WMO

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

UNEP

NATIONAL GREENHOUSE GAS INVENTORIES PROGRAMME

Revision of the "Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories

IPCC Expert Group Scoping Meeting Report

Geneva, Switzerland
16 - 18 September 2003

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This report was prepared by Taka Hiraishi, Thelma Krug, Riitta Pipatti, Leandro Buendia, Ayako Hongo, Akiko Kawase, Kyoko Miwa, Todd Ngara, Kiyoto Tanabe and Fabian Wagner, with inputs from the co-chairs and rapporteurs of the breakout groups of the meeting. We are grateful to all experts who contributed to this report and attended the meeting. We also thank the IPCC Secretariat and the WMO Conferences Unit (CNF) for organising the meeting.

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SUMMARY

The Scoping meeting developed the draft Terms of Reference (TOR), the Table of Contents (TOC) and work plan for the work on the revision of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. The drafts were forwarded to the 11th Session of the Task Force Bureau of the IPCC National Greenhouse Gas Inventories Programme for finalisation before forwarding them to IPCC Panel (Vienna, Austria, 3 – 7 November 2003) for endorsement.

1 BACKGROUND, OBJECTIVES AND ORGANISATION OF THE MEETING

1. The Scoping Meeting on the "Revision of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories" was held in Geneva on 16 – 18 September 2003. The meeting was organised by the IPCC NGGIP. Its main objectives were:
   - to assess existing methods for the sectors and also for the cross-cutting issues and how to improve them within the framework of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines) including the Good Practice Guidance (GPG2000);
   - to draft the detailed Terms of Reference (TOR), the Table of Contents (TOC) and the Work Plan for the work on the Revision of the IPCC Guidelines, and
   - to formulate a proposal of expertise needed for drafting the revised Guidelines.

2. The meeting was attended by sixty six experts (Participant list attached at the end of this report in Attachment 7) and its deliberations were conducted both in plenary sessions and in seven Breakout Groups (BOGs). The BOGs covered all sectors in the IPCC Guidelines (Energy, Industrial Processes and Solvent and Other Product Use (joint BOG), Agriculture and Land Use, land-use change and forestry (joint BOG), and Waste), cross-cutting issues and the so-called emerging issues. The Emerging Issues BOG focused on issues related to the integration of the existing materials, scope of gases and sources/sinks and other issues of relevance to the whole report. They consolidated the inputs from the other BOGs on draft TOR, TOC and Work Plan for the discussions and approval at the last plenary of the meeting.

3. The final outputs of the meeting were forwarded to the 11th Session of Task Force Bureau (TFB) for consideration and finalisation before forwarding them to IPCC Panel (Vienna, Austria, 3 – 7 November 2003) for endorsement. TFB11 met on 19 September 2003, back-to-back with this Scoping Meeting. The draft TOC, TOR and Work Plan, as agreed by the TFB 11, are attached to this report (see Attachment 1).

2 PLENARY AND BOG SESSIONS

2.1 FIRST PLENARY

4. The meeting was opened by the TFI (Task Force on Inventories) Co-chair Taka Hiraishi. The IPCC Acting Secretary Renate Christ welcomed the participants to Geneva, and informed them of other ongoing and starting IPCC work. Taka Hiraishi continued presenting the background and objectives for the Scoping Meeting.

5. Dina Kruger (TFB) gave brief overview of the IPCC Guidelines and GPG2000, and the forthcoming report on Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF). She noted that the good practice reports complement the IPCC Guidelines, and that they do not include good practice guidance for the Solvent and Other Product Use Sector, which addresses mainly emissions of non-methane volatile organic compounds (NMVOCs). She explained the standard format for methodological guidance in the good practice reports, and the key category concept, as well as the elaborated and systematic guidance on QA/QC, time series consistency and quantifying uncertainties in these reports. She emphasised that the IPCC Guidelines and good practices reports form a strong foundation for the forthcoming revision and noted areas to be considered in the

scoping of the work: improved user-friendliness, maintaining a balance between scientific completeness and practicability, new areas to be covered (new sources, new gases, etc.) and the improved applicability to all countries (maintaining the tier-structure, putting more emphasis on regional issues and improving data for developing countries).

6. Stelios Pesmajoglou (UNFCCC Secretariat) presented UNFCCC experiences in the use of the IPCC Guidelines and GPG2000 in the preparation and review of national greenhouse gas inventories. He gave an overview of relevant decisions by the Conference of the Parties to the UNFCCC (COP) and conclusions by its Subsidiary Body for Scientific and Technological Advice (SBSTA) and explained the different requirements for Annex I and non-Annex I Parties on reporting of greenhouse gas emissions and removals. He listed identified gaps in the guidelines, and pointed out areas for possible improvement. There are no IPCC methodologies for solvents, only references to methodologies by CORINAIR and US EPA. Default values are not given for all emission factors, country-specific methodologies could be included (e.g. for dams), a common approach for the decision trees would be helpful. Methods and/or data for biomass combustion, geothermal energy, boilers used in desalination plants and the non-CO_2 greenhouse gas emissions could be included or improved in the Energy Sector. The Agriculture and LULUCF sectors methodologies do not cover conversions related to desert lands. Some estimation methods could be improved, e.g. the waste sector would need more suitable methods. He also proposed close cooperation between the IPCC and UNFCCC in the revision and informed that the UNFCCC Secretariat is preparing a paper for SBSTA on the experiences with the IPCC Guidelines and GPG2000 – this would be available in October 2003.

7. Riitta Pipatti (NGGIP TSU) presented in more detail the background, objectives and scope of the meeting based on a background paper with the same title. She presented the conclusions from the TFB meetings on the revision and issues to be addressed at the meeting:

   - integration of existing material;
   - scope of gases, source and sink categories;
   - structural changes and improvements;
   - methodological updates;
   - incorporation of abatement technologies in the methodologies;
   - how to improve usability and other emerging issues.

   She also presented a preliminary work plan for the revision of the IPCC Guidelines, and assignments for the BOGs.

8. Specific issues taken up in the presentation by Riitta Pipatti were given more detailed background. Fabian Wagner (NGGIP TSU) presented the scope of gases and possible criteria (with pros and cons for these) to be used in the decision to include new gases or in reducing the scope of existing ones. An issue paper on the subject had also been prepared for the participants. The criteria presented included availability of Global Warming Potential (GWP) values, importance of the new gases, practicability to develop methodologies, resource intensity in including these in the inventory, existing methodologies developed for other conventions or agreements.

9. Kiyoto Tanabe (NGGIP TSU) presented the contents of another issue paper prepared for

the meeting on "Clarification, re-organisation and/or integration if IPCC source/sink categories. Issue included were:

- treatment of emissions from non-energy fuel use – how to consider associated immediate and delayed emissions and related export/import issues, this issue is a cross-sectoral for Energy, Industrial Processes and Waste Sectors;
- consistent treatment of N_2O emissions taking into consideration the large number of sources and pathways – integration of relevant parts of the Energy, Industrial Processes, Agriculture and Waste Sectors may deserve consideration to allow for a more integrated approach in the estimation of N_2O emissions considering the global N cycle;
- CO_2 emissions from oxidation of NMVOCs in the atmosphere – should additional guidance be developed;
- CO_2 capture and storage – where to include and how (revised emission factors or separate methodology);
- agricultural soils – treatment of gases is inconsistent and divided between the Agriculture and LULUCF Sectors. Possible actions to improve consistency could be to include all gases under either sector or merge the sectors. The latter would also allow for more consistent treatment of land conversions;
- hydroelectric dams - should the methods for this be included in the LULUCF or Energy sector.

10. The discussions that followed these presentations were lively and included following issues:

- **Integration of the IPCC Guidelines and good practices guidance report(s)** was welcomed as a starting point for the revision. The structure of the 2006 guidelines was also discussed and many favoured an approach where all sectors would be in separate volumes.

- **Should all known sources be included in the revision or should the focus be on the most important sources?** The question of new sources had been addressed also in a background paper for the meeting prepared by Anke Herold. She noted that most of the new sources identified in her paper were related to emissions of non-methane volatile organic compounds (NMVOCs) and sources mentioned in the IPCC Guidelines but for which no methodologies were provided there. In that sense many of these categories where not completely new.

