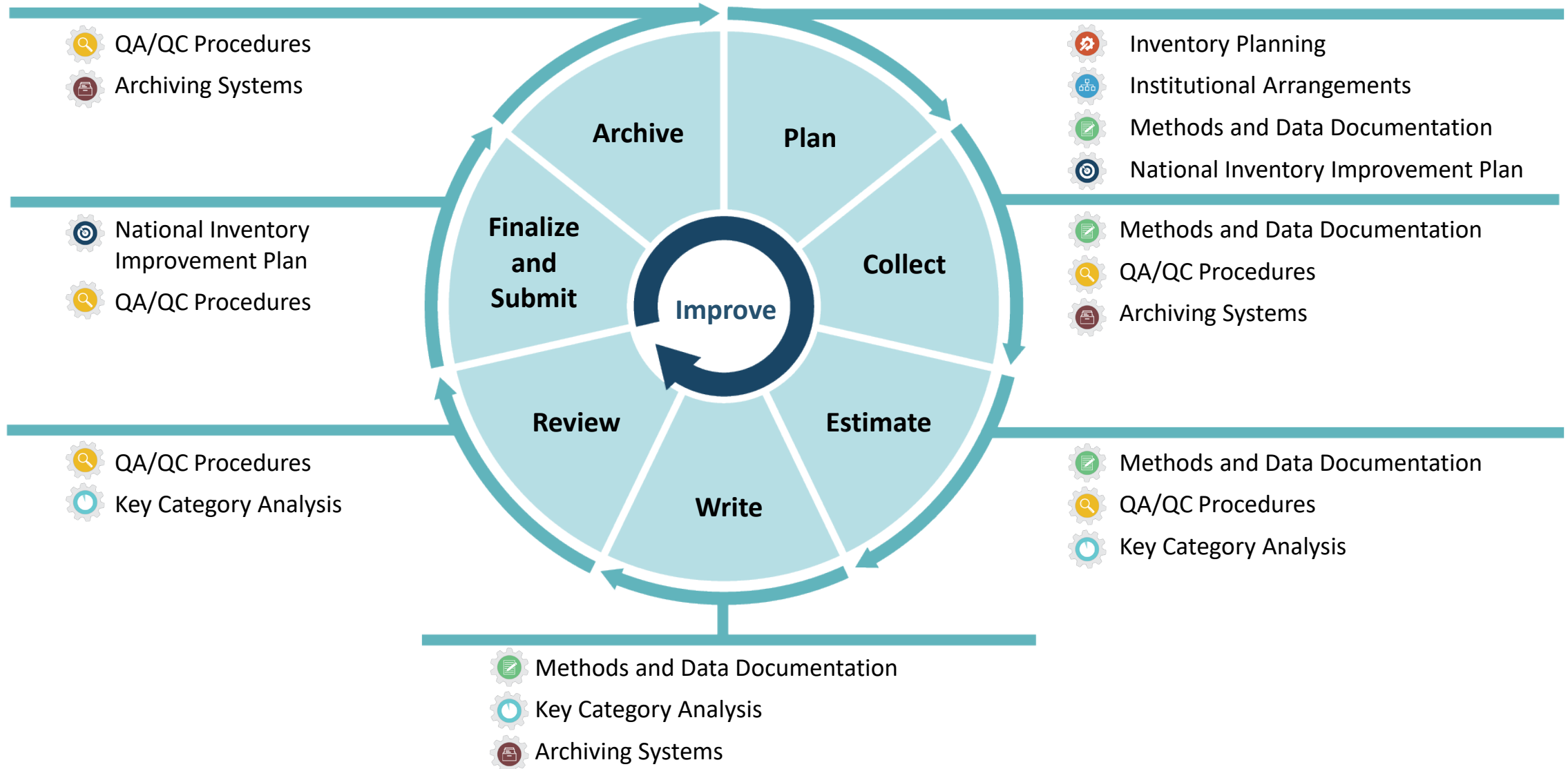**Supporting Templates, Guides, and Tools**

