Technical review of national greenhouse gas inventories

Roberto Acosta, Stylianos Pesmajoglou,
James Grabert, Rocio Lichte
UNFCCC secretariat

- 11th Annual Emission Inventory Conference
- Atlanta, 15 - 18 April 2002

Overview

- History
- Reporting guidelines
- Review guidelines
- Software tools
- Experiences with the use of the guidelines
- Conclusions
- Further work

History

- 1995 – COP 1
  - Guidelines for national communications
- 1996 – COP 2
  - Revised guidelines for national communications
- 1999 – COP 5
  - New guidelines for national communications (separate guidelines for GHG inventories)
    - Common Reporting Format
    - National Inventory Report
  - Guidelines for the technical review of GHG inventories

Common Reporting Format

- Framework for reporting information on:
  - Methods and assumptions for each IPCC sector
  - Aggregate activity data and implied emission factors
  - Bunkers, feedstocks, recalculations and changes of methodologies in relation to previous years
- Designed to facilitate:
  - Submission of annual inventory data in a standardized/uniform format from all countries
  - Quick identification of possible errors or omissions
  - Comparison of aggregate activity data and implied emission factors over time and across countries

Common Reporting Format
(42 tables)

- Summary tables (IPCC)
- CO_2 equivalent emissions table
- Methods and emission factors
- Sectoral tables (IPCC)
- Sectoral background data tables
- Reference approach (IPCC)
- Feedstock and bunkers tables
- Overview table (IPCC)
- Recalculations table
- Completeness table
- Emissions trends
- Check-list

(FCCC/CP/1999/7)

IPCC Guidelines
- Scientific basis
- Reporting framework, including reporting tables, source category structure,etc.

UNFCCC reporting guidelines on annual inventories

Future inputs
- Good practice guidance
- Other relevant results of the ongoing methodological work

National Inventory Report

- Information on methods and on GHG inventory data:
  - Methodological assumptions
  - Disaggregated emission factors and activity data
  - Calculation sheets or equivalent dbase information
  - References of sources for methods, emission factors, activity data and rationale for their selection
  - Anticipated future improvements
- Information on QA/QC procedures
- Changes in response to findings of the review process

Review guidelines (I)

- Complementary **3-stage approach**:
  - Initial checks
  - Synthesis and assessment
  - Expert review of individual inventories
- Publication of reports for each stage
- Process:
  - Countries can provide additional comments and information
  - Consent of country before publication of reports
  - Additional explanatory text in case of disagreement