- **Should aerosols (black and organic carbon, mineral dust) be included?** Views on the issue were divided: this was opposed due to the fact that they are not greenhouse gases and therefore not covered by the Convention, and supported due to their importance for climate change and to achieve a complete coverage of the anthropogenic influence on the climate system.

- It was noted that the scope of sources and gases should be critically evaluated – e.g. inclusion of new minor sources might not be justified, as the time and resources are limited. The scientific understanding and the importance of the gas or source, and whether it is possible to develop methods and default emission factors, as well as the costs to implement the methodologies, should be included in the evaluation.

- The scoping meeting should not attempt to list all new gases and sources, but develop

criteria on how to identify/include these.

- Inclusion of new sources and gases would need to be reflected in the IPCC Emission Factor Database (EFDB), e.g. by including any new source categories also in the database.

- It was agreed that duplication of work to develop methodologies for gases covered by other conventions or agreements should be avoided.

- **Would CO_2 capture and storage be included?** The IPCC is preparing a Special Report on the issues and close cooperation with this process would be continued. Specific issues related to the methodologies for CO_2 capture and storage were highlighted. The issue is cross-sectoral (Energy and Industrial Process Sectors, possibly also other sectors). The fact that use of decarbonised fuels, capture, transportation and storage of CO_2 could take place in different countries would need special attention. The issue would be discussed further in the BOGs.

11. The UNFCCC Secretariat noted that the presentations have omitted the inclusion of reporting tables (worksheets – compilation tables/sectoral tables - summary tables). It was noted that the issue of reporting would be covered as a cross-cutting issue.

2.2 BOG SESSIONS

2.2.1 Cross-cutting issues

12. The BOG on cross-cutting noted that the IPCC Guidelines contain limited information on cross-cutting issues but that the issues are treated comprehensively in the GPG2000, and the GPG-LULUCF. It was concluded that the outline of GPG2000 should be the basis for the revision, complemented with a section on data collection. This section would briefly introduce sampling to derive emission factors and other parameters used in methodologies, as well as activity data. The section would address also procedures like expert judgment and literature surveys for the purpose. Possible improvements to the issues addressed in the good practice reports were identified and discussed. The verification chapter should be made more practical and source/sector specific. Furthermore, source-specific information on cross-cutting issues (QA/QC, uncertainties and time-series consistency) should be streamlined based on guidance from the authors of cross-cutting issues. The results and conclusions of the discussions are presented in Attachment 2 which includes also a detailed draft TOC for the cross-cutting issues.

2.2.2 Energy

13. The discussion in the BOG on Energy included overarching issues (e.g. improvement of the user-friendliness, change of level key category analysis for the sector, inclusion of worked examples for a sample country, possibly as a training package on the web), activity data issues (e.g. related to non-energy use of fuels, international vs. domestic bunkers and military activities for aviation and navigation), emission factors (e.g. update of default emission factors and how to utilise the IPCC Emission Factor Database (EFDB)), inter-sectoral issues (e.g. linkage between biomass fuels and the LULUCF Sector, waste as fuel) and other issues (e.g. geothermal energy, how to treat the decomposition of methane from

fossil origin). The group developed a draft TOR and TOC for the sector and these are included in Attachment 3.

14. There was no consensus on the inclusion or exclusion of aerosols. This issue was referred to the Plenary Session for further consideration.

2.2.3 Industrial Processes and Solvent and Other Product Use

15. The BOG on Industrial process and Solvent and Product Use discussed a number of sector-specific issues. Issues highlighted in the discussions include:

- gases for inclusion;
- updating/revising process;
- merger of "Industrial Processes" and "Solvent and Other Product Use";
- new or "missing" sources;
- possible linkages with the other organizations/processes (e.g., WBCSD/WRI, ISO, GGEEC); (See explanations acronyms below in paragraph 17).
- relative significance (prioritization) of sources;
- existing references;
- availability of expertise.

16. In relation to the updating/revising process, it was noted that the differences between GPG2000 and IPCC Guidelines were greater in the Industrial Processes area than in any other sector. The BOG also highlighted the importance of distinguishing energy-related emissions from process emissions. The BOG had consultations on this with the BOG on Energy.

17. Based on the discussions on the aforementioned issues, the BOG came up with elements to be considered in developing the TOR of the sector(s) as follows:

- Relevant existing information from organisations such as (World Resources Institute (WRI), International Organization for Standardization (ISO), Greenhouse Gases Emission Estimating Consortium (GGEEC), World Business Council for Sustainable Development (WBCSD)) should be reviewed and included or referred to in the revision. The same applies to the United Nations Economic Commission for Europe (UNECE) Task Force on Emission Inventories and Projections in particular for the NMVOCs. The work done under the Convention on Long Range Transboundary Air Pollution (LRTAP) including the information in the EMEP (Co-operative Programme for Monitoring and Evaluation of Long-Range Transmissions of Air Pollutants in Europe)/CORINAIR (CORe INventory of AIR emissions) Atmospheric Emission Inventory Guidebook should be referred to in the revision of the Guidelines especially in as far as they relate to NOX from combustion, NMVOC's from industrial and evaporation processes and NH_3 from agriculture. Use of this background information would avoid duplication and focus efforts where they are most needed like the development of default emission for developing countries.
- The IPCC Guidelines and GPG2000 should be consolidated into a single report: the extended scope of the Chapter 3 of the "2006 Guidelines" should comprise Industrial processes, solvents and other product use.
- Updating should include new F-gases. Default emission factors need to be updated and fed into the EFDB. It will not be practical to address all sources and gases in this sector. The sources and gases covered should reflect both the relative importance of

the source/gas and the current level of knowledge and methodological development.

- Updating will require contributions from experts of different fields, and will also require additional innovative means (databases, workshops, utilising outside events, etc).
- A definition for "industrial process emissions" should be developed and this should include what should be reported in this sector to avoid double counting and to improve consistency and transparency.
- Comparable data on industrial process emissions should be ensured taking into account normal and exceptional emissions and consistent assumptions on source types (i.e. end of pipe and/or diffuse).
- Verification and QA/QC should be considered at different levels (e.g. national, global) by type of processes and by type of gases especially for F-gases.

18. Attachment 4 includes more details on the discussions as well as the draft TOC for "Industrial Processes and Product Use" which covers the "Industrial Processes" Sector and the "Solvent and Other Product Use" Sector in the IPCC Guidelines.

2.2.4 Agriculture and LULUCF

The BOGs on Agriculture and LULUCF met in one group to explore the possibility of merging the materials from the LUCF and Agriculture Chapters of the IPCC Guidelines, GPG2000, and GPG-LULUCF. The group decided to recommend the merger after thorough discussions on pros and cons, as well as how to structure the new Sector "Agriculture, Forestry and Other Land Use (AFOLU)

19. Major issues identified in developing the TOR and TOC for the integrated included:

- terminology issues (e.g. definitions, managed, land use, conversion, etc.)
- methodological issues (e.g. mapping back, description of tiers, and step by step approach to inventory, disaggregation of activity data, sampling)
- issues on national land use systems including guidance on sampling and allocation of lands to categories such as shifting cultivation, agroforestry, urban trees
- definition and guidance to avoid double counting in peatlands (wetlands) with forest organic soils
- treatment of settlements that would include urban trees, parks, golf courses
- treatment of other lands, harvested wood products, and the implication and linkages for the Energy and Waste Sectors relating to biomass burning, wood products and organic materials in landfills, and
- development of new or improved reporting tables that would be more flexible for reporting of country-specific methods.

20. The final draft TOC constitutes an overview and cross-cutting issues, a section for consistent representation of lands, a separate section each for agriculture, forest lands, wetlands, settlements, other land, and other items (see Attachment 5). The Agriculture section addresses cropland (including rice cultivation), grassland, lands converted to cropland or grassland, and livestock. The forest land section addresses forest land remaining forest land, and land converted to forest land. All sections (land-uses) will elaborate the changes in C stocks (five pools), burning of biomass, non-CO_2 gases, fertilization/liming, organic soils/peatlands, new gases, sources and sinks. The background paper/information used in the development of the TOR and the TOC for Agriculture and LULUCF is summarised in Attachment 5.

