



2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

5th Greenhouse Gases Inventory System Training Workshop
13-16 February 2023, UNESCAP, Bangkok, The Kingdom of Thailand

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IPCC Plenary
IPCC Bureau
IPCC Executive Committee

IPCC Secretariat
 (in Geneva,
 Switzerland)

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 The Physical Science Basis
 TSU
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Working Group II
 Climate Change Impacts, Adaptation and Vulnerability
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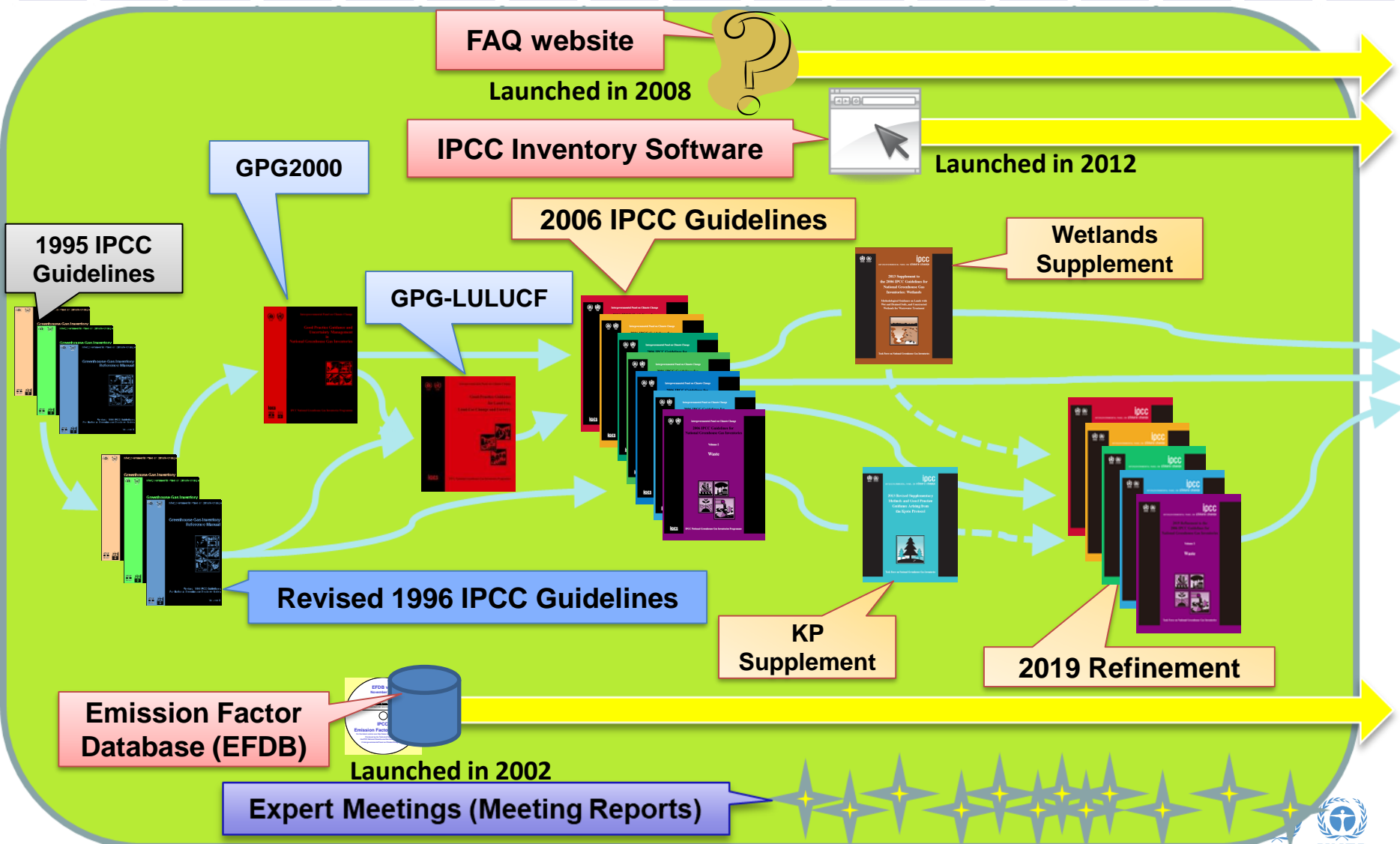
Authors, Contributors, Reviewers

Develop and refine the internationally-agreed methodology to estimate GHG emissions and removals at national level



IPCC Guidelines and Supporting Tools

1995 1996 ... 2000 ... 2003 ... 2006 ... 2013 ... 2019 2020 2021 ...