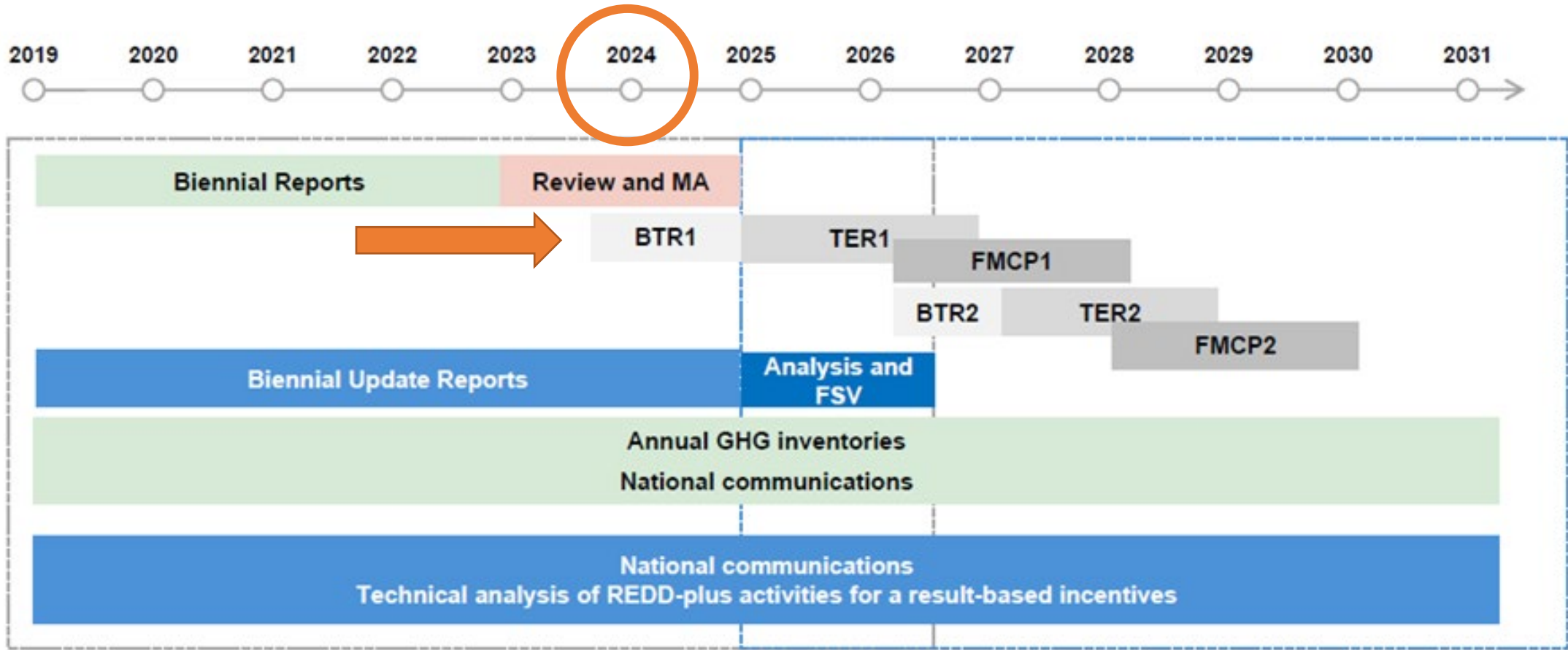- Inventory Progress Indicator (IPI) Tool