2.2.5 Waste

21. The BOG analysed the main issues identified in the meeting documents as relevant for the development of TOR, TOC and WP. Analyses were made separately for the three main source categories of the sector:
    - Solid Waste Disposal Sites
    - Wastewater Handling
    - Waste Incineration

22. The group did not identify major new sources or gases that would contribute significantly to the total greenhouse gas emissions from the sector, but analysed options for a more comprehensive coverage of gases(e.g. NOx, CO, NMVOCs, SO_2 and particles from incineration) and alternative waste treatment techniques (e.g. composting, anaerobic digestion, etc.). The BOG discussed ways to improve the structure of the sector, update methodologies and links (possible gaps or double counting) to other sectors. The results and conclusions of the analysis and discussions are presented in Attachment 6, which includes also a detailed draft TOC for the chapter.

2.2.6 Emerging issues and consolidation of the BOG outputs

23. Emerging issues group considered the integration of the existing material (IPCC Guidelines and the GPG2000), and it was proposed that the Technical Support Unit would undertake this exercise under the guidance of the TFB and its Co-chairs.

24. The group developed criteria for inclusion of new gases and sources, and these were presented to all participants and it was agreed to include them in the TOR. The group also consolidated the inputs of all BOGs for a draft TOR and TOC for the Methodology Report: 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The TOC for the whole report was consolidated at a higher level than the detailed TOCs developed by the other BOGs and the subsection where not numbered to retain flexibility for the authors to reorganize during the drafting of the report, if deemed necessary (the detailed draft TORs and TOCs for the proposed volumes of the new report should be considered only as indicative input for the authors of the report). The group also developed further the workplan for the preparation of the report. The consolidated draft TOR, TOC and Work Plan were presented to the final plenary of the meeting for finalisation.

2.3 FINAL PLENARY AND OUTPUTS OF THE MEETING

25. The output of all BOGs were presented and discussed at the final plenary of the meeting with focus on finalising the draft TOR, TOC and WP to be forwarded to the TFB11 for finalisation before submission to the IPCC Panel XXI for endorsement. The consolidated TOR and TOC were agreed upon after much discussion and minor changes. The draft TOC for cross-cutting issues was complemented with a section including reporting tables.

26. The proposed merger of the Agriculture and LULUCF sections provoked much discussion, especially in participants who were not familiar with the structure of the forthcoming GPG-LULUCF. The BOG Co-chairs and members explained the rationale, confirmed the consistency with the GPG-LULCUF and the meeting confirmed that the proposal was a justified improvement.).

27. The issue on the inclusion of aerosols in the 2006 IPCC Guidelines continued to divide the participants. The proposal from the emerging issues group was to include the aerosols as an appendix in the report as basis for further consideration. The proposal was that this appendix would review available literature on quantifying anthropogenic emissions of relevant aerosols and provide a synthesis and preliminary consideration of the methodological issues. The meeting could however not agree on this, and it was decided to forward this issue to the TFB11 for further consideration before presenting the issue to the IPCC Panel.

28. The TFB Co-chair Thelma Krug closed the meeting at 18.00 and thanked the participants for productive work in scoping for the preparation of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

ATTACHMENT 1: DRAFT TOR, TOC and WP (as agreed by TFB11)

Draft Terms of Reference for 2006 IPCC Guidelines for National Greenhouse Gas Inventories

In response to the decision of IPCC XX and the invitation from the SBSTA at its 17th session the IPCC will revise and update the 1996 revised IPCC Guidelines as outlined in the Table of Contents. This work will be completed in 2006, as noted in the work plan.

IPCC will base this work on, inter alia: The Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, the IPCC Report on Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (2000), the IPCC Emission Factor Database, and the Good Practice Guidance on Land Use, Land-Use Change and Forestry (when completed). Experience and feedback using the existing reports (EMEP/Corinair Emission Inventory Guidebook among others) and recent advances in science will also be taken into account.

Key elements of the work will be

- Structure: The existing reports will be integrated to improve user-friendliness. Information on each sector will be synthesised into single documents. There will also be a document on cross-cutting issues, including reporting tables.
- Content of cross-cutting guidance: The volume for cross-cutting issues will include general methods on data collection issues; uncertainty assessment; methodological choice and identification of key categories; time series consistency and recalculation; quality assurance /quality control (QA/QC) and verification; and reporting tables.
- Content of sectoral guidance: The volumes for each sector will include tiered methodological approaches; decision trees; new and/or updated methods and emission factors, where appropriate; cross-references and/or revisions as necessary to avoid double counting or omissions of emissions and removals; sector-specific guidance on uncertainty assessment and QA/QC; methods for new sources [1]; and reporting and documentation guidance.
- Coverage: The 2006 Guidelines will cover the same greenhouse gases and precursors included in the current guidelines and good practice guidance reports. New greenhouse gases identified in the TAR will be included if they meet the following criteria: availability of a global warming potential; identified anthropogenic sources; a basis for methodological development; and a relative importance to the total emissions. A need for development for new methods for ozone precursors is not anticipated as these are addressed under other agreements and conventions. Appropriate linkages to these methodologies will be provided.

[1] Criteria for new sources: a basis for methodological development including the ability to develop default emission factors, feasibility of obtaining the necessary data to implement the methods, and significance of the source within the sector.

Draft Table of Contents for 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Overview

Volume 1: Cross-cutting Issues and Reporting Tables
This volume will integrate existing material[2] relevant to cross-cutting issues listed below. A more complete discussion on approaches to data[3] collection (e.g. sampling, use of expert judgement in data collection) will be provided. Specific information on the topics listed below will also be elaborated at the sectoral level.

- Overview
- Approaches to Data Collection
- Uncertainties
- Methodological Choice and Identification of Key Categories
- Time Series Consistency and Recalculation
- Quality Assurance/Quality Control and Verification
- Reporting Guidance including Tables

Volume 2: Energy
29. *This volume will integrate and update existing material2 relevant to the Energy Sector. As appropriate, it will provide methodologies and default data to cover emissions of new sources (see criteria in TOR)4*

- Overview and cross-cutting issues
- Reference Approach
- Stationary Combustion
- Mobile Combustion[5]
- Fugitive Emissions

Volume 3: Industrial Processes and Product Use
This volume will integrate existing material2 relevant to Industrial Processes and Solvent and Other Product Use Sectors. It will update as necessary the existing material on current source categories. As appropriate, it will provide methodologies and default data to cover emissions of new halogenated gases. It will also develop methodologies for selected new sources (see

[2] Existing material refers to the Revised 1996 IPCC Guidelines, Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (2000), Good Practice Guidance for LULUCF, the IPCC Emission Factor Database, and any relevant material in literature and the sectors themselves. Methodologies developed under international agreements and conventions (e.g. LRTAP) will be referenced and used where necessary.

[3] Data refers to activity data, emission factors and other data used in inventory compilation.

[4] It is recognised that CO_2 capture and storage is an important emerging issue in inventory development. The coverage of CO_2 storage in this report will be closely coordinated with progress on IPCC SR on CO_2 capture and storage. CO_2 capture activities will be integrated as appropriate into the methods presented for source categories where it may occur.

[5] Emissions from international aviation and maritime transportation will be addressed here, taking into consideration the relevant work of the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO).

criteria in TOR):

- Overview and cross-cutting issues
- Chemical industry emissions
- Metal industry emissions
- Mineral industry emissions
- Non-energy product and feedstock use of fuels
- Ozone precursors from industrial processes
- Other industrial process emissions
- Solvent and other product use
- Emissions of Fluorinated Substitutes for Ozone Depleting Substances

Volume 4: Agriculture, Forestry and Other Land Use

This volume will merge the material from the LUCF and Agriculture Chapters of the Revised 1996 IPCC Guidelines, GPG2000 and GPG-LULUCF. The GPG-LULUCF will report on a land-use basis. The emissions from agriculture have been integrated into this new framework in order to resolve inconsistencies and avoid double counting. This integration should be done in a way that consistency of existing inventory data is ensured when reporting emissions and removals from the sector using the new approach.. This volume will also update data, methods and emission factors where feasible.