Paris Agreement and National GHG Inventory

- In order to build mutual trust and confidence among the Parties and to promote effective implementation of the Paris Agreement, a **transparency framework for action needs to be enhanced**.
- To that end, it is essential that all the Parties produce and report **high-quality and reliable national GHG inventories** (national emission data).

- Paris Agreement
Article 13, paragraph 7:

- Each Party shall regularly provide
 - (a) A national inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases, prepared using good practice methodologies accepted by the Intergovernmental Panel on Climate Change and...

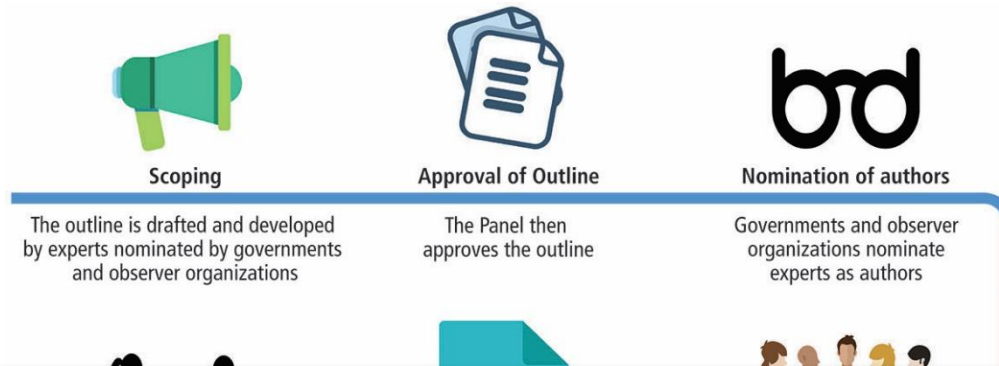


Source: IISD/ENB

Need for a refinement of 2006 IPCC Guidelines

- In August 2014, TFI Bureau discussed and concluded:
 - The 2006 IPCC Guidelines provide a technically sound methodological basis of national greenhouse gas inventory, and therefore fundamental revision is unnecessary.
 - To keep the validity of the 2006 IPCC Guidelines, certain refinements may be required, taking into account scientific and other technical advances that have matured sufficiently since 2006.
- In October 2016, IPCC decided to prepare a new Methodology Report titled “2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories”, and adopted its table of contents. (Decision IPCC/XLIV-5)

Preparation of the 2019 Refinement

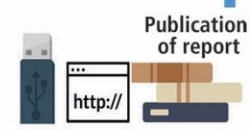


2019 Refinement was adopted/accepted by the IPCC at its 49th Session in May 2019 in Kyoto, Japan. (Decision IPCC-XLIX-9)



Peer reviewed and internationally available scientific technical and socio-economic literature, manuscripts made available for IPCC review and selected non-peer reviewed literature produced by other relevant institutions including industry

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Publication of report



2019 Refinement to the 2006 IPCC Guidelines

Adopted/accepted by IPCC at its 49th Session in Kyoto in May 2019

280

Prepared by over 280 scientists and experts

47

Authors from 47 countries

10,000

More than 10,000 review comments received from governments and experts

One of the major IPCC products during AR6 cycle

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2019 Refinement to the 2006 IPCC Guidelines

- The 2019 Refinement provides an **updated and sound scientific basis** for supporting the **preparation and continuous improvement of national greenhouse gas inventories**.
- The 2019 Refinement ***updates, supplements*** and ***elaborates*** them where the authors identified gaps or out-of-date science. The 2019 Refinement is to be used in conjunction with the 2006 IPCC Guidelines.
- Authors have examined a wide range of inventory methodologies and updated them where scientific advances and new knowledge made this necessary, following the IPCC decision.