Templates Available by Language

Templates Available in English, en Español, and en Français

In English	En Español	En Français
Introduction to Toolkit	✓	✓
Template 1. Inventory Planning	✓ (Plantilla 1…Junio2022.docx)	✓ (Modèle 1…Juin2022.docx)
National GHG Inventory Inception Memorandum	✓	✓
Template 2. Institutional Arrangements	✓ (Plantilla 2…Junio2022.docx)	✓ (Modèle 2…Juin2022.docx)
GHGI Coordinator Responsibilities & Qualifications	✓	✓
Sector Lead Roles & Responsibilities: Energy	✓	✓
Sector Lead Roles & Responsibilities: IPPU	✓	✓
Sector Lead Roles & Responsibilities: Agriculture	✓	✓
Sector Lead Roles & Responsibilities: LULUCF	✓	✓
Sector Lead Roles & Responsibilities: Waste	✓	✓
Memorandum of Cooperation	✓	✓
Sample Scope of Work	✓	Ce document n'est pas encore disponible
Template 3. Methods and Data Documentation	✓ (Plantilla 2)	✓ (Modèle 2)
Confidentiality Agreement & Amendment	✓	✓
Template 4. QA/QC Procedures	✓ (Plantilla 3)	✓ (Modèle 3)
Template 5. Key Category Analysis	✓ (Plantilla 5)	✓ (Modèle 5)
Key Category Analysis Tool	Esta herramienta no esta disponible	Cet outil n'est pas encore disponible
Template 6. Archiving System	✓ (Plantilla 6…Junio2022.docx)	✓ (Modèle 6…Juin2022.docx)
Template 7. National Inventory Improvement Plan	✓ (Plantilla 7…Junio2022.docx)	✓ (Modèle 7…Juin2022.docx)
Inventory Progress Indicator Tool	Esta herramienta no esta disponible	Cet outil n'est pas encore disponible

Inventory Compilation Cycle & the Templates

QA/QC Procedures
Archiving Systems

National Inventory Improvement Plan
QA/QC Procedures

QA/QC Procedures
Key Category Analysis

Inventory Planning
Institutional Arrangements
Methods and Data Documentation
National Inventory Improvement Plan

Methods and Data Documentation
QA/QC Procedures
Archiving Systems

Methods and Data Documentation
QA/QC Procedures
Key Category Analysis

Methods and Data Documentation
Key Category Analysis
Archiving Systems

Archive
Plan
Collect
Estimate
Write
Review
Finalize and Submit
Improve

Enhanced Transparency Framework

Toward Common Reporting and Review

Current Reporting and Review Framework ➝ **Enhanced Transparency Framework**

Annex I Parties (Developed Countries)
- National Communications (NCs), detailed reporting tables
- Biennial Reports (BRs), detailed reporting tables
- Annual GHG Inventories (GHGIs), detailed reporting tables
- Technical Expert Review of all reports, Multilateral Assessment (MA) for BRs

Non-Annex I Parties (Developing Countries)
- National Communications (NCs)
- Biennial Update Reports (BURs)
  - National GHGIs (chapter in BUR/NC, 1996 IPPC Guidelines/IPCC GPG, summary tables)
  - International Consultation and Analysis (ICA)

All Parties*
- Reporting requirements under Modalities, Procedures, and Guidelines (MPGs)
- Biennial Transparency Reports (BTRs)
  - National GHGIs (standalone or BTR chapter, 2006 IPCC Guidelines, detailed reporting tables)
  - Progress toward Nationally Determined Contributions (NDCs)
- Areas of Improvement
- Technical Expert Review
- Facilitative Multilateral Consideration

*With flexibility to developing country parties that need it in light of their capacities.

9

Templates Help Meet ETF Requirements

Modalities, Procedures, and Guidelines: each Party shall report on…

- "National entity or focal point with overall responsibility for the inventory"
- "Division of specific responsibilities"

Template 2:
Institutional Arrangements

- Activity data, choice and development of methods, emission factors, data sources and references.

Template 3:
Methods & Data Documentation

- "Quality assurance/quality control (QA/QC)"

Template 4:
QA/QC Procedures

Templates Help Meet ETF Requirements

Modalities, Procedures, and Guidelines: each Party shall report on…

- "Key categories for the starting year and the latest reporting year"

Template 5:
Key Category Analysis

- "Archiving of all information for the reported time series"

Template 6:
Archiving System

- "Planned inventory improvements"

Template 7:
Inventory Improvement Plan

Poll Question #4

Which component(s) of your inventory management system do you consider to be the most well-documented? Select all that apply.

a. Inventory planning
b. Institutional arrangements
c. Methods and data documentation
d. QA/QC procedures
e. Key category analysis
f. Archiving system
g. National inventory improvement plan
h. All of the above

Respond using Mentimeter link in the chat!

Questions?

Inventory Planning

Customizing the Templates

Read the background and instructions in blue and complete each template.