- Overview and cross-cutting issues
- Consistent Representation of Lands
- Agriculture

The following issues will be elaborated: changes in C stocks (5 pools), burning of biomass/grassland/residues, rice cultivation, non-CO2 gases, fertilization/liming, organic soils/peat lands, new gases, sources and sinks.

  - Cropland and Grassland Remaining Cropland and Grassland
  - Land Converted to Cropland
  - Land Converted to Grassland
  - Livestock

- Forest lands

  The following issues will be elaborated: changes in C stocks (5 pools), burning of biomass, non-CO_2 gases, fertilization/liming, organic soils/peat lands, new gases, sources and sinks.

  - Forest land remaining forest land
  - Land converted to forest land

- Wetlands
  - Peatlands

Flooded lands

- Settlements
  - Settlements remaining settlements
  - Land converted to settlements

- Other land

- Other
  - HWP (taking into consideration any decision of the COP on this matter)

Volume 5: Waste

This volume will integrate and update existing material2 on the Waste Sector. As appropriate, it will provide methodologies and default data to cover emissions from open burning of waste in solid waste disposal sites, open dumps, consolidation of wastewater treatment and human sewage disposal methods, alternative waste treatment technologies (like anaerobic digestion) and additional gases according to the criteria in TOR.

- Overview and cross-cutting issues
- Solid Waste Disposal Sites
- Wastewater Handling and Human Sewage
- Waste Incineration

Draft Workplan for preparing the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Period	Sequence and stages	Activity
September 2003	Scoping Meeting	Elaborate draft TOR, TOC and Workplan for the Revision including combination of sectors per meeting, size of meetings, level of participation, handling of common elements in agriculture and LUCF, merging of the GPG2000 and GPG-LULUCF, etc.
September 2003	TFB 11	Consider and finalise draft TOR, TOC and Workplan for submission to IPCC XXI.
November 2003	IPCC XXI	Approval of TOR, TOC and Workplan
November 2003	IPCC call for nomination of authors	Issue formal letter to Governments and intergovernmental bodies, inviting the author nominations.
Early February 2004	TFB (by communication)	Finalise a slate of authors, and issue invitation to 1st Authors meeting.
Mid March 2004	Integration of existing material in IPCC GLs and GPG reports	A draft integrating material in IPCC 1996 Guidelines and good practice reports will be made available to the authors.
April 2004	CLA meeting and Cross-cutting Authors Meeting	Prepare First Order Draft of cross-cutting issues; provide guidance for inclusion of cross-cutting issues and consistency in drafting the sectoral volumes
Late May/Early June 2004	Sector Authors Meeting	Prepare First Order Draft for the Agriculture, Forestry and Other Land Use Sector
July 2004	Sector Authors Meeting	Prepare First Order Draft for the Industrial Process and Product Use Sector
September 2004	Sector Authors Meeting	Prepare First Order Draft for the Energy Sector
Early November 2004	Sector Authors Meeting	Prepare First Order Draft for the Waste Sector
January 2005	Consolidation Meeting	Meeting to consolidate the Sectoral reports to First Order Draft Report of 2006 GLs (CLAs and key authors)
March – April 2005	Experts Review	First review of the FOD report by experts for six weeks
June 2005	7th Meeting	Meeting to consider experts comments and to prepare Second Order Draft.
September – October 2005	Governments/Experts review	Second review of the report by Governments and Experts for eight weeks
December 2005	8th Meeting	Meeting to consider Government comments.
February 2006	TFB 17	Endorse Final Draft Report
March 2006	Government consideration	Government consideration (four weeks)
April 2006	IPCC XXIV	Present report to IPCC Panel for Adoption/Acceptance.
May 2006	SBSTA24	Presentation to SBSTA

ATTACHMENT

The Expert scoping Meeting did not reach agreement on the treatment of aerosol issues in the context of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The proposed language below was tabled:

In the TOR (proposed as the last line in bullet on "Coverage"):

> "Aerosols will be addressed in the main body of the guidelines but an appendix, reviewing the existing methodological literature will be developed as the basis for further consideration."

In the TOC (proposed at the end of the document):

> This appendix will review available literature on quantifying anthropogenic emissions of relevant aerosols. A synthesis and preliminary consideration of methodological issues will be provided.[6]

[6] It is anticipated that the appendix will cover black carbon and organic carbon aerosols and potentially mineral dust. Methodologies for sulfate aerosols are covered in other agreements and it is not anticipated that additional consideration is needed for them.

ATTACHMENT 2: CROSS-CUTTING ISSUES – MINUTES OF THE BOG SESSIONS AND DETAILED DRAFT TOC

General

The *IPCC Guidelines* contain rather limited information on the cross-cutting issues, uncertainties are covered to some extent. In the *GPG2000*, the chapter on uncertainties was expanded on, and chapters with guidance on methodological choice, QA/QC and verification were added. In the *GPG-LULUCF* a chapter on sampling was added. There was a general agreement that the information on cross-cutting issues in *GPG2000* should be incorporated into the new guidelines. Needed changes should build on user experiences.

It was recommended that the outline of GPG2000 should be kept, with general guidance in the cross-cutting issues chapter and source-specific issues (QA/QC, verification and time series consistency) covered in the sectoral guidance. In order to increase the quality and comparability of this information it was suggested to prepare guidance to the authors on these issues to be available from the beginning of the authors meetings.

In general, definition of different tiers should be more precise throughout the report – how do the quality of the data and complexity of the method correlate. In addition, it was decided that the methods for cross-cutting issues would no more be called "tiers" to reduce confusion among inventory compilers. Optionally they could be named, e.g., approaches.

Uncertainty estimates of default parameters should be given in each sector. Uncertainties should be given for each tier. In principle, use of higher tiers should lead to lower uncertainties. Sectoral BOGs should give expert judgments of uncertainties, and the method to produce expert judgments should be consistent. Therefore the group of cross-cutting issues should also give some guidance on this.

The group had a rather wide discussion about sampling. In the GPG-LULUCF, sampling is included as a section in the chapter on cross-cutting issues. The group discussed about the need to include sampling also in the guidance for other sectors, but concluded that it is mostly a special issue for LULUCF, and should be handled under the LULUCF/agriculture volume. If the need for guidance on sampling is identified also in other sectors, guidance could be added.

A separate section on data collection would be added to the new guidelines. This section would briefly introduce sampling to collect emission factors and activity data, and include guidance also other data collection procedures like expert judgments and literature surveys.

Uncertainty

95% confidence interval is currently used as a measure for uncertainty. It was decided to be kept also in the forthcoming guidance, because this notation enables treatment of sampling, measurements and expert judgment in a consistent manner. The Tier 1 trend method needs further consideration and development. The group agreed that in the new guidelines, there will be no need for further guidance on Tier 2 method. The "advanced" method can be any method, not necessarily Monte Carlo. In the Netherlands, Tier 1 equations are at some extent modified to give more accurate results. This approach could also be presented, and probably also a method taking correlation into account in the Tier 1 method (Tier 1 b). The sources of uncertainties (structural, natural variability etc) should be clearly identified to be able to reduce uncertainties.

Parts of the chapter “conceptual basis for uncertainty analysis” should be incorporated into the

main uncertainty chapter as considered appropriate.

Key Categories

It was discussed, who are the main users of key categories: whether it is the parties or the convention. The Convention uses Tier 1, but all the parties could use Tier 2, when default uncertainty estimates will be available of each sector in the new guidance. The problem with Tier 1 is that it in many cases gives CO2 sources in fuel combustion as the most important key categories, though there is little to do to improve these estimates. Tier 1 and Tier 2 would be kept with minor modifications. Current Tier 1 and Tier 2 are principally different methods and will not give comparable results, which should be made clearer in the guidance.The threshold concept for key categories needs further consideration. For parties, the ranking of categories is the most important aspect; strict distinction of keys and non-keys is mainly used by the Convention.