Structure of 2019 Refinement

- The same structure as that of the 2006 IPCC Guidelines so as to make it easier for inventory compilers to use the 2019 Refinement with the 2006 IPCC Guidelines.
- Comprising an Overview Chapter and five volumes:
 - Vol.1: General Guidance and Reporting (GGR)
 - Vol.2: Energy
 - Vol.3: Industrial Processes and Product Use (IPPU)
 - Vol.4: Agriculture, Forestry and Other Land Use (AFOLU)
 - Vol.5: Waste
- Glossary is also included.

Structure of 2019 Refinement (cont.)

- It also contains
- Annexes including mapping tables
 - The mapping tables in each volume provide a roadmap for relating sections, equations, tables, figures and boxes in the 2019 Refinement to the 2006 IPCC Guidelines
- Appendices
 - Technical information as basis for future methodological development
- Excel based tools/examples

Key concepts of the 2019 Refinement

- Key concepts are the same as the 2006 Guidelines
- Relevant but not prescriptive with respect to the reporting of national inventories under international agreements, and the use of reported information under these agreements.
- Provides methods for estimating emissions for each gas in mass units. No specific metrics (e.g., GWP values) is recommended to calculate emission estimates in CO₂ equivalent units.
- Structured so that any country, regardless of experience or resources, should be able to produce reliable estimates of their emissions and removals.

Relationship with 2006 IPCC Guidelines

Types of refinement from inventory compilers' perspective

Type	Explanation
Update	Inventory compilers should use the chapter/section/subsection in the <i>2019 Refinement</i> instead of the corresponding chapter/section/subsection in the <i>2006 IPCC Guidelines</i> .
New Guidance	Recognizing that there is no guidance in the <i>2006 IPCC Guidelines</i> , inventory compilers should use the chapter/section/subsection in the <i>2019 Refinement</i> .
No Refinement	Inventory compilers should use the corresponding chapter/section/subsection in the <i>2006 IPCC Guidelines</i> , because no refinement has been made in that chapter/section/subsection.
Removed	There were few cases where guidance/sections were removed because they were no longer relevant.

General refinements

- Emission factors and other parameters updated because
 - refined estimates (*more and better data available to calculate averages*)
 - technological/environmental changes
- Clarification of guidance through
 - Additional examples
 - Clearer reasoning
 - Additional information on good practice
 - Additional excel-based tools

Vol.1: General Guidance and Reporting

- To guide inventory compilers of Energy, IPPU, AFOLU and Waste sectors on:
 - National GHG Inventory arrangements and management tools
 - Data collection and adapting for inventory use
 - Uncertainty assessment
 - Methodological choice and identification of key categories
 - Ensuring a consistent time series
 - QA/QC and verification of emission estimates
 - Use and reporting of models
 - Calculation of emissions of precursors of GHGs and indirect emissions
 - Reporting of emissions and removals
- To provide reporting framework in standard tabular format:
 - Tables facilitate consistency between countries, categories, gases and years
 - They are not intended to prescribe specific reporting formats under the UNFCCC

Vol.1: General Guidance and Reporting

New guidance on

- Implementation of a national inventory management system
(institutional arrangements structuring, roles and capabilities of actors and stakeholders, data flows and suggested contents of Data Supply Agreements, work plans, improvement plans, data management systems, quality system)
- Development of country specific emission factors
- Integration into NGHGI of emissions reported from facilities
- Non-linear interpolation
- Use and reporting of models

Vol.1: General Guidance and Reporting

Updated guidance on

- Data Collection
- Comparison with atmospheric measurements
- Indirect CO₂ inputs to the atmosphere

Clarification on

- uncertainty calculation (*uncertainty in the mean vs in the individual; Stepwise use of Monte-Carlo analysis; Tier 1 Uncertainty calculation tool*)
- key category analysis

Vol.2: Energy



Exploration
and
exploitation of
primary
energy
sources

Conversion of
primary energy
sources into more
useable energy
forms in refineries
and power plants