### Introduction to Template 7. National Inventory Improvement Plan

In the U.S. EPA *Toolkit for Building National GHG Inventory Systems ('Toolkit')*, this is Template 7. Its purpose is to help the National Inventory Coordinator (NIC) develop a National Inventory Improvement Plan (NIIP). Every country should have a comprehensive improvement plan including identifying improvements to methods, data, and the inventory system to improve inventory quality over time, including the transparency, consistency, comparability, completeness, and accuracy of subsequent reported national GHG inventories. Beyond identifying improvement projects, the improvement plan should also the assign a priority level to each proposed project. The plan should also provide an explanation of why certain improvement options should be considered high priority (e.g., key categories), and outline implementation details, e.g. projected budget and resource needs and indicate the time horizon for implementation (e.g., near-term such as the next inventory or long-term meaning future inventories). The plan will likely focus on improvements to key categories, consistent with IPCC good practice guidance, any priority capacity-building needs identified during technical analysis of Biennial Update Reports, Biennial Transparency Reports, or other QA/QC processes, and finally on all other aspects of the inventory as resources permit.

Preparing and reporting an improvement plan is consistent with future reporting requirements under the Enhanced Transparency Framework (ETF)[1]. To facilitate continuous improvement, countries should identify, regularly update, and report information on areas of improvement. In addition to areas noted above, improvements should also address capacity constraints related to use of flexibility and in the future, responding to improvements identified by technical expert review teams.

Instructions

The tables in this template may be customized by adding or removing columns or rows to better reflect your country's particular needs or circumstances.

Complete the cells that are shaded this color:
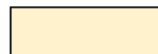
Enter new information about your inventory in black text.

Easy-to-follow instructions for each step in the template.

More on Customizing the Templates

National Inventory Improvement Plan

This National Inventory Improvement Plan (NIIP) presents options for improving the national GHG inventory system to support compilation of a high-quality inventory consistent with the 2006 IPCC Guidelines. The NIIP will guide future efforts to increase the transparency, consistency, comparability, completeness, and accuracy of future inventories. It will inform the overall improvement of the national GHG inventory, including strengthening institutional capacity over the coming years. These improvements have been identified through documentation of existing institutional arrangements, category-by-category analyses of methods and data, QA/QC procedures, key categories, and the archiving system.

Table 7-1, below, identifies the improvement options for this NIIP and their level of priority. Table 7-2 proposes inventory improvement projects consisting of the high-priority options from Table 7-1.

Includes example text in black that you can customize according to your national circumstances.

STEP 1: Compile the list of improvement options in Table 7-1, below.

Purpose of Table 7-1	To provide a clear overview of the improvement options identified by the inventory team in Templates 2 through 6 and an explanation of why certain improvement options should be categorized as high-priority.
How to use the table when complete	To guide efforts to increase the transparency, accuracy, consistency, comparability, and completeness of future national GHG inventories.
General instructions	Consolidate all improvements listed in Templates 2 through 6 into this table. Ensure that these improvements include enough identified in Templates 2 through 6. Improvements in these categories need to be specific, not general. Improvements that are too general are unlikely to be completed Also include improvements suggested during external assessments or reviews (e.g., International Consultation and Analysis). If you or another Party has evaluated your inventory using the Inventory Progress Indicator (IPI) tool, you may also record in Table 7-1 any improvements that would address inventory gaps noted in the evaluation. Add rows to the table as necessary. Improvements in these categories need to be specific, not general. Improvements that are too general are unlikely to be completed.

Blue text is for your reference. DELETE blue text in the final template once it has been filled out.

How this Template Will Help!

***Inventory Planning* will help the inventory team:**

- Create a national GHG inventory schedule and record due dates for key stages of inventory compilation

- Track progress on completing the templates

Case Study: How to Get Started

Background: Atlantis has compiled inventories periodically in the past on a project basis and is now preparing to compile their inventory every 2 years to meet their commitments under the Paris Agreement. The NIC has been identified and is starting the inventory planning process.

Next Steps:

- The NIC will develop a detailed work plan and schedule that includes each stage of the compilation schedule (Table 1-1 in Template 1 and Inventory Inception Memo).