It is preferable to define only one method for identifying key categories; in the LULUCF-GPG there will be methods for identifying key categories both with and without LULUCF sector, but one single method would be more practical. The aggregation level is in principle left open for inventory compilers, but clearer guidance is nevertheless needed. The use of other methods for key category identification (e.g. sensitivity analysis after Monte Carlo simulation of uncertainties) would also be good practice and this should be better highlighted and reflected in the reporting tables.

QA/QC and Verification

The group discussed how much flexibility in the system would be recommendable, and what demand there should be for reporting on QA/QC systems, completeness of the inventory and verification. It was agreed to keep the ambition level of GPG2000. An inventory improvement plan would be recommended as part of quality system, as well as identification/reporting of potential key sources that are not included in the inventory. There should be more focus on inventory improvements and issues related to completeness. If a country reports "IE" (included elsewhere), it should be clearly documented where the source is included.

In case of verification, the text in LULUCF-GPG would be used as a basis for further development. Verification of annual emissions and emission trends should be separated. Practical approaches for particular sectors and for groups of sectors should be highlighted (for example the reference approach for energy and potential emissions for HFCs). In addition, it should be clarified what approaches are applicable at the national level.

Draft Detailed Table of Contents for Volume 1: Cross-cutting issues

Table of contents of GPG2000 and GPG-LULUCF was used as a basis for this table of contents. The group agreed that QA/QC and verification should be integrated to a single section. A new section on data collection, including guidance for expert judgment, literature review and sampling was planned to be added. The group agreed that the annex in GPG2000 on conceptual basis for uncertainty estimates should be partly included in the uncertainty section.

1.1 Introduction

1.2 Data Collection
Introduction
Expert judgment
Literature Review
Sampling

1.3 Uncertainties
Introduction
Identifying Uncertainties
Quantifying Uncertainties
Methods to Combine Uncertainties
Technical Background Information
Examples

1.4 Methodological Choice and Identification of Key Categories
Introduction
General Considerations on Methodological Choice
Identification of Key Categories
Quantitative approach
Qualitative considerations
Application of the Results
Reporting and Documentation
Technical Background Information
Examples

1.5 Time Series Consistency and Recalculation
Introduction
Time Series Consistency and Methodological Change
Recalculations and Non-annual Data
Reporting and documentation

1.6 Quality Assurance/Quality Control and Verification
Introduction
QA/QC Plan
General QC Procedure
Source/Sink category specific QC Procedures
QA Review Procedure
Verification
Verification Approaches
Guidance for verification

Technical background information
Examples
Documentation, archiving and Reporting

ATTACHMENT 3: ENERGY – DRAFT DETAILED TOC, TOR AND OTHER INPUT

Draft Terms of Reference for the Energy Sector

Overarching

- Improve user-friendliness
- Uncertainty for different tiers
- Worked examples for sample country (training package on web ?)
- Key Source Analysis (change the level of detail)
- Do we need to separate CO_2 and non CO_2 for stationary combustion ?
- Relation between reference and sectoral approach in Introduction Chapter

Activity data issues

- Non-Energy Use
- Definition of bunkers (International vs. Domestic)
- Military activities for aviation and navigation

Emission factors

- Update of Default Emission Factors
- Ethanol and ethanol blends used for transportation
- Should we include default EF for Tier 2 in the guidelines or refer to the EFDB if a country specific value is not available?
- Biomass for stationary and mobile (CO_2 reporting and Non-CO_2)
- Add EF for fugitive N_2O emissions (check with UNFCCC)

Inter-Sector Issues

- Possible linkage between biomass fuel and LULUCF (CO_2)
- Feedstocks
- Definition of 'fugitive' in energy sector (vs industry)
- Waste as fuel (linkage to waste sector) > consistent EF

Others

- SO_2 scrubbing
- Geothermal energy related emissions (check with UNFCCC)
- Borderline fuels (peat, geothermal, etc)
- Method for emissions from closed/abandoned mines
- Unburned fraction of methane from combustion (check with UNFCCC)
- CO_2 from decompostion of methane of fossil origin (check with UNFCCC)

Draft Detailed Table of Contents for Volume 2: Energy

2.1. Introduction
(including definition)

2.2. Reference approach

2.3. Stationary combustion
(Introduction, Definition, Reading Help)
- 2.3.1 CO_2
  (Decision Tree incl. Uncertainty)
  - 2.3.1.1 Tier 1 (activity data, emission factor)
  - 2.3.1.2 Higher tiers (activity data, emission factor)
- 2.3.2 Non-CO_2
  (Decision Tree incl. Uncertainty)
  - 2.3.2.1 Tier 1 (activity data, emission factor)
  - 2.3.2.2 Higher tiers (activity data, emission factor)

2.4. Mobile combustion
- 2.4.1 Aviation
  - 2.4.1.1 (Decision Tree incl. Uncertainty)
  - 2.4.1.2 Tier 1 (activity data, emission factor)
  - 2.4.1.3 Higher tiers (activity data, emission factor)
- 2.4.2 Road Transport (Decision Tree incl. Uncertainty)
  - 2.4.2.1 Tier 1 (activity data, emission factor)
  - 2.4.2.2 Higher tiers (activity data, emission factor)
- 2.4.3 Railways (Decision Tree incl. Uncertainty)
  - 2.4.3.1 Tier 1 (activity data, emission factor)
  - 2.4.3.2 Higher tiers (activity data, emission factor)
- 2.4.4 Navigation
  - 2.4.4.1 (Decision Tree incl. Uncertainty)
  - 2.4.4.2 Tier 1 (activity data, emission factor)
  - 2.4.4.3 Higher tiers (activity data, emission factor)
- 2.4.5 Other transportations
  - 2.4.5.1 Tier 1 (activity data, emission factor)
  - 2.4.5.2 Higher tiers (activity data, emission factor)
- 2.5. Fugitives
  - 2.5.1 Overview
  - 2.5.2 Fugitive Emission from Coal Mining and Handling
    - 2.5.2.1 Tier 1?
    - 2.5.2.2 Higher tiers?
    - 2.5.2.3 Fugitive Emission from Oil and Natural Gas Activities
    - 2.5.2.4 Tier 1?
    - 2.5.2.5 Higher tiers?

Illustrative table: New sources and possible double counting problems:

New source	*Significance of source*	*Methods available*	*Feasible to develop?* *Practicable to use*	*Flags* *double counting?* *Cross linkages?*
Peat production	Significance is unknown to the group	FIN reported this emissions, so a method is available	Definition problems? If one party uses it then country specific method!	
Abandoned mines	Maybe significant in the UK and possibly other countries; Needs to be discussed if its inclusion is appropriate	UK, GER & FR is currently estimating these emissions, so a method is available but is still under construction	Might be country specific. Definition of activity data.	Cross linkage with LUCLUF?
Carbon capture	Is not a source or sink		Adjust emission factor!	
Carbon storage	Significance under study	Maybe no methods available	Timing might prevent a method to be included in 2006 GLs	Cross linkages with Industrial Processes and LUCLUF?
Use of candles	Probably not significant			
Geothermal	Significance to be established (fossil or not?)			

ATTACHMENT 4: INDUSTRIAL PROCESSES AND PRODUCT USE – SUMMARY OF ISSUES DISCUSSED AND DRAFT DETAILED TOR AND TOC

Discussion on the ISO Standards and Liaison Opportunity

Kevin Boehmer of the Canadian Standards Association (working for ISO) joined the meeting to update members on standards activities in the emissions sector. Specifically, he spoke about ISO 14064 Parts 1, 2 & 3.

- The relevance of these three parts are as follows:
  (1) Organisational and Entity Quantification
  (2) Project Quantification
  (3) Validation and Verification
- All documents are currently Working Drafts but will shortly become Committee Drafts and will go for formal commenting procedures perhaps during the first quarter of the year 2004.
- IPCC-NGGIP could have formal liaison status with the opportunity to comment of Working Drafts (however, no voting rights).
- Close liaison already established with WBCSD/WRI initiative. However, compatibility cannot be guaranteed because of consensus process within committee membership.
- There has been limited access to drafts via the EU Emission Trading Guidelines process and technical edits have been provided.
- Key Source concept has yet to be fully addressed.
- ISO aims to be policy sensitive but policy neutral.

