

# BOG 2: Uncertainties, QA/QC, Verification, Precursors and Indirect Emissions

Final Plenary

Comments in red were added based on plenary discussion.

**Issue #3:** Refinement of guidance on uncertainty based on the latest scientific knowledge and simplification of guidance by providing more default values, calculation examples and best practices

# Uncertainty

## ❖ What is the refinement?

- **Incorporation of methodological development and/or case studies on issues, such as spatial variability, regional upscaling, correlation/autocorrelation, resampling techniques, addressing representativeness of data, trend analysis, population vs. mean variance**
  - **Over 50 relevant articles based on a brief search of the literature published since 2006, and over 10 years of reporting by parties to the UNFCCC**
  - **Literature may be useful for general guidance that can supplement the existing methods (Should not be a scientific review of the methods, however).**

# Uncertainty

## ❖ What is the refinement?

- **Provide additional simplified explanation of procedures with case studies and decision trees**
- **Expand good practice for Monte Carlo simulations**
  - More direction but not be overly prescriptive
- **Discuss how to use uncertainty as a way to improve the inventory development**
  - Focusing effort on large sources of uncertainty or reducing model complexity
  - e.g., Simple decision tree

# Uncertainty

## ❖ What is the refinement?

- How to propagate uncertainty when applying Approach 1 for some sources and Approach 2 for others?
- Address large percentage uncertainties when using Rule B
- Include guiding principles for conducting an uncertainty analysis
- Note: May need to address specific issues on uncertainty analysis in the sectoral sections of a report, technical bulletin, etc.

# Uncertainty

- ❖ **Is the science available for the refinement?**
  - Yes
- ❖ **What is the priority level?**
  - Update guidance, High priority
  - Not major changes to the existing guidance
- ❖ **Suggested way of refinement?**
  - Methodology Report (Volume 1, Chapter 3)

**Issue #5:** Addition of examples of tools that could be useful for the purposes of QA/QC, verification or validation

# Tools for QA/QC and Verification

## ❖ What is the refinement?

- **Guidance on visualization options for quality control, such as tracking processes and flows using Sankey Diagrams, particularly for sectors and sources that are highly interlinked**
- **Visualization of time series with graphs to identify errors, i.e., outliers**
- **Provide case study examples of QA tools**
  - **FAO tools for AFOLU emissions**
  - **UK government tool for QA of spreadsheets and databases**

# Tools for QA/QC and Verification

- ❖ **Is the science/information available for the refinement?**
  - Yes
- ❖ **What is the priority level?**
  - Medium
- ❖ **Suggested way of refinement?**
  - Technical Bulletin and/or FAQ

**Issue #6:** Development or improvement of guidance on the verification using other estimation results like FAOSTAT emissions database and GHG concentration in atmosphere by satellite observation (remote sensing data)

# Verification

## ❖ What is the refinement?

- Verification section is outdated in the 2006 IPCC GL
- Discuss various ways to verify emission estimates in the context of the latest science with case examples
  - Atmospheric concentration data
  - Independent monitoring of carbon stocks and fluxes
  - Other approaches
  - **Not developing detailed methods, but reference more detailed guidance material that has been published elsewhere**

# Verification

## ❖ What is the refinement?

- **Discuss other uses of these data**
  - **Direct emission measurements to prepare better emission factors**
  - **Additional data to improve the inventory**
- Note: May need some follow-up in the sectoral guidance about the use of atmospheric data and other data

# Verification

- ❖ **Is the science/information available for the refinement?**
  - Yes
- ❖ **What is the priority level?**
  - High (Update guidance)
- ❖ **Suggested way of refinement?**
  - Methodology Report (Section 6.10.2)

**Issue #7:** Clearer guidance for the calculation of indirect CO<sub>2</sub> emissions

# Precursors and Indirect emissions

## ❖ What is the refinement?

- Provide clarity about estimation of the indirect CO<sub>2</sub> emissions across sectors that are not otherwise counted
  - Elaborate box 7.2
  - Clarify if the adopted GWPs include the indirect CO<sub>2</sub> emissions
- Clarify definition for “indirect” emissions in the guidelines (e.g., AFOLU vs. Waste)
  - Also other terms such as offsite emissions

# Precursors and Indirect emissions

- ❖ **Is the science/information available for the refinement?**
  - Yes
- ❖ **What is the priority level?**
  - Medium
- ❖ **Suggested way of refinement?**
  - Methodology Report (Chapter 7, Box 7.2)