- The NIC will assign tasks to document the inventory management system in the templates and track progress in the Overall Template Progress summary table (Table 1-2 in Template 1).

Step 1: Inventory Compilation Schedule

Table 1-1. Inventory Compilation Schedule

	Stage	Due date (e.g., Month, day, and year)	Comments
Improve	Plan		
	Collect		
	Estimate		
	Write		
	Review		
	Finalize & Submit		
	Archive		

Who completes this table: National Inventory Coordinator (NIC)

Example of Table 1-1

Table 1-1. Inventory Compilation Schedule

	Stage	Due date (e.g., Month and year)	Comments
Improve	Plan	June 2022	• Sector leads: update list of planned improvements by June 15 • Inventory kick-off meeting on June 30
	Collect	December 2022	• Notify NIC of any new sources/sinks or GHGs to add to GHGI by December 31
	Estimate	First Draft: June 2023 *Second Draft: April 2024*	• Sector leads: to minimize version control issues, make sure to use the latest inventory compilation files provided at kick-off
	Write	First Draft: October 2023 *Second Draft: June 2024*	• For each category, clearly specify which IPCC tier methodology is used
	Review	First Draft: January 2024 *Second Draft: October 2024*	• QA review period: January 1-January 31. 2024
	Finalize & report	December 2024	• BTR submission deadline is December 31, 2024
	Archive	February 2025	• Sector leads: save all references (AD, EF) to inventory archive by February 15

Who completes this table: National Inventory Coordinator (NIC)

Step 2: Overall Template Progress

Table 1-2. Overall Template Progress

Template	Summary of progress towards completing the template	Obstacles and possible solutions	Status
1. Inventory Planning			
2. Institutional Arrangements			
3. Methods and Data Documentation			
4. QA/QC Procedures			
5. Archiving System			
6. Key Category Analysis			
7. National Inventory Improvement Plan			

Tip: Revisit this table before initiating the next inventory cycle to recall and address or avoid obstacles.

Who completes this table: National Inventory Coordinator (NIC)

Example of Table 1-2

Table 1-2. Overall Template Progress

Template	Summary of progress towards completing the template	Obstacles and possible solutions	Status
1. Inventory Planning	Inventory Compilation Schedule is completed. Template Progress table is being updated regularly.		In Progress
2. Institutional Arrangements	Sector Leads are compiling tables 2-3 for respective sectors.	Obstacle: need more disaggregated IPPU AD Solution: engage statistics ministry, industry associations.	In Progress
3. Methods and Data Documentation			Not Started
4. QA/QC Procedures			Not Started
5. Archiving System			Not Started
6. Key Category Analysis			Not Started
7. National Inventory Improvement Plan			Not Started

Who completes this table: National Inventory Coordinator (NIC)

Supporting Template: National GHG Inventory Inception Memorandum

- NIC can customize the inception memo template to provide general guidance and convey the detailed schedule to the inventory compilation team (i.e., sector leads, QA/QC coordinator, uncertainty coordinator, consultants).

