Introducing the Inventory Project Progress Indicator (IPPI) Tool

Presented by:
Mr. Joshua Forgotson
Senior Technical Officer
USAID Low Emissions Asian Development (LEAD) Program
ICF International (USAID Contractor)

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Introducing the IPPI Tool

• History
  o The Inventory Project Progress Indicator (IPPI) tool was initially developed under the US Environment Protection Agency’s (USEPA) Capacity Building for National GHG Inventory Systems in Developing Countries project.
  o Subsequently, the tool was expanded and an IPPI implementation plan was developed by the Low Emissions Asian Development (LEAD) program, a regional US Agency for International Development (USAID) initiative.
Introducing the IPPI Tool (continued)

- Purpose: To serve as kilometer markers on the road to a high-quality inventory
  - The Consultative Group of Experts (CGE) of the United Nations Framework Convention on Climate Change defines quality in the context of national GHG inventories by stating that, “National GHG inventories must produce emission/removal data which are neither far over nor below real values as far as can be judged according to the available data and information.”

(See: https://unfccc.int/files/national.../1_-_national_arrangements.ppt)
Introducing the IPPI Tool (continued)

• Form: Excel workbook, multiple sheets
• Function: Principles, indicators, and a quantitative and qualitative assessment of each.
• Use: Prepare an inventory, fill out an IPPI sheet. Two years later (for example), prepare another inventory, fill out another IPPI sheet, and compare the two sheets to see if you are going the right direction on the road to a better inventory.
## Assessment Scale

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB</td>
<td>No basis for assessment. Not applicable.</td>
</tr>
<tr>
<td>0</td>
<td>Unspecified. No evidence exists to confirm or refute that this indicator has been satisfied.</td>
</tr>
<tr>
<td>1</td>
<td>There is evidence that the indicator has not been satisfied either wholly or in part.</td>
</tr>
<tr>
<td>2</td>
<td>There is evidence that the indicator has been partially satisfied.</td>
</tr>
<tr>
<td>3</td>
<td>There is evidence that the indicator has been wholly satisfied.</td>
</tr>
</tbody>
</table>
### Assessment Scale

<table>
<thead>
<tr>
<th>Rating</th>
<th>Example: Indicator 21. All sources/sinks that were included in the country’s previous National Communications (NC) are included in this inventory.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB</td>
<td>No basis because there is no previous NC.</td>
</tr>
<tr>
<td>0</td>
<td>There is a previous NC, and the current inventory <strong>DOES NOT STATE</strong> exactly which sources or sinks were included in the previous or current inventory.</td>
</tr>
<tr>
<td>1</td>
<td>The current inventory states that <strong>NO</strong> sources or sinks in the previous inventory are included in the current inventory.</td>
</tr>
<tr>
<td>2</td>
<td>The current inventory states that <strong>SOME BUT NOT ALL</strong> of the sources or sinks in the previous inventory are included in the current inventory.</td>
</tr>
<tr>
<td>3</td>
<td>The current inventory states that <strong>ALL</strong> of the sources or sinks in the previous inventory are included in the current inventory.</td>
</tr>
</tbody>
</table>
Qualitative Assessment

• A detailed explanation of why an indicator is rated NB, 0, 1, 2, or 3.

• If the rating is 1, 2, or 3, the assessment should cite the evidence that supports the explanation.
Background – Limitations

1. The indicators are not comprehensive.

2. The indicators all receive equal weighting, even though some are clearly more important than others.

3. There is subjectivity in applying the assessment scale to qualitative information.
Contact

MR. JOSHUA FORGOTSON
Senior Technical Officer
USAID LEAD Program
ICF International
(USAID Contractor)

Email: Joshua.Forgotson@icfi.com
Skype: jdforgotson

www.LowEmissionsAsia.org
The TACCC Principles:
Transparency, Accuracy, Consistency, Completeness, and Comparability

Presented by:
Mr. Joshua Forgotson, Ms. Marian Van Pelt, and Mr. Alexander Lataille Respectively: Senior Technical Officer, Vice President, and Senior Associate
USAID Low Emissions Asian Development (LEAD) Program
ICF International (USAID Contractor)
Hanoi, Viet Nam – May 3-6, 2016
The TACCC principles are Transparency, Accuracy, Consistency, Completeness, and Comparability.