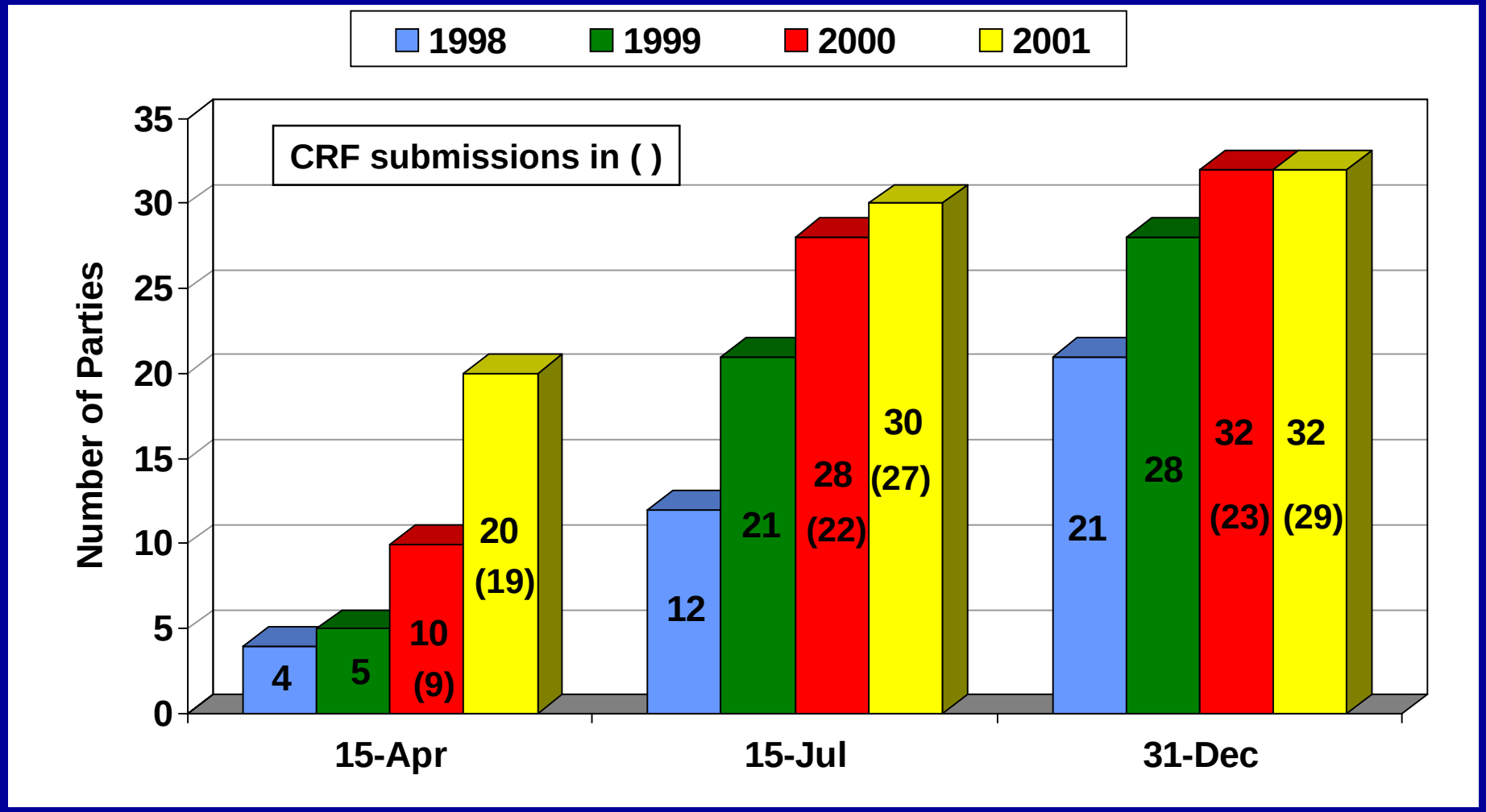
Review guidelines (II)

- Initial checks
  - Check completeness and correctness of format
- Synthesis and assessment
  - Comparison of inventory data across countries
  - Identify issues for further consideration
- Individual reviews
  - Periodic detailed examination of inventory estimates, procedures and methodologies used by teams of experts
  - Three operational approaches:
    - Desk reviews (sending information to experts)
    - Centralized reviews (experts meet in a single location)
    - Country visits

Software tools

- Reporting software
  - MS Excel application for the CRF
- MS SQL based database system
  - Data maintenance requirements of the reporting and review process
  - Adequate data accessibility and quality
- Review software tools
  - Analytical needs of the review process
  - Access to basic CRF data as well as information on reporting completeness, recalculations, emission contributions and emissions trends

Submissions of annual GHG inventories



Comparison of 2000 and 2001 submissions

	2000 (1990-1998)	2001 (1990-1999)
Total CRF submissions	23	29
CRF for entire time series	5	14
CRF for one or more years	12	11
Partial CRF for one or more years	6	4
National Inventory Reports	8	15

Completed review activities

- Review of GHG inventories from 30 countries (submitted in 2000 and 2001)
  - 4 desk reviews (19 countries)
  - 2 centralized reviews (12 counties)
  - 8 in-country reviews
    - Australia, Austria, Finland, France, New Zealand, Sweden, United Kingdom, United States of America

- 123 national experts participated in the 14 review teams (including 8 experts from the USA)

Experiences with the use of the guidelines

Reporting guidelines (I)

- The submission of information in accordance with the reporting guidelines has assisted in assessing the quality and reliability of inventories, such as:
  - Easier detection of anomalies/mistakes through data search processes
  - Comparison of implied emission factors across countries
  - Comparison of activity data with international statistics, if possible
  - Assessment of time series consistency

Reporting guidelines (II)

- Issues that need to be addressed further :
  - Reporting requirements concerning the use of the IPCC good practice guidance (identification of major sources of emissions and on the selection of methods and emission factors for these sources)
  - Information on the application of QA/QC procedures and on estimation of uncertainties
  - Outline and content of the NIR (need for more complete inventory information)
  - Eliminate reporting of redundant or duplicate information
  - Consistency with the IPCC good practice guidance