- The standard for plant is expected to be mandatory or, at worst, 'to encourage'. The standard expects all sources to be identified or, if non-quantifiable, then estimates can be provided but only with supporting rationale.

Discussion on the role of Greenhouse Gases Emission Estimating Consortium (GGEEC)

- A brief history was given, acknowledging sponsorship from US EPA, JICOP, ADEME and various industry partners.
- The approach being adopted is to use the global certainties of HFC, PFC and SF_6 consumption to validate emission models (including emission factors and activity levels) and to develop proxies for activity drivers based on socio-economic datasets (e.g. domestic refrigerator ownership, number of dwellings etc. etc.). These are then used:

  (1) To validate existing Tier 2 models used by reporting parties
  (2) To provide a Tier 2 default model based on relevant activity drivers for small consumers (and emitters)

- Although the sectoral models differ in nature, the project has facilitated the development of a common front-end software package in Visual C++ which generates data in a consistent fashion and provides a user-friendly interface.
- In the context of the IPCC-NGGI 2006 Guidelines, the GGEEC project is expected to deliver 'one way' of reaching validated Tier 2 emissions estimates with minimum effort.

- It was stated that the main issue concerning linkage to the Guidelines themselves was to ensure compatibility – particularly with respect to emission factors and basic methodology. This should be achieved by involving the appropriate expertise in Guideline development.

- This led onto a wider discussion of the need to identify expertise and attract appropriate authors into the process.

Draft Detailed Terms of Reference

1- Review existing information (WRI, ISO, WBCSD) and include or refer to it in the document

2- Consolidate IPCC 96 and GPG in a single 2006 GL : extended scope to comprise both Industrial processes and Solvents and other product use sectors

3- Updating should include New F-gases and Default emissions factor should be updated and fed into EFDB. It will not be practical to address all of the sources and gases of emissions in this sector. The sources and gases covered should reflect both the relative importance of the source/gas and the current level of knowledge and methodological development.

4- Updating will require outside contributions coming from experts of different fields, require additional innovative means (databases, workshops, utilizing outside events…)

5- Harmonization of definition of industrial process emissions and what should be reported in this sector to avoid double counting to improve consistency and transparency.

6- Ensuring comparable data on industrial process emissions taking into account normal and exceptional emissions and consistent assumptions on source types (i.e. end of pipe and/or diffuse).

7- Verification / QA / QC at different levels by type of processes at the global level, by type of gases especially for F-gases

Draft detailed Table of Contents for Volume 3: Industrial Processes and Product Use

3.9.3 Solvents
3.9.4 Foam Blowing Agents
3.9.5 Refrigeration
3.9.6 Mobile Air-Conditioning
3.9.7 Fire Protection
3.9.8 Other Applications

3.10 References

NOTE:

- The inclusion of Section 3.1.4 on abatement followed a discussion during which it was agreed that Industrial Processes provided more opportunity than exist in other sectors to identify the contribution of abatement as a separate entity. This was seen to aid transparency and highlight abatement strategy contributions.

- While recognising that separation of abatement might not be possible in all areas covered by the chapter, it was agreed that this would be preferable as a basis for establishing algorithms.

ATTACHMENT 5: AGRICULTURE, FORESTRY AND OTHER LAND USE (AFOLU)

Issues to be considered in the revision in relation to the TOR

Should be based on LUCF of 96 GLs and LULUCF GPG:

- Linkage should be clear;
- Approaches and tier structure should be maintained;
- Guidance on area allocation should be maintained (shifting cultivation, agroforestry)
- User-friendliness in length and structure.

For each category updates should made for:

- Activity data (default and regional wherever possible);
- Convention factors (default and regional wherever possible); use of EFDB
- Methodology for gases identified in TOC (except those in square brackets)
- For new gases/sources default activity data and conversion factors could be provided, if the methodology is developed sufficiently
- Tiers 1 to 3 (description to be provided)

Methodological choice:

- Admit repetitions with Agriculture in calculation methods
- Avoid double-counting and omissions
- Cross reference between Agriculture and Forest Chapters for methodology in estimating conversion of land uses and
- Cross reference between Agriculture and Forest Chapters in estimating emissions and removals from urban tress and other vegetation in settlements
- Develop applicable methodology for new gases/sources and abatement strategies

Expertise required keep balance between

- Inventory preparers and scientists;
- Geographical representation;
- Soil/forest experts
- Experts in CO_2 and non-CO_2 gases

Issues to be considered in relation to the TOC:

- Emissions of NH3 could be considered within N balance.
- Reporting issues – new tables need to be developed and this may entail changes in the TOC. These tables need to consider how Parties unable to separate activity data (e.g. N inputs and liming) by land use categories can continue to report emissions in a manner consistent with the 1996 Guidelines
- During the Plenary (18 Sep) it was suggested that the timing (annually vs. longer periods) as well as the activity data (agricultural production and/or land use) should be considered in developing the new approach in such a way that the basic methods used in 1996 Guidelines for estimating agricultural emissions (Chapter 5) could be continued to be used and the annual reporting of these emission should continue to be used.

Draft Detailed Table of Contents for Volume 4: Agriculture, Forestry and other Land Use

4.1 Introduction
4.1.1 Terminology issues (definitions, managed, land use, conversion etc….)
4.1.2 Methodological issues (mapping back, description of tiers and step by step approach, disaggregation of activity data, sampling, uncertainty analysis)
4.1.3 N-C cycles

4.2 Consistent representation of lands
4.2.1 National LU systems (Based on Chp2 GPG LULUCF) including guidance on sampling
4.2.2 Allocation of lands to categories e.g. shifting cultivation, agroforestry, urban trees…

4.3 Agriculture
4.3.1 Croplands/grasslands remaining croplands/grasslands[7]
- 4.3.1.1 Changes in C stocks (5 pools including soil C, tillage, etc.)
- 4.3.1.2 N_2O direct (N inputs, etc)
- 4.3.1.3 N_2O indirect (N inputs, etc)
- 4.3.1.4 CO_2 from liming
- 4.3.1.5 Rice cultivation (CH_4 and N_2O)
- 4.3.1.6 Filed burning of agricultural residues (CH_4, N_2O, NOx, CO, NMVOCs); Note sugarcane burning reported here or other category?
- 4.3.1.7 Grassland burning (CH_4, N_2O, NOx, CO, NMVOCs)
- 4.3.1.8 Other gases/new sources and sinks (e.g NH_3?, CH_4)

4.3.2 Lands converted to croplands
- 4.3.2.1 Changes in C stocks (5 pools including soil C, tillage, etc.)
- 4.3.2.2 N_2O direct (N inputs, etc)
- 4.3.2.3 N_2O indirect (N inputs, etc)
- 4.3.2.4 CO_2 from liming
- 4.3.2.5 Biomass burning (CH_4, N_2O, NOx, CO, NMVOCs)
- 4.3.2.6 Other gases/new sources and sinks (e.g NH_3?, $CH4$)

4.3.3 Lands converted to grasslands
- 4.3.3.1 Changes in C stocks (5 pools including soil C, tillage, etc.)
- 4.3.3.2 N_2O direct (N inputs, etc)
- 4.3.3.3 N_2O indirect (N inputs, etc)
- 4.3.3.4 CO_2 from liming
- 4.3.3.5 Biomass burning (CH_4, N_2O, NOx, CO, NMVOCs)
- 4.3.3.6 Other gases/new sources and sinks (e.g NH_3?, CH_4)

4.3.4 Livestock
- 4.3.4.1 Livestock characterisation
- 4.3.4.2 Enteric Fermentation (CH_4)
- 4.3.4.3 Manure Management (N_2O, CH_4, NH_3?)

4.4 Forest Lands
4.4.1 Forest Land Remaining Forest Land
- 4.4.1.1 Changes in C stocks (5 pools)
- 4.4.1.2 Forest burning (CH_4, N_2O, NOx, CO, NMVOCs)

[7] Emissions and removals from croplands and grasslands should be reported separately. Emissions from rice cultivation are reported under croplands.