(See https://unfccc.int/files/national.../1_-_national_arrangements.ppt)

In the IPPI tool, there are two additional indicators:
1. Institutional Arrangements; and,
2. Inventory Improvements.

We talk about these principles here because the IPPI tool assesses an inventory’s alignment with all seven of them.
The IPPI tool assesses an inventory’s alignment with the seven indicators by defining each as a series of indicators.

These indicators are criteria, which, if an inventory fully satisfied them, would suggest that the inventory were of a high quality and usefulness.

We will now consider them one-by-one.
TACCC Principles

TRANSPARENCY
What is “Transparency”?

- Transparency asks whether the data, assumptions, and methods in the inventory are presented clearly.

- Transparency is important because an inventory should be replicable in order for it to be built upon by future teams, or used in developing GHG-related policies or programs.
Transparency

What does a “Transparent” inventory look like?

- It has clear documentation of the methods, data sources, and assumptions upon which its emission/removal estimates are based.

- It has enough detail so that the emission/removal estimates for each category may be reproduced.

- It confirms that this information has been archived.
Key Indicator #1: Methodologies for each source/sink are documented and archived.

✓ The methodologies for each source/sink have been recorded in the inventory.
✓ They have also been saved in either electronic or paper format in a secure location for later reference.
Key Indicator #2: Data sources for each source/sink category are documented.

- The inventory states where the data for each source/sink were obtained.

- This is crucial to transparency because it lends the inventory *credibility*. It also allows future inventory teams to build on the previous analysis.
Transparency

Key Indicator #3: Data for each source/sink are archived.

✓ The data that were used in the emission/removal calculations have been stored in electronic or paper format in a secure location for future reference, following the archiving plan.
Transparency

**Key Indicator #4:** Methodological and data assumptions (e.g., expert judgment) are documented in the corresponding source/sink inventory text or in an annex to relevant inventory reports.

✔ When preparing GHG estimates for an inventory, some inputs must be assumed. To be transparent, an inventory will state what those assumptions were, who made them, and why.
Key Indicator #5: Methodological and data assumptions are archived in the corresponding source/sink calculation files or in an annex to relevant inventory reports.

✓ The assumptions referred to in the previous indicator have been stored for future reference according to the archiving plan.
Transparency

**Key Indicator #6**: Estimates for each source/sink are reproducible.

- The methodologies, data sources, and any expert judgement are easily identified and labeled in the inventory.
- Enough information is included to allow interested people to reproduce the estimates.
- By understanding how these estimates were prepared, future inventory developers will know how to prepare the next estimates.
Transparency

Review of indicators:

For each source/sink

✓ Methodology, data sources, and data are documented and archived

✓ Expert judgment and methodological/data assumptions are documented and archived

✓ Estimates are reproducible
TACCC Principles

ACCURACY
Accuracy

What is “Accuracy”?  

- Accuracy refers to whether emission or removal estimates are *as close as possible to their true values.*
Accuracy

What does an “Accurate” inventory look like?

- Tier 2 or 3 methodologies were used for all or almost all key categories.

- QA/QC and uncertainty analysis were performed.

- An inventory improvement process exists.
Accuracy

**Key Indicator #7:** Tier 2 or Tier 3 methodology is used for key categories.

☑ Emissions/removals are estimated for all key categories using either a Tier 2 or Tier 3 methodology from the IPCC Guidelines.
Key Indicator #8: Tier 2 or Tier 3 methodology is used for non-key source/sink categories.

Emissions/removals are estimated for non-key categories using either a Tier 2 or Tier 3 methodology from the IPCC Guidelines.
**Key Indicator #9:** Nationally generated data is used for key categories.

✔ Instead of relying on international or default data, like activity data or emission factors, an inventory can increase its accuracy by using properly-generated country-specific data.
Key Indicator #10: All estimates for source/sink categories use data and methods that are equal, better, or more up-to-date than those used by other organizations.

✓ All estimates are calculated using the most accurate and suitable data and methodologies available.
Accuracy

Review of the first four Accuracy indicators:

✓ *Tier 2* or *Tier 3 methodologies* are used for *KCA* and *non-KCA* sources/sinks

✓ Estimates use *country-specific/most accurate data* and *methodologies* available
Key Indicator #11: QA/QC management plan has been developed for Tier 1 QC.