Transmission
and
distribution of
fuels

Use of fuels
in stationary
and mobile
applications

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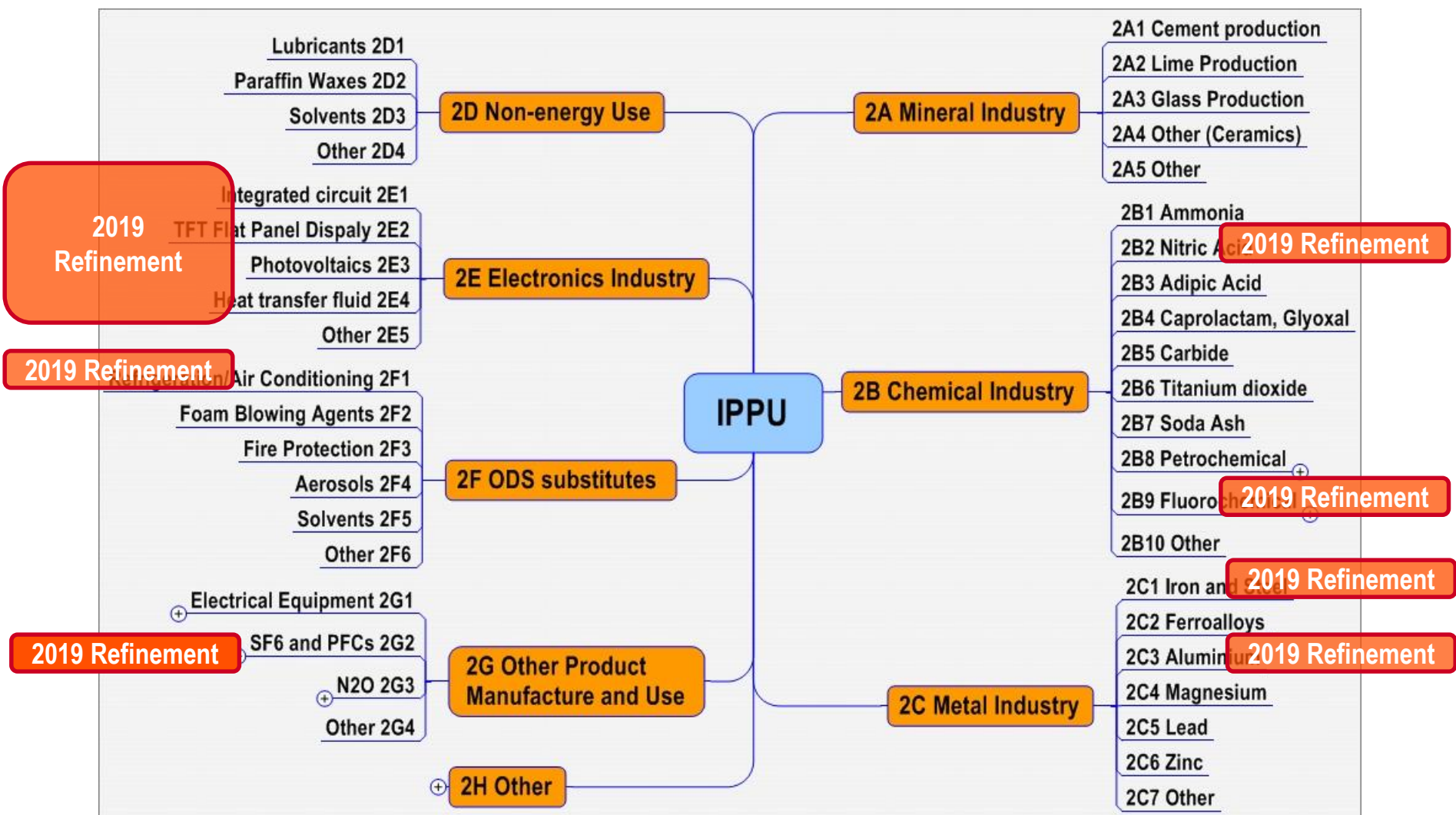
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Vol.2: Energy

- **New guidance:** Fugitive emissions from fuel transformation including solid to solid transformation (charcoal and biochar production; coke production) and gasification transformation (coal to liquids and gas to liquids)
- **Updated/elaborated guidance:** e.g., fugitive emissions from underground and surface mines; fugitive emissions from oil and natural gas systems
- **Updated and new default data:** e.g., emissions from abandoned surface and underground mines; fugitive emissions from oil and natural gas systems; emissions from fuel transformation
- **Clarification of terminologies** used in fugitive emissions from oil and natural gas systems (Annex 4A.3)