4.4.1.3 N_2O direct (N inputs, etc)
4.4.1.4 N_2O indirect (atmospheric deposition, leaching, etc)
4.4.1.5 CO_2 from liming
4.4.1.6 New gases/sources and sinks (NH_3?, CH_4)

4.4.2 Land Converted to Forest Land
4.4.2.1 Changes in C stocks (5 pools)
4.4.2.2 Burning (CH_4, N_2O, NOx, CO, NMVOCs)
4.4.2.3 N_2O direct (N inputs, etc)
4.4.2.4 N_2O indirect (atmospheric deposition, leaching, etc)
4.4.2.5 CO_2 from liming
4.4.2.6 New gases/sources and sinks (NH_3?, CH_4)

4.5 Wetlands
4.5.1 Peatlands[8]
4.5.2 Flooded lands

4.6 Settlements (could include urban trees, parks, golf courses, …)
4.6.1 Settlements remaining settlements
4.6.1.1 Changes in C stocks (5 pools)
4.6.1.2 Burning (CH_4, N_2O, NOx, CO, NMVOCs)
4.6.1.3 $_{N2}O$ direct (N inputs, etc)
4.6.1.4 N_2O indirect (atmospheric deposition, leaching, etc)
4.6.1.5 CO_2 from liming
4.6.1.6 New gases/sources and sinks (NH_3?, CH_4)
4.6.2 Land converted to settlements
4.6.2.1 Changes in C stocks (5 pools)
4.6.2.2 Burning (CH_4, N_2O, NOx, CO, NMVOCs)
4.6.2.3 N_2O direct (N inputs, etc)
4.6.2.4 N_2O indirect (atmospheric deposition, leaching, etc)
4.6.2.5 CO_2 from liming
4.6.2.6 New gases/sources and sinks (NH_3?, CH_4)

4.7 Other lands

4.8 Other
- HWP
- Carbon implications with Energy, Waste (landfills)
- Other C storage in products? Could go in other chapter of 2006 GL? Assess linkages with Waste and Energy Sectors

Issues:
- N accounting to ensure appropriate assignment to source categories (NH_3, NOx, volatilisation and split between direct and indirect)
- Incorporate recent research on N_2O emissions
- Rice cultivation – develop methods to better reflect different management practices under different ecosystems
- Manure management – need to develop methane conversion factor (MCF) to better reflect different management systems (e.g. crusts, deep litter, time in storage, temperature, etc.)

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8 Provide definition and guidance to avoid double counting with forest organic soils.

ATTACHMENT 6: WASTE – ISSUES DISCUSSED AND DETAILED DRAFT TOR AND TOC

INTEGRATION OF EXISTING MATERIALS

In relationship with the integration of the existent material, the BOG considered more convenient than this it is carried out directly by the TSU. Also recommended to make this integration in a single volume taking into account the following aspects:

- To maintain, as much as possible, the structure of the IPCC Guidelines and the GPG2000.
- To reduce the available material eliminating the topics repeated in the three volumes of the IPCC Guidelines and the GPG2000.
- To concentrate the treatment of the topics on specific sections without repeating them in the diverse sections of the material (this aspect is fundamentally related with the cross cutting issues, reporting and documentation etc).
- To base an important part of the work with the Guidelines on supplementary materials such as a new software of the IPCC for the 2006Guidelines and the EFDB. The BOG considered that this new software should facilitate the report of the emissions both from the Annex I Parties and the Non-Annex I Parties considering their specific commitments, but on a general common base of report. The software -al less for the simplest methods - would also include the worksheets of the inventory with explanations for their filled, avoiding their inclusion in the volume of the guidelines.
- The single volume proposed has two main parts. The first one, with a common structure, includes all the methodological aspects necessary for the estimate of the emissions in each IPCC sector. The second part, will be dedicated to the aspects of reporting, documentation and the cross cutting issues of the GPG. These parts are complemented with supplementary materials, for example information on the software, the EFDB etc.

SCOPE OF GASES

The BOG considered the possibility to expand the scope of gases taking into account the advances of the science. It was considered that the 1996Guidelines and GPG2000 give methodologies and/or good practice guidance for the main direct and indirect greenhouse gases emissions in the Sector Waste. The new sources proposed for the sector don't contribute with new gases to the IPCC Guidelines. They contribute with emissions of direct and indirect GHG of the IPCC Guidelines not considered previously in the sector Waste (basically from the open burning of solid waste in SWDs and the extension of the scope of gases/particles related with the incineration of waste –NOx, CO, NMVOC, SO_2, and particles.

The most important extension in the scope is related with the emissions of particles from the waste incineration and the open burning of waste in solid waste disposal sites (SWDs). The emissions of particles from the waste incineration are very dependent of the abatement technology used and It is very probable that the estimation methodology and the emission parameters incorporate this aspect. This expansion decision is dependent on outcome from emerging issues BOG.

SCOPE OF SOURCE AND SINK CATEGORIES

The proposal for inclusion of missing/new source categories is related to the recommended scope of gases/particles, the scientific information available for the development of methodologies and the importance of the sources. The initial proposed missing/new categories

and subcategories in the sector are the following:

Solid Waste Disposal Sites

- Emissions from Open Burning of Waste in Solid Waste Disposal Sites

Burning of solid waste is a widespread practice in many developing countries. Their causes are varied. Depending on the characteristics of the waste the following main pollutants can be emitted: fossil CO_2, CO, CH_4 (of smaller importance), NO_x (of smaller importance), NMVOC, Acid gases (SO_x, HCl), and particles. The simpler methodology is based on the product of activity data and emission factors. The available emission factors are not very robust, but facilitate an initial approach of the emissions. It is desirable to have a Tier 2 methodology although it was not still identified by the BOG.

Suggested option: *To use the Tier 1 approach and to work to reduce the lack of activity data for this source category*

- Emissions from Open Dumps

This is another typical source of the sector waste in many developing countries (also related with the previous source). The open dumps are more favorable for aerobic degradation and may cause much lower emissions from solid waste disposal than in industrialized countries.

Suggested option: *Some of the IPCC default values should be reviewed and updated. Due the limited information for this source, this issue requires of updating.*

Wastewater Handling

- Was indicated the necessity of considering new types of industrial sources for which is carried out the estimate of methane emissions.
- The analysis also focused in the necessity of updated the organization of the categories related with the emissions of N_20 that facilitates a comprehensive analysis of this gas, especially in the Sectors Agriculture and Waste

  Suggested option: *Maintain the current structure with improvement of consistency.*

Incineration

The BOG didn't identify missing/new sources here. However, is required the updating of the emissions identified in a previous section. The emissions from the incineration of waste in facilities with energy recovery and their use as substitute fuel in industrial plants are considered in the Energy Sector.

Suggested option: *Maintain the estimate of emissions from the open burning of agricultural waste in the Sector Agriculture*

STRUCTURAL CHANGES

Taking into account the elements described in 2.1 for the integration of the material, in the Table 1 –corresponding to the TOC of the sector- is presented the structure changes proposed for the Sector Waste. Only are presented the levels of the structure related with the categories of sources. These y are subdivided in the subcategories included in the *IPCC Guidelines* plus the two new subcategories proposed in 2.3. To facilitate the comparison of the structural changes, in the first two columns of the table are included the TOC of the sector waste in the *IPCC Guidelines* and the *2000GPG*.

METHODOLOGICAL UPDATES

A summary of the analysis made on issues relevant for the methodologies in the sector waste and how these would need to incorporated in the 2006Guidelines is presented below.

Solid Waste Disposal Sites

- Was analyzed the problem that represents for the sector, the great differences that are obtained in the estimation of methane using the default method and the FOD method, as well as the difficulties that represents the application of this last for many developing countries due to the absence of historical data related to the disposition of solid wastes. Another aspect on this issue is the absence of default values for many of the factors required for the application of the FOD method.

  Suggested option. With the objective of, at least, to have two tiers for this category it is considered convenient to explore the possibility to improve the default method using a simplified model, and to facilitate the use of the FOD method submitting default values for emission parameters for countries, regions, climates, economic conditions etc.