- It is best practice when planning a new national GHG inventory to write down how quality assurance and quality control will be performed. This indicator refers specifically to the “QC” part of the QA/QC plan.

- “Tier 1” QC refers to QC that will be applied regardless of source/sink category. The subject of such QC may include topics like data units, conversion factors, labeling, or references.

- Guidelines for writing a QA/QC plan may be found in the IPCC Guidelines.
Key Indicator #12: QA/QC management plan for Tier 1 QC has been implemented.

✓ The QC procedures referred to in the previous indicator have been applied.
Accuracy

**Key Indicator #13**: Category-specific Tier 2 QC procedures have been developed.

- Unlike Tier 1 QC procedures, which apply to all sources/sinks, “Tier 2” QC procedures are source/sink category-specific. The IPCC Guidelines includes further information.

- According to this indicator, Tier 2 QC procedures should be decided upon and recorded.
Key Indicator #14: Tier 2 QC procedures have been implemented.

☑ The QC procedures referred to in the previous indicator have been applied.
Key Indicator #15: QA process has been implemented.

☑️ QA procedures, as described in the IPCC Guidelines, have been applied to the inventory.
Key Indicator #16: An inventory improvement process has been linked to the QA/QC management plan and procedures.

✓ During the performance of QA/QC, a variety of errors will normally be observed.

✓ It is important for the process of ensuring that future inventories improve upon the current inventory to include measures designed to reduce the occurrence of those errors.
Key Indicator #17: Uncertainty is estimated following IPCC guidance.

✓ Uncertainty analysis has been performed according to the IPCC guidelines, e.g., Chapter 3 of Volume 1 of the 2006 IPCC Guidelines.
Accuracy

Review of last seven Accuracy indicators:

✓ A QC management plan for Tier 1 and Tier 2 QC has been developed and implemented

✓ A QA process has been developed and implemented

✓ An inventory improvement plan has been developed based on results from QA/QC plan

✓ An Uncertainty Analysis has been performed
TACCC Principles

CONSISTENCY
What is “Consistency”? 

- Assume you have more than one inventory, e.g., NC2, and INC.
- For them to be “consistent,” the estimates in both must be based on the same assumptions and equations.
- Imagine emissions from automobiles were 10,000 tCO$_2$e in 1994 and 15,000 tCO$_2$e in 2004. How do you know emissions rose 5,000 tCO$_2$e?
Consistency

Key Indicator #18: Consistent data and methodology are used across time series for each source/sink category.

For any given category, these items remain constant for all inventoried years:

- how its activity data were produced; and
- how its emission/removal estimate was calculated.

If any change, prior inventories’ emissions/removals must be re-estimated to be consistent with the new inventory.
Consistency

Key Indicator #19: Inconsistencies in data and/or methodology for any source/sink category are documented.

✓ If an inconsistency was unavoidable, this should be explained in the inventory.
Consistency

Key Indicator #20: Sources/sinks and sub-sources are categorized consistent with IPCC guidance.

✓ Sources/sinks are clearly labeled with the code numbers and names provided in the IPCC Guidelines.

✓ They are also categorized according to the sector split provided in the IPCC Guidelines.

✓ If a source/sink is not in the guidelines, it is appropriately defined in the inventory.
Consistency

Review of indicators:

Across inventories:

✓ **Data are created, collected or otherwise obtained in a consistent manner.**

✓ **Consistent methodologies are used to estimate emissions/removals.**

✓ **Inconsistencies** are explained.

✓ **Sources/sinks** are categorized according to IPCC guidelines.
TACCC Principles

COMPLETENESS
What is “Completeness”?  

- Completeness asks whether the inventory includes estimates for all of the emissions/removals as stated in the IPCC guidelines based on the full geographic area of the Party creating the inventory.
What does a “Complete” inventory look like?

- As applicable, it includes all of the sources/sinks that were included in a past inventory.

- It includes the results of a key category analysis (KCA).

- It presents emissions/removals in the aggregate and by gas for the main GHGs (CO₂, CH₄, N₂O), Hi-GWP gases, and indirect gases.
Completeness

Key Indicator #21: All sources/sinks that were included in the country’s previous National Communications (NC) are included in this inventory.

✓ The categories in the country’s previous inventory reappear in the current inventory if they occurred during the year(s) of concern to the current inventory.