Synthesis and assessment (I)

- Early identification of potential problems based on electronic processing of data
  - Opportunity for overcoming any identified problem in a systematic manner
- Useful information to the expert review teams contributing to an increase in the efficiency of the third stage (individual reviews)
  - Deeper analysis of the potential problem(s) and
  - Investigation of possible cause(s)
- Countries recognized that the identified gaps/problems need to be rectified and informed of their plans to do so while preparing their next inventory submission

Synthesis and assessment (II)

- Some encountered problems:
  - No reporting or misallocation of emissions from some source-categories or activities
  - Insufficient disaggregation of data from sources
  - Use of inappropriate methods for estimation of emissions
  - Apparent over- or underestimation of emissions
  - Differences between activity data reported in the CRF and data published in international statistics
  - Relatively high/low implied emission factors not justifiable by national circumstances
  - Inconsistency in time series
  - Transcription errors or other typographical mistakes

Individual reviews (I)

- Determination of transparency of the supporting documentation based on the information incorporated in the NIR
  - Description of methods, derivation of emission factors, underlying assumptions etc.
- Detailed assessment of methodologies and all related aspects that influence the accuracy of the estimates
- Determination of completeness of estimates, for instance in cases where emissions from an activity of an IPCC source category were omitted

Individual reviews (II)

- Some encountered problems:
  - Weaknesses in the verification of the data as well as in the data collection process and archiving systems
  - Use of different methods for data collection for different years
  - Inappropriate assumptions in the used methodologies
  - Use of outdated or inappropriate emission factors
  - Errors in the calculation of emission factors
  - Identification of methods that are not consistent with the IPCC methodology
  - Difficulties in the allocation of domestic and international marine and aviation emissions

Experts' views

- All experts provided very positive feedback about the usefulness of the technical review process
  - Involvement of competent review experts either with extensive expertise at a particular IPCC sector or with broad knowledge of all areas of the inventory process.
- National inventory authorities of the countries whose inventories were reviewed have also reported positive experiences with the review of their national inventories
- Strengths and weaknesses of the different review approaches were identified
- Proposals for improving the efficiency of the technical review process were made

Software tools

- Core element of the process
  - Optimize information assessment and experts/countries' time
- Production of UNFCCC publications
- Support of the inventory review process
  - Essential to the provision of timely and accurate information to countries, review experts and the public
- User-friendly searchable format
- Standard analysis and comparisons

Conclusions (I)

- Preparation of reliable and high quality inventories
  - Well defined, complete and coherent guidelines for reporting and review of GHG information
  - Development of database and dedicated software tools
- Better reporting
  - Increase in the number of annual submissions
  - Improved adherence to agreed timelines
  - Enhancement of inventory quality and completeness
- National inventory report
  - Assessment of the transparency, accuracy and completeness of an inventory
  - Should have a common and comprehensive structure

Conclusions (II)

- Standardized reporting format
  - Software application
  - Facilitates the processing of the reported information
  - Contributes to the effectiveness of the review process
- Detailed assessment of the quality and reliability of inventories and early detection of potential problems
  - Identification of gaps and methodological problems
  - Opportunities for national inventory compilers to rectify deficiencies in the inventory preparation process
  - Competence and extensive inventory expertise of review experts
  - Training of experts

Conclusions (III)

- Database and software tools
  - Vital in ensuring that the large number of annual inventories can be processed and reviewed in a cost-effective, timely and accurate manner

- Some of the experiences could also be relevant for developing and reviewing local, regional and national inventories.

Further work

- Annual review of the GHG inventories from all developed countries will start in 2003
- Revision of the reporting and review guidelines
  - Expected adoption: COP 8 (New Delhi - Oct. 2002)
- Elaboration of a handbook for review experts
- Improvement and further development of the GHG database and software tools

Thank you

- Web site:
  - http://www.unfccc.int/ghg/resource/tempemis2.html
- E-mail address:
  - ghginvai@unfccc.int
- Mailing address:
  - Martin-Luther-King Strasse 8., D-53175, Bonn, Germany

- DISCLAIMER
  - The views and opinions of the authors do not state or reflect those of the secretariat of the UNFCCC or those of the Parties to the UNFCCC