- Participants may have more than one role, depending on staff resources.
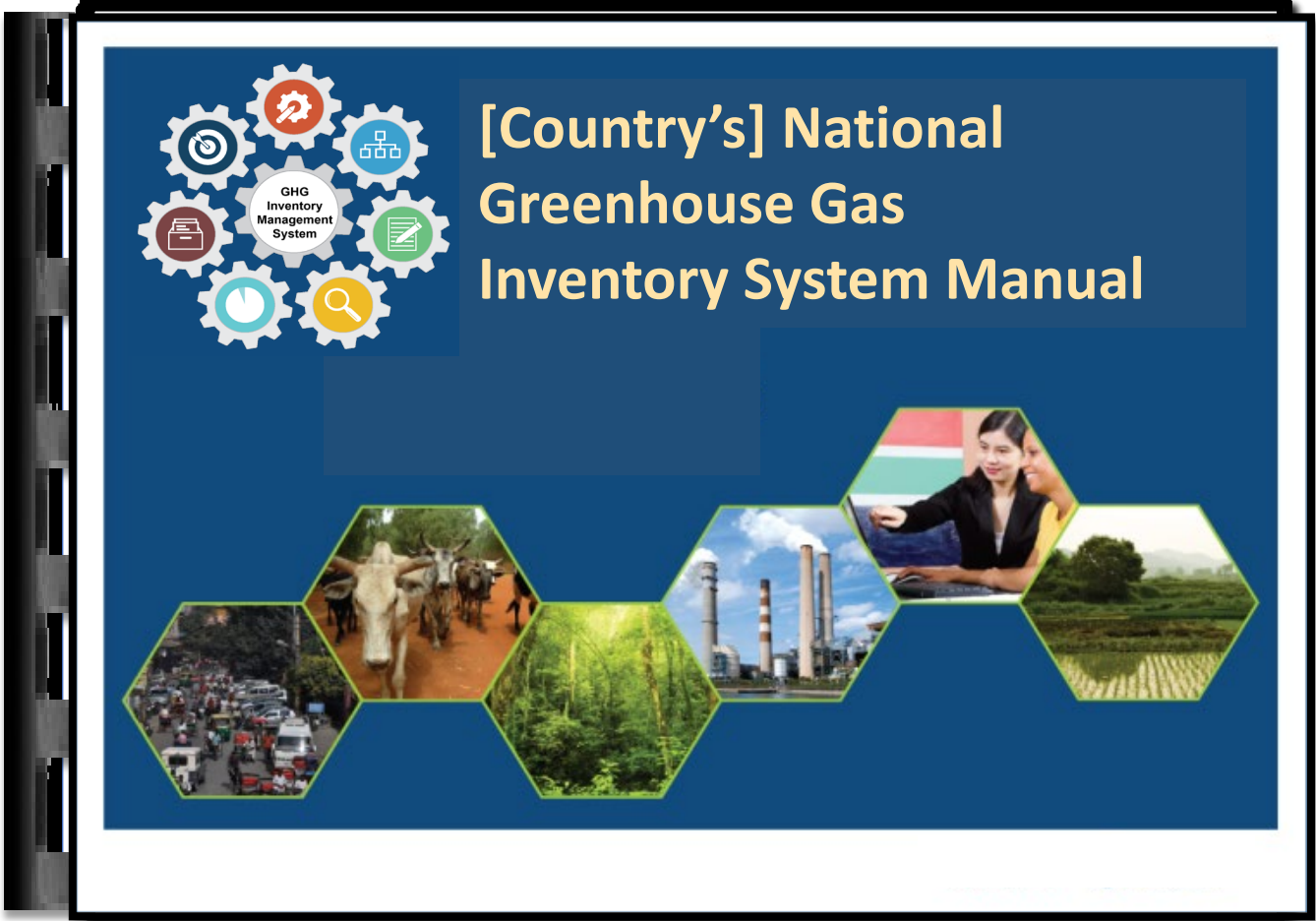
- Components include:

Inventory Inception Memorandum
To: Inventory compilers, QA/QC coordinator, etc.
Subject: Inventory Preparation Procedures for 2022-2024
_____

1. Introduction
2. Work Plan and Schedule
3. Inventory Structure and Team Member Responsibilities
4. Documentation Procedures
5. Data Management
6. Instructions for the Report Text
7. QA/QC Requirements
8. Uncertainty Analysis*
…