✓ If any category does not reappear, an explanation is included.
Completeness

Key Indicator #22: New source/sink categories that were not included in previous NC are included/evaluated in this inventory.

✓ The addition of a new source/sink should include an explanation of why it was included this year while not in previous years.
Completeness

**Key Indicator #23**: All source/sink categories that other organizations have estimated for this country are included in this inventory.

- A variety of organizations not involved in preparing the inventory may, for reasons of their own, have estimated emissions/removals of various categories.
- Good practice would be to mention these estimates, and include or exclude them, making sure to explain how the decision to do either was made.
Completeness

**Key Indicator #24:** Key Category Analysis (KCA) is included.

- It is good practice to perform KCA and include its complete results, for example, in table format, in the inventory.
Completeness

Key Indicator #25: KCA is applied correctly per IPCC guidelines.

✓ Included with the KCA in the inventory should be a description of how it was performed, e.g., according to the instructions in Chapter 4 of Volume 1 of the 2006 IPCC Guidelines.

✓ If a complete KCA calculation table is included in the inventory, it may be self-evident that KCA was applied correctly.
Completeness

**Key Indicator #26:** Emission estimates are provided both in aggregate (across all gases) and on gas-by-gas basis (CO₂, CH₄, and N₂O).

- The GHG Reporting requirements in the IPCC Guidelines, e.g., Chapter 8, Section 2 of Volume 1 of the 2006 Guidelines, are followed and documented.

- This means that emissions/removals from a given category are presented not only in CO₂ equivalent form (e.g., tCO₂e), but in terms of the individual gases associated with that category.
Completeness

Key Indicator #27: High-GWP emission estimates (HFCs, PFCs, and SF₆) are included, if these emissions are occurring from industrial or other sources.

- The GHG Reporting requirements in the IPCC guidelines, e.g., Chapter 8, Section 2 of Volume 1 of the 2006 Guidelines, are followed and documented.

- If these estimates are not included, an explanation is given (e.g., “Emissions of these gases are not included because they did not occur.”).
Completeness

Key Indicator #28: Indirect emission estimates (CO, NO$_x$, NMVOCs, and SO$_x$) are included.

- The GHG Reporting requirements in the IPCC guidelines, e.g., Chapter 8, Section 2 of Volume 1 of the 2006 Guidelines, are followed and documented.

- If these estimates are not included, an explanation is given (e.g., “Emissions of these gases are not included because they did not occur.”).
Completeness

Review of indicators:

✓ All sources/sinks that have been estimated by other organizations, included in past inventories, and that were not included in the last inventory are included/evaluated this inventory.

✓ A KCA analysis is included and applied per IPCC Guidelines

✓ Emission estimates are provided for all sources, in aggregate and by gas, to include High-GWP and indirect emission estimates.
COMPARABILITY
What is “Comparability”?  

- Comparability asks whether the emissions and removals in the inventory of interest were estimated according to the IPCC guidelines.
**Comparability**

**Key Indicator #29:** IPCC Guidelines (1996 or 2006) are used for every source/sink category.

- The guidance, e.g., methods, in the IPCC Guidelines are used to estimate the emissions/removals of every category.

- If the emissions/removals of a given category are estimated using different guidelines, an explanation is provided.
Comparability

**Key Indicator #30:** 2006 IPCC Guidelines are used for some source/sink categories.

- To the extent possible, the 2006 IPCC Guidelines are prioritized over previous IPCC Guidelines.
Comparability

**Key Indicator #31:** Reference and sectoral approaches for CO₂ from fuel combustion are used, and an explanation for any large difference between the two approaches is provided.

- A *sectoral* approach is used to estimate CO₂ emissions from fuel combustion.
- A *reference* approach is used to estimate CO₂ emissions from fuel combustion.
- Significant differences between the results of the two approaches are explained.
Comparability

Review of indicators:

- The **1996 or 2006 IPCC Guidelines** are used for all sources/sinks and the **2006 Guidelines** are used for some sources/sinks (and eventually all of them).

- Both *Reference and Sectoral approaches* are used for CO₂ fossil fuel combustion, and large differences are explained.
Other IPPI Principles

Institutional Arrangements
Institutional Arrangements

What are “Institutional Arrangements”?