- Also was identified the necessity of obtaining a clear definition of the terms commercial waste and industrial waste. This aspect is also closely related with the problem that is generated when the industrial wastes are deposited in the municipal SWDs and the emissions are estimated from the waste generation per capita. The DOC content of these wastes differs much from that of average MSW (the same for the deposition of construction and demolition waste and sludge).
  Suggested option: *In MSW is necessary to consider and to improve the definitions of some waste types not included in the default values of the Guidelines. Also for this source category it is required an updated and improvement of the quality of the data and emission factors used.*

Wastewater Handling

- Was identified the necessity of incorporating a methodology for the estimation of N2O emissions from the handling of industrial wastewaters. Equally the deliberations focused on the necessity of improving the very simplified methodology for the estimate of direct N2O emissions human sewage.

Suggested option: *To combine household and sewage treatment technologies and to develop new industrial wastewater treatment methodology.*

- Important for this source category it is also the improvement of the level of scientific understanding of some treatment technologies among them the latrines, the septic tanks and others.

Suggested option: *To develop tier 1 methodologies for latrines + septic tanks*

Incineration

- Possible double counting or omission of emissions associated to the burning or incineration of non fuel products manufactured from fuels.

Other recommended aspects were the following:

- An emphasis should be made on improving the coverage of regional needs, in particular regional emission factors.
- To improve the topic of samplings in the Sector Waste. The indications on this matter can improve the quality of the available activity data and emission factors in the sector.

INCORPORATION OF ABATEMENT TECHNOLOGIES IN THE METHODOLOGIES

The 1996 Guidelines and GPG2000 provide mainly methodologies for unabated or uncontrolled emissions. The introduction of measures and technologies to reduce emissions should be reflected in the national inventories. Among the aspects that require of a special

consideration are the following:

- Abatement of emissions which are very dependent on technologies.
- The linkage of measures done at company/entity level and national inventories.

The areas of the Sector Waste, identified in the BOG, where abatement of emissions needs to be addressed specifically and reflected in the TOR and TOC are described below.

Solid Waste Disposal Sites

- Composting
- Anaerobic Digestion
- Flares + Gas Engines
- Pyrolysis Gasification
- Plasma Technology
- Recycling
- Combined Waste Handling/Treatment

Suggested option: *To consider the abatement technologies when preparing an assessment and to incorporate in the guidelines appropriated information on emission factors and other emission parameters related with the different abatement technologies applied in the sector.*

IMPROVING USABILITY

The BOG considers that the structure changes proposed for the TOC of the sector and the inclusion and use of complementary supports, as a new software and the EFDB, is improved the usability of the guidelines and its use is simplified.

INTER-BOG AREAS

In addition, participants identified the following inter-bog areas than might also be considered in the revision. The suggested options for considerations are included in brackets.

- Incineration: (Waste; Energy)
- Landfill gas utilization (Energy) vs flaring (Waste)
- Landfill carbon stored
- Sludge incineration (Energy; Waste)
- Sludge dispersion in agricultural soils (Agriculture/LULUCF)
- Manure burning/Incineration (Energy; Agriculture/LULUCF; Waste)
- Open burning of agricultural wastes (AgricultureLULUCF)
- Carbon stored in the wood products (LUCF)

OTHER ISSUES

Also the participants focused in the aspect related with the CO_2 emissions corresponding to atmospheric oxidations of emissions of CO, NMVOC and CH_4 from the Sector Waste.
Suggested option: *Not considered necessary at this time.*

DRAFT TOR OF THE WASTE SECTOR

The BOG considered that the elements provided in the epigraphs 1, 2 and 3 constitute the TOR in the work required for the revision of the Sector Waste in the Revised 1996 IPCC Guidelines. Also were identified the following aspects to be included in the TOR:

- Transparency (methodologies, data, and reporting).
- Practicability fort the users for country specific processes, practices and reporting.
- Verifiable methodologies, identifying cross-cutting issues and possible double counting and omissions.
- Cross-links to Energy, Agriculture/LUCF, and Industrial Process sectors.

DRAFT TOC OF THE WASTE SECTOR

In the Waste sector are included three major source categories. Each major source category is divided into subcategories. In the sector, al included all GHG emissions from solid waste disposal on land, wastewater handling and waste incineration. Main sources are usually CH_4 from solid waste disposal and CH_4 from wastewater.

The draft TOC proposed by the Sectoral BOG for consideration by the plenary is presented in the table at the end of this attachment. In this TOC the elements exposed previously were taken into account.

NECESSARY EXPERTISE FOR THE DEVELOPMENT OF THE WORK

The BOG considered the necessity of the participation of experts with experiences in the following fields:

- CH_4 oxidation + surface emissions
- N_2O wastewater
- Inventory
- Modeler (FOD +)
- Emissions Processes
- Data – Expert Judgment
- Emissions Factors – Expert Judgment
- Waste incineration expert (energy group)
- N-cycle (Agriculture + LUCF)
- Expert in waste management in developing countries

Volume 5: Detailed Draft TOC for the Sector Waste in the *2006 Guidelines*. Reporting, documentation and cross-cutting issues are included in second part of the volume. The same structure for each sector.

Vol.1 RI **Sectoral Reporting Table** for Waste Annex 3 A3.6 Summary of the 96 GLs of Industrial Processes sector **Vol.2 WB Modules & Worksheets** 6 Waste 6.1 Introduction 6.2 Land Disposal of Solid Waste 6.3 Methane Emissions from Wastewater Handling 6.4 Methane Emissions from Industrial Wastewater and Sludge Streams 6.5 Nitrous Oxide Emissions from Human Sewage **Vol.3 RM 6. Waste** 6 Waste 6.1 Overview 6.2 Methane Emissions from Solid Waste Disposal Sites 6.3 Methane Emissions from Wastewater Handling 6.4 Nitrous Oxide Emissions from Human Sewage 6.5 Emissions from Waste Incineration 6.6 References	**Chapter 5 Waste** 5.1 CH_4 Emissions from Solid Waste Disposal Sites 5.1.1 Methodological Issues 5.1.2 Reporting and Documentation 5.1.3 Inventory Quality Assurance/Quality Control (QA/QC) 5.2 Emissions from Wastewater Handling 5.2.1 Methodological Issues 5.2.2 Reporting and Documentation 5.2.3 Inventory Quality Assurance/Quality Control (QA/QC) 5.3 Emissions from Waste Incineration 5.3.1 Methodological Issues 5.3.2 Reporting and Documentation 5.3.3 Inventory Quality Assurance/Quality Control (QA/QC) References	**Chapter A Waste** A Waste A.1 Introduction A.2 Emissions from Solid Waste Disposal Sites A.2.1 Description A.2.2 Methodological Issues Simpler Methodology. Tier 1 Detailed Methodology. Tier 2 A.2.3 Activity Data A.2.4 Emission Parameters A.3 CH_4 and N_2O Emissions from Wastewater Handling A.3.1 Description A.3.2 Methodological Issues Simpler Methodology. Tier 1 Detailed Methodology. Tier 2 A.3.3 Activity Data A.3.4 Emission Parameters A.4 Emissions from Waste Incineration A.4.1 Description A.4.2 Methodological Issues Simpler Methodology. Tier 1 Detailed Methodology. Tier 2 A.4.3 Activity Data A4.4 Emission Parameters References

APPENDIX 1
Summary of Outputs from the BOG4: Waste (New sources)

Source Category	GHG/particles	Methodology Available	Default Data Available	Experience Available	**Development Possible**
New Source Category	GHG/particles	Methodology Available	Default Data Available	Experience Available	**Development Possible**
Open burning of solid waste in SWDs	**CO_2; CH_4; CO; NO_x; COVDM; SO_2; particles**	Y (tier 1)	Y (EF not robust)	Limited	**1**
Open dumps	**CH_4**	?	?	?	**?**

1- To included a simpler methodology (EF x AD) and explore the possibility of introduce a detailed methodology

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Revision of the "*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*"
16 - 18 September 2003
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