Vol.3: Industrial Processes and Product Use

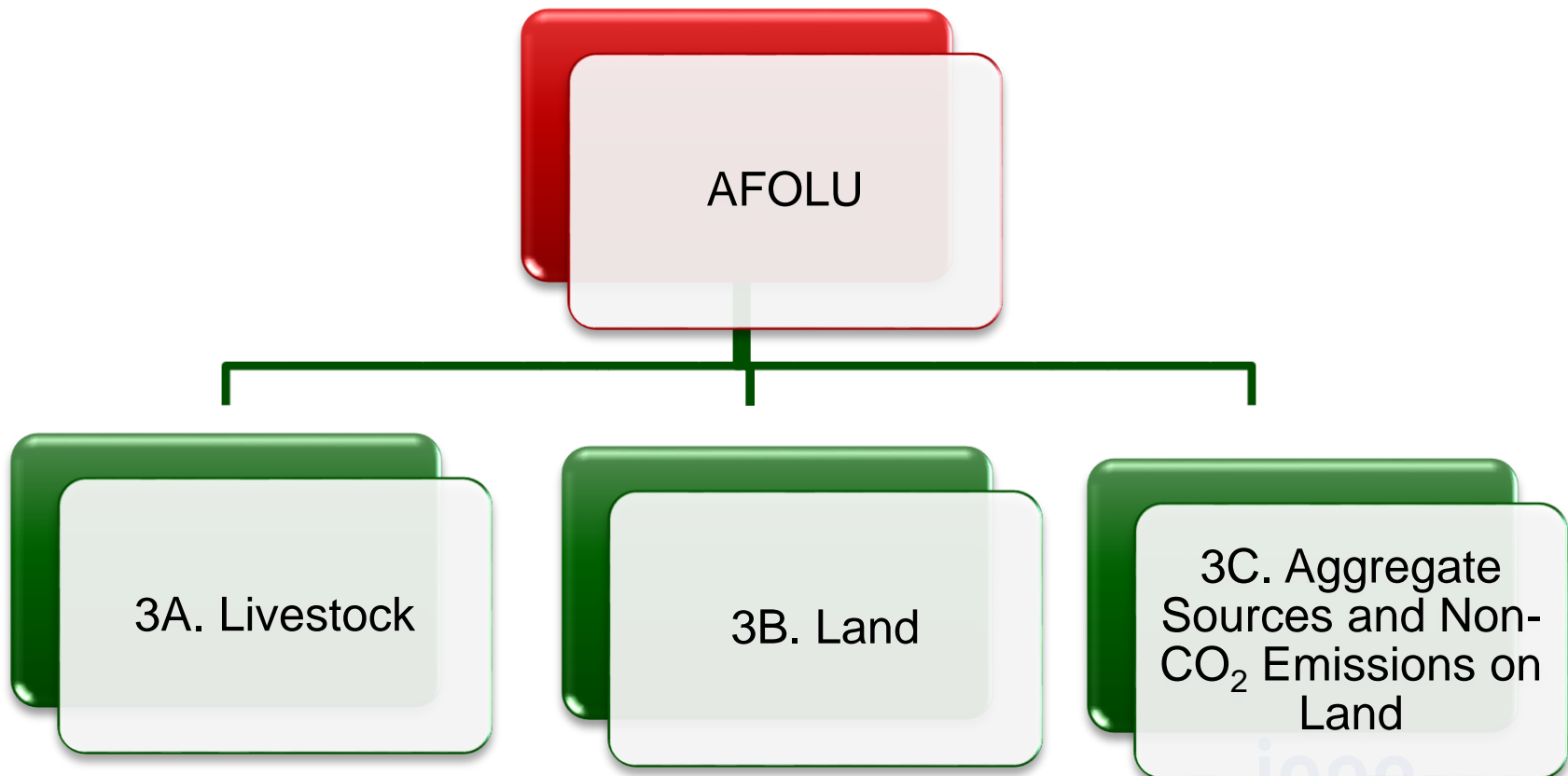


Vol.3: Industrial Processes and Product Use

- New guidance: e.g., hydrogen production; rare earths production; alumina production; water-proofing of electronic circuit boards
- Updated/elaborated guidance: e.g., nitric acid production; fluorochemical production; iron & steel production; aluminium production; electronic industry emissions; refrigeration and air conditioning
- Updated and new default data: e.g., emissions from nitric acid production; emissions from iron and steel production; emissions from alumina production; emissions from rare earths production
- Excel-based Tier 2 calculation example for refrigeration and air conditioning