- Preparing a national GHG inventory is easier when it is done systematically. A fundamental part of the system is how the many entities involved coordinate their diverse and complementary roles. Some may be legally mandated, and others based on a mutual understanding or agreement. When the roles of the entities – i.e., “institutions” – are established and mutually recognized, we say they are “arranged.” Hence, we have the term, “institutional arrangements.”
Institutional Arrangements

What do “Institutional Arrangements” in an inventory look like?

- There is a dedicated inventory lead agency
- Full- or part-time staff are assigned to the inventory
- The necessary budget is available
- The government lends its support to the inventory, preferably for the long-term
Institutional Arrangements

Key Indicator #32: There is a designated agency to lead inventory development (preparation, planning and management).

✓ There is an official/enforceable mandate, like an executive order, that puts a specific entity in charge of the inventory process.
Institutional Arrangements

Key Indicator #33: There is a designated inventory management team leader.

✔ The “designated agency” referred to in the previous indicator has one person with ultimate responsibility for overseeing the members of the inventory team.
Key Indicator #34: There is full-time staff to coordinate inventory preparation.

- At least one full-time staff member is responsible for organizing the preparation of the inventory.
Institutional Arrangements

Key Indicator #35: There is only part-time staff to coordinate inventory preparation.

✓ The inventory coordinator has staff who are dedicated to and responsible for supporting inventory preparation in addition to their other duties.
Institutional Arrangements

Key Indicator #36: There are external entities (e.g., universities, non-governmental organizations) that support the development of the inventory.

- Entities with the official mandate to complete the inventory are collaborating with entities without the official mandate, especially those with complementary knowledge/skills.

- There may be non-disclosure agreements, memoranda of understanding, consulting contracts, or similar agreements that state the terms of the collaboration.
Institutional Arrangements

Key Indicator #37: There is additional budget for the current inventory, in addition to GEF funds.

- The inventory coordinator has access to funding outside of the GEF funds.
- This budget may be established via an executive order, inter-agency agreement, or other legally binding arrangement, for example.
Institutional Arrangements

Key Indicator #38: There has been long-term support (5+ Years) for the inventory system from country government.

✓ For at least five years, the national government has demonstrated its commitment to supporting and improving the country’s national GHG inventory system.

✓ The country government has provided the necessary resources and information to support long-term inventory development.
Institutional Arrangements

Review of indicators:

There is a

✓ Designated agency,
✓ Staff (full or part time),
✓ External entities,
✓ Budget, and
✓ Long term support from the national government on national GHG inventory development.
Other IPPI Principles

Improvements
Improvements

What are “Improvements”?  

- They are “wish lists” that are captured during the development of the inventory and that if implemented, one would expect to produce better emission/removal estimates.
What do “Improvements” in an inventory look like?

- Future needs are identified and collected into specific prioritized actions.
- Actions are organized into an inventory improvement plan that can be utilized by future teams.
Improvements

Key Indicator #39: Areas needing improvement are identified and documented.

✓ Where improvements are needed, specific actions that should help achieve those improvements have been decided upon and recorded in writing.
Improvements

**Key Indicator #40: **There is an inventory improvement plan that has been documented and archived.

- The various measures by which future inventories may improve upon the inventory being assessed have been developed into a plan.
- This plan has been recorded in writing, and stored in a secure location in either digital or paper format.
Improvements

Review of indicators:

✓ *Improvements* are identified/documented and an *inventory improvement plan* has been developed/documentated/archived.
This concludes our introduction to the indicators that the IPPI tool uses to determined the extent to which the national GHG inventory being assessed is aligned with the TACCC principles, plus Institutional Arrangements and Inventory Improvements.

As a reminder, these indicators are criteria which, if an inventory fully satisfied them, would suggest that the inventory were of a high quality and usefulness.
MR. JOSHUA FORGOTSON
SENIOR TECHNICAL OFFICER
USAID LEAD Program
ICF International
(USAID Contractor)

Email: Joshua.Forgotson@icfi.com
Skype: jdforgotson

www.LowEmissionsAsia.org
Contact

MS. MARIAN VAN PELT
VICE PRESIDENT
ICF International
(USAID Contractor)

Email: Marian.VanPelt@icfi.com

www.LowEmissionsAsia.org
MR. ALEXANDER LATAILLE
SENIOR ASSOCIATE
ICF International
(USAID Contractor)

Email: Alexander.Lataille@icfi.com

www.LowEmissionsAsia.org