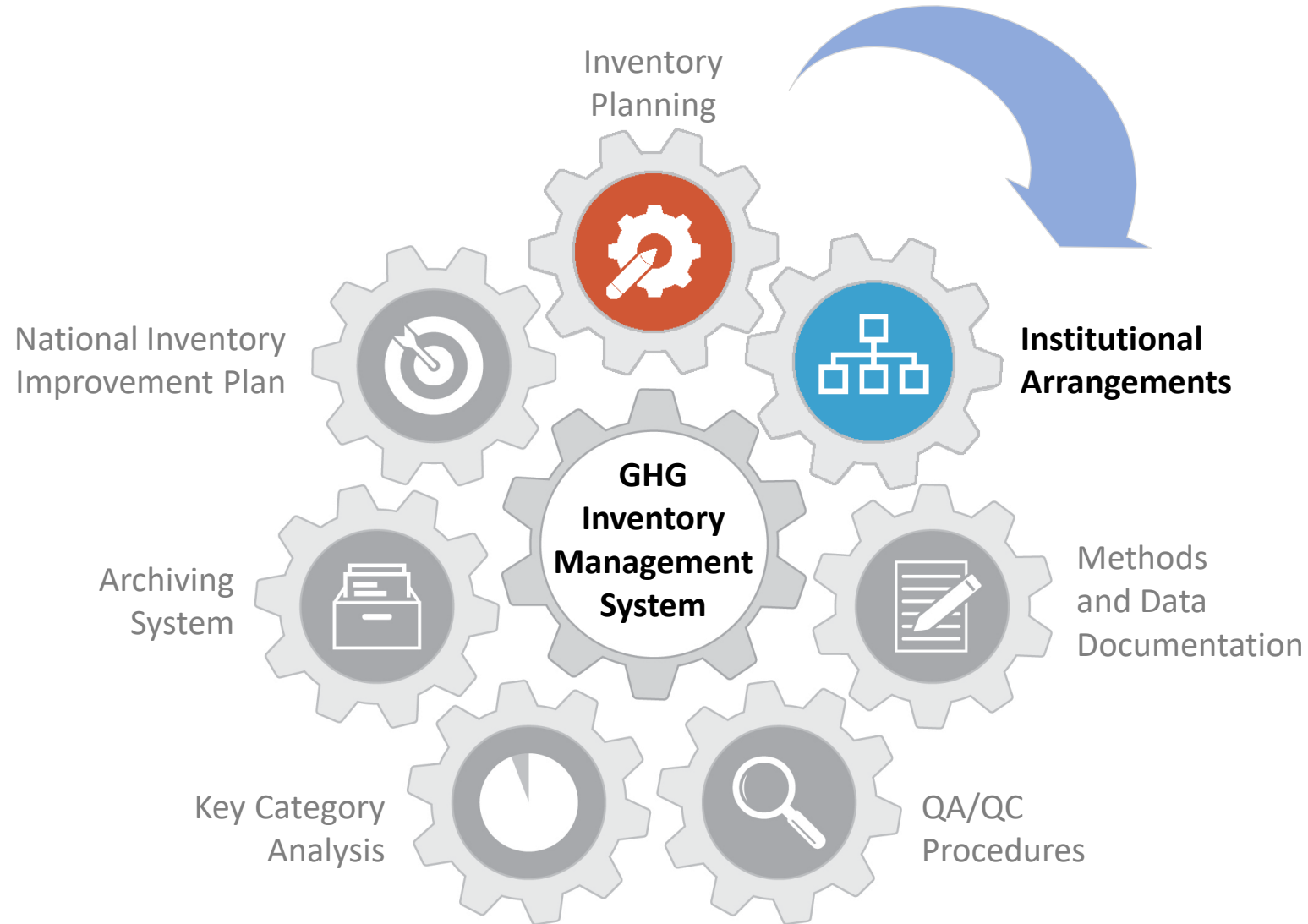* EPA is considering developing a new resource to help conduct uncertainty analyses. Please send any suggestions or feedback: ghgi.transparency@epa.gov.

Action Items from Inventory Planning

1. Establish a suitable schedule for each stage of the compilation cycle
   - Consult with key stakeholders in your inventory as needed (e.g., your management, sector leads/compilers, data providers) to understand data availability and other needs or constraints.

2. Track progress towards completing all templates to ensure useful documentation of national GHG inventory system

3. Prepare an inception memorandum for your GHG inventory to convey important guidance and due dates to your inventory compilation team
   - Coordinate the compilation teams and manage the inventory compilation cycle

Next Presentations

Inventory Planning

National Inventory Improvement Plan

Institutional Arrangements

Archiving System

GHG Inventory Management System

Methods and Data Documentation

Key Category Analysis

QA/QC Procedures

Thank You For Your Attention!

For questions & more information, email:

ghgi.transparency@epa.gov

Toolkit for Building National GHG Inventory Systems
https://www.epa.gov/ghgemissions/toolkit-building-national-ghg-inventory-systems