Vol.4: Agriculture, Forestry and Other Land Use

The 2006 Guidelines integrates Land Use, Land Use Change and Forestry (LULUCF) and the Agriculture sectors into a single Sector: Agriculture, Forestry and Other land-use (AFOLU) sector:



Vol.4: Agriculture, Forestry and Other Land Use

- New guidance: e.g., Tier 2 estimation of carbon (C) stock change of mineral soils associated with biochar amendments; disaggregation of GHG emissions and removals associated with natural disturbances causing inter-annual variability (optional approach); Tier 2 steady-state method for cropland mineral soil organic C stock change; CH₄ emissions from *Flooded Land*; approach to developing indicative estimates of anthropogenic component of total emissions from *Flooded Land* (optional approach)
- Updated/elaborated guidance: e.g., land representation; application of Tier 3 models; clarification on the approaches for HWP
- Updated and new default data: e.g., CH₄ emissions from *Flooded Land*; disaggregated (high and low productivity systems) EFs for enteric fermentation; direct and indirect N₂O emissions from managed soils; baseline EFs for CH₄ emissions from rice cultivation stratified by region
- Excel-based tools: Tier 2 steady-state soil carbon method spreadsheet; MCF calculations example spreadsheet for manure management

Vol.5: Waste

- New guidance: N₂O emissions from industrial wastewater
- Updated/elaborated guidance: e.g., types of managed solid waste disposal sites; incineration and open burning of waste including thermal technologies (pyrolysis, gasification and plasma); emissions from wastewater treatment and discharge
- Updated and new default data: e.g., waste generation and composition; parameters of domestic and industrial sludge; emissions from gasification and pyrolysis of waste; emissions from domestic and industrial wastewater treatment and discharge
- Updated IPCC Waste Model for estimation of CH₄ emissions from solid waste disposal sites (Excel-based)

2019 Refinement and Paris Agreement

- “Katowice Climate Package” was adopted by the UNFCCC COP24/CMA1 in December 2018 to operationalize the Paris Agreement. It stipulates:
 - Each Party shall use the *2006 IPCC Guidelines*, and shall use *any subsequent version or refinement of the IPCC guidelines* agreed upon by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA).



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- IPCC-TFI Home**
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- Emission Factor Database (EFDB)
- Electronic Discussion Group (EDG)

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988. Its main objective was to assess scientific, technical and socio-economic information relevant to the understanding of human induced climate change, potential impacts of climate change and options for mitigation and adaptation. The IPCC has completed four assessment reports, developed methodology guidelines for national greenhouse gas inventories, special reports and technical papers. For more information on the IPCC, its activities and publications, please see the [IPCC homepage](#).

The IPCC National Greenhouse Gas Inventories Programme (IPCC-NGGIP) had been undertaken since 1991 by the IPCC WG I in close collaboration with the Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA).

[[More about IPCC-NGGIP](#)]

IPCC-NGGIP Publication



- [2006 IPCC Guidelines for National Greenhouse Gas Inventories](#)
- [Good Practice Guidance for Land Use, Land-Use Change and Forestry](#)
- [Default and Methodological Options to Inventory Emissions](#)

Thank you very much.

For details on IPCC TFI, please visit:

<http://www.ipcc-nggip.iges.or.jp/>

SB32

- [Presentation of Side Event at UNFCCC-SB32 in Bonn, 31 May 2010](#) has been uploaded on [Presentations](#). (1 June 2010)

Meeting Documents Available

- [Meeting Report](#)

Future Meetings

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Previous Meetings

- [IPCC Expert Meeting on Uncertainty and Validation of Emission Inventories](#)